

Educational Expenditures in Finland up to the Year 2030

PEKKA PARKKINEN

Research Chief
Government Institute for Economic Research
Helsinki, Finland

Abstract

In this paper expenditures on education and their share to the gross domestic product (GDP) in Finland are estimated until 2030. The estimate of the number of pupils is based on the 1991 population prognosis made by the Central Statistical Office of Finland.

The actual education expenditures per pupil has been calculated for different levels of education in 1980–1990. In the future only real labor costs per pupil are assumed to increase. They will increase at the average rate of the labor productivity growth in the economy. Other real costs (teaching materials, welfare services, administrative costs, etc.) per pupil are assumed to be constant during the prognosis period.

Although the school age population will clearly diminish, the real education expenditures will increase by one thirds up to 2030 in Finland. However, at the same time the share of these expenditures to the GDP will decrease by two percentage points. On the other hand social expenditures in proportion to the GDP will increase very rapidly due to the aging population. Yet the growth rate of the public expenditures is expected to be only slightly higher than the growth rate of the GDP.

Keywords: education, educational costs, national economy, Finland

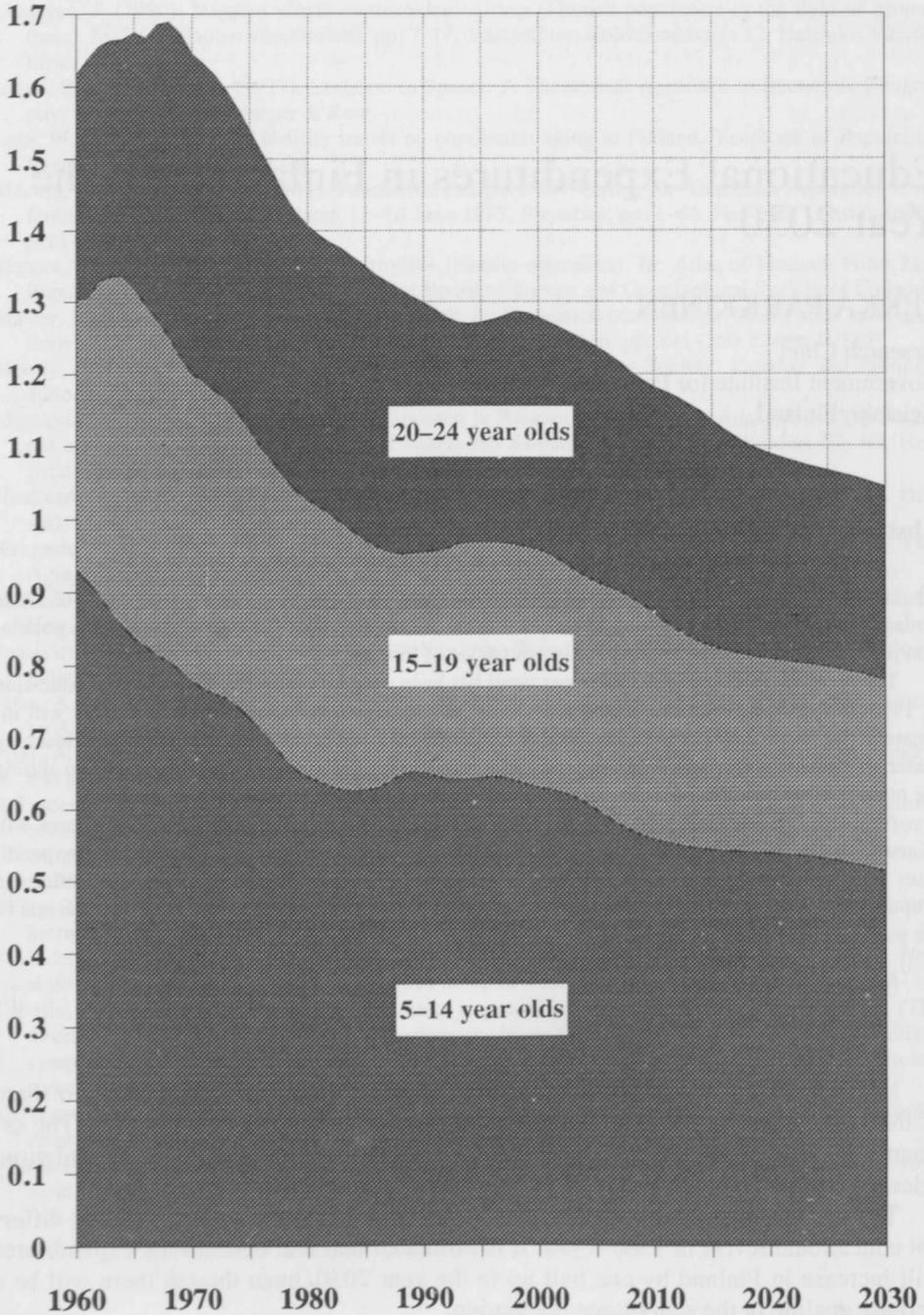
In this paper the development of educational expenditures in Finland and their share of the gross domestic product (GDP) have been estimated from 1980 to 2030. The estimate of the number of students is based on the size of the school-age population, released by Statistics Finland in 1991.

The amount of education expenditures per student has been calculated for different educational levels in 1980–1990. It is estimated that real educational expenditures will increase in Finland by one half up to the year 2030, even though there will be a definite decline in the school-age population.

The school-age population of Finland 1960–2030

As a consequence of the decrease in the birth rate in Finland, the young age groups have diminished. The population at the primary education level, or 5–14-year-olds according to the 5-year classification used in this article, already began to decline in the

Figure 1. School-aged population 1960–2030, in millions



1950s. The number of students on the secondary education level, in Finland 15–19 year olds, has already been decreasing since the mid-1960s and the age groups on the tertiary education level, or the 20–24-year-old population, has been diminishing since the end of the 1960s (Table 1).

In 1968 the school-age population, or those aged 5–24 years, was at its peak level, totaling 1.7 million (Figure 1). Their proportion of the whole population was just

37 percent throughout the 1960s. In 1991 their proportion had dropped by almost one fourth, to less than 1.3 million or one fourth of the population.

Table 1. The school-age population and the entire population in 1960–1991, in thousands.

	Aged 5–14 years	Aged 15–19 years	Aged 20–24 years	School-age population (aged 5–24 years)	Entire population
1960	932	372	313	1 617	4 446
1970	779	421	445	1 645	4 598
1980	646	380	381	1 407	4 788
1991	648	309	332	1 289	5 027

The population projection to the year 2030 used in this article (Statistics Finland 1992) presumes that

- future fertility will be the same as the average of the last few years, or a total fertility of 1.72 children per woman,
- mortality will decrease until 2010 and will remain unchanged after that. At the end of the projection period, male life expectancy at birth will be 73.1 years and that of females 80 years,
- immigration and emigration will be equal.

Low fertility will result in the school-age population diminishing much more rapidly than the population as a whole. The school-age population will decrease from well over one fourth to a good fifth of the whole population already in three decades, provided that no unexpected changes occur in fertility, immigration or mortality. There are now almost 1.3 million persons of school age living in Finland; by the year 2030 their number will decrease to somewhat over one million.

The number of students in Finland

In Finland children begin the compulsory nine-year comprehensive school at the age of seven. After comprehensive school, one half of the age group continues in senior secondary school and 40 percent in vocational and professional education institutions. At present less than one tenth do not continue their education after leaving comprehensive school.

One half of those graduating from senior secondary school continue at a university. It is also possible to gain admittance to a university from certain programs in vocational and professional education institutions. The universities can accept almost one fourth of the age group. During the current decade, trial university programs incorporating both vocational and professional education have been inaugurated.

In 1991 there was a total of more than one million students studying at comprehensive schools, senior secondary schools, vocational and professional education institutions and universities. Of these, 600,000 were attending comprehensive school. Both senior secondary schools and universities had clearly more than 100,000 students each. Vocational and professional education institutions had a total enrollment of 180,000 students (Table 2).

The number of children in comprehensive school has continued to decline, because the age groups at comprehensive-school age have been diminishing in Finland since

the 1950s. The number of students in senior secondary school has been over 100,000 since the 1970s.

In spite of these shrinking age groups, the number of students in vocational and professional education institutions and in universities has continued to rise, because there has been a strong increase in the amount of secondary and university level education provided in Finland. All young people are now offered vocational and professional education. Furthermore, until recently, vocational education for adults has been continuously increased.

Table 2. Number of students in Finland in 1960–1991, in thousands

	1960	1970	1980	1985	1991
Comprehensive schools	808	723	599	569	596
Senior secondary schools	38	828	116	112	114
Vocational and professional Education institutions	56	105	141	150	180
Universities	24	59	84	92	113
Total number of students	925	969	939	923	1 003

In 1991 students in comprehensive school (primary education level) comprised 92 percent of the population aged 5–14 years. The proportion of the 15–19-year-old age group in senior secondary school has grown continuously and was almost 37 percent in 1991. Five out of six students in vocational and professional education were 15–24 years old. In this article education at vocational and professional education institutions also includes adult vocational and professional education. At present, 28 percent of the 15–24-year-old population is studying at vocational and professional education institutions. This proportion has increased 10 percentage points since 1980.

Over forty percent of all university students are 20–24 years of age. The ratio of those attending the university to these age groups at the university education level has increased rapidly. In 1991 it was 34 percent or 12 percentage points greater than in 1980. This increase is partly due to a lengthening in the time taken to complete a university degree.

The expansion in education still occurring in Finland during the last decade is reflected in the growing proportion of students on all education levels in relation to the population aged 5–24 years. In ten years this proportion has risen 10 percentage points and was almost 78 percent in 1991.

The future proportion of students in primary education is estimated to be the same as in 1990, or 92 percent of the population aged 5–14 years. This means that, in the future, we will continue to have a nine-year comprehensive school in Finland.

Up to 1991, the proportions of the 15–24-year-old population attending senior secondary school, vocational and professional education institutions and universities grew rapidly in Finland. It is assumed that these proportions will remain at the 1991 level throughout the period being studied, up to the year 2030. In the light of past developments, this assumption seems unrealistic, but it may, for many reasons, prove realistic (Table 3).

First, as a consequence of the very high unemployment rate in Finland, many young people who in a normal employment situation would have been on the labor market are now applying for admission to secondary and tertiary education. In October 1993 the unemployment rate was over 20 percent and among the young people it was 35 percent.

Second, considerable improvements have been made in the efficiency of the Finnish education system, for the deficit in the public economy has reached a very high

level. Improved efficiency means that in a shorter time than now, students must be provided with more knowledge and skills. If the efficiency of education improves, an increasing number of students from each age group will be able to complete a degree, even if the proportion of students in relation to the corresponding age groups remains the same.

Third, improving the efficiency of the Finnish education system means that overlapping education and the number of dropouts will be decreased. In this way the average time spent in education will diminish, even though graduates may have better knowledge and skills than those graduating earlier from corresponding schools or courses. A typical current example of overlapping education is the student who has graduated from senior secondary school and who ends up in a vocational or professional education institution course meant for students graduating from the primary level.

Fourth, at present there are still many students in secondary education who did not immediately gain admission to the secondary level after graduating from the primary level. An increasing number of students are being accepted and the age groups have decreased. As this "delayed demand for education" will end during this decade, the pressure will be reduced especially on vocational and professional education institutions. Thus a growing number of young people from each age group will actually be able to gain admission to vocational and professional education institutions, even if the ratio of students in these schools to the population aged 15–24 years does not increase.

The number of students in primary education will decrease by one fifth during the next four decades, when the population aged 5–14 years diminishes (Figure 2). In senior secondary schools and in vocational and professional education institutions, the number of students will increase slightly in the 1990s, but will later decrease. Four decades from now the number of students in senior secondary schools and in vocational and professional education institutions will be one sixth smaller than now.

The number of university students will remain more or less unchanged until the middle of the following decade. In 2030 there will be one fifth fewer students in the universities, if the future ratio of university students to the population aged 15–24 years is the same as it is now.

Table 3. The number of students in 1991–2010, in thousands.

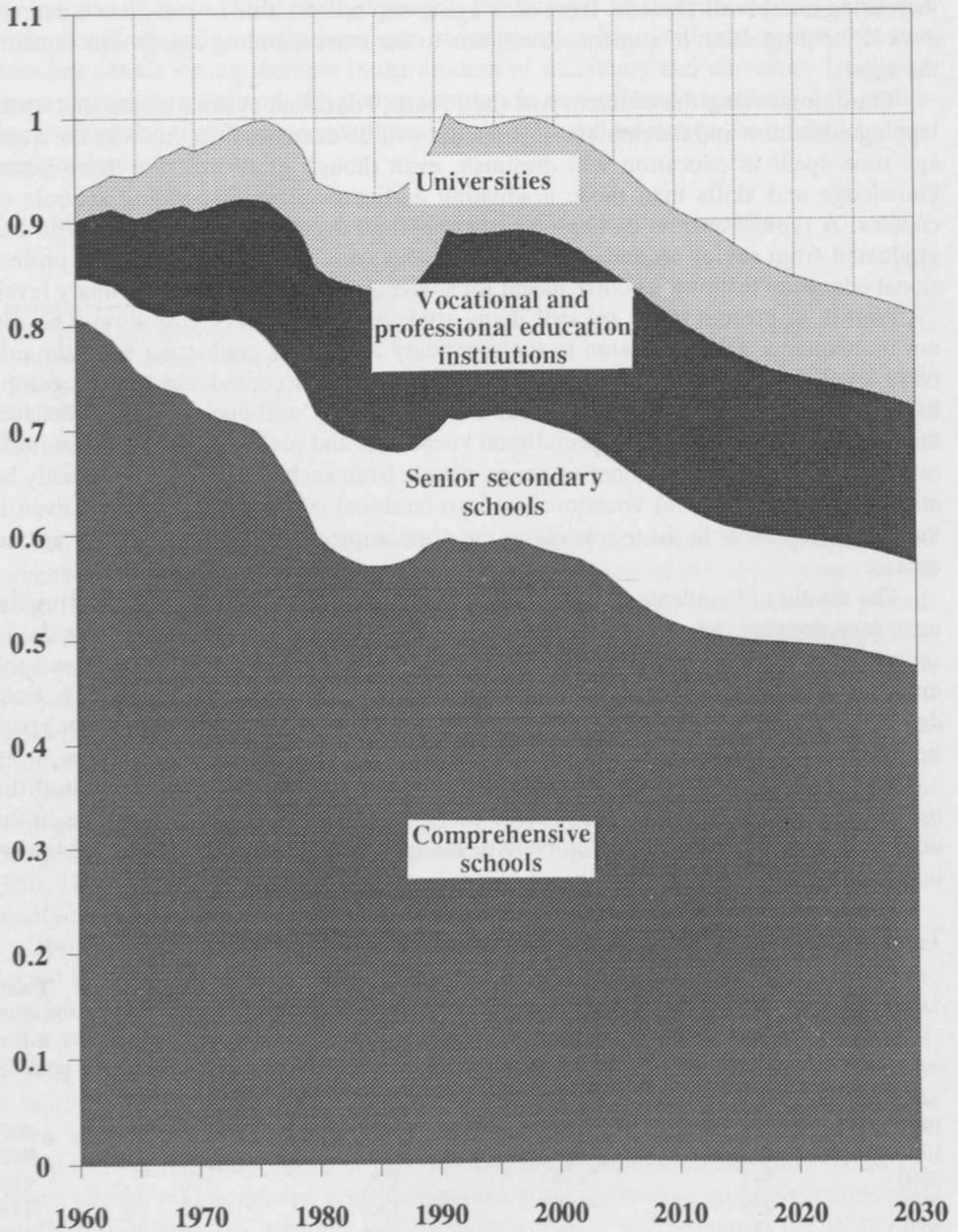
	Students in comprehensive school	Students in senior secondary school	Students in vocational and professional education institutions	University students	Total number of students
1991	596	114	180	113	1 003
1000	580	121	182	109	992
2010	513	116	175	106	910
2020	439	100	155	96	844
2030	471	98	149	90	809

Expenditures on education in 1980–1990¹

Expenditures on education include all costs for education in Finland except expenditures for personnel training at the workplace, on which no reliable statistics are available in Finland. Alternative costs, that is earnings lost because of education, are also not included in education expenditures (Table 4).

¹ Rate for the USD in 1990 3.82 FIM, 1991 4.05 FIM, 1992 4.48 FIM.

Figure 2. Number of students in 1060–2030, in millions



In 1990 expenditures on education in Finland totaled 33 billion FIM or 6.3 percent of the GDP. Emoluments for the teaching staff comprised almost one half of these expenditures. Labor costs for the administrative staff and other personnel were one sixth of the expenditures on education.

Among other current expenditures on the formal education system, the largest were for school meals and other welfare services, teaching materials, scholarships and the equivalent. In 1990 capital expenditures totaled 6.2 percent of the expenditures on education.

Table 4. Expenditures on education in Finland in 1990 in billions (FIM)

	FIM billion	%
Emoluments for personnel	18.8	56.9
– Teaching staff	14.0	42.3
– Administrative staff	1.7	5.1
– Other personnel	3.1	9.5
Other administrative expenditures	0.8	2.4
School meals and other welfare services	2.3	7.0
Teaching material	2.0	6.2
Scholarships, grants, etc	1.5	4.5
Other current expenditures	3.9	11.8
Capital expenditures	3.7	11.3
Total expenditures on education	33.0	100

Of these expenditures on education, the state paid almost 21 billion FIM, the municipalities almost 10 billion FIM and the private sector under three billion FIM.

Almost 38 percent of the expenditures on education in Finland was used on current expenditures on the primary education level. The corresponding expenditures on the senior secondary level were seven percent. More than one fifth was invested in current expenditures at vocational and professional education institutions and one seventh at universities. The same amount was spent on adult education as on senior secondary schools. Capital expenditures amounted to 11 percent of all education expenditures.

Expenditures on education at current prices have been changed in the following to real costs by using the price index of private final consumption expenditures according to national accounts. Expenditures on education are given at 1990 prices.

From 1980 to 1990 the real expenditures on vocational and professional education institutions have grown on the average by eight percent per year. The real growth of expenditures on university education was somewhat more than six percent and that of adult education somewhat more than five percent per year.

The real expenditures on senior secondary schools grew almost three percent a year and slightly more rapidly for comprehensive schools. The real growth of capital expenditures on education in 1980–1990 was six percent per year.

The total expenditures for education in Finland increased in reality during the last decade by an average of five percent a year or over one and a half times. This was possible because of the favorable economic development in Finland. From 1980 to 1990 real income increased by more than one third. At this time our economic growth was one of the most rapid in Europe.

During the last decade real current expenditures on education per student increased in all types of education. The real cost of one year's education at a vocational or professional education institution increased the most, 6.2 percent per year. In senior secondary school the corresponding costs grew by more than four percent, in comprehensive school by almost four percent and at universities by almost three percent a year.

The real rise in the costs of one year's education is mainly a result of education becoming more labor intensive. When the labor costs of personnel increase, the real expenditures for the school year rise.

In addition, the size of groups being taught was reduced in order to improve the quality of education. Consequently, the number of teachers grew more rapidly than that of students. From 1980 to 1989 the number of teachers in the formal education system increased by more than 15 percent, and the number of students by only two percent. The administrative staff and other personnel also increased very rapidly in education.

During the preceding decade, social benefits to students were improved and teaching material increased. Capital expenditures and other education-related costs also grew rapidly.

The current value of school buildings and other capital stock related to education was a total of 56 billion FIM in 1990. A careful estimate of interest expenditures on this capital would be 5.6 billion per year. The consumption of this fixed capital was 2.2 billion FIM according to Statistics Finland. When these capital costs per student of fixed capital is added to current expenditures per student, the result is the total cost of one school year per student.

In 1990 the expenditures for one school year in Finland including capital expenditures were 54,000 FIM in vocational and professional education institutions, 52,000 FIM at universities, 27,000 FIM in senior secondary school and 26,000 FIM in comprehensive school. Calculated in this way, a student who has completed the primary level has cost 234,000 FIM (in nine years) and a student who has graduated from the university 627,000 FIM (in 17 years).

Educational expenditures in 1990–2030

The development of the size of educational expenditures depends on the rate of economic growth. In the scenario for the national economy, the gross domestic product and labor productivity will grow up to the year 2005 by 3.4 percent a year (Figure 3). The growth of labor productivity will then assumedly slow down at an even pace, so that in the 2020s the productivity of labor will improve by only somewhat more than one percent a year. When the real income per capita in Finland begins to reach that of the richest industrial countries, the growth in the productivity of labor can no longer continue at a substantially faster rate than in other high income countries.

The growth rate of the gross domestic product after the year 2005 will be even slower than the growth of labor productivity, for the working-age population will decrease in Finland and the work force will be aging. Thus economic growth in the 2020s will remain at slightly over one half percent a year.

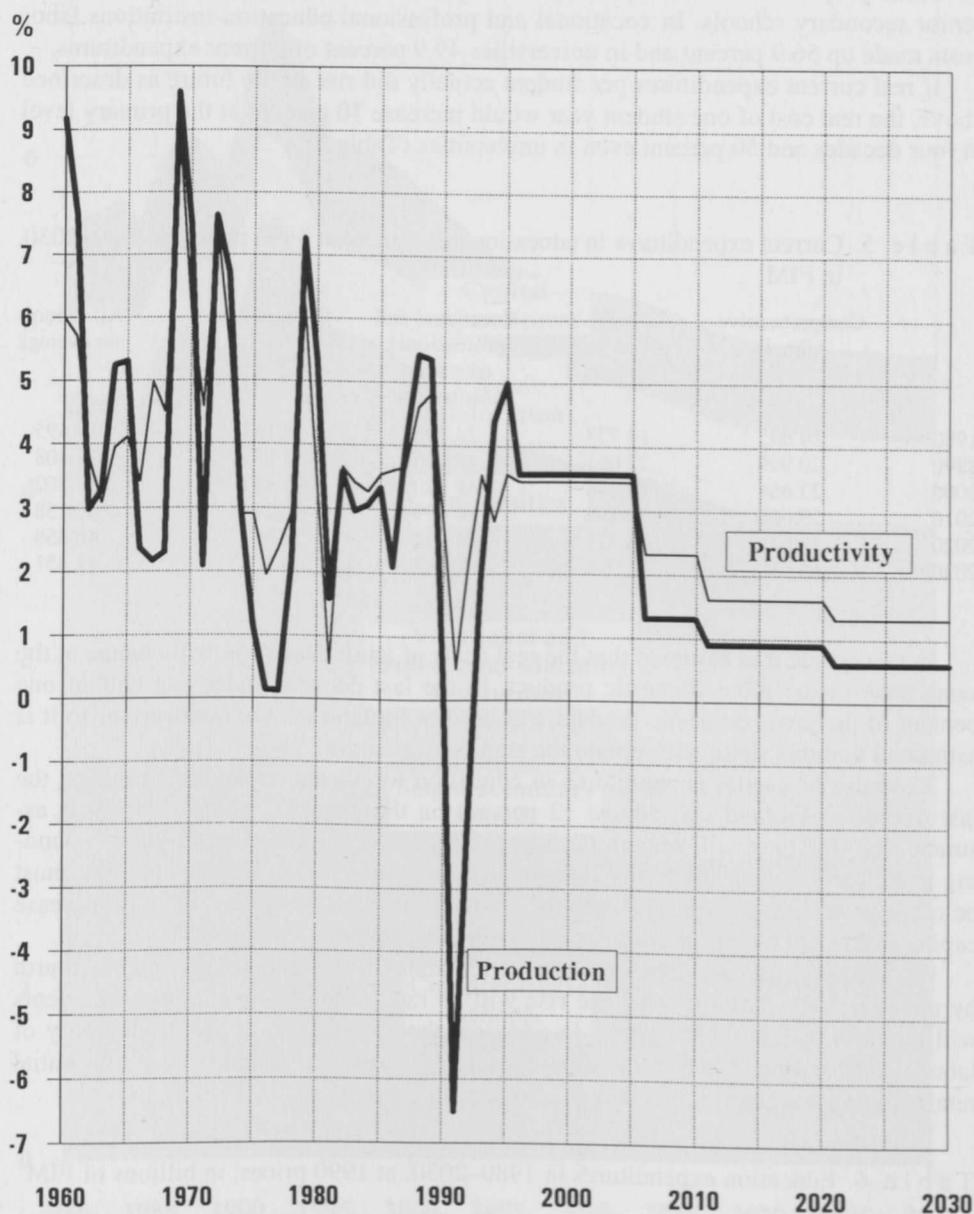
It is assumed that the real labor costs calculated per student will rise in education in the future at the same rate as the productivity of labor per work hour improves in the whole national economy.

In the last decade in Finland, the number of teachers and other personnel in education increased more rapidly than the number of students. The size of groups being taught was decreased as a means of improving the quality of education. Because of the great deficit in the public economy, Finland can no longer afford to decrease group size in the future.

In addition, it is assumed that labor expenditures will be the only expenditures per student in which a real rise will occur. This also signifies an essential change compared to the past. Thus administrative, teaching material, welfare and other real current expenditures would change in the future at the same rate as the number of students.

This future scenario is supported by an effort to retard the growth of public expenditures. According to government decisions on economization, in the future there

Figure 3. Annual changes in productivity calculated by working hour and in production 1960–2030



will also be a decrease in public expenditures on education, which form the majority of the total expenditures on education in Finland.

At its worst, this means compromising on the quality of education, which may retard the growth of human capital in Finland. The growth rate of the nation's real income may then also slow down. In accordance with the decisions on economization, the sizes of groups being taught may be increased and also in other ways improvement in the quality of education may be retarded.

Even though the real cost of one student year were to be determined in the future purely by real labor costs, the real cost of one student year will change at different

rates in different forms of education. This is because the proportion of current expenditures composed by labor costs is not the same in different forms of education. In 1990 this proportion was 73.4 percent in comprehensive schools and 70.6 percent in senior secondary schools. In vocational and professional education institutions labor costs made up 56.9 percent and in universities 49.9 percent of current expenditures.

If real current expenditures per student actually did rise in the future as described above, the real cost of one student year would increase 70 percent at the primary level in four decades and 50 percent even in universities (Table 5).

Table 5. Current expenditures in education per student at 1990 prices in 1980–2030, in FIM

	Comprehensive schools	Senior secondary schools	Vocational and professional education institutions	Universities	All schools on average
1980	14 695	14 737	24 102	30 142	17 495
1990	20 999	22 061	43 946	41 897	27 408
2000	23 664	24 748	48 220	45 457	30 702
2010	29 020	30 116	56 499	52 244	37 158
2020	32 641	33 721	61 894	56 600	40 858
2030	35 917	36 970	66 658	60 408	44 451

In this article it is assumed that the real costs of adult education will change at the same pace as the gross domestic product. In the last decade, under one half of one percent of the gross domestic product was used in Finland on adult education, so it is estimated that this share will remain the same in the future.

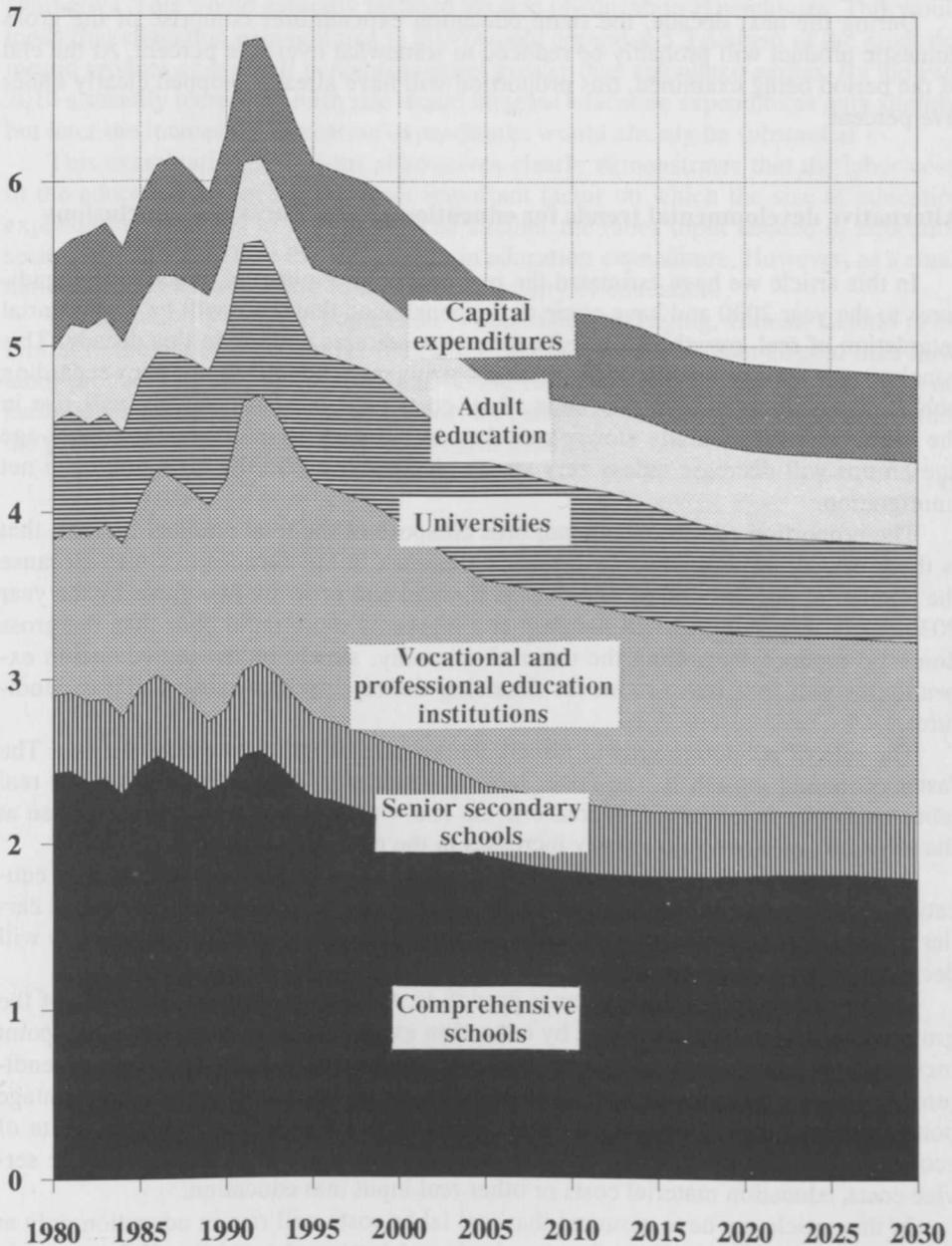
The ratio of capital expenditures in education to current expenditures during the last decade in Finland was almost 12 percent on the average. In the future it is assumed that this ratio will remain the same. Because economization on public spending in Finland also means trying to save on education expenditures, an attempt must be made to have capital compensate for labor as much as possible. This will increase capital expenditures especially on machines and equipment.

On this basis, education expenditures in Finland will rise in real terms by one fourth by the year 2010, but after that the rise will be rather slow. The number of students will begin to decline in ten years. In addition, the growth rate of the productivity of labor will also slow down in the next decade, so that there will also be a substantial retardation in the growth rate of real labor costs (Table 6).

Table 6. Education expenditures in 1980–2030, at 1990 prices, in billions of FIM

	Comprehensive schools	Senior secondary schools	Vocational and professional education Institutions	Universities	All schools on average
1990	12.5	2.3	7.2	4.7	26.7
2010	14.9	3.5	9.9	5.5	33.8
2030	16.9	3.6	10.0	5.5	36.0
	Adult education		Capital expenditures	Total education expenditures	
1990	2.6		3.7	33.0	
2010	4.1		4.5	42.3	
2030	4.7		4.9	45.5	

Figure 4. Ratio of education expenditures to gross domestic product



In 1980 education expenditures composed 5.6 percent of the gross domestic product in Finland. This share rose rapidly during the last decade and was already 6.3 percent in 1990. After this the value of the gross domestic product has clearly decreased, but real education expenditures have increased. Therefore the ratio of education expenditures to the gross domestic product has risen to a record height of 6.8 percent in 1992. (Figure 4).

When the economic recession sometimes loosens its grip in Finland, total production will probably increase very rapidly for few years. At the same time the economization measures in the education sector will likely decline the real education costs.

Therefore, during this decade the share of the domestic product composed of education expenditures will perhaps return to under six percent.

During the next decade, the share education expenditures comprise of the gross domestic product will probably be reduced to somewhat over five percent. At the end of the period being examined, this proportion will have already dropped clearly under five percent.

Alternative developmental trends for education expenditures and conclusions

In this article we have estimated the real growth in Finland of education expenditures to the year 2030 and have come to the conclusion that there will be a substantial retardation of real growth rate in education expenditures already in this decade. This conclusion is mainly a result of the assumed stringent economization policy regarding public expenditures also in education. Real costs calculated per student will rise in the future at a substantially slower rate than in the past. In addition, the school-age age groups will decrease unless very strong changes occur in the birth rate or in net immigration.

The proportion education expenditures compose of the total national income, that is the gross domestic product, will clearly diminish in the decades to come. Because the number of people aged 65 and over in Finland will grow by two thirds by the year 2030, social expenditures will increase at a markedly more rapid pace than the gross domestic product. Regarding the national economy, slowly increasing education expenditures will thus leave room for financing the rapidly increasing social expenditures.

The rate of economic growth affects the amount of education expenditures. The faster economic growth is, the faster labor productivity will improve. Thus the real labor costs of education will increase if the real wages of the education staff rise at the same rate as labor productivity increases in the national economy.

As the growth rate of the economy increases by one percentage point, the real education costs in 2030 at 1990 prices will be 10 billion FIM greater than presented earlier. If economic growth slows down by one percentage point, real education costs will decrease by the same amount.

Nevertheless, the faster economic growth is, the smaller will be the share of the gross domestic product composed by education expenditures. A one percentage point increase in the rate of economic growth will decrease the share of education expenditures in the gross domestic product in the year 2030 by one half of one percentage point. This outcome is mainly the result of it being estimated that the faster rate of economic growth will not increase the real administrative expenditures, welfare service costs, education material costs or other real input into education.

In this article we have assumed that real labor costs will rise in education only at the same rate as labor productivity rises in the total national economy. If, however, in the future the real labor costs of education were to rise as they did in the last decade, at twice the growth rate of labor productivity in the national economy, in the year 2030 education expenditures would make up 8 percent of the gross domestic product or one and a half times as much as in the basic alternative.

If, on the other hand, labor productivity in education were to rise in the future so rapidly that real labor costs in education per work hour would be half as slow as the rise in the growth rate of the national economy, the share of education expenditures in the national product would drop to under 4 percent by the year 2030.

It is assumed that the birth rate in Finland will be the same as it was on the average in the previous decade, meaning that the population would renew itself by only

82 percent. If population renewal were to rise to 100 percent by the year 2005, the future school-age groups would be larger than estimated in the basic education alternative. This would naturally increase the size of education expenditures. This would mean that education expenditures in 2030 would comprise 5.3 percent of the gross domestic product or one half percentage point greater than calculated earlier. By the year 2010 a steadily increasing birth rate would increase education expenditures only slightly, but later the increase in education expenditures would already be substantial.

This examination of various alternatives clearly demonstrates that the labor costs in the education sector are the most important factor on which the size of education expenditures depends in the future. The smaller the labor input needed in education sector, the slower will be the real growth in education expenditure. However, as a small nation Finland cannot afford to weaken the quality of education.

In a situation where the population is decreasing and aging, Human Capital is essential to the national economy. With a substantially larger Human Capital than now, labor productivity and real income can be increased so much that in the year 2030 the national economy will be able to support an elderly population two thirds larger than the present one with a labor force one fourth smaller.