

# **FINNISH ECONOMY**

## **Structural Indicators 2008**

### **Editors**

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## Foreword

The Finnish economy has developed favourably in the past few years. Furthermore, Finland has been ranked high in the competitiveness comparisons between countries. With reason, the operation and institutions of the Finnish economy seem to be in the public gaze also internationally.

In the ever tightening international competition, the labour force is required to be highly skilled, enterprises must be constantly alert to changes in demand, and markets should operate efficiently. The public sector creates prerequisites for realising these requirements. Ongoing economic success calls for progress in all these areas.

The Finnish Economy – Structural Indicators 2008 is an annual publication of the Government Institute for Economic Research (VATT). This publication is an account of the state and development of the Finnish economy and of the position of Finland compared to other countries. The main focus is national economy from a public sector perspective. It illustrates, apart from the tasks of VATT, also the importance of an effective public sector as a significant factor in international competition. This report also examines the development of differences in welfare, because the social safety net is supplied and income differences are levelled by the public sector.

In this volume, a VATT team has compiled statistics and summarised results based on studies executed at the Institute concerning the operation of the Finnish economy and the public sector. This publication is issued every odd year in Finnish and every even year in English. The Finnish Economy – Structural Indicators report can also be downloaded from the VATT website at <http://www.vatt.fi/en/>.

This extensive report is a result of close co-operation. It can be considered a collective publication of the Institute: it shows the wide scope of operations of the VATT and the diverse knowhow of our researchers and research assistants. The end of each chapter includes a list of English publications written by VATT researchers on the subject. With my warmest thanks, I acknowledge each and everyone who has given their input when compiling this publication.

Helsinki, 12 June 2008

Seija Iilmakunnas  
Director General



## Country abbreviations

BE	Belgium
BG	Bulgaria
CA	Canada
CZ	Czech Republic
DK	Denmark
DE	Germany
EE	Estonia
EL	Greece
ES	Spain
FR	France
IE	Ireland
IS	Iceland
IT	Italy
JP	Japan
CY	Cyprus
LV	Latvia
LT	Lithuania
LU	Luxembourg
HU	Hungary
MT	Malta
NL	The Netherlands
NO	Norway
AT	Austria
PL	Poland
PT	Portugal
RO	Romania
SI	Slovenia
SK	Slovakia
FI	Finland
CH	Switzerland
SE	Sweden
TR	Turkey
UK	The United Kingdom
US	The United States of America
EU19	EU countries which are members in the OECD
EU15	EU countries from 1.1.1995
EU25	EU countries from 1.5.2004
EU27	EU countries from 1.1.2007



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## **1 Overview of developments in Finnish national economy**

During the early 1990s, Finland faced the severest economic recession in its history since the Civil War of 1918. Since the crisis, the recovery of the economy has been the fastest in the EU after Ireland. In 1994–2000, output grew on average by 4.7 per cent and exports by 10.7 per cent annually. In 2001–2007, the growth rate was slower, but it was still over 3 per cent per annum, and fast enough to reduce unemployment.

The level of real per capita income in Finland is clearly above the average of the EU27 countries.

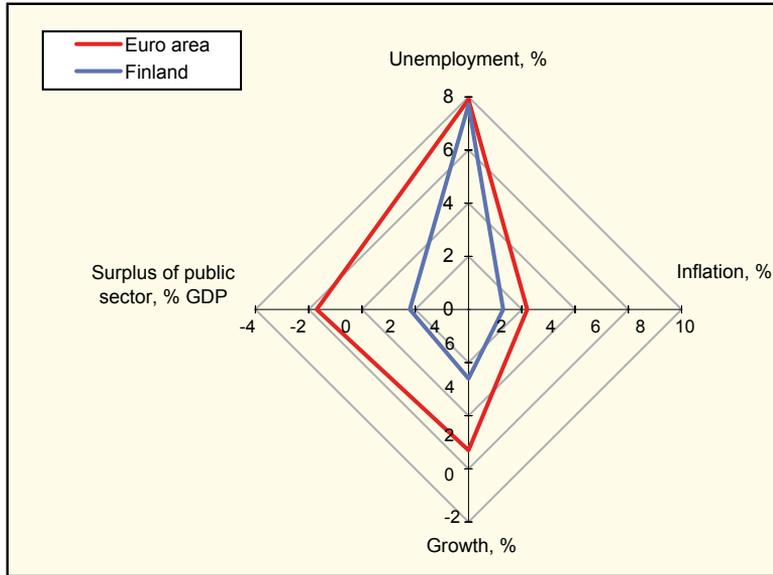
Medium-term prospects are rather bright for the Finnish economy. Price competitiveness is good and the productivity of key industries is high. The ratio of R&D investments to GDP is the second highest in the EU countries after Sweden. The shortages of skilled labour may be the most serious risk.

During the 1990s, the structure of the Finnish economy was transformed from traditional capital and resource-intensive production to strongly knowledge-intensive, owing to enormous growth in the electronics industry, especially in information and communications technology. This structural change was shown in the declining capital-output ratio. In the 1990s, production capacity was substantially increased, although the investments-to-GDP ratio declined.

During the past 10 years, strong economic performance has helped to increase tax revenue and decrease the relative size of the public sector. Owing to a considerable surplus in the public finances, the public sector debt has diminished.

## 1.1 Macroeconomic balance

Figure 1.1. Finnish economy in 2006 in comparison to Euro area average (growth, unemployment, inflation and balance of public finances)

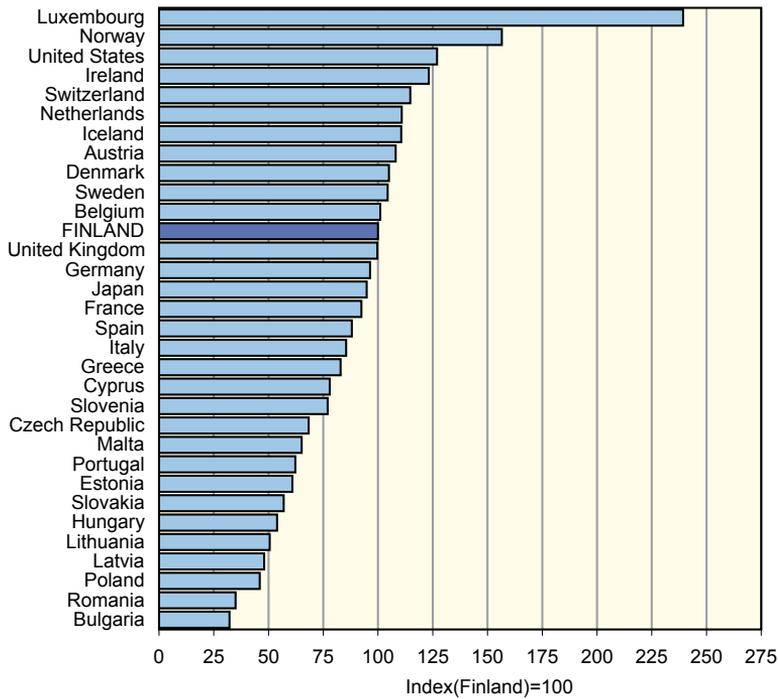


Source: VATT (Ministry of Finance and EU)

The scales in the figure are selected so that the size of the quadrangle represents the balance of the economy: the smaller the diamond, the better the balance. The inflation indicator used here is the annual change in the harmonised index of consumer prices.

In 2006, the Finnish economy grew faster than that of the Euro area on average. The rate of inflation was clearly below the Euro area mean, whilst the rate of unemployment was close to the average. In Finland, the surplus of the public sector was the largest in the Euro area, whereas public finances, on the average, show a deficit in the Euro area.

Figure 1.2. Real income level in 2007, index(Finland)=100



Source: VATT (Eurostat)

The real income level in Finland is higher than in the EU countries on the average. The richest country is Luxembourg, where the GDP per capita is over 100 per cent higher than in Finland. In the USA and Norway, the real income level is about one third higher than in Finland. United Kingdom, Japan, France and Germany produce real income per capita about as much as Finland. In the Baltic countries, the real income level is less than 50 per cent of that in Finland.

Table 1.3. Overview of economies of new EU member states (EU12)

	Total population 2006, mil.	GDP per capita PPS <sup>1)</sup> 2006 EU15 =100	Inflation rate 2006, %	Unemployment rate 2005, %	General government net lending 2005, % of GDP	General government gross debt 2005, % of GDP
Poland	38.1	48	1.3	13.8	-3.9	47.8
Czech Republic	10.2	70	2.1	7.1	-2.9	30.4
Hungary	10.0	59	4.0	7.5	-9.2	66.0
Slovakia	5.4	56	4.3	13.4	-3.4	30.7
Lithuania	3.4	51	3.8	5.6	-0.3	18.2
Latvia	2.3	49	6.6	6.8	-0.4	10.0
Slovenia	2.0	78	2.5	6.0	-1.4	27.8
Estonia	1.3	60	4.4	5.9	3.8	4.1
Cyprus	0.8	82	2.2	4.7	-1.5	65.3
Malta	0.4	66	2.6	7.4	-2.6	66.5
Bulgaria	7.7	33	7.4	9.0	3.3	22.8
Romania	21.6	33	6.6	7.4	-1.9	12.4
EU15	390.2	100	2.2	7.4	-1.6	63.4
EU27	493.5	89	2.3	7.9	-1.7	61.7

<sup>1)</sup> Purchasing power standards

Source: EU

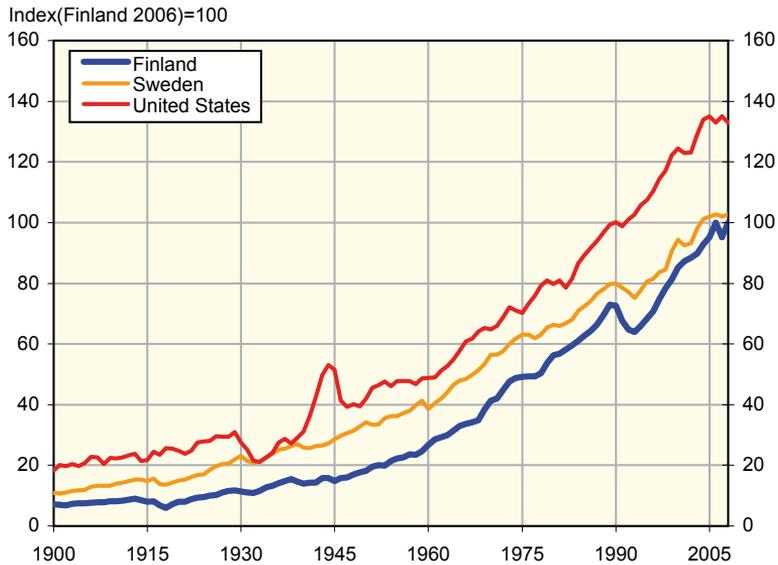
The accession of the new EU members increased the total EU population by approximately 25 per cent. The population of Poland, 38 million people, is far ahead of those of the other countries.

With regard to the GDP per capita figures, income level in the new member states varies from one third to four fifths of that in the EU15. The wealthiest population lives in Cyprus and the poorest in Bulgaria and Romania.

In 2006, the prices rose more rapidly in most new member states than in the EU15. The inflation rate was highest in Bulgaria. As regards the unemployment rates, they vary between 13.8, recorded in Poland, and 4.7 per cent, found in Cyprus.

Estonia and Bulgaria were the only countries with surplus in government balance in 2006. Hungary performed worst with a general government deficit of 9.2 per cent of GDP. The gross public debt relative to GDP was highest in Malta, 66.5 per cent. The least indebted economies were those of the Baltic countries and Romania.

Figure 1.4. Real income level (PPP) in 1900–2006 in Finland, Sweden and USA, index(Finland 2006)=100

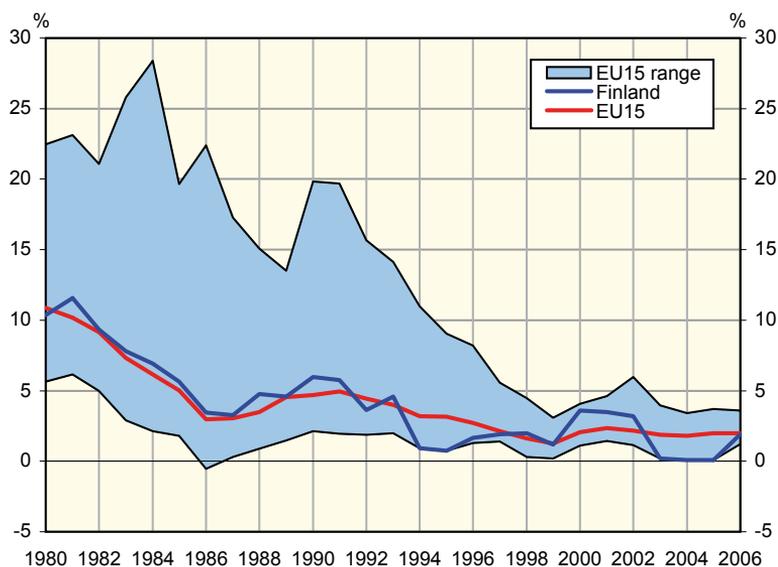


Source: VATT (OECD)

The long-term economic development of Finland can be seen as a gradual catching-up process. At the beginning of the 20<sup>th</sup> century, Finland was a poor country. During the 20<sup>th</sup> century the real income level of Finland grew twelvefold. Owing to faster economic growth than in many more mature economies, Finland was able to catch up with Sweden and approach the US level. However, Finland achieved the income level enjoyed in the U.S.

Real income level means the gross domestic product per capita. Purchasing power parity (PPP) calculates the GDP using comparable prices across countries.

Figure 1.5. Inflation in Finland and EU15 area in 1980–2006, per cent

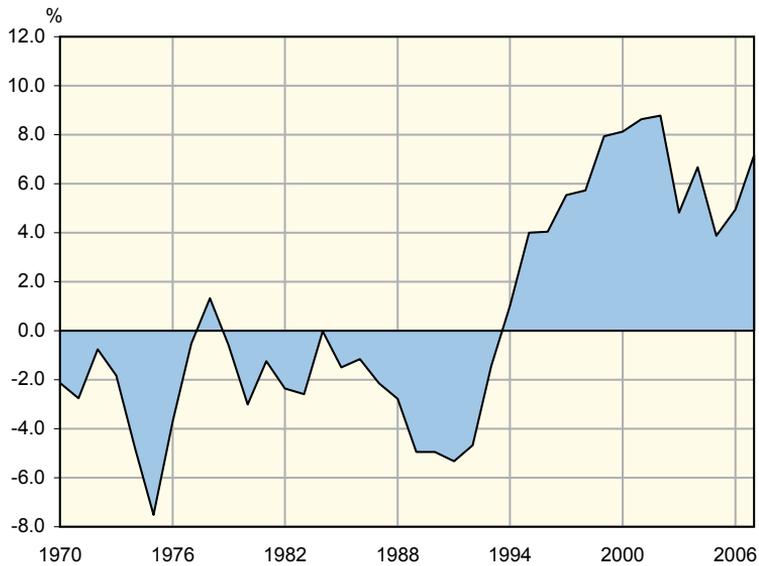


Source: VATT (EU)

The inflation rate of Finland closely followed the EU average until the end of the 1980s. Both in the EU15 countries on the average and in Finland, the rate of consumer price inflation slowed down from over 10 per cent in the early 1980s to 3 per cent in 1986. During the recession of the early 1990s, the Finnish inflation rate got well below of that in the EU15 countries on average. At the turn of the millennium, the inflation rate in Finland grew faster than the EU15 average. After that, the Finnish inflation has again been more moderate than that of the EU15 average. This has been partly because of reductions in indirect taxation.

Inflation = rise of the price level, represented by the private consumption deflator (National Accounts) in the figure, a commensurate indicator for measuring inflation.

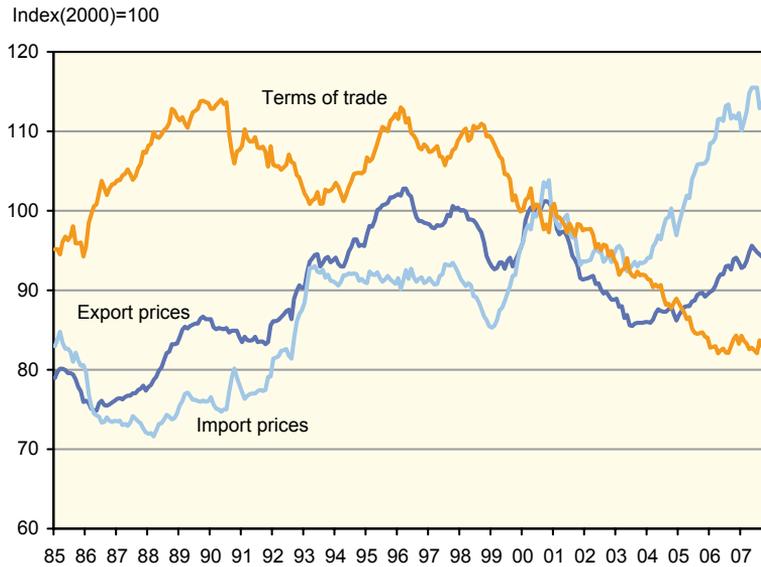
Figure 1.6. Current account in Finland in 1970–2007, percentage of GDP



Source: VATT (Bank of Finland)

During the post-war decades, the Finnish economy suffered from persistent current account deficits. Often the deepening of the current account deficit was a sign of overheating in the Finnish economy and a portent for a period of slow growth due to restrictive macroeconomic policies aimed to improve the balance of payments. In the present conditions as Finland is a part of the Euro area, this indicator has lost its importance, since the deficit no longer directly affects the currency exchange rate and interest rates. The current account surplus has been big since 1994, which, above all, is a result of the outstanding price competitiveness of export products and the high domestic savings rate. Surplus has, however, been decreasing recently mainly because of the worsening terms of trade.

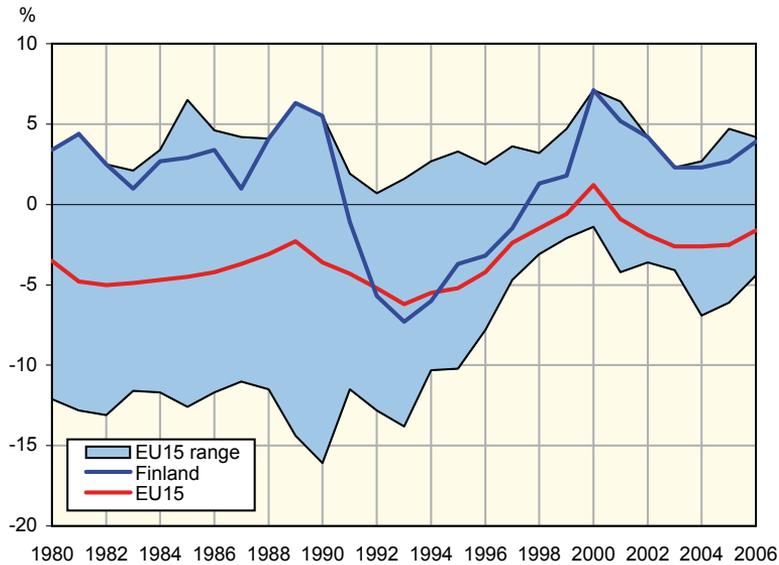
Figure 1.7. Export prices, import prices and terms of trade 1985/1 - 2007/12, monthly data, index(2000)=100



Source: VATT (Statistics Finland)

Finland imports energy and exports products of the electronics and paper industry. With high energy prices and low paper prices, the terms of trade of Finland are very low just now. The current accounts of Finland show, however, a surplus.

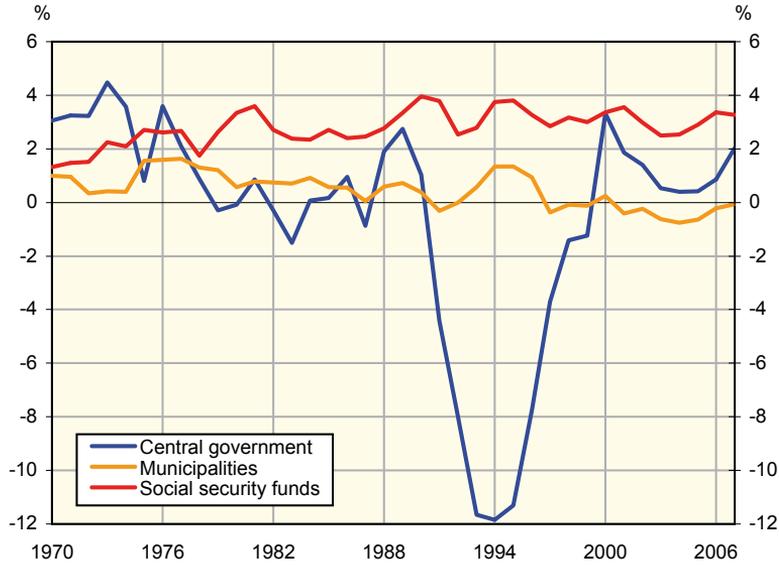
Figure 1.8. Surplus of public sector (general government net lending) in Finland and EU15 countries in 1980–2006, percentage of GDP



Source: VATT (Ministry of Finance and EU)

Within the EU, public finances were on average in surplus in 2000 for the first time in three decades. Since 2001, the average balance has again shown a deficit. In Finland, public sector finances have shown a surplus since the depression of the 1990s, a surplus which, relative to the GDP, is currently one of the largest in the EU area. During the worst recession years (1992–1994), the deficit of public sector finances in Finland levelled with the EU average. The EU's weakest balance in public sector finances has most often been in Italy and in Greece. In 2006, the deficit was largest in Hungary.

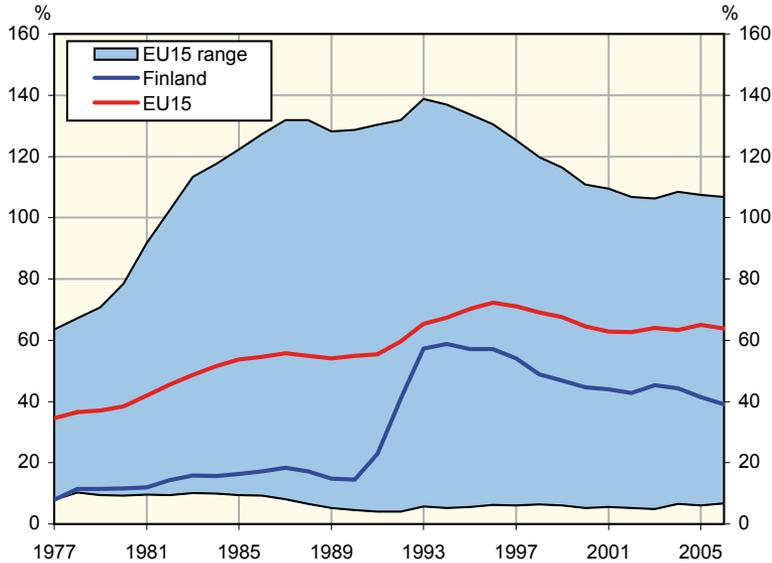
Figure 1.9. Surplus in central government and municipal sector finances and social security funds in Finland in 1970–2007, percentage of GDP



Source: VATT (Statistics Finland)

Fluctuations in the balance of aggregate public sector finances mainly result from large fluctuations in central government finances. The municipal sector finances have usually been in balance and the accounts of social security funds show a clear surplus – mostly owing to a partly pre-funded pension insurance system. The depression of the early 1990s produced a large deficit in the central government finances. However, the central government finances recovered quickly and are showing a surplus again. The municipal sector, on the other hand, has shown a slight deficit in recent years.

Figure 1.10. Public sector gross debt in EU15 countries in 1977–2006, percentage of GDP



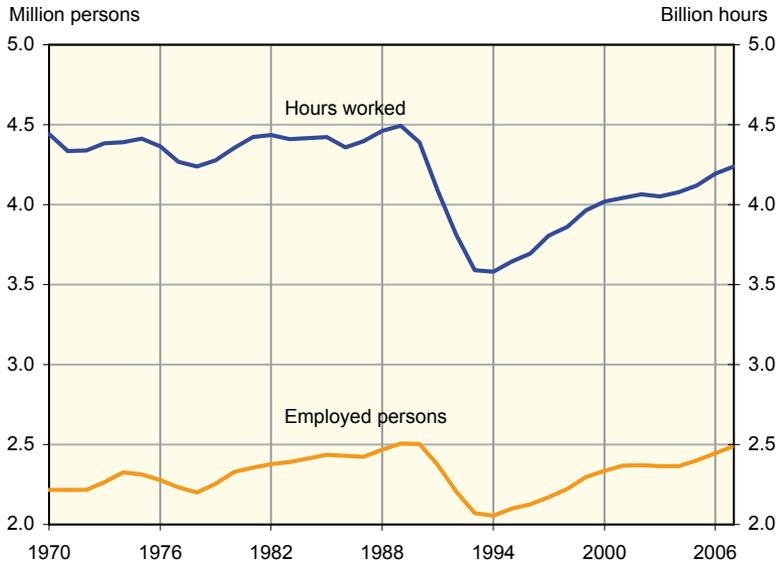
Source: VATT (EU)

In the EU area, the ratio of public sector gross debt to GDP is highest in Italy and Greece where the debt ratio is over 100 per cent. In Luxembourg, the public sector debt is only a few percentage points relative to the GDP. In the Baltic countries the public sector debt is also low. Before the 1990s, the Finnish public sector belonged to the least indebted. The share of the public sector debt remained at 15 per cent of the GDP.

On average, the public sector debt in the EU area still exceeds the 60 per cent of the Maastricht criteria. In Finland, the public debt remained below the EU mean and the 60 per cent limit even during the depression of the 1990s. In 2006, Finland's public sector debt was among the lowest in the EU.

## 1.2 Growth factors

Figure 1.11. Employed persons and hours worked in 1970–2007, million persons and billion hours

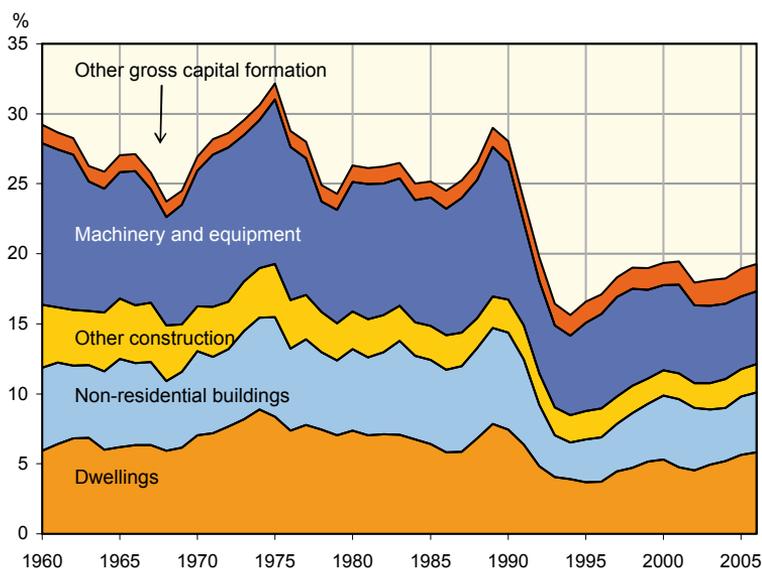


Source: VATT (Statistics Finland)

During the years of the deep recession 1991–1994, total employment collapsed by close to half a million persons or by 20 per cent. Since then, the economic growth has been fast and employment has recovered. In 2007, there were 2.5 million employed persons in Finland. The number of employed persons is almost equal to the one before depression in 1990. In 2007, employment office registers held 217 000 unemployed job-seekers.

According to the National Accounts, the annual aggregate hours worked in the economy equalled 4.5 billion hours before the depression. During the worst year, 1994, the total of hours worked was only 3.5 billion. Since then, the number has increased to 4.25 billion hours. Only the older part, persons aged between 55–64 years, of the working-age population now work more hours per capita than before the depression.

Figure 1.12. Investments in 1960–2006, percentage of GDP



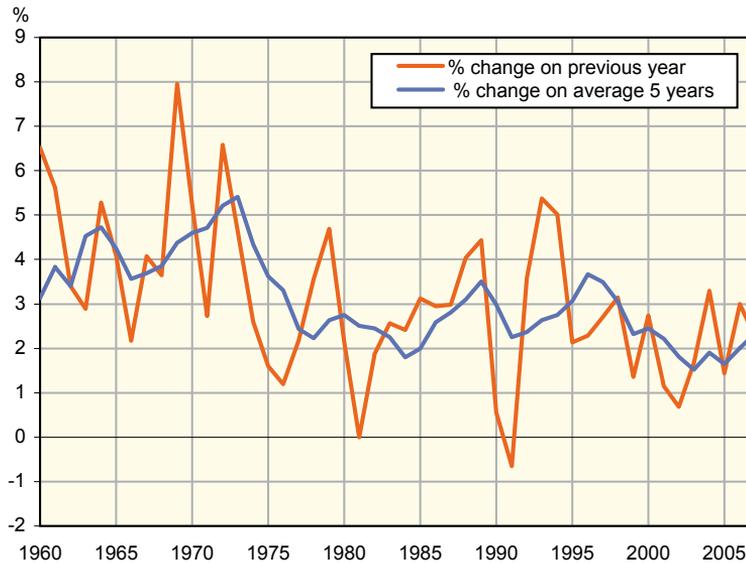
Source: VATT (Statistics Finland)

Finland has traditionally been a country of capital-intensive production and high investment rates. Until 1990, the ratio of investments to GDP fluctuated usually between 25 and 30 per cent. In 1991–1994, the investment rate collapsed by 12 percentage points. During the rapid economic growth since the mid-1990s, it rose close to 20 per cent.

The GDP ratio of fixed investments has settled at a clearly lower level than during earlier decades. However, the ratio close to 20 per cent is enough to increase and renew the production machinery, as is the case in the EU, USA and Japan. The Finnish production structure has become less capital-intensive as a consequence of the brisk growth in services and the electronics industry. The use of capital is also now more efficient, owing to economic globalisation and structural changes.

Investments = gross fixed capital formation.

Figure 1.13. Annual changes in labour productivity in Finland in 1960–2007, per cent



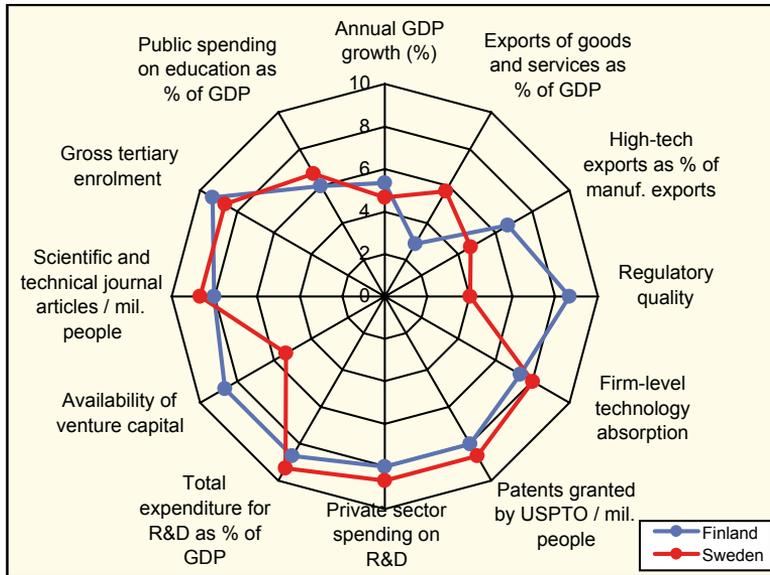
Source: VATT (Statistics Finland, National Accounts)

According to the National Accounts, labour productivity per hour has improved on average 2.7 per cent annually during the last hundred years, and 3.6 per cent annually since 1960. During the past four decades, the annual changes in labour productivity have ranged from less than zero to nine per cent. However, the trend seems to be downwards.

By and large, productivity grows fast under brisk economic growth, when the growth of production is based on exports. Again, when growth concentrates on construction and other domestic demand, as in 2005, the growth of productivity slackens. Then the employment effect of growth, on the other hand, is good.

### 1.3 Knowledge, technology and innovations

Figure 1.14. Finland's and Sweden's competitiveness compared with top of Western Europe (highest rank =10)



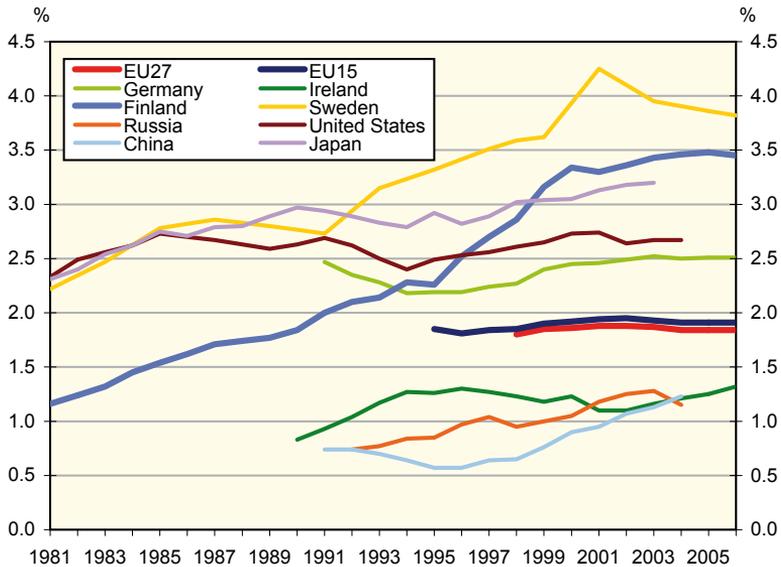
Source: World Bank Institute (information from 2001–2006)

Finland and Sweden are leading innovation economies in the world. Finland ranks well in comparison with the Western European countries on the fields of investments on public and private R&D, tertiary enrolment share of age class, number of patents granted, and number of scientific articles. Finland is also close to the top of Europe in regulatory quality and in availability of venture capital.

Finland and Sweden have traditionally supported open economy and free trade. The share of foreign trade has been significant in both countries even if it is smaller than in some Central European countries. The share of high-technology products in total export is only on the average level, though clearly bigger in Finland than in Sweden.

The figure is based on an interactive program of the World Bank Institute, which consists of a set of 80 structural and qualitative variables that benchmark economies. In this figure, the real competitiveness of Finland and Sweden is compared with the best performed Western Europe country. For each variable, the point of comparison is the best country in the group which gets the value 10 for the variable.

Figure 1.15. R&D spending in countries with high R&D intensity in 1981–2006, percentage of GDP

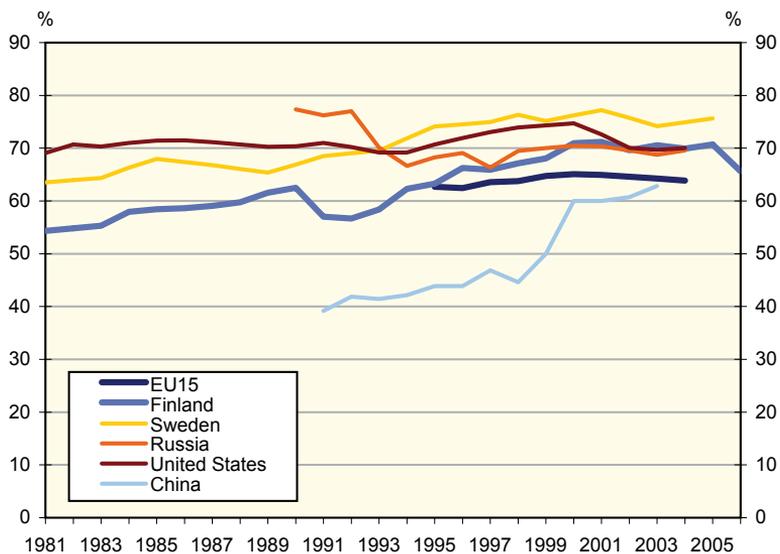


Source: VATT (Eurostat)

Investments on R&D as ratio to GDP seem to have reached a stable level in many western countries. The average ratio of R&D has not grown in EU countries in the recent years. In Sweden, the ratio of R&D investments to GDP has decreased for several years but the level is still higher than in any other country. Finland's relatively high R&D spending ratio of 3.5% also decreased in 2006, because of unusually high economic growth in that year.

R&D investments have grown fast in Russia and particularly in China, and they have caught up with the EU countries. Even though the technology level of China is lagging the western countries, its share in the world R&D investments rose to 2.12% in 2002 which is about four times more than that of Finland. Russia's share 0.49% was almost the same as Finland's in that particular year.

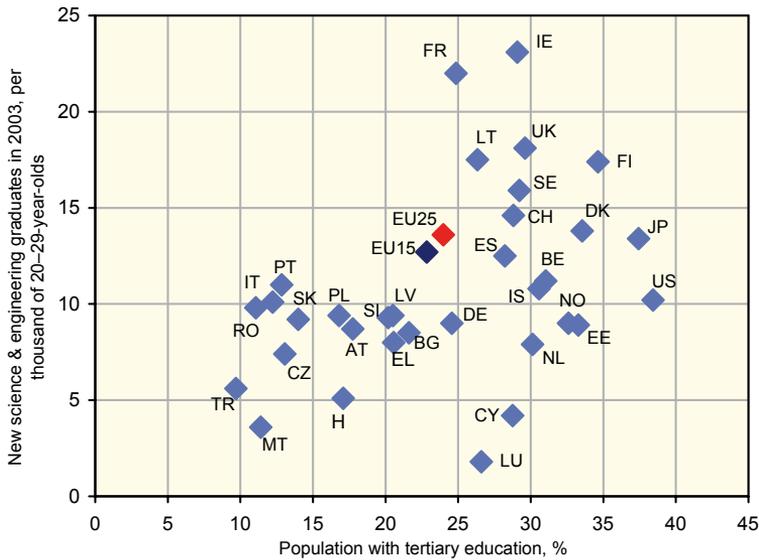
Figure 1.16. Private sector spending on R&D in 1981–2006, percentage of total R&D spending



Source: VATT (Eurostat)

The share of the private sector in research funding has grown in many countries and the shares are fairly on the same level, between 65% and 75%. In Russia and China, the private sector share has also reached that level of other countries. In recent years, the share of public and private sectors has changed differently in various countries, for example in the USA and Finland, the share of private sector has slightly declined.

Figure 1.17. Finland in international schooling comparison

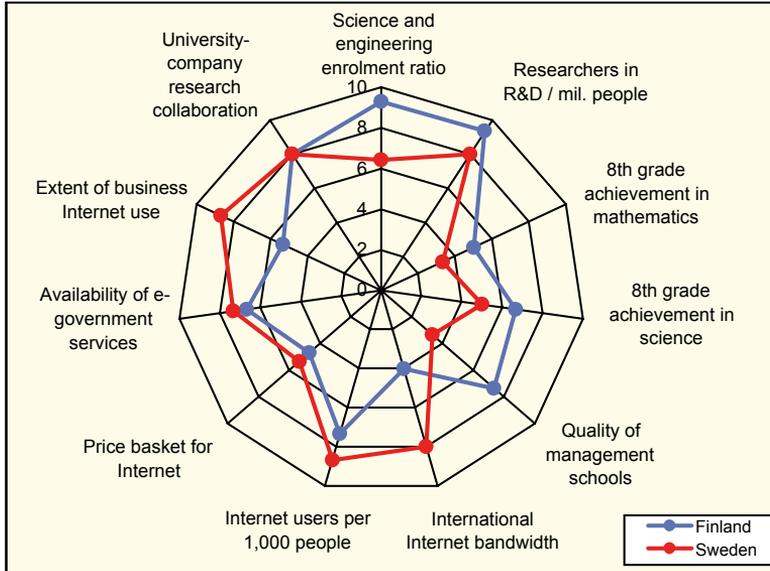


Source: European Innovation Scoreboard Database 2006 (data mainly from 2004 and 2005)

Schooling investments as a ratio to GDP is only slightly higher in Finland than in Western Europe, but investments have produced good results according to different indicators. For example, Finland has been ranked very high in the PISA study which measures students' performance in literature, mathematics and science. Finland is catching up with the top countries in tertiary education ratio. In Finland, every third 25–64-year-old has received a tertiary degree education. In Finland, education is directed strongly to the field of natural sciences and technology.

Differences among countries should, however, be interpreted cautiously. There are large discrepancies in educational systems and the level of attainment required to receive a tertiary degree varies across countries.

Figure 1.18. Internet, knowledge and education in Finland and Sweden compared with top of Western Europe

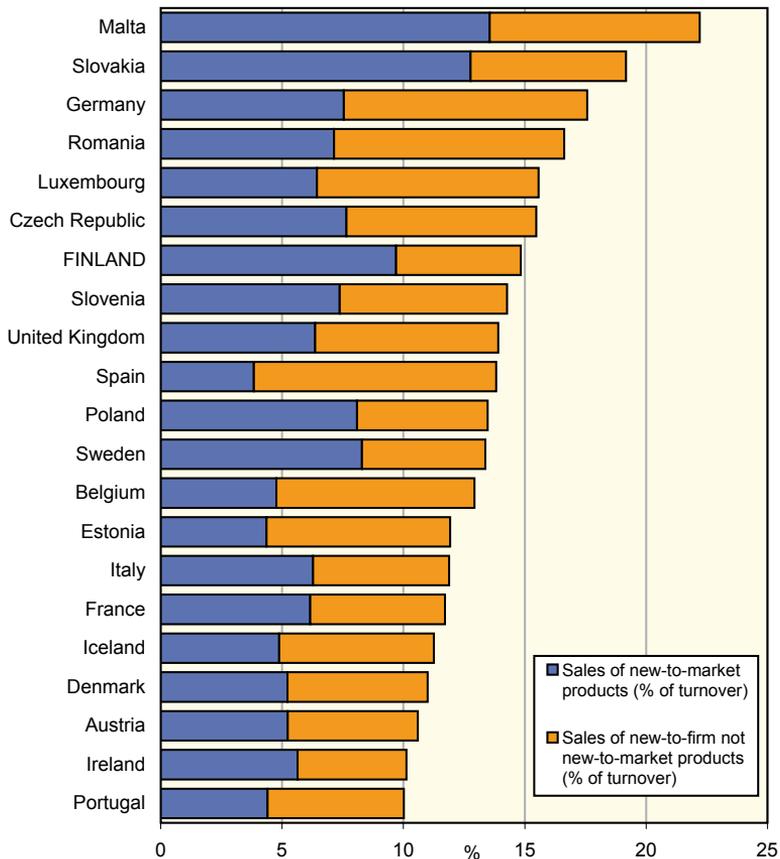


Source: World Bank Institute

Education and developed data transmission systems help the exploitation of existing technological and innovative capacity. Finland and Sweden are both placed well in this field in comparison with other European countries. Finland is particularly strong in the fields of education and researcher capacity. Sweden has succeeded better in dimensions which measure Internet usage and Internet service supply. Universities and the corporate sector co-operate actively in both countries, which improves the spreading and commercial exploitation of knowledge.

The figure is based on an interactive program of the World Bank Institute, which consists of a set of 80 structural and qualitative variables that benchmark economies. In this figure, the real competitiveness of Finland and Sweden is compared with the best performed Western Europe country. For each variable, the point of comparison is the best country in the group which gets the value 10 for the variable.

Figure 1.19. Share of innovations as percentage of turnover in 2004

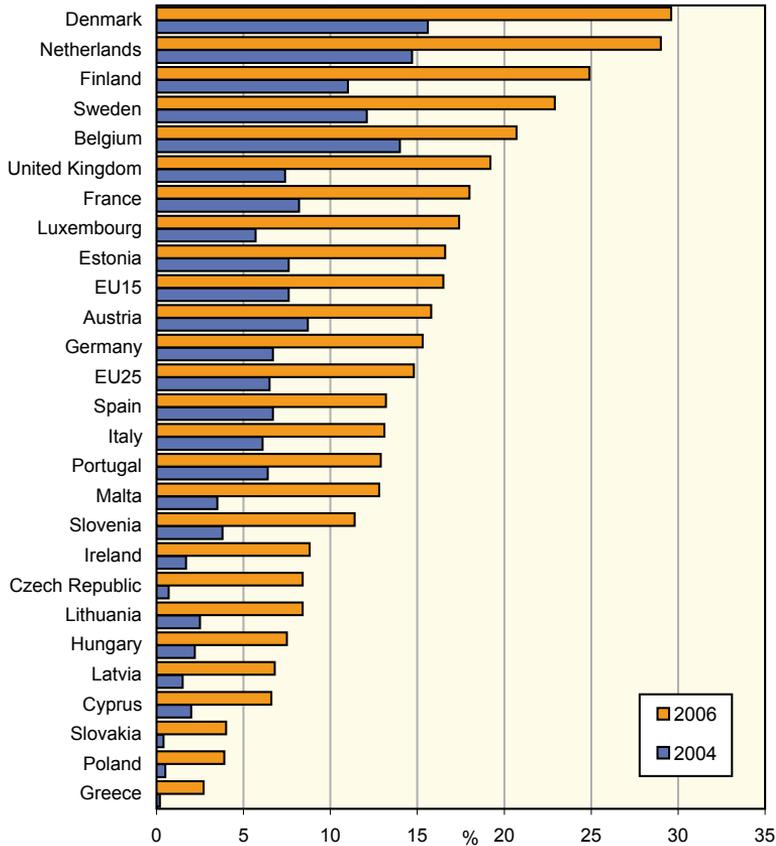


Source: European Innovation Scoreboard Database 2006 (CIS 4)

Finland's strategy to encourage knowledge and innovations is also evident in product markets. Share of products new-to-firm are on the average EU level, but Finland produces relatively large volumes of new-to-market products, so radical innovations seem to dominate copying from others. The weight of new-to-market products is in line with the relatively large number of patents and scientific articles.

The development strategy of Finland, the high level of public and private sector R&D investments and the strong trust of corporations in their own innovation is extraordinary for small open economies. For those countries, it is more typical to copy and import technology from abroad because of high expenses and uncertainty. In big countries, the benefits of publicly financed R&D investment are relatively greater due to the positive externalities spread in close regions. Large markets also encourage to invest in R&D more because the expected profits are respectively bigger.

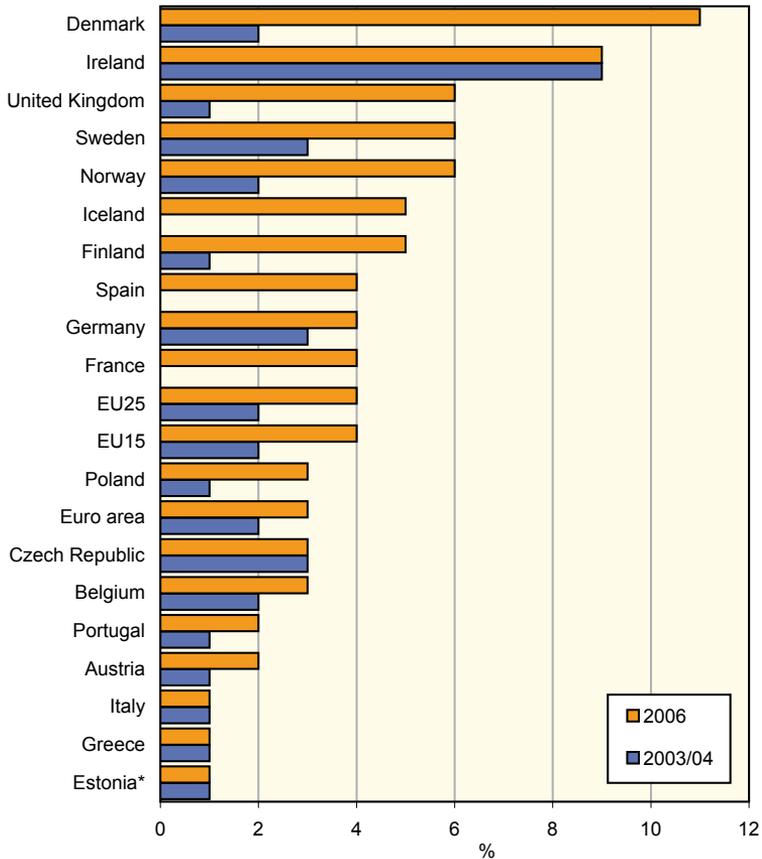
Figure 1.20. Broadband penetration rate in 2004 and 2006, per cent of households



Source: Eurostat

Finland has been in the front line in the development of the information society. Every fourth household has a broadband access. Only in Denmark and the Netherlands, the broadband penetration is higher. In Ireland, less than 10 per cent of households have a broadband connection. In Ireland, Internet users per 1 000 inhabitants was 265 and in Finland 628, respectively.

Figure 1.21. Total turnover of enterprises from e-commerce as percentage, in 2006 and 2003/2004



\*Data from 2005 and 2004

Enterprises with at least 10 workers excluding finance sector

Source: Eurostat

The development of e-commerce has varied across the EU countries. On average, it has been rising during the 21st century and now represents about 4% of the total turnover of enterprises. The growth has been very fast in Denmark where the proportion now exceeds 10%. Also in Ireland, the proportion is almost 10%, but it has not grown recently. In Finland, the proportion increased from one to five per cent in a couple of years, but in 2006 it did not grow anymore.

VATT researchers have made several publications on this area. See for example:

Berghäll Elina (2006): R&D and Productivity Growth in Finnish ICT Manufacturing. [VATT discussion papers 388](#). Helsinki

Berghäll Elina (2006): Technical Efficiency in an R&D Intensive Industry: Finnish ICT Manufacturing. [VATT discussion papers 389](#). Helsinki

Berghäll Elina (2006): Technical Change, Efficiency, Firm Size and Age in an R&D Intensive Sector. [VATT discussion papers 390](#). Helsinki

Berghäll Elina (2008): Revealing Agglomeration Economies with Stochastic Frontier Modelling in the Finnish ICT Industry. [VATT discussion papers 435](#). Helsinki

Hjerppe Reino – Kiander Jaakko – Virén Matti (2006): Are Government Expenditure Productive? Measuring the Effect on Private Sector Production. [VATT discussion papers 381](#). Helsinki

Honkapohja S. – Koskela E. – Leibfritz W. – Uusitalo, R. (2007): Economic Prosperity Recaptured: The Finnish Path from Crisis to Fast Growth. MIT Press (in press)

Kiander Jaakko – Romppanen Antti, eds. (2005): Finland's First 10 Years in the European Union – Economic Consequences. [VATT discussion papers 377](#). Helsinki

Seppä Elina (2007): Innovation Performance of Firms in Manufacturing Industry: Evidence from Belgium, Finland and Germany in 1998–2000. [VATT discussion papers 414](#). Helsinki



## **2 Structure of Finnish economy**

The structure of the Finnish economy has changed rapidly during the last thirty years. The shares of agriculture and manufacturing in the total output – and even more clearly in employment – have declined, while the share of services has increased. In agriculture, the structural change shows as the decreasing number of farms and employed in agriculture and growth in the average size of farms.

Most notable changes in manufacturing have been the strong expansion of the electronics industry and the declining importance of the consumer goods industry in the 1990s. Expanding public services marked the development in service branches until the end of the 1980s. Since then, the growth has centred on the business sector and, in particular, on business services.

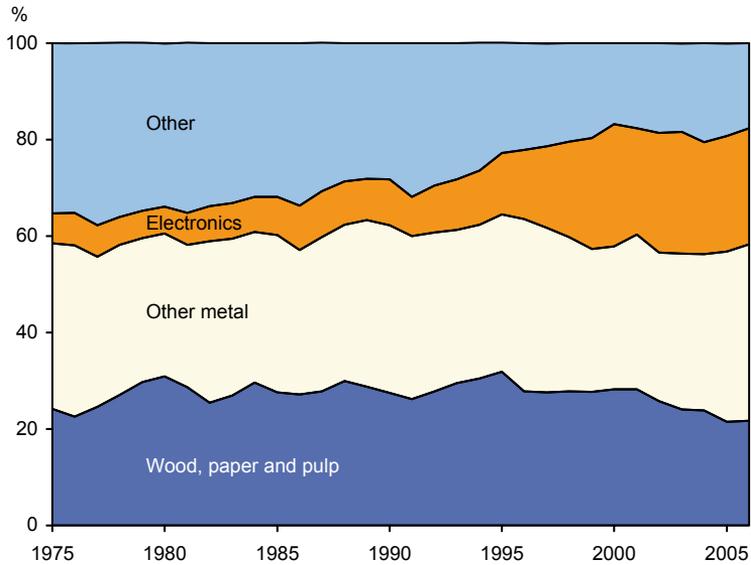
During the recession of 1990–1993, approx. 20 per cent of firms went bankrupt. The number of firms has recovered since. In 2006, there were clearly more enterprises than before the depression – 250 000 in all. However, the new firms were not in the same sector as the old ones.

The Finnish business sector has globalised fast. The outward investment of Finnish companies has increased markedly since 1993, and currently a large part of the labour force of the biggest companies is located abroad. Globalisation has become reality also in subsidiary companies and in business mergers. A large share of the equity of the Finnish listed companies has been sold to foreign owners.

The GDP ratio of exports rose to the 40 per cent level in the 2000s. The regional distribution of exports is now returning to the pre-recession era. The most significant change as regards industrial branches has been the relative decline in exports of paper, pulp and wood industries for the benefit of electronics and other metal industries.

## 2.1 Changes in production structure

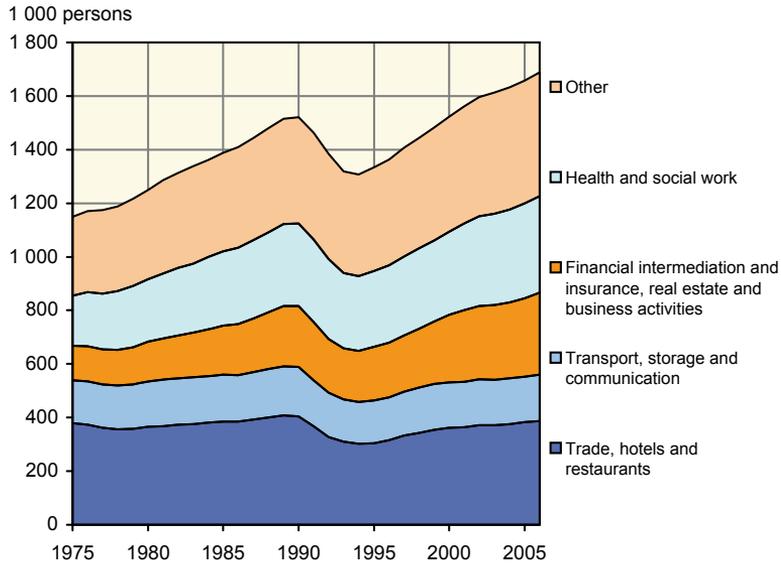
Figure 2.1. Main manufacturing branches in 1975–2006, percentage of aggregate value added of the manufacturing



Source: Statistics Finland/National Accounts

Of the main branches of manufacturing, electronics increased its value added rapidly in the 1990s and has remained practically unchanged ever since. The relative share of branches producing consumer goods has shrunk. The share of other metal products has grown and the share of wood, paper and pulp declined in recent years.

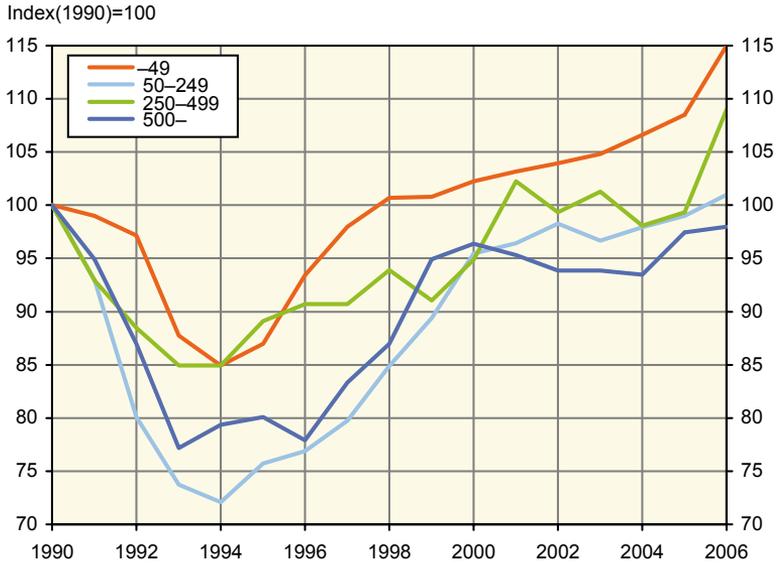
Figure 2.2. Employment in services in 1975–2006, thousand persons



Source: Statistics Finland/National Accounts

Employment in services grew strongly until the end of the 1980s. The growth was especially fast in public services. During the first half of the 1990s, employment collapsed in the service sectors, and the pre-depression level was only regained in 2000 and exceeded in 2001. In recent years, the number of employed persons has grown fastest in business services.

Figure 2.3. Firms by number of personnel in 1990–2006, index(1990)=100

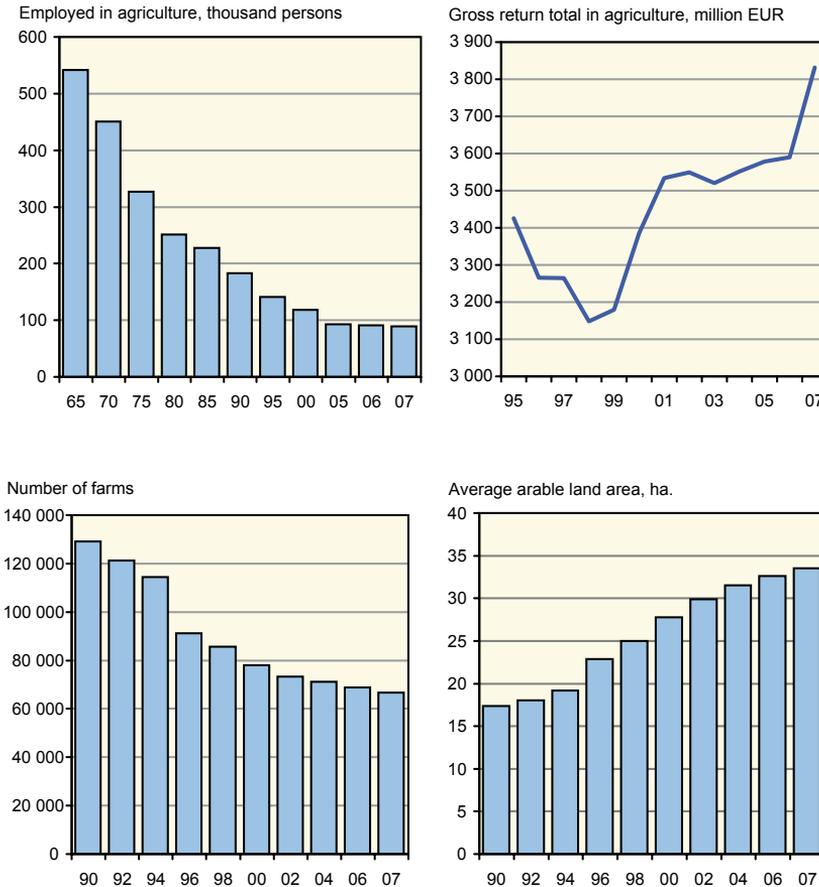


Source: VATT (Statistics Finland)

The wave of bankruptcies in the early 1990s decreased the number of firms by a fifth. Since then, the number of firms has recovered. During the time of high unemployment, many of those who were out of work employed themselves by starting a business. The growing demand for services and the outsourcing of business activities in large companies further increased the number of small firms.

Ninety-nine per cent of Finnish firms are small, employing less than 50 persons. In 2006, there were 247 000 firms in this size group, 2 400 medium-sized firms with 50–249 employees, 341 firms with 250–499 employees and 271 firms with over 500 employees.

Figure 2.4. Employed in agriculture, thousand persons, gross return total in agriculture, million EUR, active farms and average farm size



Farm size = arable land area on farm

Source: Statistics Finland, Agrifood Research Finland

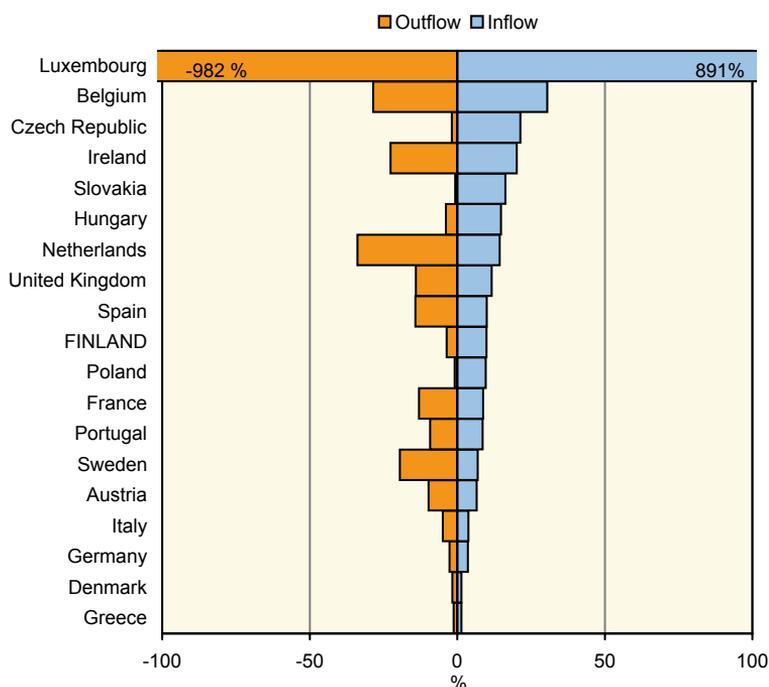
Structural change in the Finnish economy took place late and it was fast. Employment in agriculture was very high until the mid-1960s. Since 1965, agricultural employment has decreased from 550 000 persons to a sixth of that number. In 2007, the employment in agriculture numbered 89 000 persons. However, in relative terms that was still more than in many other industrial countries.

The gross return total in agriculture has varied during the EU membership between 3 148 million EUR in 1988 to 3 832 million EUR in 2007.

In 2007, the number of farms engaged in active production was 66 800, having declined by 62 000 since 1990. At the same time, the average size of a farm grew by 16 hectares to 33.5 hectares. Additionally, the average forest area owned by farms was around 50 hectares in 2007. The declining number of farms has increased agricultural productivity.

## 2.2 Globalisation of economy

Figure 2.5. Cumulative foreign direct investment of EU19 countries in 2002–2005, percentage of 2005 GDP



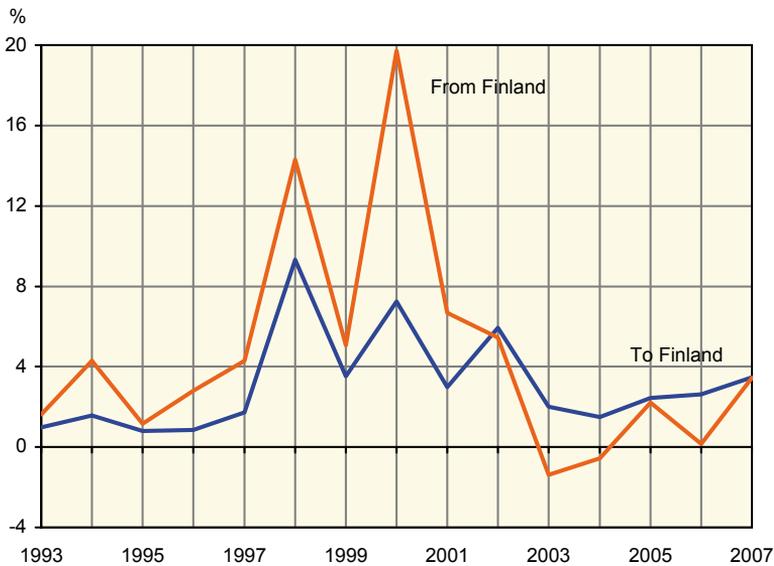
Source: VATT (OECD)

The liberalisation of capital movements and the opening of economies led to increased movements of capital across countries since the 1980s. Better access to other countries encouraged foreign direct investment. Furthermore, tougher competition in international markets boosted international business mergers.

Belgium and Luxembourg attracted the highest rate of direct investments relative to GDP. Ireland and Czech Republic also received a great deal of investments relative to the size of their economy.

During the four-year period 2002–2005, Finland received a volume of foreign direct investments which amounted to a tenth of the GDP of 2005. In Finland, the volume of investment abroad was the seventh lowest in the EU19. Cumulative direct investment abroad amounted to nearly 4 per cent of the GDP of 2005. Thus, Finland was importing capital in net terms.

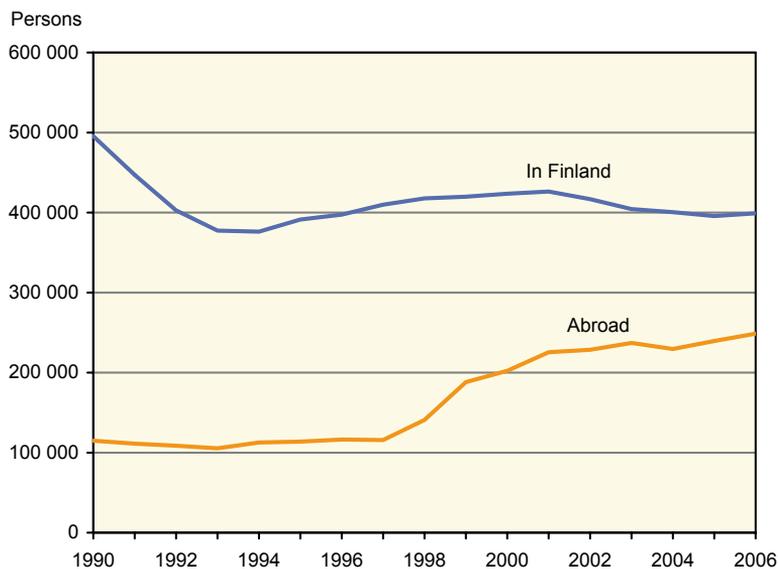
Figure 2.6. Foreign direct investments to and from Finland in 1993–2007, percentage of GDP



Source: ETLA and Statistics Finland

Direct investments from Finland exceeded investments to Finland during 1993–2001. Mergers and acquisitions have strongly increased direct investments in the case of Finland. Particularly Nordic and Finnish-Swedish mergers have been important. In 2000, investments from Finland reached a record volume of nearly 20 per cent of the GDP, while investments flowing into the country showed clear growth from the year before, as well. Again, these large fluctuations resulted from a few big corporate reorganisations. In 2003, the foreign direct investment flows to Finland declined considerably and since then remained at that fairly low level. The investments from Finland were also at a lower level than before. In 2003 and 2004, capital was repatriated more than invested abroad. Most of the capital repatriation was due to intragroup loan arrangements. In 2007, the inflows and outflows of foreign direct investments were at the same level.

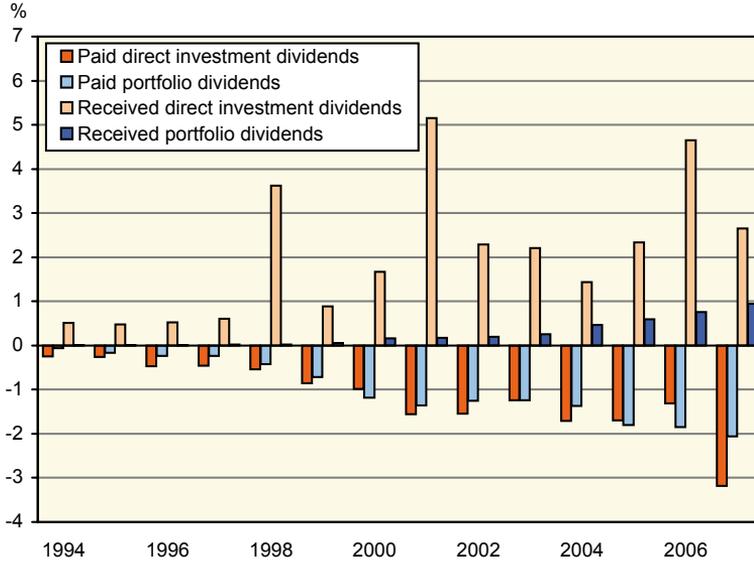
Figure 2.7. Employment of Finnish manufacturing companies in Finland and abroad 1990–2006, persons



Source: Statistics Finland and Bank of Finland

During the recession of 1990–1993, the employment in Finnish manufacturing decreased by 120 000 persons, i.e. nearly 25 per cent, and was 376 000 persons in 1994. Thereafter, the employment increased until the year 2001, when the employment in manufacturing was 426 000 persons. After that, the employment in Finnish manufacturing has decreased again. After the recession, the employment of the foreign subsidiaries of Finnish manufacturing companies began to rise strongly. During 1995–2006, the employment of these subsidiaries more than doubled and was 250 000 persons in 2006.

Figure 2.8. Dividend payments by direct and portfolio investment to and from Finland in 1994–2007, percentage of GDP

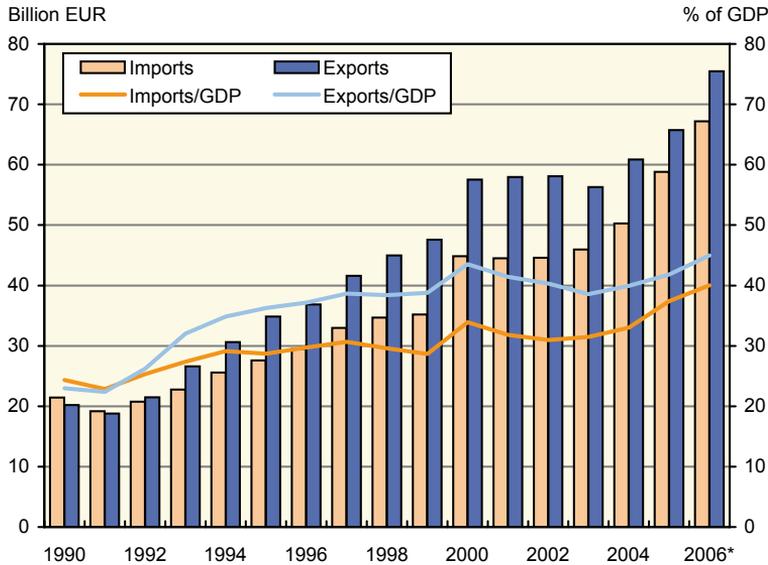


Source: VATT (The Research Institute of the Finnish Economy and Statistics Finland)

Dividend income from foreign direct investments of Finnish companies amounted to only 0.5 per cent of the GDP between 1994 and 1997, a share which has grown notably since. In 1998 and 2001, an exceptionally large dividend yield from direct investments was repatriated, their share growing to 4–5 per cent of GDP. Finland clearly received more dividends from direct investments than those she remitted abroad. In 2004 and 2007, the situation was reversed – dividend income from abroad was about 20 per cent higher than dividends remitted abroad. The yield from portfolio investments, on the other hand, has been minor in Finland. The volume of remitted dividends from portfolio investments has clearly grown, their share reaching and in some years (e.g. 2005) exceeding the level of dividends from direct investments. In 2007, it exceeded twice the volume of received portfolio dividends.

## Growth in Finnish foreign trade

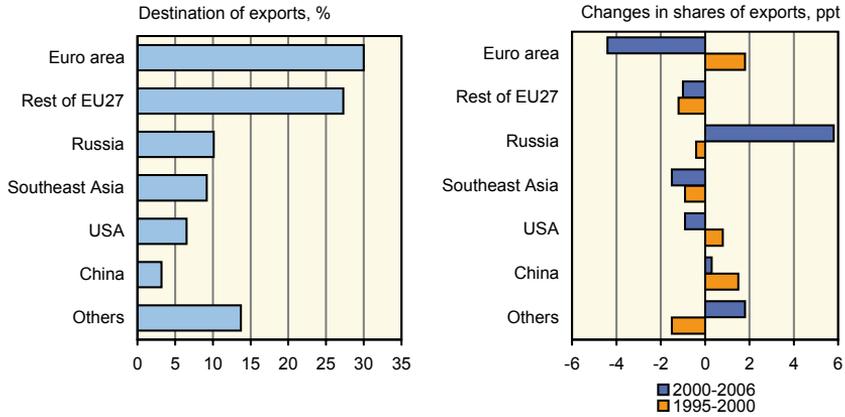
Figure 2.9. Exports and imports in 1990–2006\*, billion EUR and percentage of GDP



Source: VATT (Statistics Finland/National Accounts)

At the beginning of the 1990s, the value of both Finnish exports and imports was around 20 billion EUR, reaching little over 20 per cent of GDP. As a result of economic policy which improved the competitiveness of export and limited domestic demand, the export-led growth started in 1992. The exports have nominally grown around 10 per cent annually whereas the growth in imports has remained 7 per cent resulting in surplus in the current account. By 2006, the share of exports in GDP has exceeded the level of 40 per cent and the share of imports is also around 40 per cent. During the past 15 years, the openness of the Finnish economy has increased both in absolute and relative terms.

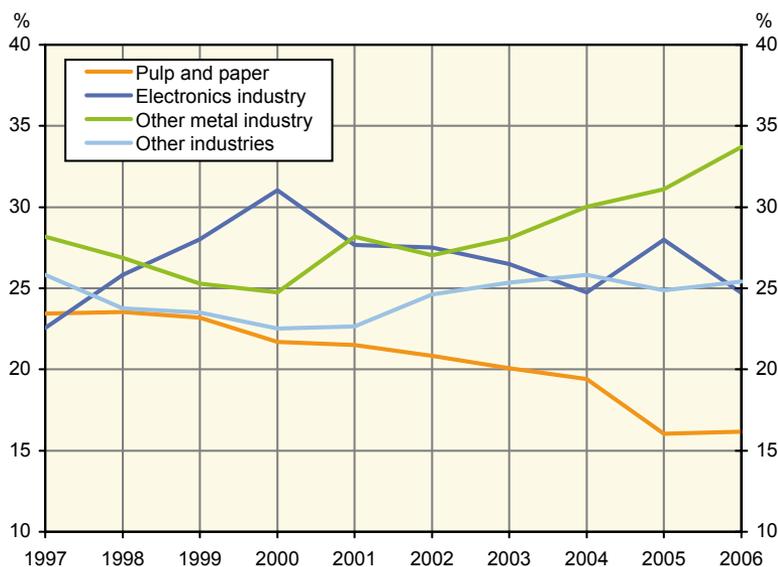
Figure 2.10. Destination of exports in 2006, per cent, and changes in shares of exports by destination in 1995–2000 and 2000–2006, percentage points (ppt)



Source: Finnish Foreign Trade Statistics

The EU countries (the Euro area and the rest of the EU27 countries) reached nearly 60 per cent of total Finnish exports. Regional shares have tended to remain stable in time. During the past 15 years, however, the importance of Russia has first declined after its foundation and then started gradually to increase so that the current share of Russia in Finnish exports is about 10 per cent, the same as it used to be in the last years of the Soviet Union. The declining share of the European markets in Finnish exports is due to low growth in Europe and expanding markets outside Europe.

Figure 2.11. Share of industries in manufacturing exports in 1997–2006, per cent



Source: Finnish Foreign Trade Statistics

During the strong growth in export its composition has also changed. The share of the pulp and paper industry has decreased from nearly 25 per cent at the end of the 1990s to little over 15 per cent in 2006. The share of electronics increased at the beginning of the 21<sup>st</sup> century to over 30 per cent but has declined since to 25 per cent. The strong growth of exports in the other metal industry has increased its share from 28 per cent to nearly 35 per cent of total exports. The share of other branches has varied around 25 per cent.

VATT researchers have made several publications on this area. See for example:

Jones Ronald W. (2005): Aspects of Globalization. [VATT discussion papers 379](#). Helsinki

Kerkelä Leena – Huan-Niemi Ellen (2005): Trade Preferences in the EU Sugar Sector: Winners and Losers. [VATT discussion papers 358](#). Helsinki

Kerkelä Leena – Lehtonen Heikki – Niemi Jyrki (2005): The Impacts of WTO Export Subsidy Abolition on the Agri-food Industry in EU: A Preliminary Assessment. [VATT discussion papers 375](#). Helsinki

### **3 Labour market**

Finland enjoyed high employment and low unemployment until the late 1980s. This changed in the early years of the 1990s when depression wiped out nearly half a million jobs and the unemployment rate peaked at 16 per cent. It took more than a decade for employment to return to its pre-depression level. At the same time, the unemployment rate declined by almost 10 percentage points. The unemployment rate has now reached the EU average, but it still remains above its pre-depression level.

Many institutional settings, such as the wage bargaining system, employment protection, and various incentive systems, affect the functioning of the labour market. In international comparisons, Finland is typically classified as a country with high union density and centralised wage bargaining. Both employees and employers are highly organised and wage agreements are often negotiated at the central union level or co-ordinated otherwise. In employment protection, Finland belongs to the average range in comparisons with other OECD countries.

The Finnish labour market is characterised by full-time contracts and high labour force participation of women. The share of part-time contracts has been slowly increasing but the pace has been slower than in the other EU countries. Fixed-term contracts used to be more common in Finland, but recently their share has come closer and closer to the EU average. This is quite remarkable given that a typical work is more common among women and the employment rate of Finnish women is well over 60 per cent.

The education level of the labour force rises as new generations reach working age and older generations retire from working life. Nearly all labour market entrants have received professional training, and more and more of them have received tertiary education. This has not been reflected in wages as returns to education continue to be high in Finland. Education also pays in terms of employment. Less educated are more inclined to be unemployed than higher educated.

### 3.1 Main indicators of Finnish labour market

At the end of the 1980s, the Finnish labour market situation was excellent. The employment rate was among the highest and the unemployment rate among the lowest in the world. A sharp fall in production at the beginning of the 1990s led to a fall of 15 percentage points in the employment rate and to the multiplication of the unemployment rate. Labour supply also contracted, mainly as a result of young people postponing their graduation. Although the economic growth has been rapid since the mid-1990s, return to the full employment of the late 1980s is not yet in sight. Roughly two thirds of the fall in the employment rate and of the rise in the unemployment rate have been restored. Labour supply already exceeds the pre-depression level.

Table 3.1. Balance of labour resources (aged 15–64 years) in 1989, 1994 and 2006, thousand persons and per cent

	1989	1994	2006	Change 1994/89	Change 2006/94
Aged 15–64 years, 1 000 persons	3 344	3 403	3 507	59	104
Labour force, 1 000 persons	2 564	2 448	2 620	-116	172
Employed, 1 000 persons	2 483	2 040	2 416	-443	376
Unemployed, 1 000 persons	80	408	204	328	-204
Labour force participation rate, %	77	72	75	-5	3
Employment rate, %	74	60	69	-14	9
Unemployment rate, %	3	17	8	13	-9

Source: Statistics Finland/Labour Force Survey

The statistics of the Ministry of Labour depict a fairly similar picture of the development of unemployment. It is noteworthy that exiting to the unemployment pension did not decrease the open unemployment during the depression. Owing to the long “unemployment pension tunnel”, the number of unemployment pensioners did not start to grow until after the depression. Unemployment was tackled mainly by increasing labour market measures. Since 1998 their volume has, however, been cut.

Employment rate = employed / working age population

Unemployment rate = unemployed / labour force

Labour force participation rate = (employed + unemployed) / working age population

Table 3.2. Unemployed job seekers, unemployment pensioners, participants in ALMP measures, and vacancies in 1989, 1994 and 2006, thousand persons

	1989	1994	2006	Change 1994/89	Change 2006/94
Unemployed job-seekers	103	494	250	391	-244
Unemployment pensioners	65	45	46	-20	1
Participants in ALMP measures	50	98	85	48	-13
Vacancies	30	7	34	-23	27

Source: Ministry of Labour and Finnish Centre for Pensions

According to the Ministry of Labour, there were 250 000 unemployed job seekers in 2006. Including unemployment pensioners and people participating in active labour market policy (ALMP) measures, the volume of labour force reserves was some 381 000 persons. According to the definition of unemployment used by Statistics Finland, the number of unemployed persons fell to 204 000 in the same year.

The most important statistics on the labour market are the Labour Force Survey by Statistics Finland and the job-seeker registers kept by the Ministry of Labour. The data contents and compilation criteria of these statistics differ from each other.

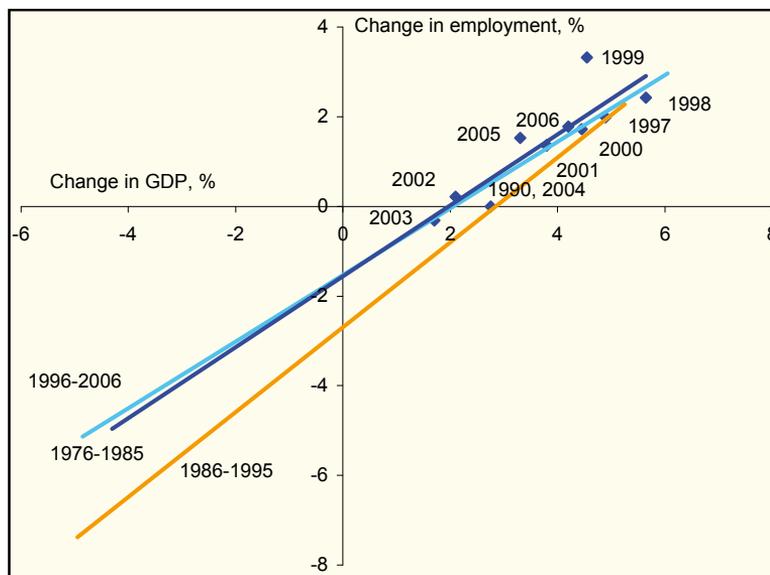
The statistics of the Ministry of Labour include information on vacancies reported in employment offices and on job seekers. Job seekers may, in addition to the unemployed, include job-changers, students and people participating in labour market measures. The statistics often cover only part of the labour market, which sets limitations to their use. With them a good overall picture can be formed of the different features of unemployment and of the coverage and focus of the ALMP measures. Of the open labour market vacancies, public employment services cover only a part and the coverage varies according to the sector and business cycle.

The monthly Labour Force Survey is based on a sample of the working-age population (15–74-year-olds), so it cannot be used in very detailed, e.g. municipality-level, analyses. To be classified as an unemployed person in the Labour Force Survey requires active job-seeking within the previous four weeks. Therefore, many elderly unemployed, especially those waiting for retirement on unemployment pension, fall outside the labour force.

According to the register on job seekers, there were 69 000 unemployed persons aged 55 or over in 2005, but only 27 000 according to the Labour Force Survey. On the other hand, a student about to enter the labour market within a few weeks may be classified as unemployed in the Labour Force Survey. The job-seeker register included 31 000 unemployed persons under the age of 25 in 2005, but the Labour Force Survey included over 64 000. The picture of the structure of unemployment varies based on different sources and different specifications.

### 3.2 Development of employment

Figure 3.3. Impact of output growth on employment change in Finland



The change in GDP is a two-year moving average of annual changes and the change in employment refers to the latter year.

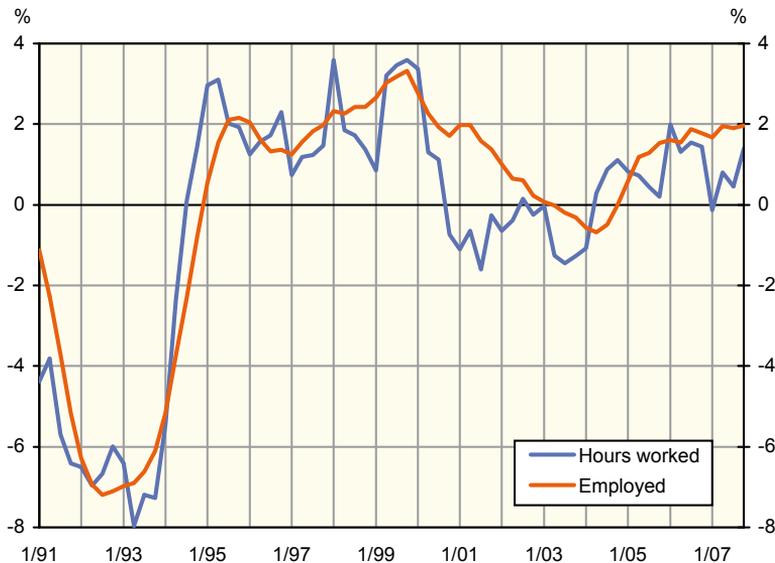
Source: VATT

In a ten-year period between 1976 and 1985, an output growth of around two per cent was enough to sustain the level of employment. Between 1986 and 1995, a 3 per cent growth rate was needed to accomplish the same. This change was mainly caused by factors connected with the deep depression of the early 1990s and the recovery from it. When the profitability of firms took a downturn, cutting down costs and rationalisation were inevitable. Ineffective firms were put out of business and non-productive jobs were abolished. This sustained the growth in productivity during the depression years. Furthermore, the growth rate of productivity accelerated in the initial stages of recovery as labour force reserves were utilised and working overtime increased. These factors resulted in the deterioration of the employment-output relationship.

Recent years show a re-emergence of the earlier relationship and an improvement in the employment effects of economic growth. In 1999, the growth in employment

was exceptionally fast in comparison to growth in output. Employment increased by more than 3 per cent annually. In 2000, the growth in output continued at a high level, but employment increased by only less than 2 per cent. Apparently, the most easily employable part of the labour force reserves has been exhausted, and production growth was sought by focusing on productivity and increasing investments. In the observations from 2001 and especially 2002, the signs of slower economic growth were already visible: growth in both employment and output had clearly slowed down – in 2003 growth in production picked up but total employment started to decline. Following years show again the pattern of production picking up first (2004) and employment growth accelerating a year later (2005).

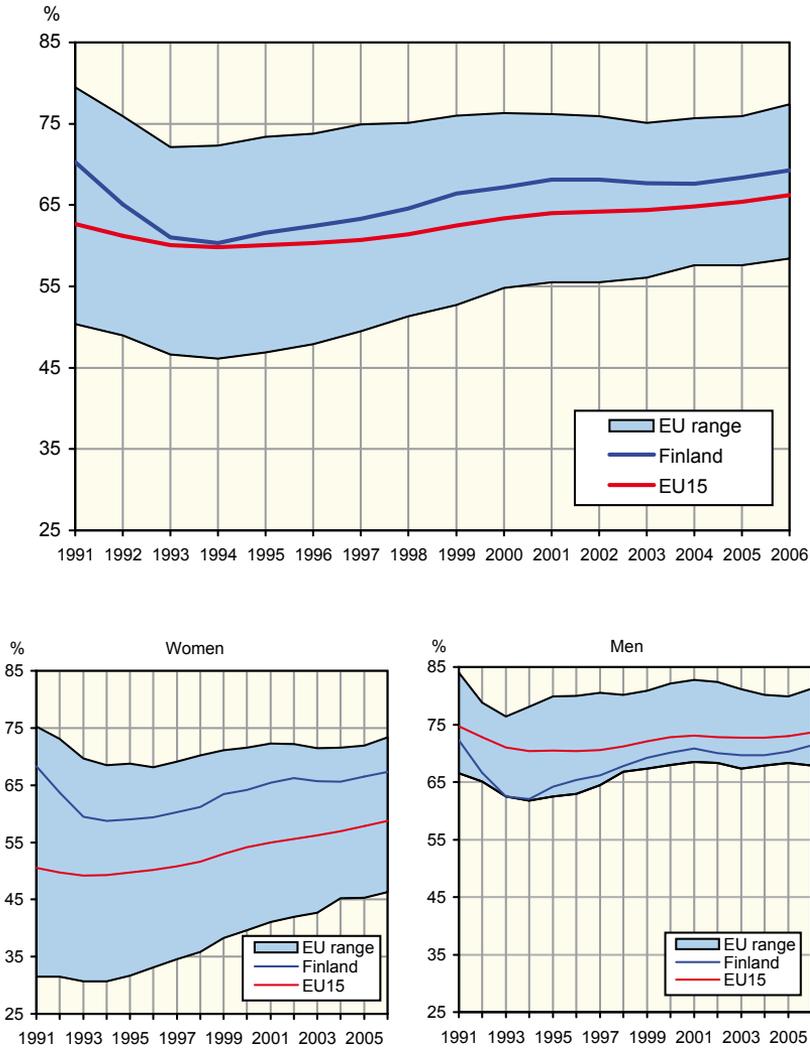
Figure 3.4. Annual changes of employment (moving average of quarterly observations) 1/1991–4/2007, per cent



Source: Statistics Finland

Changes in hours worked have not been as smooth as changes in employment. This is partly due to the effect of midweek holidays on annual working hours. During the recovery from the depression (1994–1995), hours worked grew fast, when those on reduced working time moved into full-time employment and overtime work increased. Both the number of hours worked and employment declined from 2000 to 2004. In 2004, both measures started to increase.

Figure 3.5. Employment rate in EU15 countries in 1991–2006, share of employed in working-age population, per cent

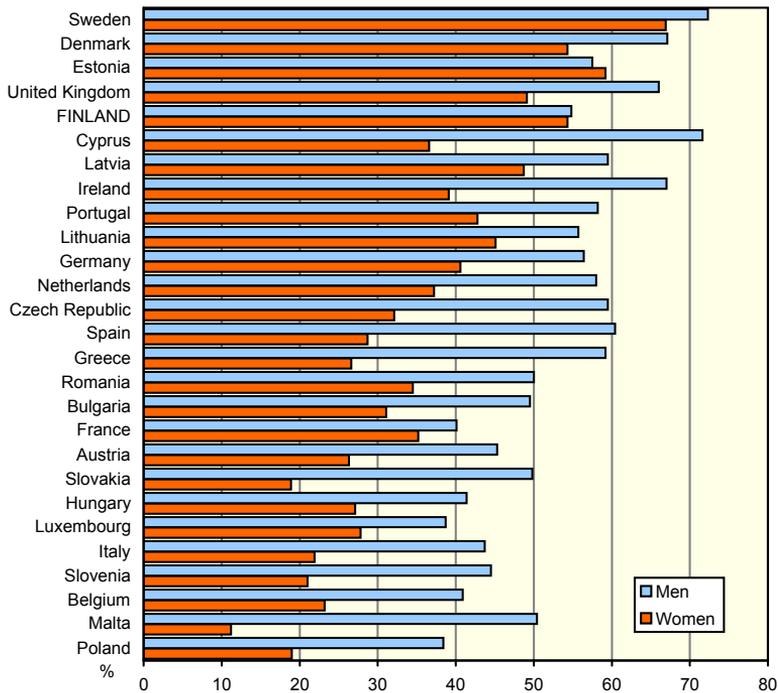


Source: VATT (EU/Employment in Europe)

The employment rate of Finnish women has always been among the highest ones in the EU. The overall employment rate was some 10 percentage points higher than the EU average at the beginning of the 1990s. Employment deteriorated rapidly during the depression. In just three years the Finnish employment rate declined to the same level with the EU average.

From the mid-1990s onwards, the employment rate in Finland has increased faster than the EU average. The employment rate of men has increased by some 9 percentage points being currently only some 2 percentage points smaller than the EU average. The employment rate of women has remained some 9 percentage points above the EU average. There is, however, a long way to go before reaching the highest overall employment rate which can be found in Denmark, Sweden and the Netherlands.

Figure 3.6. Employment rate for older (55–64-year-olds) workers by sex in the EU27 in 2006, per cent

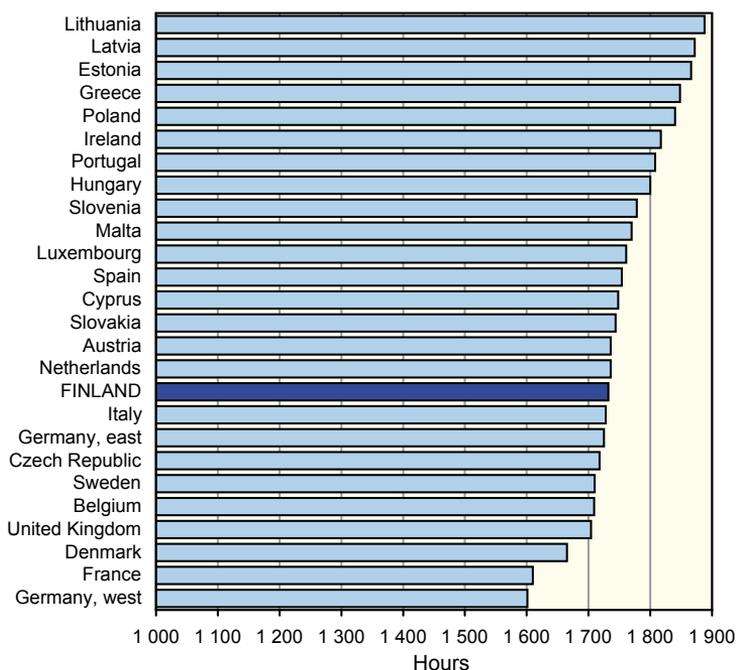


Source: VATT (Eurostat)

In 2006, about 55 per cent of Finns aged 55-64 were employed. The employment rate was clearly lower than in other Nordic countries, but higher than the EU average.

Older Swedes continue in employment more than in other countries. The other end of the scale is represented by Poland and Malta: there about 30 per cent of this age group continue working. In six EU countries, the employment rate of women is 25 or less. The lowest rate is in Romania, about 10 per cent.

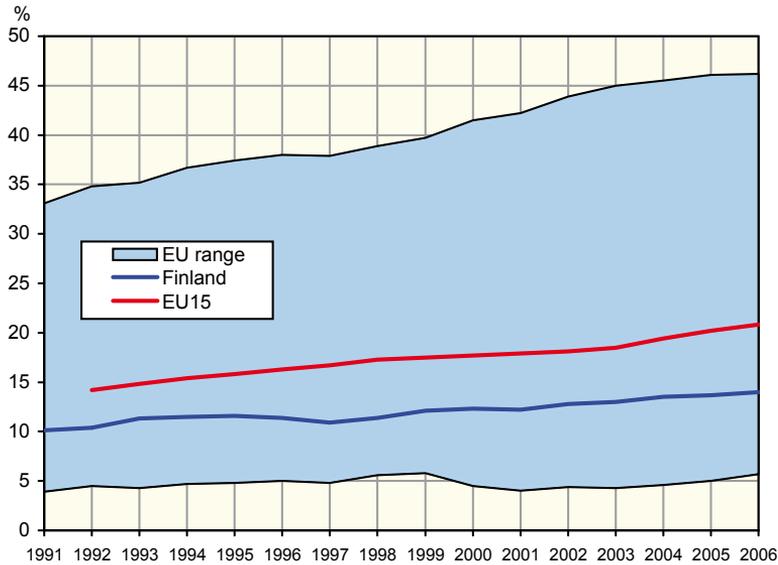
Figure 3.7. Average annual working time of an industrial worker in EU25 countries in 2004, hours



Source: The Confederation of Finnish Industries, EK

The shortening of working hours has been characteristic of the long-term development of labour markets. Annual working time has been halved during the past hundred years. Exact international comparisons of the length of working time are difficult to construe, due to sector-specific working time models and other particular factors which influence real working hours. Comparisons are usually carried out by comparing working hours in manufacturing industries. In the EU countries, the average annual working time ranges from about 1 600 hours in the western parts of Germany to nearly 1 900 in Lithuania. Finland ranks a little below the average with its 1 700 annual working hours.

Figure 3.8. Part-time workers in EU15 countries in 1991–2006, per cent of the employed

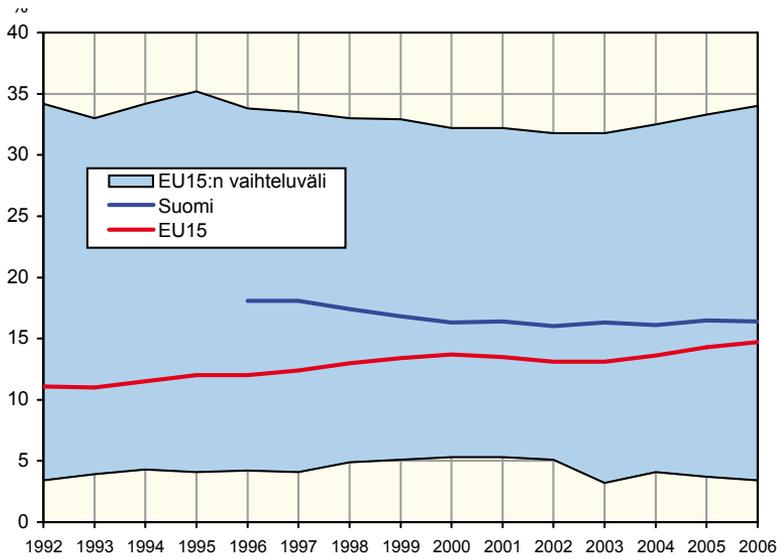


Source: EU/Employment in Europe

The share of part-time workers counts for about one fifth of total employment but varies greatly among the EU countries. The Netherlands has by far the highest share: almost half of the employed work part-time. This is nearly 20 percentage points higher than in any other country in the EU. Greece has the lowest share of part-time workers with only some 5 per cent of total employment.

The share of part-time workers has slowly grown in Finland by some 4 percentage points during the observation period. This is about 2 percentage points less than the increase in the EU average. Part-time working is more common among women. Every third woman in the EU holds a part-time job in comparison to the 10 per cent of men. Part-time work is more common among women also in Finland, even though the gender differences are smaller than in most of the EU countries.

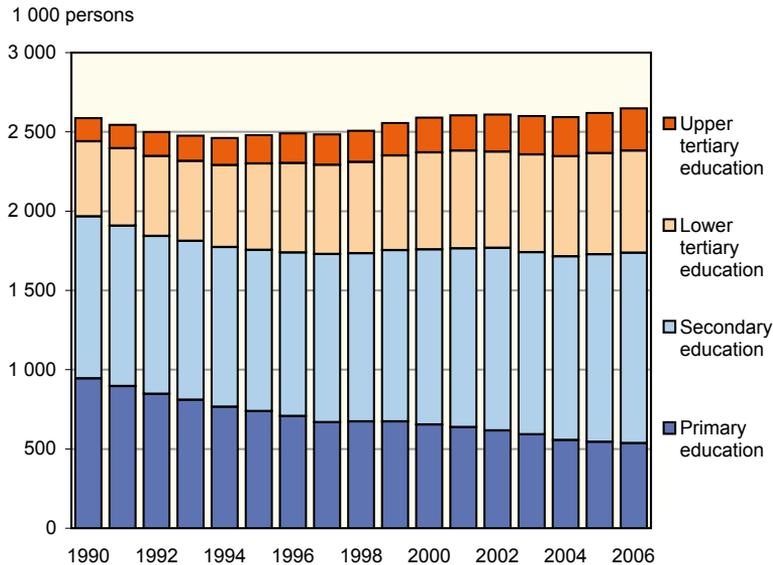
Figure 3.9. Fixed-term contracts in EU15 countries in 1992–2006, per cent of total employment



Source: EU/Employment in Europe

The share of fixed-term contracts in all job contracts shows a slight increase in the EU region, the average figure heading towards 15 per cent. The EU average hides large differences among countries ranging from over 30 per cent in Spain to less than 5 per cent in Ireland. Unlike in most of the EU countries, the share of job contracts made for fixed periods has somewhat declined in Finland during the observation period. Currently, the share of fixed-term contracts in Finland is close to the EU average.

Figure 3.10. Education level of labour force in 1990–2006, thousand persons



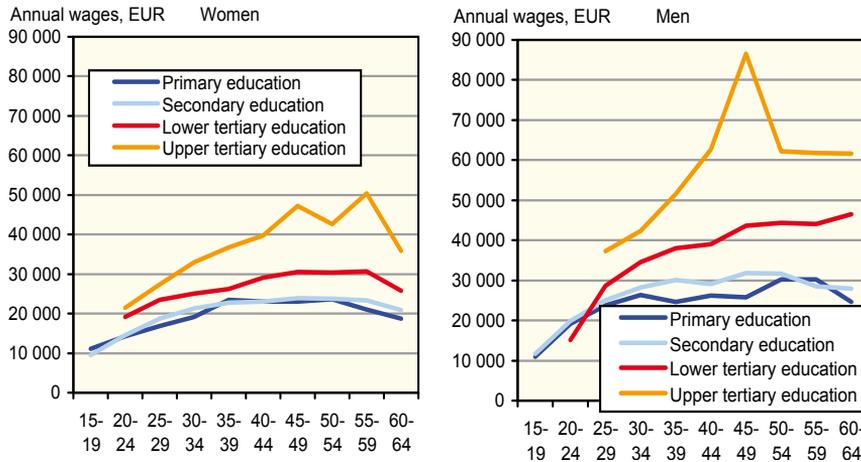
The definitions are based on the ISCED 1997.

Source: Statistics Finland/Labour Force Survey and Register of Completed Education and Degrees

The education level of the labour force is constantly improving. Since 1990, the number of people with primary education has decreased by over 400 000 persons. At the same time, there has been an increase of the same magnitude in the number of individuals having graduated from secondary or tertiary education.

The number of upper tertiary degree graduates has shown the relatively greatest growth. The size of this group has increased by 80 per cent since 1990. The corresponding figures for secondary and lower tertiary education are 17 and 36 per cent. During the latter part of the observation period, a decline in the number of individuals with primary education has slowed down.

Figure 3.11. Earnings of the employed by education level, sex and age in 2005, EUR

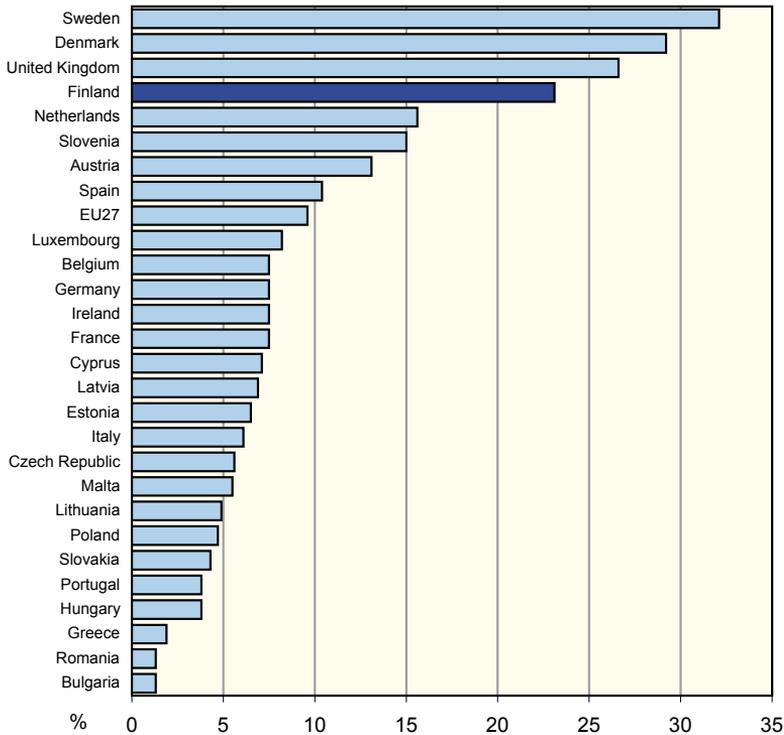


Source: VATT

The propensity to educate oneself is conditional on returns to education. Education improves average wages. Wage differences between education levels grow with age. Men and women reach the maximum wage level at the age of 55–59. In this age group, men with upper tertiary education earn over 30 000 EUR more than men with primary education.

Annual wages by education are calculated from the 2005 Income Distribution Statistics. The sample includes all those with at least six months of employment. Income from stock options is included in the wages in 2005, which causes deviation in the earnings of the best-educated workers, in particular.

Figure 3.12. Participation in life-long learning in EU27 countries in 2006, per cent of 25–64-year-olds



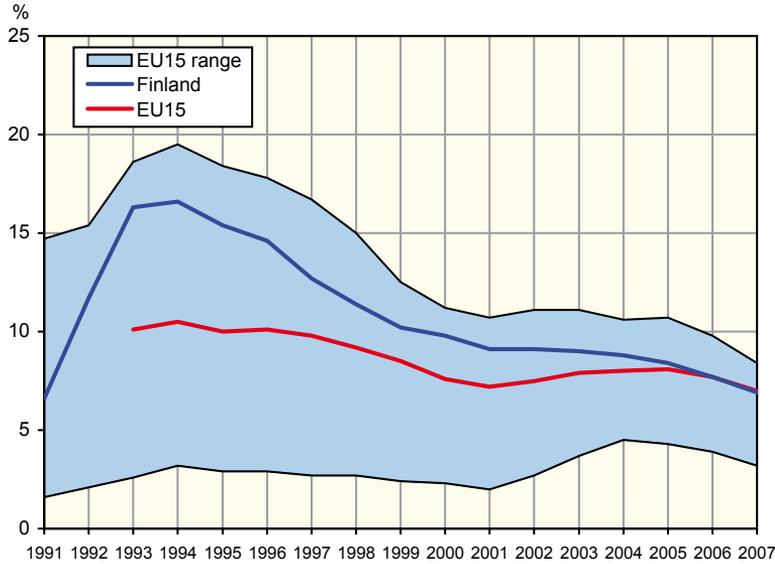
Source: Eurostat, Labour Force Survey

The information was compiled by a survey on participation in education during the four weeks period preceding the survey. Education includes initial education, further education, continuing or further training, on-the-job training, seminars, distance learning, evening classes, self-learning, etc. as well as other courses taken because of general interest: language, data-processing courses etc.

An essential characteristic of a knowledge economy is continual technical development and innovation. Under these conditions, individuals need to continually learn new ideas and skills. Participation in life-long learning in Finland compares well in the EU. Employers arrange on-the-job training for their employees. The public sector offers good opportunities for further education, for example, at open universities and workers' institutes.

### 3.3 Unemployment

Figure 3.13. Unemployment rate in EU15 countries in 1991–2007, per cent

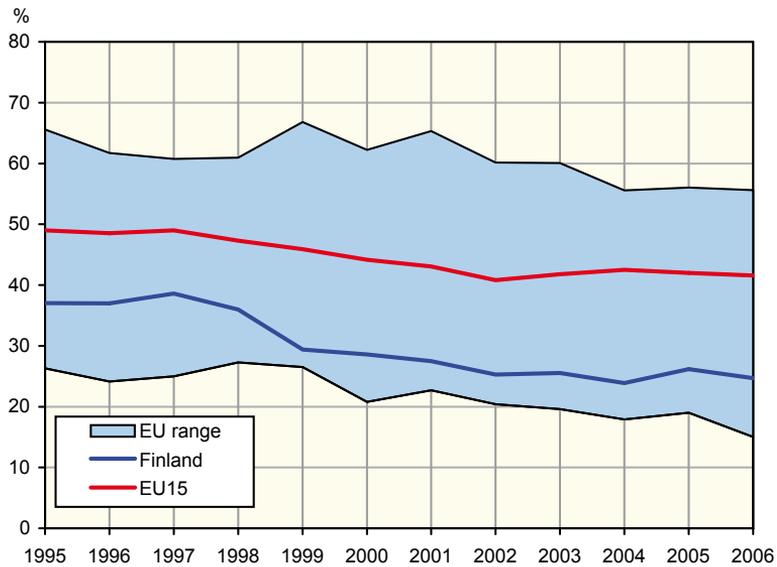


Source: VATT (EU/Employment in Europe)

In the early 1990s, the unemployment rate in Finland was catching up with the EU mean and has since exceeded it. Since 1994, however, Finnish unemployment has rapidly decreased while the EU average has also diminished gradually. Consequently, the Finnish unemployment rate was 6.9 percent in 2007 while the EU15 average was 7.0 percent.

Unemployment rates vary greatly among the EU15 countries, although the differences have decreased since the 1990s. Germany, Spain and France had the highest unemployment rates in 2007 (8.4, 8.3 and 8.3 per cent) while the Netherlands had the lowest rate (3.2 per cent). Differences among the EU25 countries are even larger. The highest unemployment rates were in Slovakia and Poland (11.3 and 9.6 per cent). The lowest rate in Cyprus (3.9 per cent) is somewhat higher than the lowest rate in the EU15.

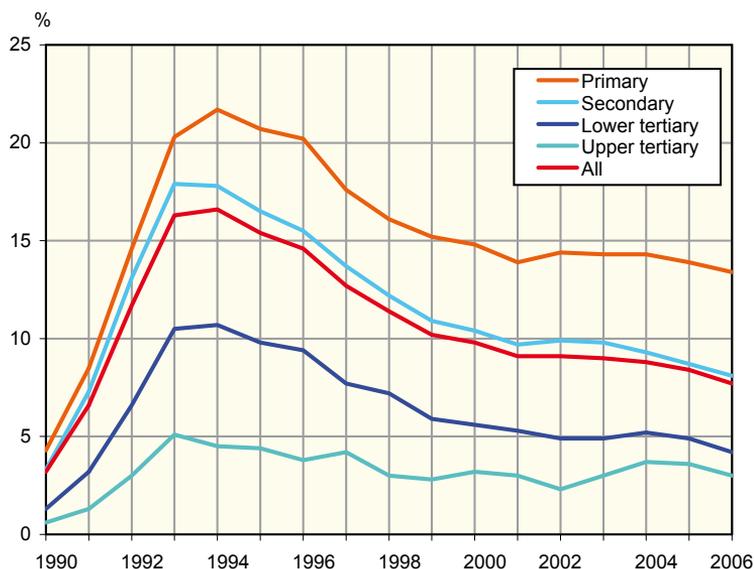
Figure 3.14. Long-term unemployed in EU15 countries in 1995–2006, per cent of unemployed



Source: VATT (EU)

Four out of ten unemployed people have been unemployed for longer than one year in the EU, on average. Long-term unemployment has declined during the observation period, but worryingly there have been no observable changes during the past few years. Long-term unemployment is widespread in Italy, Belgium, Greece and Germany where the share of long-term unemployed may exceed 50 per cent. Long-term unemployment is less of a problem in the Scandinavian countries. The same applies to Finland where the long-term unemployment rate is some 25 per cent.

Figure 3.15. Unemployment rates by level of education in 1990–2006, per cent

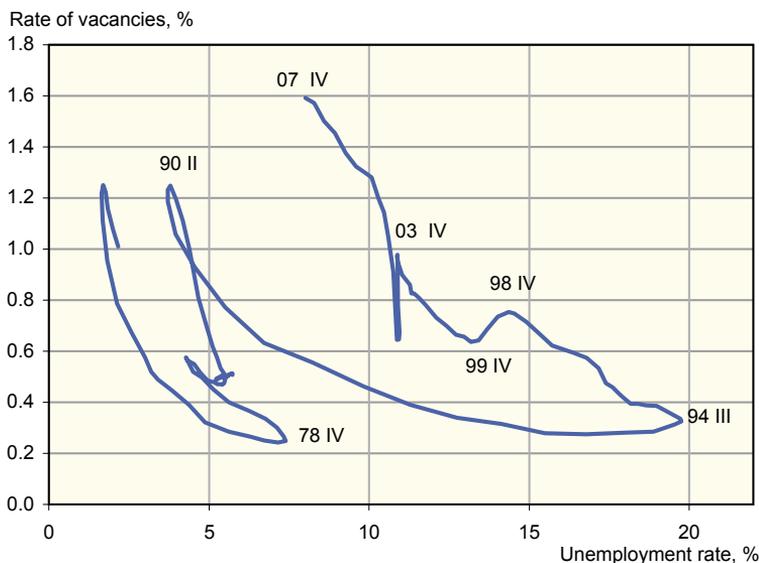


Source: Labour force survey/Statistics Finland

At the beginning of the 1990s, unemployment rates were low at all education levels. During the depression, the total unemployment rate grew fivefold. The unemployment rate among less-educated peaked at 22 per cent, from which it has come down to 13 per cent. Those with lower or upper tertiary education faced an eightfold increase in unemployment rates – up to 10 and 5 per cent, respectively. From these levels, their unemployment rates have gradually lowered to 3–4 per cent. In absolute terms, unemployment differences across levels of education have increased during the observation period. The gap between the unemployment rates of the least and the most educated groups has widened from 4 percentage points to 10 percentage points.

### 3.4 Functioning of labour market

Figure 3.16. Rate of vacancies and unemployment rate in Finland in 1973/4–2007/4, moving average of four quarters



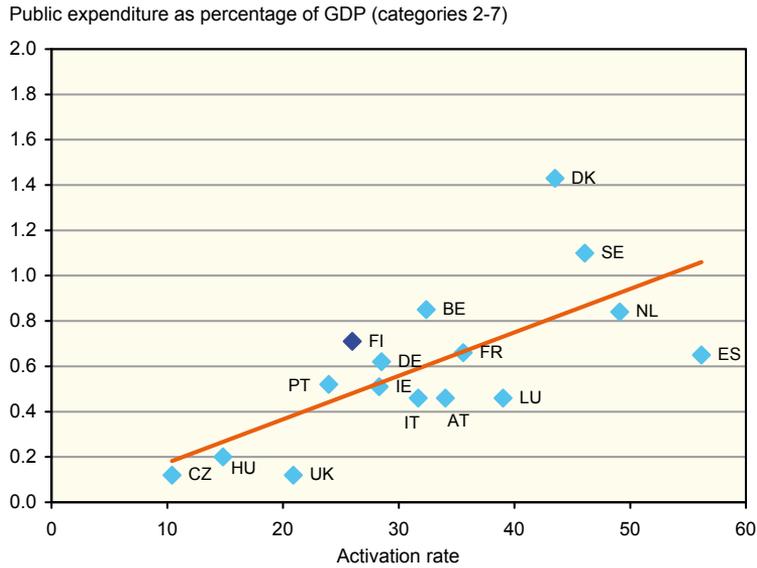
Source: Ministry of Labour and Statistics Finland

The vacancy rate corresponds to the ratio of vacancies in the public employment service statistics to the total of the vacancies and the employed. The unemployment rate is calculated as the proportion of unemployed job-seekers (compiled by the Ministry of Labour) to the total of the unemployed and the employed.

The relation of the vacancy rate to the unemployment rate is considered as an indicator of structural labour market problems. If a certain vacancy rate couples with a higher unemployment rate than earlier (the curve moves further from the origin), structural problems have worsened. The figure shows this to have occurred both at the end of the 1970s, when unemployment fell after a recession, and in the mid-1990s, during the recovery from the depression of the early 1990s.

In 1999, the curve turned towards the origin, i.e. the unemployment rate diminished simultaneously with the vacancy rate. This reflects a faster fill rate of vacancies, which in turn implies that structural problems were, at least, not worsening. At the beginning of the year 2000, the direction of the curve seems to have turned again as the rate of vacancies started to increase after 1999. One should bear in mind that the market share of employment service varies over time, which affects the movements of the curve.

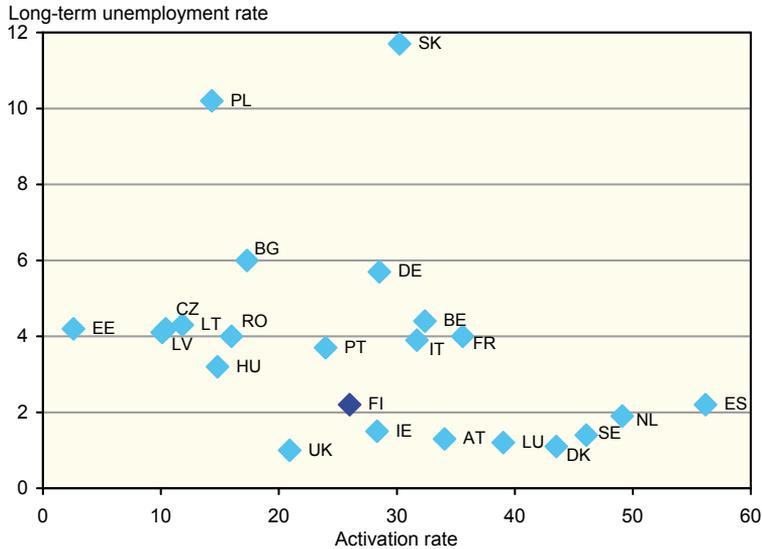
Figure 3.17. Public expenditure in active labour market policies as a percentage of GDP and activation rate in some EU countries in 2005



Source: OECD, Eurostat

The comparison of the public expenditure in active labour market policies with the activation rate shows that the extent of active labour market policies varies substantially between the EU member states. Public expenditure as a percentage of GDP is highest in Denmark and Sweden. On the other hand, Spain has the highest activation rate, even though the public expenditure as a percentage of GDP is on the average level. The public expenditure as a percentage of GDP and activation rates are lowest in Czech Republic, Hungary and United Kingdom.

Figure 3.18. Long-term unemployment rate and activation rate in some EU-countries in 2005



OECD, Eurostat

The long-term unemployed are the main target group for active labour market programmes. Spain, the Netherlands, Sweden and Denmark have highest activation rates and low long-term unemployment rates. Countries with low activation rates typically have higher long term unemployment rates, although United Kingdom has achieved a low long-term unemployment rate by a low activation rate. Despite exceptions, the general feature is that high activation rate implicates low long-term unemployment rate.

Public expenditure as a percentage of GDP corresponds to the OECD definition (Employment Outlook 2007). Active labour market policy measures (categories 2-7) include: training, employment incentives, supported employment and rehabilitation, direct job creation and start-up incentives. The activation rate is the ratio of participants in active labour market programmes to the total number of unemployed job-seekers and participants in those programmes. The long-term unemployment rate is the proportion of long-term unemployed (duration of unemployment is one year or longer) to the total number of labour force.

VATT researchers have made several publications on this area. See for example:

Appelqvist Jukka (2007): Wage and Earnings Losses of Displaced Workers in Finland. [VATT discussion papers 422](#). Helsinki

Böckerman P. – Uusitalo R. (2006): Union membership and the erosion of the Ghent system: Lessons from Finland. *British Journal of Industrial Relations* 44:2 283–303

Hämäläinen Kari – Tuomala Juha (2007): Vocational Labour Market Training in Promoting Youth Employment. [VATT discussion papers 432](#). Helsinki

Hämäläinen K. – Uusitalo R. – Vuori J. (2008): Varying bias in the matching estimates: Evidence from two randomized job search training experiments. *Labour Economics* (in press)

Hämäläinen Kari – Uusitalo Roope – Vuori Jukka (2008): Varying Biases in the Matching Estimates: Evidence from two Randomized Job Search Training Experiments. *Labour Economics*, forthcoming. (Also available as [VATT discussion papers 438](#))

Ilmakunnas Seija – Takala Mervi (2005): Promoting Employment among Ageing Workers: Lessons from Successful Policy Changes in Finland, *The Geneva Papers on Risk and Insurance-issues and Practice* 30:4, 674-692

Ilmakunnas Pekka – Ilmakunnas Seija (2008): Gradual retirement and lengthening of working life, in Kemp P. A. – van den Bosch K. – Smith L. (eds.), *Social Protection in an Ageing World*, *International Studies on Social Security*, Intersentia

Kangasharju A. (2007): Do Wage Subsidies Increase Employment in Firms? *Economica*, 74, 51–64. (Also available as [VATT discussion papers 378](#))

Korkeamäki Ossi – Uusitalo Roope (2008): Employment and Wage Effects of a Payroll-Tax Cut-Evidence from a Regional Experiment. *International Tax and Public Finance*, forthcoming. (Also available as [VATT discussion papers 443](#))

Koskela E. – Uusitalo R. (2006): *The Un-Intended Convergence: How the Finnish Unemployment Reached the European Level*, Werding, Martin (ed.), *Structural Unemployment in Western Europe: Reasons and Remedies*, Cambridge MA, London UK: MIT Press

Kyyrä Tomi (2007): *Studies on Wage Differentials and Labour Market Transitions*. [VATT research reports 133](#). Helsinki

Kyyrä Tomi (2008): Partial Unemployment Insurance Benefits and the Transition Rate to Regular Work. [VATT discussion papers 440](#). Helsinki

Kyyrä Tomi – Ollikainen Virve (2006): To Search or Not to Search? The Effects of UI Benefit Extension for the Elderly Unemployment. *Journal of Public Economics*, forthcoming. (Also available as [VATT discussion papers 400](#))

Kyyrä Tomi – Wilke Ralf A. (2006): Reduction in the Long-Term Unemployment of the Elderly: A Success Story from Finland Revised. [VATT discussion papers 396](#). Helsinki

Räisänen Heikki (2005): Recent Labour Market Developments in Europe. [VATT research reports 116](#). Helsinki

Räisänen Heikki (2005): What Kind of Job-broker is the Public Employment Service? Evidence from Finnish Job Vacancy Microdata in 2002–2003. [VATT discussion papers 352](#). Helsinki

Räisänen Heikki with the contribution of Heinonen Elisabet (2005): Comparative Analysis on the Job-Broking Market in Japan and Finland. [VATT discussion papers 370](#). Helsinki

Uusitalo R. – Vartiainen J. (2007): Finland: Firm Factors in Wages and Wage Changes. Lazear E. – Shaw K. (eds.) Wage Structure, Raises and Mobility: International Comparisons of the Structure of Wages Within and Across Firms, University of Chicago Press (in press)

Uusitalo Roope – Verho Jouko (2007): The effect of unemployment benefits on re-employment rates: Evidence from the Finnish UI-benefit reform, IFAU Working Papers 2007:21



## 4 Taxation

In the 1980s, the total tax revenue as a percentage of the GDP remained in Finland at the level of 40 per cent which was close to the EU15 average level. In the 1990s, the ratio of tax to GDP rose to over 45 per cent. In 2006 it was 44 per cent. The Finnish tax to GDP ratio is the fifth highest among the EU15 countries and it exceeds the EU15 average by about four percentage points.

Personal income taxes and social security contributions form a considerably higher share of the total tax revenue in Finland than in other EU19 countries, i.e. those EU countries which are members of the OECD, on average. This is partly due to the abolishment of tax deductions and allowances (tax expenditures) or their compensation by income transfers. The ratio of tax expenditures to the tax revenue has indeed halved in Finland since the end of the 1980s as a result of reforms. Most income transfers to households are also taxable, which raises the tax ratio.

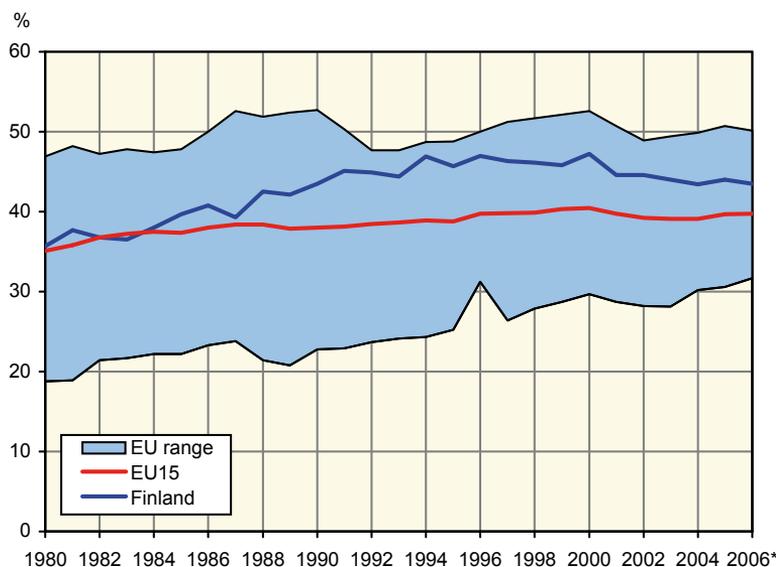
In Finland, the tax wedge on the labour costs is higher than the average of the EU19 countries. Especially marginal tax rates are high. Furthermore, personal income taxes are higher than the EU19 average for all types of families and various income levels. Single individuals make an exception. Their taxes go a bit below the EU19 average. The difference is biggest on those families with small children and only one wage earner with high income. The situation becomes more balanced if one takes into account income transfers to households. If the benefits gained from services provided by the public sector are included, the net earnings of Finnish families change for the better.

The taxation of profits and capital income in general varies a lot in the EU countries. The nominal income tax rate for corporations in Finland is about the EU average.

In Finland, indirect taxation is heavy. The value added tax rates are among the highest in the EU25, as are the excise duties on alcohol, fuels and vehicles. On the other hand, taxation on property (incl. real estate taxes) is relatively light, and there is no wealth tax.

## 4.1 Level of taxation

Figure 4.1. Tax to GDP ratio in Finland and EU15 countries in 1980–2006\*, per cent



Source: VATT (OECD/Revenue Statistics and Statistics Finland/Economic Statistics)

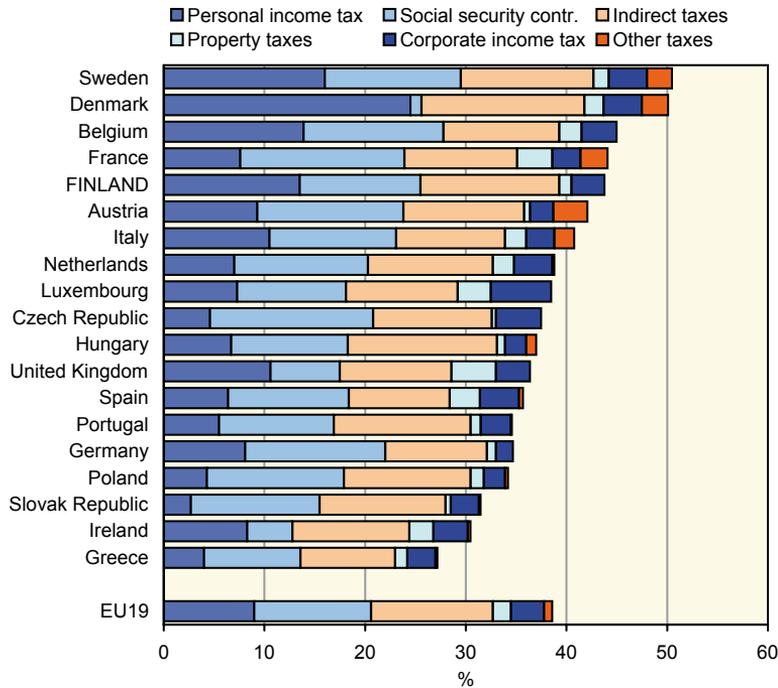
In 2006, the total tax revenue as a percentage of GDP in Finland was 43.5 per cent, 8 percentage points higher than in 1980. While the Finnish tax ratio in the late 1980s was at the EU15 average level, it is now clearly above it. In Finland, the tax ratio began to increase faster since the end of the 1980s. At its highest, it was 47.2 per cent in 2000; since then the tax ratio has decreased by 3.7 percentage points. Among the EU15 countries, the Finnish tax ratio is the fifth highest after Sweden, Denmark, Belgium and France. There remain large differences in the level of tax ratios among the EU15 countries.

Tax ratio = accrual basis tax revenue (incl. social insurance contributions) / gross domestic product

Country-specific comparisons of tax ratios are difficult because of differing subsidies to individuals and firms across countries. Support given in the form of tax deductions lowers the tax ratio, and a taxable income transfer or subsidy raises it. A general trend in the Nordic countries has been to substitute tax deductions for income transfers, which has led to rising tax ratios and increasing public spending, even though the economic position of taxpayers has not changed. In Finland, by the 1980s, income transfers were made taxable in most cases and in the 1994 family support reform, tax deductions for children were removed while the child and housing allowances were increased, respectively.

## 4.2 Tax structure

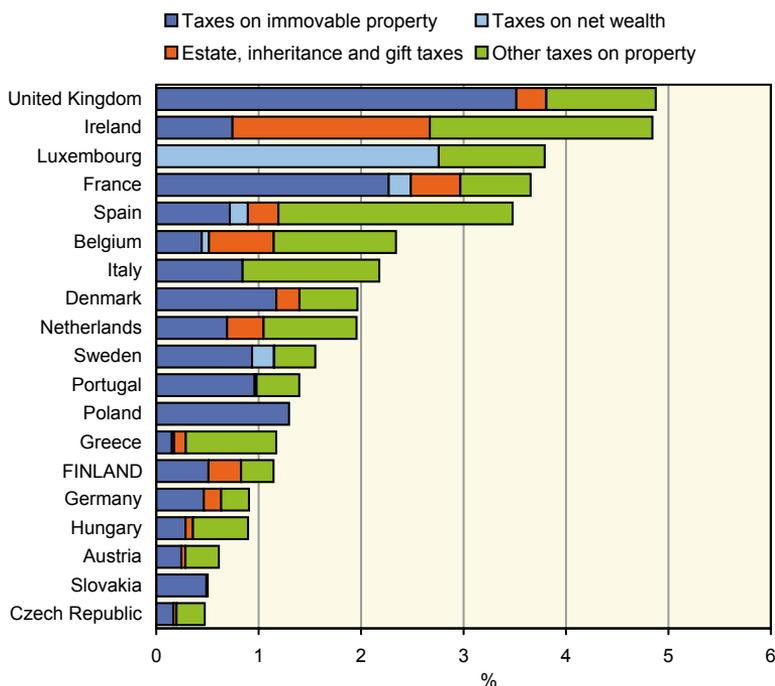
Figure 4.2. Tax structures in 2005, per cent of GDP



Source: OECD/Revenue Statistics

The differences in tax to GDP ratios between the EU19 countries are mainly explained by how heavily personal income is taxed. The highest income tax plus social security contribution in relation to GDP is in Sweden (30 per cent) and the lowest in Ireland (13 per cent). Finland ranks fourth in this comparison after Sweden, Denmark and Belgium. The share of corporate income tax in GDP in Finland is at the EU19 average level (3.3 per cent). Taxes on property (i.e. taxes on wealth, real estate tax and inheritance tax), on the other hand, form the seventh smallest share of GDP in Finland compared to the EU19 countries.

Figure 4.3. Taxes on property in EU19 countries in 2006, per cent of GDP

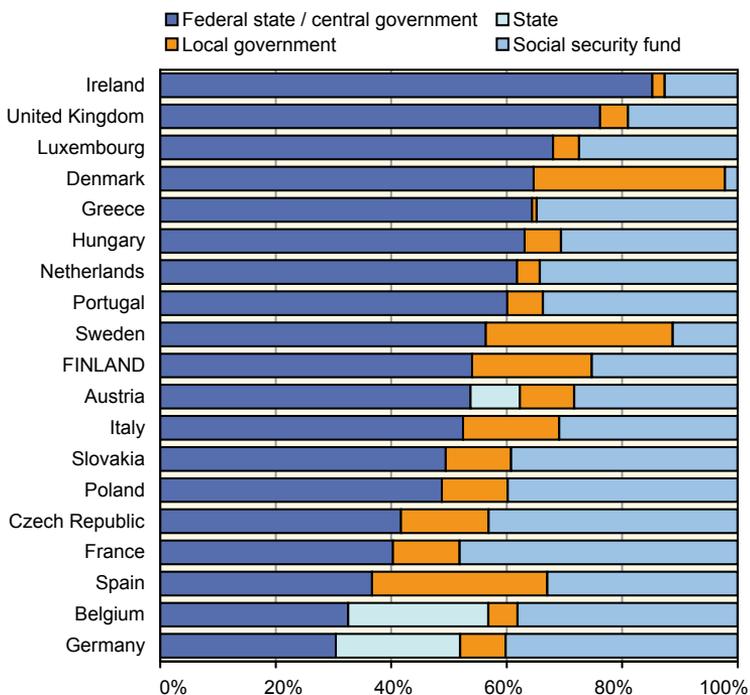


Source: OECD

Taxes on property as a percentage of GDP vary considerably among countries. In the United Kingdom, the percentage was almost five in 2006. This was mainly due to the high taxes on immovable property and other taxes on property consisting largely of the stamp duty. Also Ireland reached that level by collecting lots of taxes on financial and capital transactions as well as on estate, inheritance and gifts. Finland stands clearly below the average of the EU19 countries in this comparison. Taxes on net wealth and on estate, inheritance and gift have become of less importance. The wealth tax has been abolished in many countries. For most countries, other taxes on property (e.g. taxes on financial and capital transactions) are a prominent source of income. Taxing immovable property is also a remarkable way to collect taxes.

### 4.3 Tax recipients

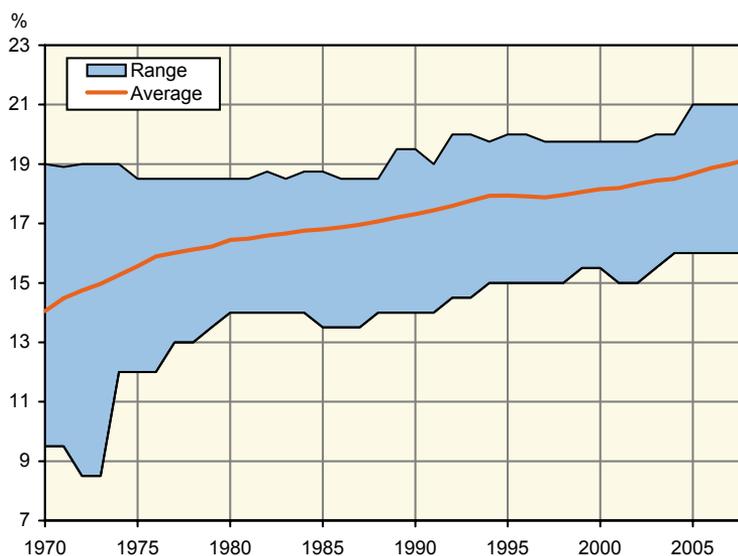
Figure 4.4. Shares of tax revenue by tax recipients in EU19 countries in 2005, per cent



Source: OECD/Revenue Statistics

The EU19 countries have organised the administration of tax collection and the use of tax revenue in different ways. In Finland and other Nordic countries, decision-making regarding a large share of taxation and public spending has been decentralised to the lower levels of administration. Municipalities take care of welfare services to a large extent and are, at the same time, important tax collectors. Also in Spain, the tax share of local government is on the Nordic level. In other EU19 countries, the share of local government is smaller. In some federal states, however, individual states are responsible for collecting a part of the taxes. In some countries, the social security funds are the biggest tax recipients.

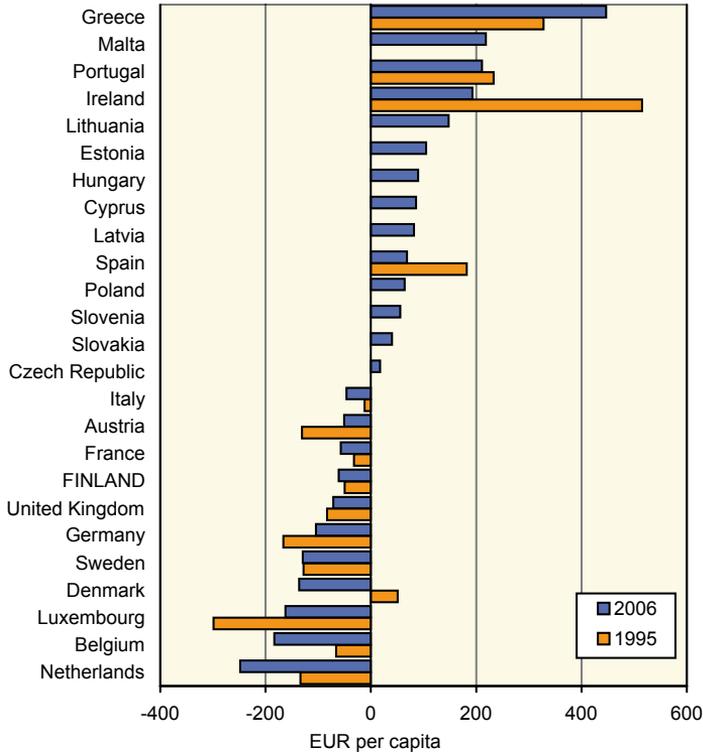
Figure 4.5. Range of municipal tax rates and average tax rate in Finland in 1970–2008, per cent



Source: VATT (Statistics Finland/Municipal Accounts)

The average municipal tax rate increased by over 5 percentage points between 1970 and 2008. The strong rise in the tax rate in the 1970s may be explained by the rapid extension of tasks given to municipalities during the decade. In the early 1980s, on the other hand, the increase in tax rates was quite modest, apparently owing to the state grant system which was favourable to the municipalities. From the end of the 1980s, tax rates started to rise again with increasing municipal expenditure. The depression in the early 1990s forced the municipalities to increase their tax rates to compensate for the diminishing tax base. After the mid-1990s, the average tax rate even decreased slightly, owing to the fast growing tax base and tight management of finances, especially by curbing local government expenses. At the beginning of the 2000s, the average tax rate began to rise in connection with the halt in the growth in corporate tax revenue as well as the influence of earned income deduction upon tax revenue. Since 2003, the income deductions have been compensated to the municipalities but despite this, exceptionally many municipalities have increased their tax rates in 2005 and 2008. This development is closely related to the rapid increase of municipal expenditures.

Figure 4.6. Net contributors (-) and net recipients (+) in EU25 budget in 1995 and 2006, EUR per capita



Source: VATT (Annual reports of Court of Auditors from the budget years of 1995 and 2006, EU)

In 2006, net recipients in the EU budget among the EU25 countries were Greece, Portugal, Ireland, and Spain of the old member countries. All ten new member countries were also net recipients. These countries received more in subsidies from the EU than they paid to the EU budget. These countries, excluding Ireland, are regarded as so-called poor member countries. Their share of payments to the EU25 budget is lower than the EU average because the EU membership fees are shared between member countries in proportion to their GDP, approximately. For example, Portugal has a smaller share of the total payments to the EU budget than Finland although its population is more than twofold. Spain has a population of eight times the one of Finland but its total payments to the EU budget are only sixfold.

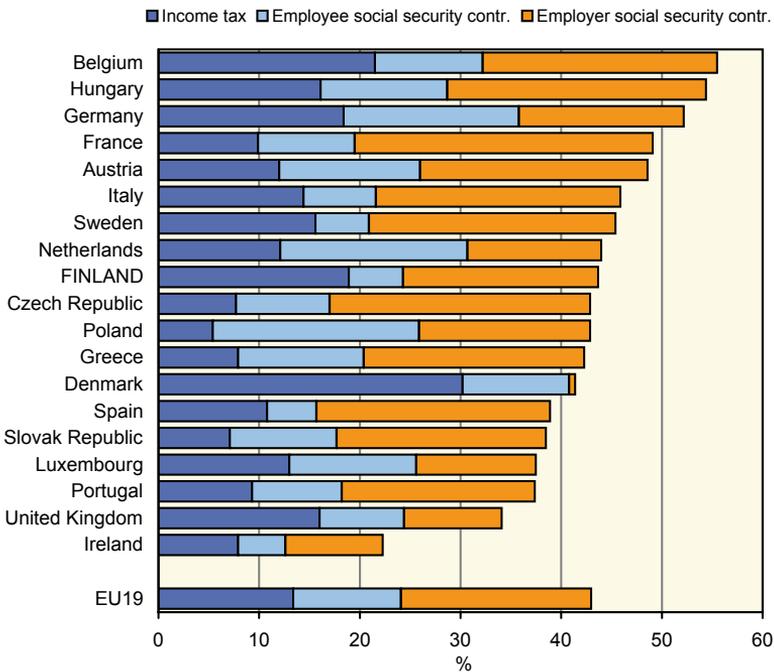
The large net income of Ireland is mainly due to large subsidies from the EU. The country receives both agricultural subsidies and subsidies from the structural fund

in considerably greater amounts than EU countries on average. This is also the case in Greece and Spain. The large net income in Portugal is explained by both large subsidies from the structural fund and small payments to the EU budget. Payments were smallest per capita in Portugal and Greece in the EU15 and in Poland and Latvia in the EU25.

## 4.4 Taxation of earned income

### Tax wedge of earned income

Figure 4.7. Income tax plus employee and employer social security contributions of single average worker (AW) in 2007, per cent of total labour costs

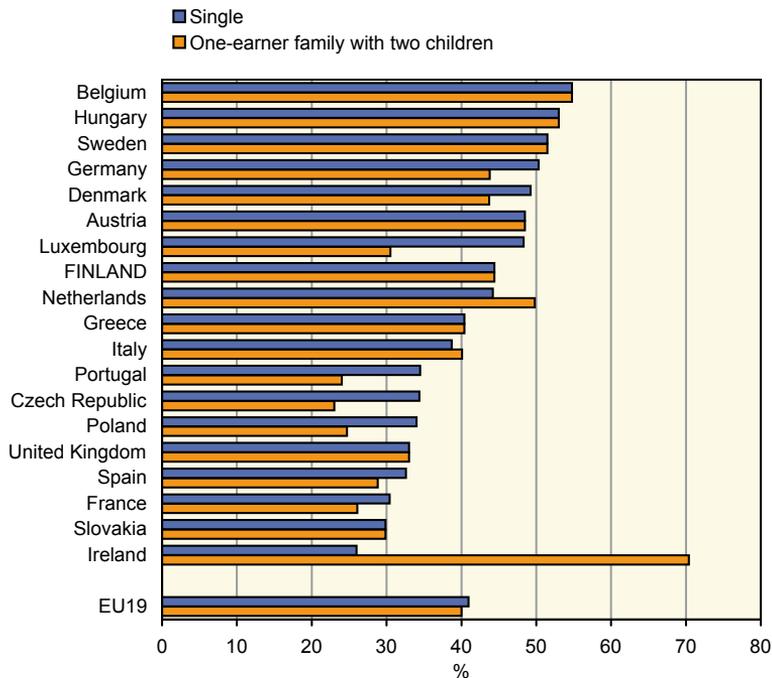


Source: OECD/Taxing Wages

The Finnish taxation of earned income (gross wages and employer social security contributions) ranks the ninth highest in the EU19 and the tax wedge is near the EU19 average. The lowest tax wedge is in Ireland and United Kingdom and the highest is in Belgium. The order of countries changes a bit, if merely taxes

on earned income (gross wages) are considered. In Finland, income taxation without the employee social security contributions is the third highest, but in many countries social security contributions are higher than in Finland. Income taxation is lowest in Poland; however, the Polish social security contributions are the third highest in the EU19.

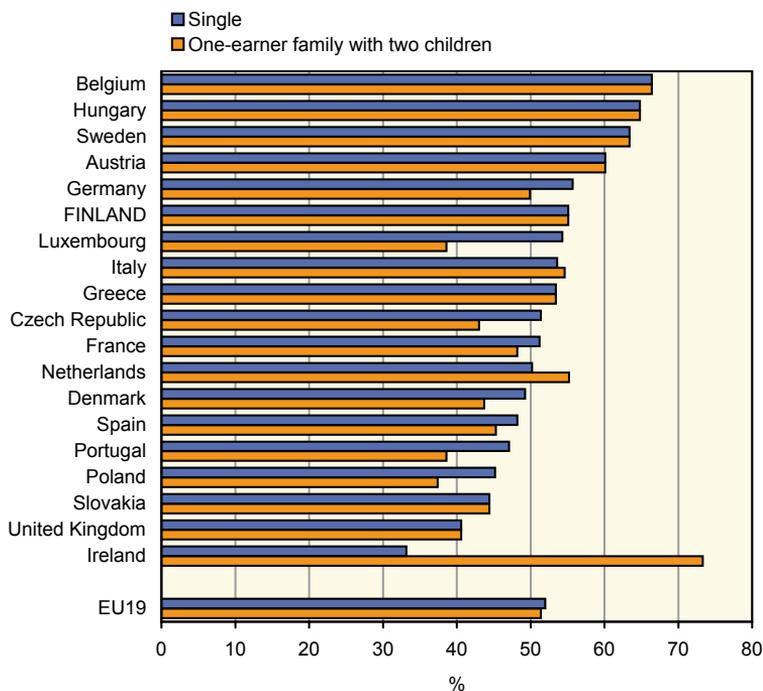
Figure 4.8. Marginal tax rate of gross wages (income tax and employee social security contributions minus child benefits) at average worker (AW) wage level in 2007



Source: OECD/Taxing Wages

In Finland, the marginal average tax rate of earned income in 2007 was 44 per cent for a single person – over 3 percentage points higher than the EU19 average. The EU19 average marginal tax rate for a family with two children and one wage earner was about 1 percentage points lower than for a single person. Support for families via taxation is given in eight of the EU19 countries. In Luxembourg, Czech Republic and Portugal, families with children were entitled to largest deductions. In some countries, child benefits depend on income and diminish when the income rises. Therefore, the marginal tax rate of the one-earner family rises above that of the single taxpayer.

Figure 4.9. Marginal tax rate of labour costs (income tax, social security contributions for both employee and employer minus child benefits) at average worker (AW) wage level in 2007

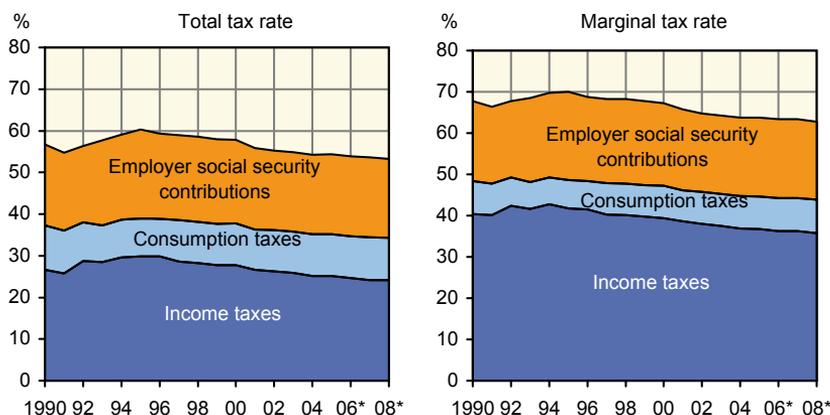


Source: OECD/Taxing Wages

The marginal tax rate of labour costs is higher than the marginal tax rate for wage costs only because of the employer social security contributions. In Finland, the marginal tax rate of labour costs is 55 per cent, whereas the EU19 average is 52 per cent for single persons and somewhat lower for families.

## Tax wedge in Finland

Figure 4.10. Total and marginal tax rates of average production worker (APW) wage level in Finland 1990–2008\*, per cent of labour costs



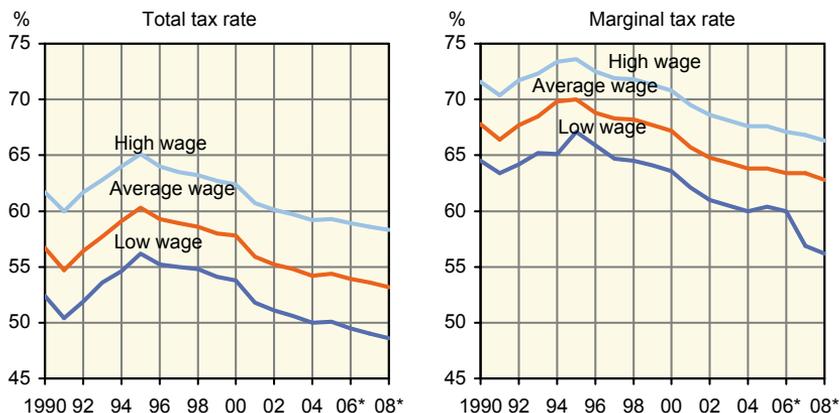
Source: VATT

The total tax wedge, i.e. the sum of income taxes (incl. employee social security contributions) and consumption taxes plus the employer social security contribution as a percentage of total labour costs, grew in Finland until 1995. Since then, the wedge has slowly diminished. Changes in the tax wedge are influenced by both a rise in the income level and changes in tax rules. In most years, the average wage level has risen in real terms. Owing to progressive taxation, the real wage increase raises the income tax rate as such, even if inflation adjustments were made to the income tax schedule and tax deductions.

The tax wedge of the wage increase, i.e. the marginal tax rate for labour costs, is the share of the increase in taxes on labour costs due to the wage increase. The income tax is an important component of the tax wedge. A large income tax share in the tax wedge diminishes net wages disposable for consumption and, consequently, the share of indirect taxes in the tax wedge. The share of the employer social security contributions of labour costs is the same in both the marginal and the total tax wedges.

The tax wedge of the APW wage increase is nearly 63 per cent in 2008. During the whole period under consideration, it has been about 10 percentage points higher than the respective total tax wedge calculated from the annual income.

Figure 4.11. Total and marginal tax rates of low, average (APW) and high wage production workers in Finland in 1990–2008\*, per cent of labour costs



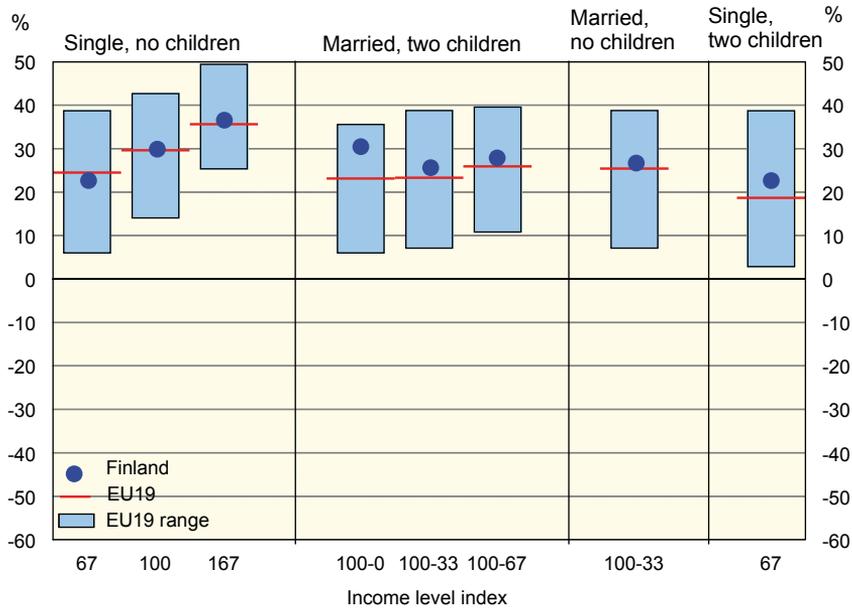
Consumption taxes are included.

Source: VATT

The tax wedge of the high wage earner (who earns 167% of the wages of the APW) is about 5 percentage points higher than the tax wedge of the APW. The tax wedge of the low wage earner (who earns 67% of the wages of the APW) is, correspondingly, about 4 percentage points lower than the tax wedge of the APW. In 2008, the monthly wage of the low wage earner is about 1 800 EUR, of the average wage earner (APW) 2 650 EUR, and of the high wage earner about 4 450 EUR. Between 1991 and 1995, the total tax wedges increased about 5–6 percentage points, but after that they began to decrease at all income levels.

## Tax rate by family type

Figure 4.12. Average income tax rate (taxes and social security contributions, per cent of wages) by family type and income level in 2007



100 = Average worker's (AW) wage

67 = Wages 67% of AW wage

167 = Wages 167% of AW wage

100-0 = One spouse employed with AW wage, other at home

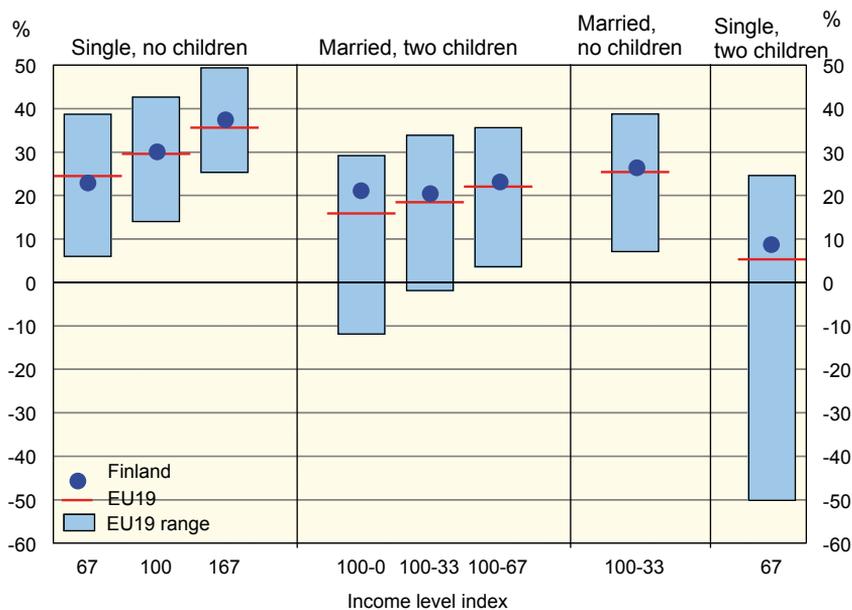
100-33 = One spouse earns AW wage, other 33% of it

100-67 = One spouse earns AW wage, other 67% of it

Source: OECD/Taxing Wages

Taxation varies in all countries according to both income and type of family. In Finland, the tax rates for a single person are quite near the EU19 average. For married persons, the tax rates are somewhat higher than in the EU19 on average, especially in one-earner families. The tax rate is calculated as a weighted average of the tax rates of spouses. Finland applies a separate assessment of spouses which means that the tax rate of the spouse who earns less decreases the average tax rate of a couple. A corresponding situation exists in Austria, Greece, Hungary and Sweden. In countries where joint assessment applies, the effect depends on the configuration of the system.

Figure 4.13. Income tax plus social security contribution minus child benefits by family type and income level in 2007, percentage of gross wages



100 = Average worker's (AW) wage

67 = Wages 67% of AW wage

167 = Wages 167% of AW wage

100-0 = One spouse employed with AW wage, other at home

100-33 = One spouse earns AW wage, other 33% of it

100-67 = One spouse earns AW wage, other 67% of it

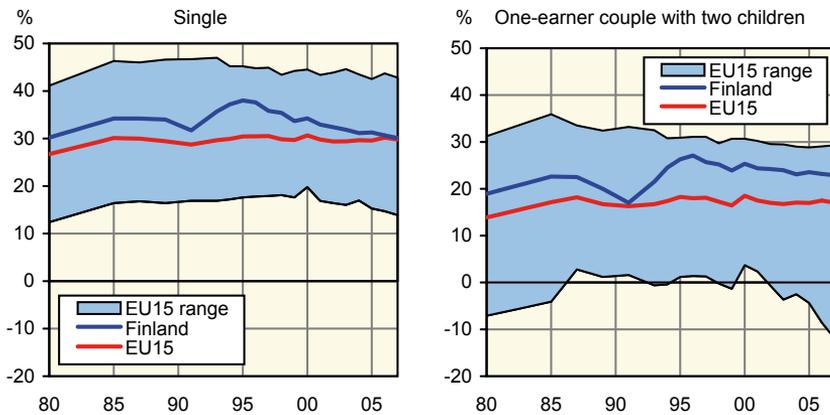
Source: OECD/Taxing Wages

The position of different types of families changes somewhat when child benefits are taken into consideration. The position of Finland compared with the EU19 average remains the same, except for an improvement in the relative position of single parents. Their net tax burden is only 4 percentage points higher than the EU19 average, but notably heavier in gross terms.

The tax burden of a single person is 7 percentage points higher than that of a married person with children, although the gross tax burdens are equal. This is caused by child benefits which in Finland are granted as income transfers.

Many countries also support low income earners and families by payable tax credits which are paid to taxpayers in cash to the extent that the deduction exceeds the tax payable. For this reason the tax rate can be negative.

Figure 4.14. Income tax plus social security contribution minus child benefits of single person and of one-earner couple with two children at APW wage level in Finland and EU15 countries in 1980–2007, percentage of gross earnings



Source: OECD/Taxing Wages

In Finland, the net tax burden of wage earners (taking the income transfers into account) has been constantly higher than the EU15 average, although the income tax rate has been reduced significantly after 1995. In the case of single persons, the difference from the EU15 average has decreased in the recent years. In 2007, the tax rate of a single person almost reached the EU15 average. The tax burden was at its highest in Germany and at its lowest in Ireland.

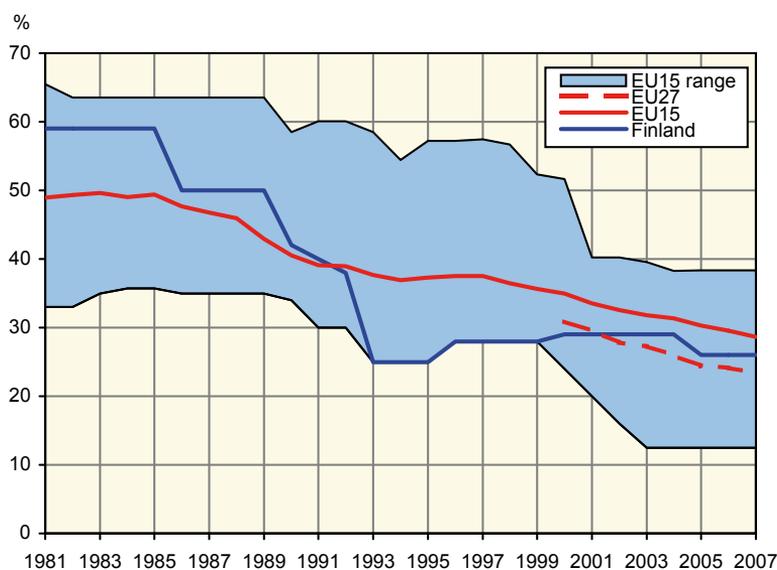
The tax burden of persons with families is also heavier than in the EU15 on the average and, in their case, the difference from the EU15 average has grown. At the beginning of the 1990s, Finland nearly reached the EU15 average, but in 2007 the gap was 6 percentage points. Differences within the EU15 are wide and have grown during the past ten years. The tax burden is at its highest in Denmark and at its lowest in Ireland where received income transfers exceed taxes which have been paid. The EU15 average tax rate for a person with a family is 13 percentage points lower than that of a single person. In Luxembourg, Belgium and Ireland, the difference is over 20 percentage points.

In part, the differences reflect the different roles of public services across countries, as tax revenue is mainly used for these services. In addition, the structure of

taxation is shown in the differences. In some countries, the bulk of tax revenues accrues from sources other than personal income tax.

## 4.5 Corporate and capital income taxation

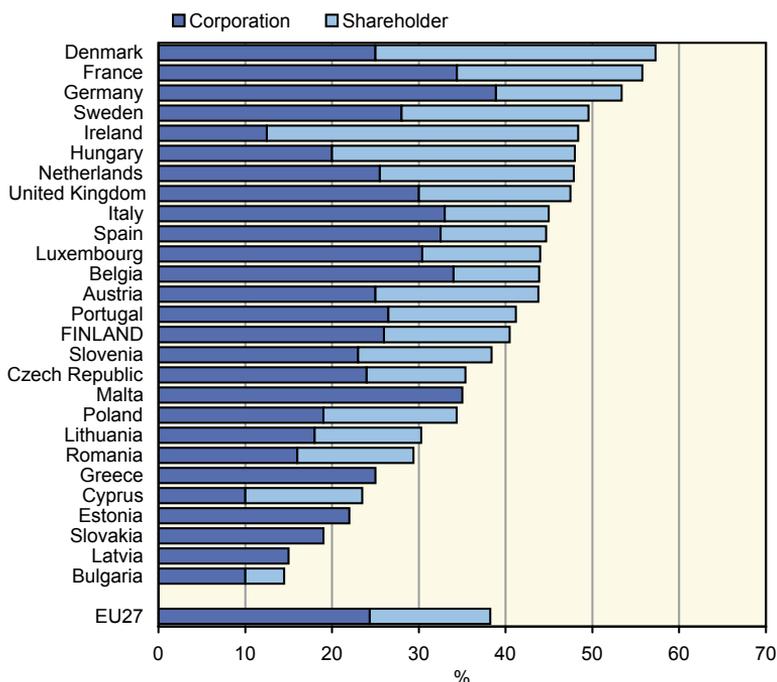
Figure 4.15. Statutory corporate tax rates of retained profits in EU15 countries in 1981–2007, per cent



Source: KPMG

In 1981, the Finnish corporate tax rate was the third highest (59 per cent) in the EU15 after Germany and Austria and 10 percentage points higher than the EU15 average. In 25 years, the statutory tax rate has fallen in Finland 33 percentage points. During 1993–1999, the Finnish corporate tax rate was lowest in the EU15, even though it was raised from 25 to 28 per cent in 1996. In 2000, the tax rate was further raised to 29 per cent. In 2005, it was lowered to 26 per cent. The Finnish corporate tax rate is still 3 percentage points below the EU15 average. The average EU15 tax rates have fallen by 20 percentage points but the difference between the highest and the lowest rate is still about 25 percentage points. When considering the EU25 countries, the new member countries lower the EU average tax rate by 5 percentage points in 2007.

Figure 4.16. Highest marginal tax rate for distributed profits in 2007, per cent



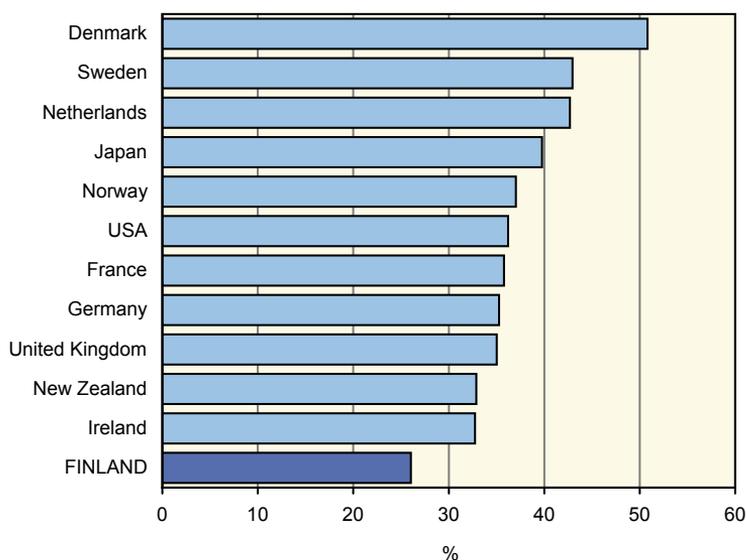
Source: VATT

In Finland, the total tax burden to distributed profits is 2 percentage points higher than the EU27 average, though it is clearly lower than in EU15 countries. In recent years, several countries have moved into the half income system where only half of the dividend income is taxable (Germany, Luxembourg). Finland taxes 70 per cent, France 60 per cent and Italy 40 per cent of dividend income. In Greece, Latvia and Slovakia, dividends are tax exempt. In Cyprus, Austria, Portugal, Czech Republic, Slovenia, Spain, Belgium, Poland, Romania, Bulgaria, and Lithuania, dividend taxation is relieved by a final withholding tax varying from 5 to 25 per cent. Even though Estonia does not tax retained earnings at all, the companies are liable to pay taxes on distribution.

In the Netherlands, dividend income is tax exempt and the taxation of capital income is replaced by the taxation of imputed rent on net wealth in personal taxation. A withholding tax is, however, yet imposed on dividend income but is credited against the tax on the taxation of net wealth. This withholding tax is included in the calculations.

The pure statutory tax rates do not give an accurate idea of the effective tax burden. Several countries have a varied range of tax concessions which lower both the statutory corporate tax rate and the shareholder dividend income tax rate. The concessions for shareholders often concern smaller dividend incomes. The highest marginal tax rate mainly describes the tax burden of high income shareholders.

Figure 4.17. Effective marginal tax rate for domestic real investments in certain countries in 2006, per cent

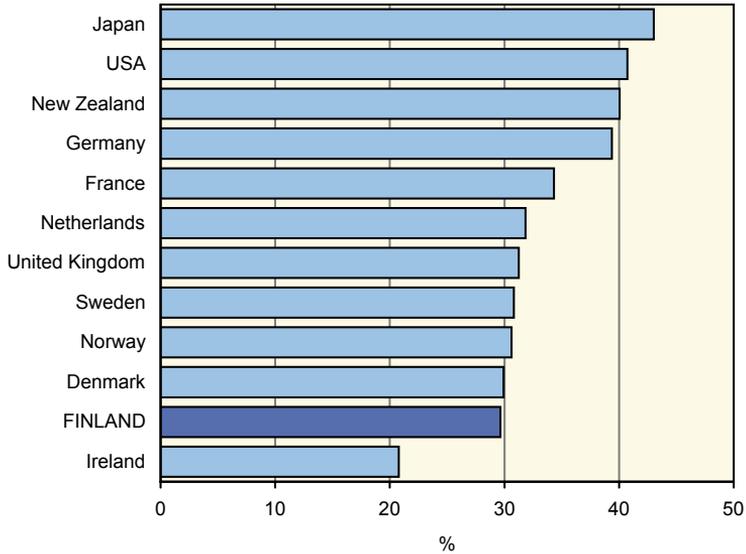


Source: VATT

The effective marginal tax rate (EMTR) of distributed profits – taking into account the taxes of both the corporation and the shareholder – can be calculated as a tax burden on a certain real investment. The lower the EMTR, the more capital is invested. In Finland, the effective marginal tax rate is the lowest compared with other countries. Thus, the tax system encourages the Finns to invest.

The assumptions used in the calculations are as follows: The investor is a private person. The investment is financed by 55% on retained profits, 35% debt and 10% new share issues. The investment consists of machinery (50%), buildings (28%) and inventories (22%).

Figure 4.18. Effective average tax rate of foreign investments in certain countries in 2006, per cent



Source: VATT

The tax incentives for direct investments are often described by the effective average tax rate (EATR) on investment. The average tax burden to the investment made to Ireland from other countries under consideration is 21 per cent, and it is clearly the most advantageous country. Finland ranks the second in attracting foreign investments.

The calculations describe the tax burden of investment made by a foreign parent company in a subsidiary in the destination country. The tax burden in the figure is calculated as the average tax burden of investments (EATR) made from other countries to the destination country. The investment is financed by retained profits (1/3), debt (1/3) and new share issues (1/3) from the subsidiary. The investment consists of machinery (50%), buildings (28%) and inventories (22%).

## 4.6 Indirect taxation

Table 4.19. Value added tax rates in EU27 countries on 1 Jan 2008

	Standard rate	Reduced rate	Super reduced rate <sup>1</sup>	Zero rate	"Parking rate" <sup>2</sup>
Minimum tax	15	5			12
Denmark	25	–		X	
Sweden	25	6 and 12		X	
FINLAND	22	8 and 17		X	
Poland	22	7	3	X	
Belgium	21	6		X	12
Ireland	21	13.5	4.4	X	13.5
Portugal	21	5 and 12			
Hungary	20	5 and 15			
Austria	20	10		X	12
Italy	20	10	4		
Slovenia	20	8.5			
Bulgaria	20	7			
France	19.6	5.5	2.1		
Netherlands	19	6			
Slovakia	19	–			
Czech Republic	19	5		X	
Greece	19	9	4.5		
Romania	19	9			
Latvia	18	5			
Lithuania	18	5 and 9			
Malta	18	5		X	
Estonia	18	5		X	
United Kingdom	17.5	5		X	
Germany	16	7			
Spain	16	7	4		
Luxembourg	15	6	3		12
Cyprus	15	5 and 8		X	

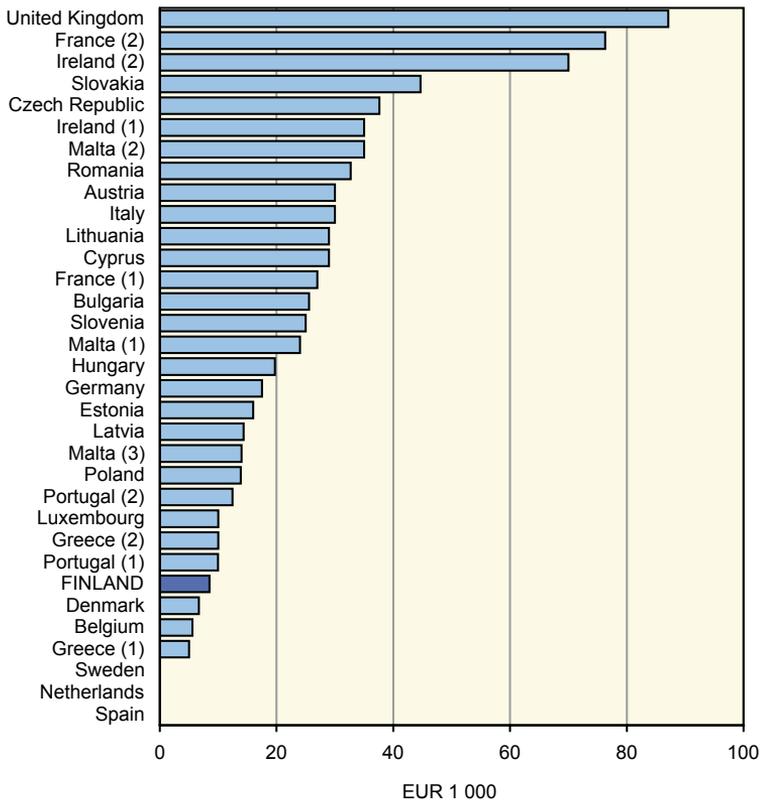
1) Allowed by Access Treaty

2) Temporary tax rate for articles moving to new tax rate

Source: EU

The rate of the Finnish standard value added tax is 22 per cent and it is the third highest among the EU27 countries. Also reduced tax rates are fairly high in Finland compared with other countries. According to the value added tax directive, only two reduced rates are accepted in the EU countries. Twelve member countries have zero rates for certain articles, which means that the goods or services are sold to the end user without tax, but the tax included in the factor input is refunded to the seller.

Figure 4.20. Lower limit of turnover in value added taxation in EU27 countries in 2008, thousand EUR



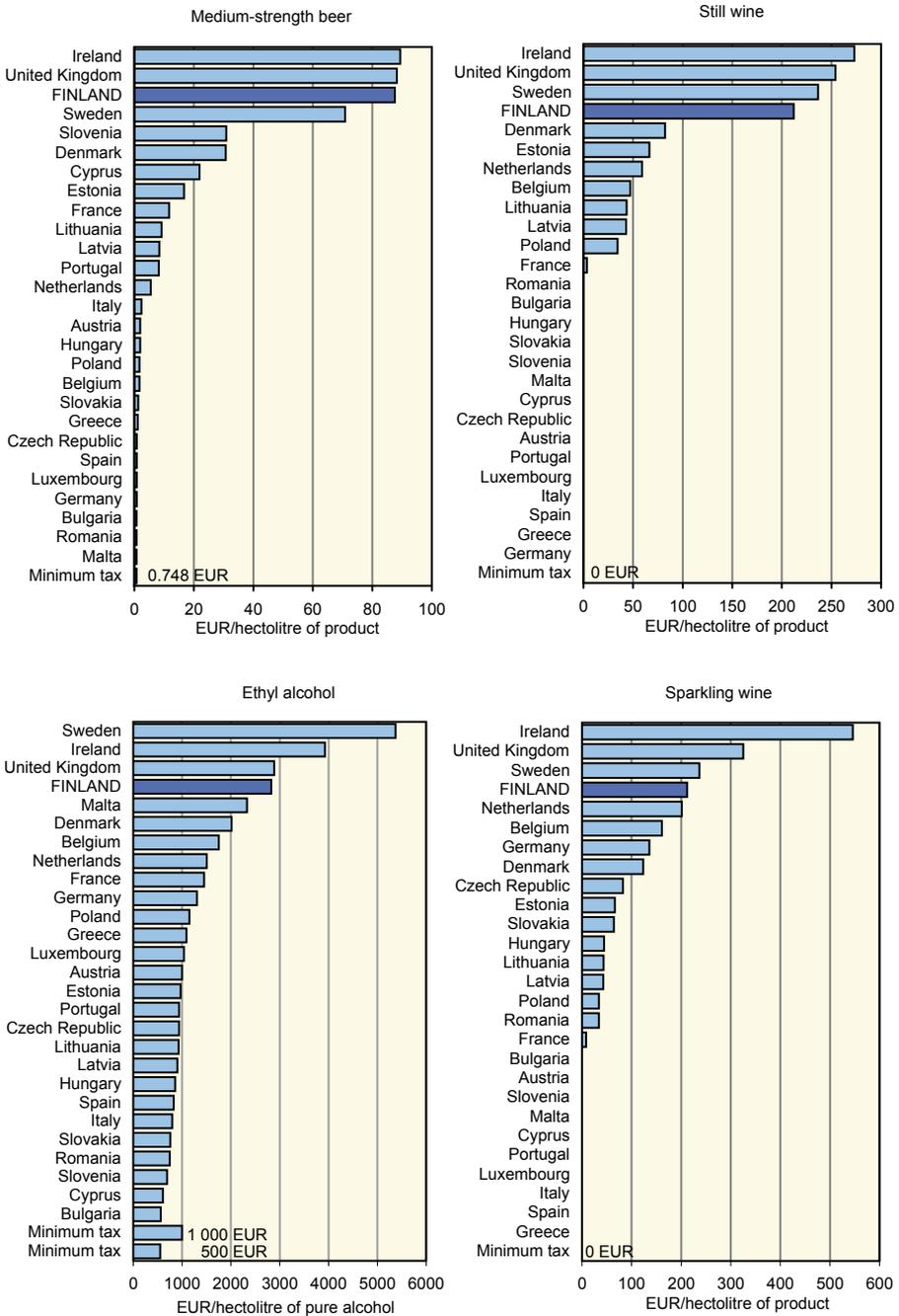
(1) = services, (2) = goods, (3) = other

Netherlands: Graduated tax relief. If the VAT payable is less than 1 883 EUR (1 883 EUR - payable tax\*2,5), may be deducted; when the balance is less than 1 345 EUR, no VAT liability exists. Finland: Graduated tax relief: payable tax - ((turnover - 8 500 EUR) \*payable tax / 14 000 EUR)

Source: BDO International and OECD

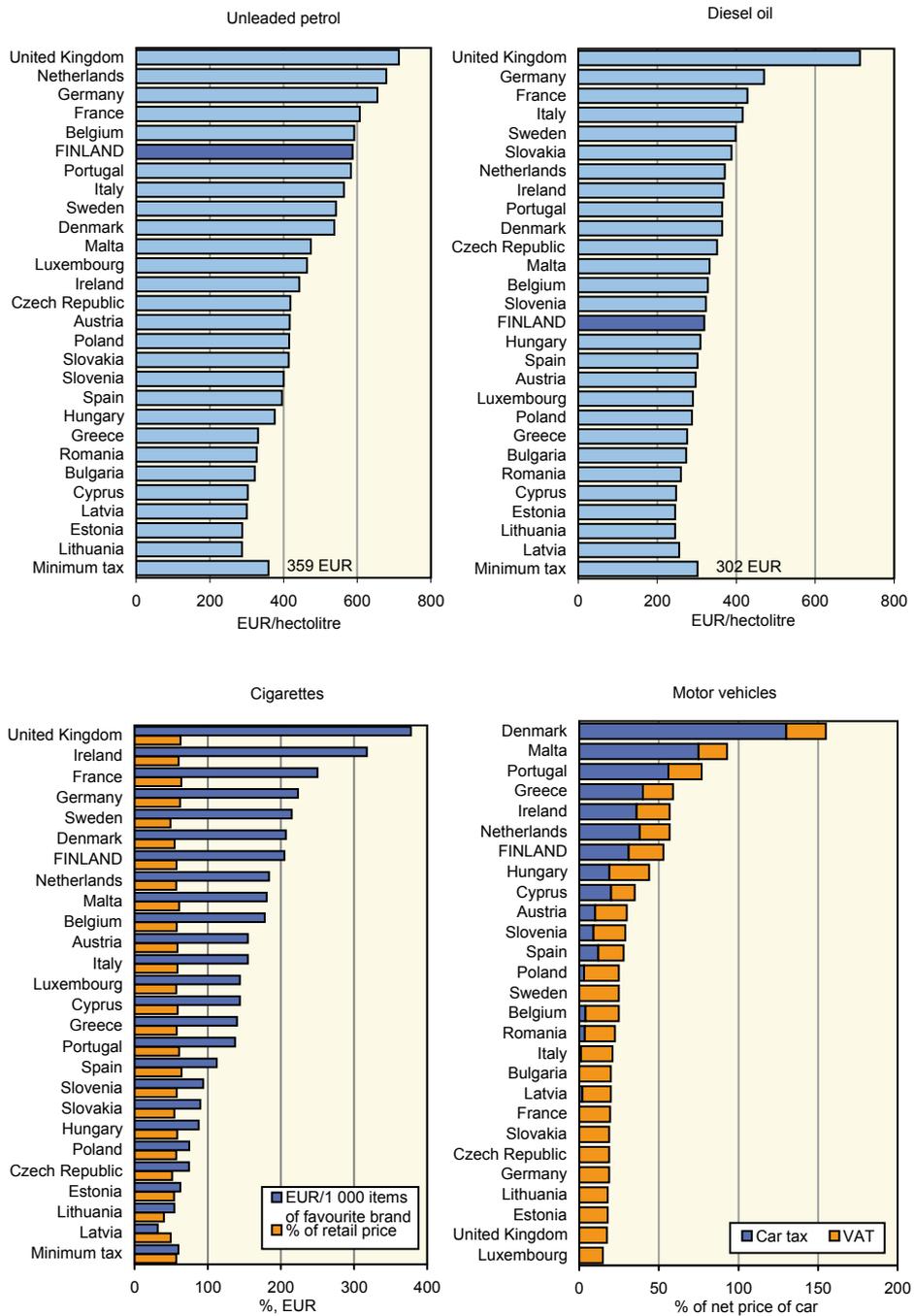
In most countries which apply value added taxation, an enterprise becomes liable to this taxation when its turnover exceeds a certain limit. Some smallest enterprises are tax exempt for administrative reasons. The limits for the turnover are on different levels across countries. In the EU27 countries, the limit for the taxable turnover varies from zero to 87 000 EUR. The highest limit is in the United Kingdom. Even those countries which have no special turnover limits relieve the value added taxation of small firms in some other way. In Finland, the limit for the taxable turnover is one of the lowest in the EU27.

Figure 4.21a. Excise duties on alcoholic beverages in EU27 countries in 2007



Source: European Commission

Figure 4.21b. Other excise duties in EU27 countries in 2007



Source: European Commission, ACEA

With the exception of diesel oil, excise duties in Finland are above the EU27 average. The taxation of beer and ethyl alcohol is especially heavy. Motor vehicle taxation was relieved in 2002 and 2005.

Ethyl alcohol: 1 000 EUR is the minimum level for countries where the tax level exceeded 1 000 EUR in 1992. Even those countries where the tax level at that time was lower than 1 000 EUR are no longer able to lower the tax level.

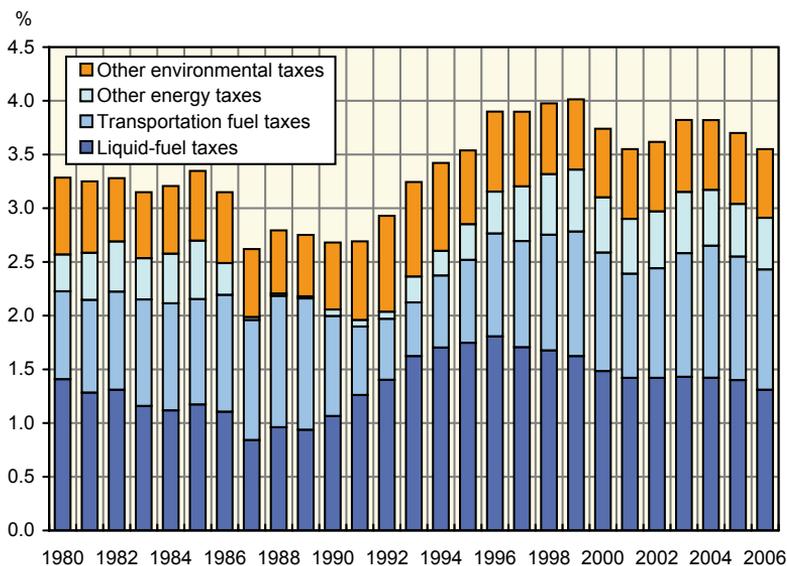
Cigarettes: according to Directive 2002/10/EC, the minimum excise duty is 57% of TIRSP (retail selling price, all taxes included) and at least 60 EUR/1 000 items, or 95 EUR/1 000 items. New member states have transitional provisions.

Unleaded petrol: the comparison is based on the cheapest 95 octane petrol.

Motor vehicles: car tax must be paid when a new vehicle is purchased (which does not include the annual vehicle use tax).

## 4.7 Environmentally related taxes

Figure 4.22. Revenues from environmentally related taxes in Finland in 1980–2006, per cent of GDP



Source: Statistics Finland

The ratio of environmentally related taxes to GDP increased in Finland throughout the 1990s. In 2000, revenue from environmentally related taxes fell and rose again in 2003. In 2006, the ratio of environmentally related taxes to GDP was 3.5 per cent. Nearly 6 billion EUR were raised in tax. Of this amount, 2.2 billion was from motor fuel and 0.8 billion from other energy taxes. One billion EUR came from other environmental taxes. Taxes based on vehicles brought in 1.9 million EUR.

VATT researchers have made several publications on this area. See for example:

Hietala Harri – Kari Seppo (2006): Investment Incentives in Closely Held Corporations and Finland's 2005 Tax Reform. [VATT discussion papers 392](#). Helsinki

Hietala Harri – Kari Seppo (2006): Investment Incentives in Closely Held Corporations and Finland's 2005 Tax Reform. Finnish Economic Papers 2/2006

Kanniainen Vesa – Kari Seppo, eds. (2005): Taxation, Economic Policy and the Economy. VATT publications 41. Helsinki

Kanniainen Vesa – Kari Seppo – Ylä-Liedenpohja Jouko (2005): The Start-Up and Growth Stages in Enterprise formation: The "New View" of Dividend Taxation Reconsidered. CESifo Working Papers No. 1476

Kanniainen Vesa – Kari Seppo – Ylä-Liedenpohja Jouko (2005): The Start-Up and Growth Phases in Enterprise Formation: The "New View" of Dividend Taxation Reconsidered. HECER Discussion papers 53

Kanniainen Vesa – Kari Seppo – Ylä-Liedenpohja Jouko (2007): Nordic Dual Income Taxation of Entrepreneurs. International Tax and Public Finance, 14, (4). (Also available as [VATT discussion papers 415](#))

Kari Seppo – Hietala Harri (2005): Investment Incentives in Closely Held Corporations and Finland's 2005 Tax Reform, HECER Discussion Papers 58

Kari Seppo – Karikallio Hanna (2007): Tax Treatment of Dividends and Capital Gains and the Dividend Decision under Dual Income Tax. International Tax and Public Finance, 14 (4). (Also available as [VATT discussion papers 416](#))

Kari Seppo – Karakallio Hanna – Pirttilä Jukka (2008): Anticipating Tax Changes: Evidence from the Finnish Corporate Income Tax Reform of 2005. CESifo Working Papers 2201. (Also available as [VATT discussion papers 426](#))

Kari Seppo – Ylä-Liedenpohja (2005): Cost of Capital for Cross-Border Investment: The Fallacy of Estonia as a Tax Haven, Baltic Journal of Economics 5, 28–43, (Autumn/Winter 2004/2005). (Also available as [VATT discussion papers 367](#))

Kari Seppo – Ylä-Liedenpohja Jouko (2005): The Effects of Equalization Tax on Multinational Investments and Transfer Pricing, FinanzArchiv, vol. 61, 45–61

Kari Seppo – Ylä-Liedenpohja Jouko (2005): Nordic Dual Income Taxation of Enterprises, CESifo Working Papers No. 1623

Korkeamäki O. – Uusitalo R. (2008): Employment and wage effects of a payroll tax cut – Evidence from a regional tax exemption experiment, International Tax and Public Finance (in press)

Kosonen Tuomas (2007): The Increased Revenue from Finnish Corporate Income Tax in the 1990s. [VATT discussion papers 421](#). Helsinki

Lyytikäinen Teemu (2007): The Effect of Three-Rate Property Taxation on Housing Construction. [VATT discussion papers 419](#). Helsinki

Saarimaa Tuukka (2005): Taxation and Debt Financing of Home Acquisition: Evidence from the Finnish 1993 Tax Reform. [VATT discussion papers 366](#). Helsinki

## 5 Welfare state and public expenditure

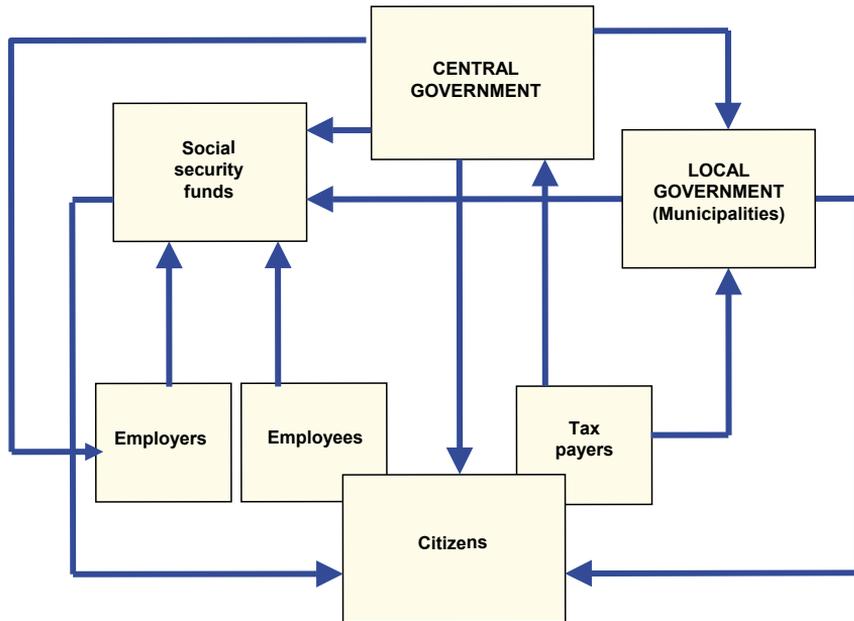
The public-economy sector in Finland is founded on three pillars: the state (central government), the municipalities (local government) and social security funds. The state is the most prominent of the three. The greatest amounts of money flow through the state, and it transfers part of the revenues that it has collected for the use of municipalities. The state has the main responsibility of economic stabilization and, for this reason, the balance of the central government varies a lot according to business cycles. The development of local government and the social security finances is more stable. In 2006, the public sector had a surplus of almost 4 per cent of GDP.

The economic crisis of the early 1990s was followed by a period of fiscal consolidation. The real growth in non-cyclical public expenditure was moderate in the 1990s. Expenditures on public consumption and investment now represent a smaller part of the total demand than at the beginning of the 1990s. The growth of pension expenditure stems from the ageing of the population and the maturing of the employment pension system. The unemployment expenditure grew at the beginning of the 1990s, but since then expenditure has shown a downward trend, following the trend in unemployment. The share of public expenditure in GDP is 49 per cent which is two percentage points more than the EU25 average. There are, however, differences among the EU countries. In Sweden the share is 56 per cent whereas in Estonia it is 32 per cent.

In Nordic countries, welfare services and transfers of income to households are relatively high. Their share of public expenditure is almost two thirds. The welfare services in Finland are primarily produced by the local government.

For many reasons, it is difficult to make an international comparison of financial support to households. In some countries support is given in the form of free services, in some as taxable transfers of income, and in some countries as taxfree transfers of income or as forms of tax relief. In addition, social security systems are managed in some countries by means of a collective insurance system, whereas in others by means of an individual insurance system.

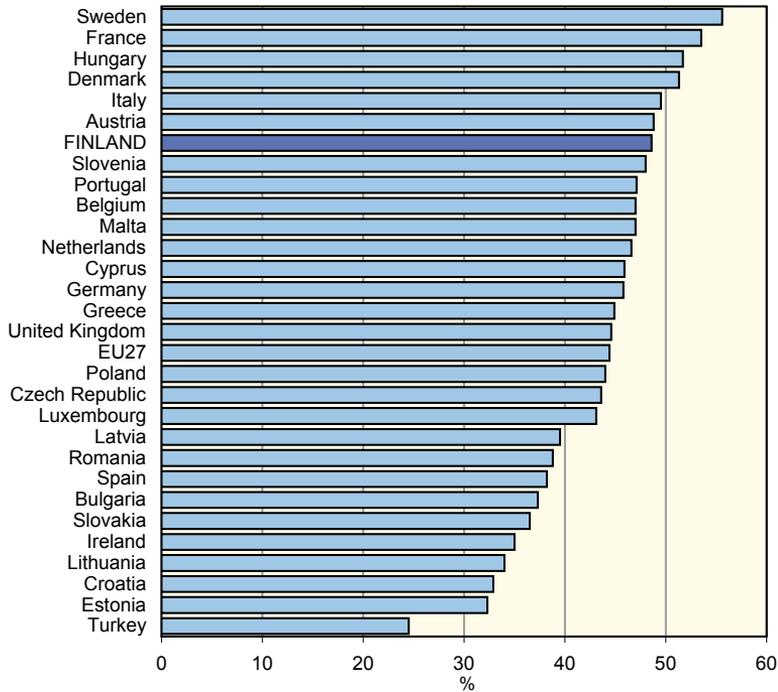
Figure 5.1. Money flows in Finnish public sector



The state and municipalities receive income from taxes and payments. The social security funds, which are the Social Insurance Institute (KELA), the employment pension insurance institutions and the unemployment insurance fund, receive income from social security contributions. The social security funds and municipalities also receive grants and contributions from the central government. Transfers of money between various organs of the public sector as well as citizens and enterprises are, therefore, manifold and complex.

## 5.1 Total public expenditure

Figure 5.2. General government expenditure in EU27 countries, Croatia and Turkey in 2006, percentage of GDP

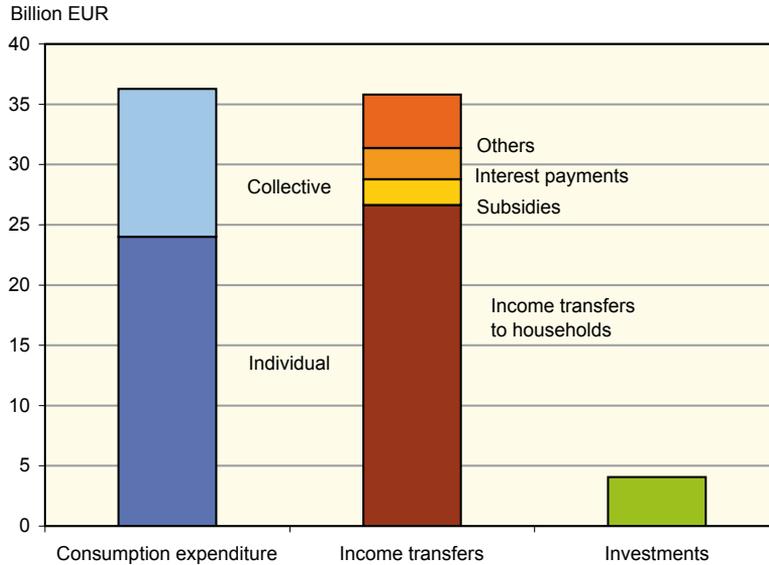


Source: Eurostat

The size of the public sector is often depicted by the share of the total public expenditure in GDP. This practice is justifiable when size and growth of the public sector is examined specifically from the viewpoint of costs. In Europe, the share of public expenditure has traditionally been higher than in the non-European OECD countries.

In the EU27 countries, an average of 44 per cent of the GDP was spent on public expenditure in 2006. The share varied from 56 per cent in Sweden to 32 per cent in Estonia. Finland's share of 49 per cent was about four percentage points higher than the EU average.

Figure 5.3. General government expenditure in Finland in 2006, billion EUR



Source: Statistics Finland/National Accounts

In 2006, public expenditure in Finland amounted to well over 76 billion EUR. Of this sum, public consumption expenditure was almost 36 billion, income transfers and interest payments were of the same size, and public investments 4 billion EUR. Public consumption expenditure consisted of costs of collective public goods such as general government, administration and national defence. About two thirds of public consumption expenditure was used for individual services provided mainly by the municipalities. Individual services include educational, health care and social services. The municipal welfare services are funded mainly by taxes, although the share of user fees, which vary from service to service, has increased.

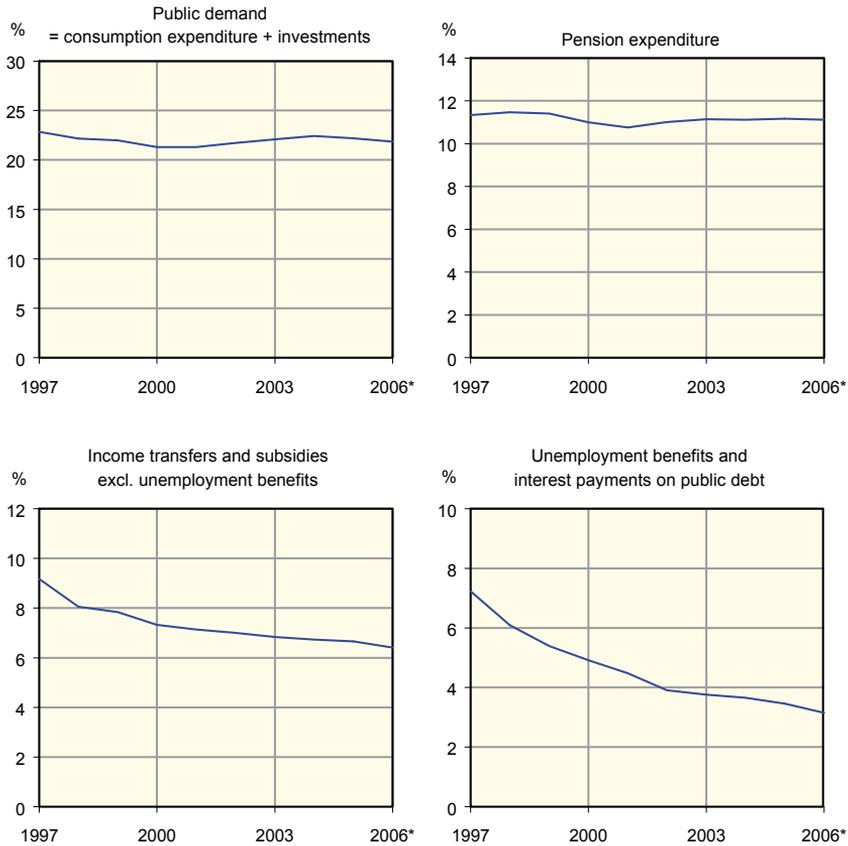
With regard to income transfers, the share of social income transfers is clearly the greatest: over 26 billion EUR. The share of subsidies is 2 billion and the share of interest costs is 2.6 billion EUR. The other transfers of income consist of, among other things, the costs of development aid.

Public consumption expenditure is the running costs incurred by the provision of goods and services, such as the compensation to public sector employees, purchases of goods and services, and rental expenses.

Income transfers are the benefits given as money to households via public social security systems, support directed to industry, agriculture, traffic and other enterprises, costs of interest on public loans and, among others, income transfers paid to foreign recipients such as development co-operation.

Public investments include the investments connected with all public activities such as the provision of welfare services and the construction of communications.

Figure 5.4. Items of general government expenditure in 1997–2006\*, percentage of trend GDP

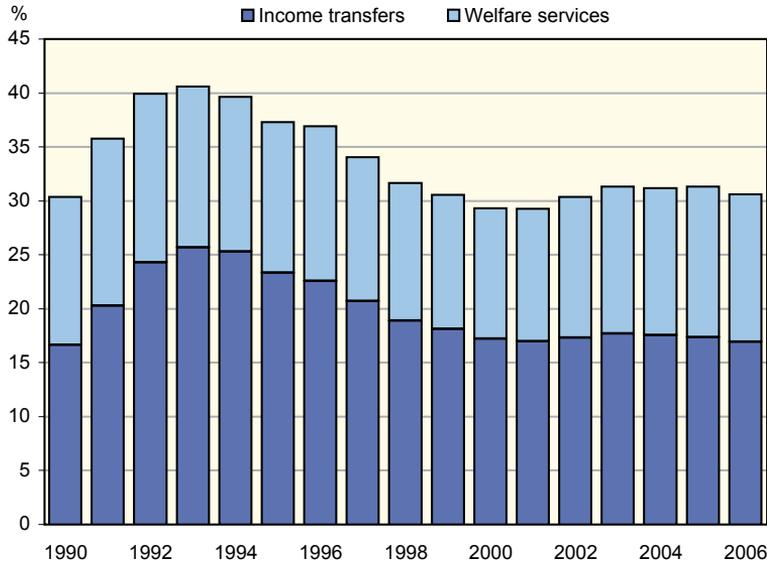


Source: Statistics Finland/National Accounts

In relation to GDP, public demand was somewhat reduced in the years 1997–2001. After that, public demand has returned close to its earlier level. The pension expenditures of the trend output have varied around 11 per cent. Income transfers without the cyclically varying unemployment benefits have been reduced in relation to the trend output since 1997. Expenditure on unemployment benefits and interest costs rose steeply in the beginning of the 1990s. Since 1997, these expenditures have steadily reduced in relation to the trend output.

## 5.2 Public support to households

Figure 5.5. Income transfers to households and welfare service costs in 1990–2006, percentage of GDP

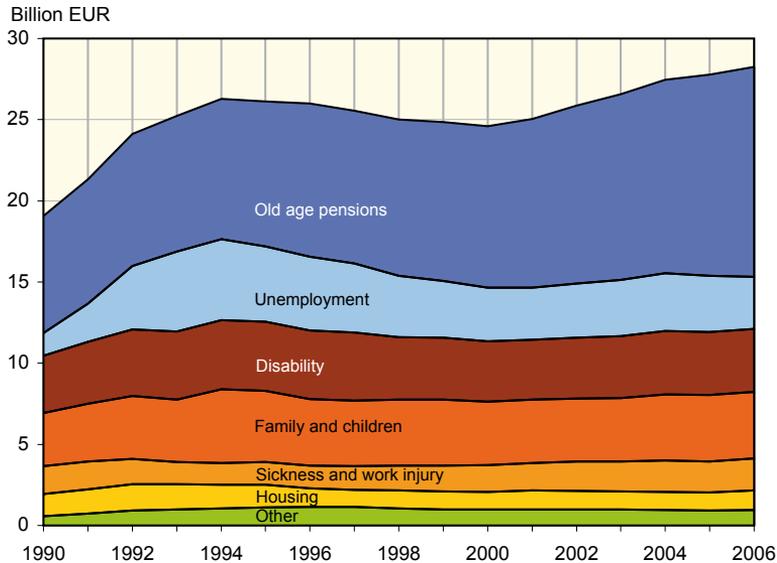


Source: VATT (Ministry of Social Affairs and Health, Social Insurance Institution of Finland, State Treasury)

The total public support to households in relation to the GDP rose to its highest level to well over 40 per cent in 1993. Since then, the share has fallen to the level of about 31 per cent. The share rose strongly in the years 1991–1992 when income transfers were increased and there was a significant fall in the GDP. From 1994, the GDP shares of both income transfers and welfare services fell owing to the recovery of the economy. Since 2002, public support to households, in real terms, has been almost unchanged.

### 5.3 Income transfers to households

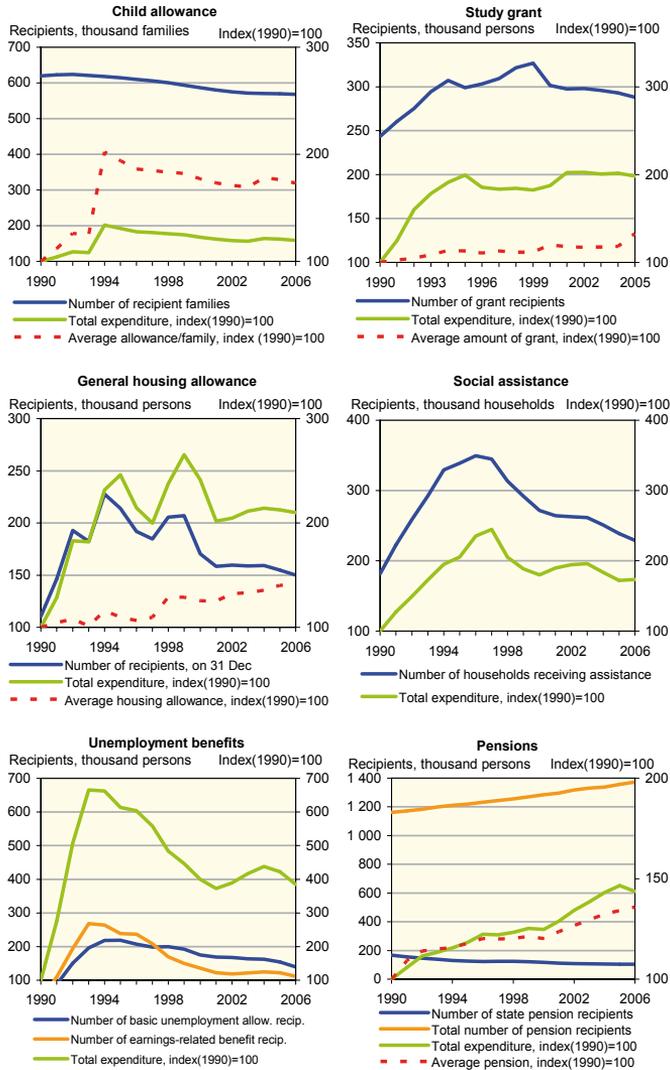
Figure 5.6. Income transfers to households in 1990–2006, billion EUR at 2006 prices



Source: VATT (Ministry of Social Affairs and Health, Social Insurance Institution of Finland, State Treasury)

Old age pensions are the most important part of income transfers to households. Pension expenditure has grown since 1990, in real terms, by almost 5.7 billion EUR. In 1994, about 5.0 billion EUR (in 2006 money) was paid in unemployment benefits which have since then steadily decreased. The disability expenses grew slightly in 1991–1995. Since then, they slightly decreased up to the year 2001. Benefits received by families with children increased in 1994, owing to the reform of the family allowance system, when tax deductions for families with children were correspondingly cut. The reduction in the housing support mainly originates from the structural change in the tax deductibility of interest expenses on mortgage loans in the 1993 capital tax reform.

Figure 5.7. Selected social expenditures in 1990–2006



Source: Social Insurance Institution (KELA), National Research and Development Centre for Welfare and Health (STAKES)

The number of families receiving child allowance has decreased by almost 10 per cent from 1990 to 2006. This is mainly explained by the fall in the birth rate. On the other hand, the total expenditure on child allowance and the average allowance per family increased between 1990 and 1994 as a result of the reform of the family

allowance system. Thereafter, they have decreased rather steadily in line with the number of recipients. The total expenditure on child allowance is almost 60 per cent higher, and the average allowance per family almost 70 per cent higher in 2006 compared to the corresponding levels in 1990.

The amount of the recipients of study grant has grown by a fifth between 1990 and 2005. The growth was fastest at the beginning of the 1990s during the economic downturn in Finland. The average amount of the grant rose slowly from 1994 to 2004, but jumped in 2005 as a result of an increased share of student loan and housing supplement. The total expenditure of the grant doubled from 1990 to 1995 but the growth has slowed down since 1995. The rise of the total costs has been influenced not only by the increased number of students but also by the broadening of housing supplement and other benefits related to the study grant.

From 1990 to 1994, the number of the recipients of general housing allowance more than doubled. This was mainly due to the economic recession in Finland. Since 1994, the number of the recipients of the allowance has dropped from around 228 000 to 150 000 at the end of 2006. The average housing allowance has risen over 40 per cent from 1990 to 2006. The total expenditure of the general housing allowance has grown in line with the number of recipients and the rise in the average amount of the allowance. The total expenditure was at its highest in 1999.

Social assistance as a means tested benefit has the same trend as other social benefits. The amount of social assistance recipients increased considerably at the time of the recession. The number of households receiving social assistance in 1990 was 180 000 and in 1996 around 350 000. The total expenditure on social assistance increased similarly. The number of recipients and the total expenditure started to decline fast from 1997. The decline slowed down in 2000 and the total expenditure even grew slightly between 2001 and 2003 declining again thereafter.

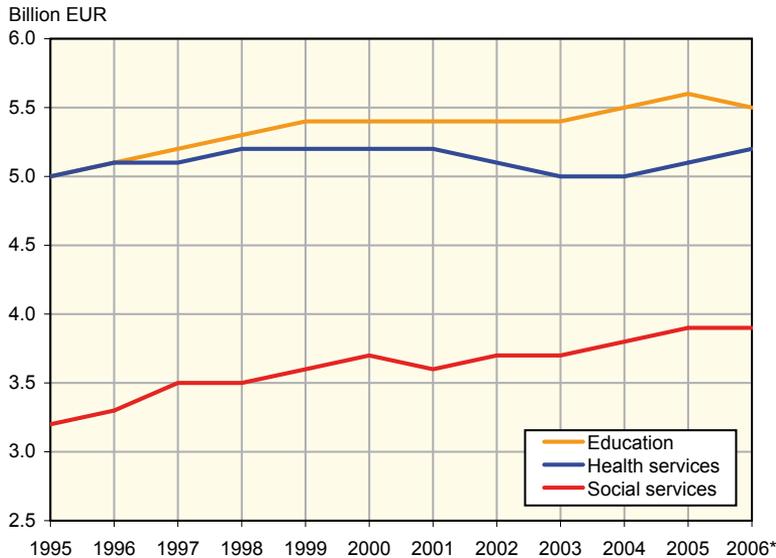
The skyrocket increase in the total expenditure on unemployment benefits clearly shows the effect of the recession on the employment situation and on the household income in Finland. Unemployment benefit expenses increased almost sevenfold from 1990 to 1994. Since 1994, the total expenditure declined remarkably but started to rise again in 2002 although the number of unemployed jobseekers has decreased continuously.

The total number of those receiving a pension has grown steadily from 1 161 000 persons in 1990 to 1 372 000 in 2006. On the other hand, the amount of those receiving only state pension\* has declined constantly to 103 000 persons in 2006. The average amount of pension has risen around 35 per cent between 1990 and 2006. The total expenditure has risen more rapidly, especially during recent years.

\*State pension is a basic minimum pension guaranteed to all Finns older than 64 years. However, as the number of pensioners entitled to better occupational pensions has increased, the need for state pensions has diminished.

## 5.4 Welfare services

Figure 5.8. Value added of public welfare services in 1995–2006\*, billion EUR at 2000 prices



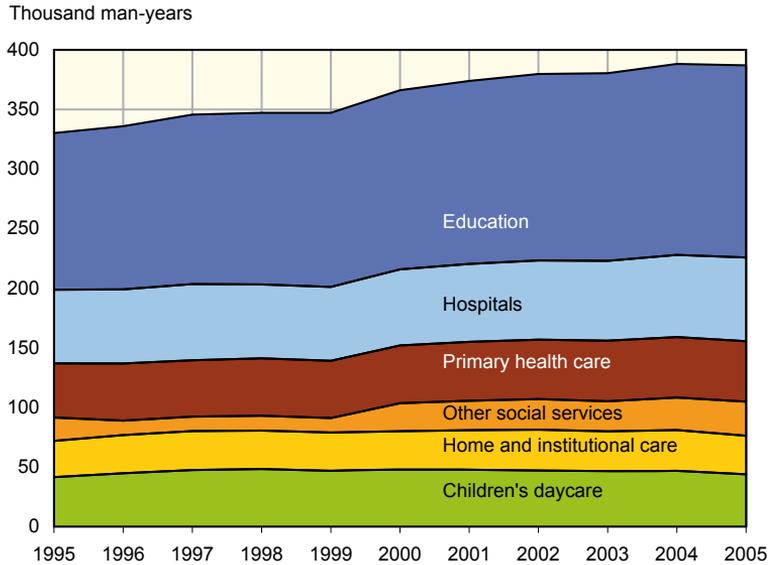
Source: Statistics Finland/National Accounts

The volume of public education, health care and social services rose by about 10 per cent from 1995 to 2006. The social services grew most strongly, by 22 per cent. In Finland, municipalities have the primary responsibility for arranging welfare services. However, the share of private enterprises and non-profitmaking corporations has increased in the provision of social and health care services.

Municipalities are responsible for basic education and upper secondary school education, in addition to the bulk of vocational education. The state, on the other hand, is responsible for university education. Public health care is mainly on the responsibility of the municipal sector. Health centres provide basic health care services, and hospitals belonging to hospital districts provide specialised hospital services. In 2005, there were over 3 200 private health care providers.

The most significant of the social services are institutional and outpatient services for the elderly, and day care services for children. The share of public services, for example in home services and day care services, has decreased slightly in recent years, and they have been complemented by private commercial services. In 2006, there were 3 700 private providers in social care.

Figure 5.9. Personnel in municipal welfare services in 1995–2005, thousand man-years



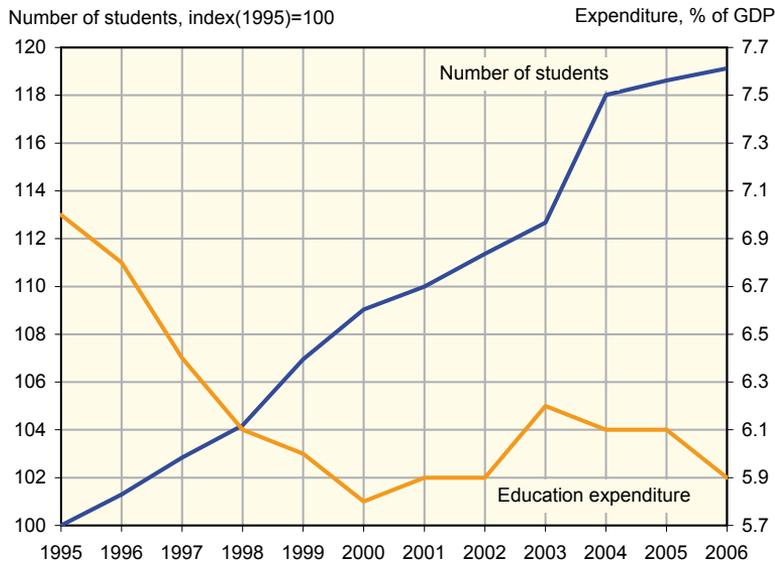
Source: Statistics Finland

The number of personnel in municipal welfare services calculated as annual full-time employees was 380 000 in 2005 which was about 17 per cent more than in 1995. Nearly 60 per cent of them were working in social and health care. From 1995 to 2005, the number of personnel grew most rapidly in education, by 23 per cent.

In 2005 the number of employees in children's day care was over 44 000. There were 32 000 employees in home services and institutional care for the elderly. There were about 51 000 employees in primary health care and about 70 000 employees in hospitals. The professional structure of health care employees has changed considerably in the past ten years. The number of doctors and nurses has greatly increased, while the numbers of auxiliary hospital personnel and other auxiliary personnel have clearly decreased.

## Education

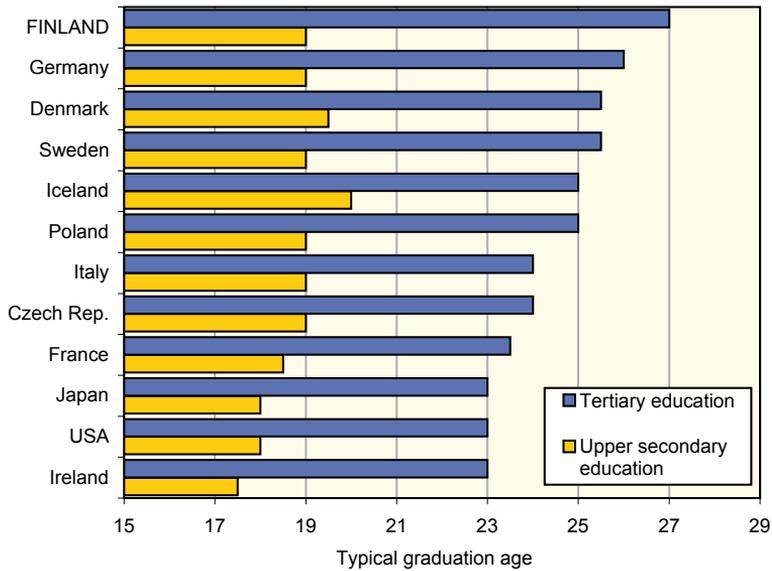
Figure 5.10. Education expenditure (as percentage of GDP) and number of students (index(1995)=100) in 1995–2006



Source: Statistics Finland

The number of students in primary, secondary and tertiary educational institutions grew steadily from 1995 to 2006. In 2006, the total of almost 1.3 million pupils and students were attending primary and secondary schools, upper secondary schools, vocational institutes and universities. The number had grown from 1995 by 19 per cent. The GDP share of public education expenditure fell steadily until 2000, after which it increased slightly until 2003. Thereafter it decreased again. In 2006, it was 5.9 per cent. The fall in the GDP share of education at the end of the 1990s stems from the rapid growth of GDP. In real terms, educational expenditure has grown constantly through the whole period.

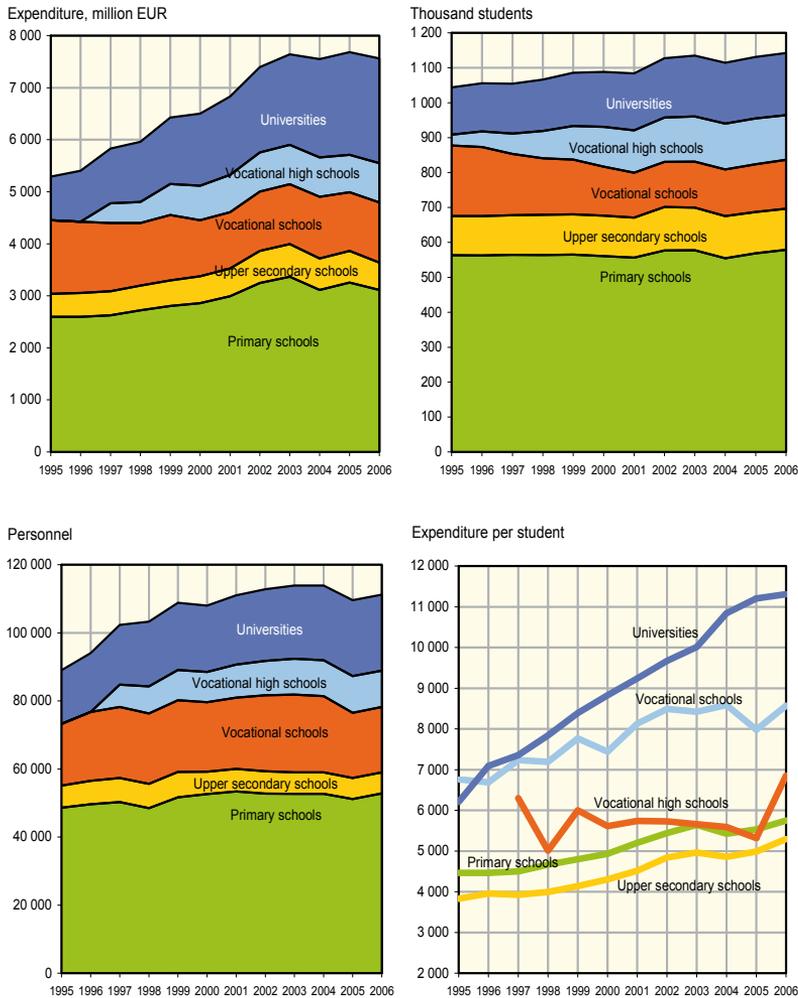
Figure 5.11. Typical graduation ages in upper secondary education and in tertiary education in some countries



Source: OECD, Education at a Glance 2007

Students receive a MA degree in Finland at a clearly older age than in other countries which were under consideration. There are, on average, eight years between graduating from an upper secondary school and gaining a degree. Of this period, two to three years are spent on substitute courses or, as gap years while students are waiting for the study place they desire. In Ireland, a typical graduate is four years younger than in Finland.

Figure 5.12. Expenditure, personnel, students and expenditure per student at primary, upper secondary, vocational and vocational high schools and universities in 1995–2006, expenditures at 2006 prices



Source: Ministry of education, Statistics Finland

In 2006, the expenditure of primary schools was 3.1 billion EUR, upper secondary schools 0.5 billion EUR, vocational schools nearly 1.2 billion EUR, and vocational high schools 0.8 billion EUR. The expenditure of universities was two billion EUR of which two thirds were financed by the budget. Except for universities, the expenditure of education was publicly funded.

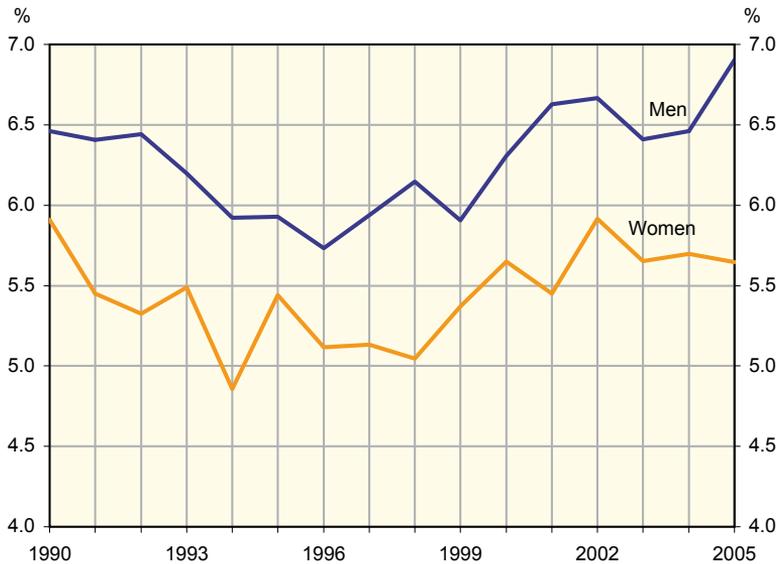
The real operating costs in 2006 were on average a fifth bigger than in 1995 at primary schools and upper secondary schools. The operating costs of vocational schools were a fifth smaller than in 1995 because a part of vocational schools were changed to vocational high schools. The funding of universities had an over twofold increase in 1995–2006 because of the growth of external funding.

The number of primary school and upper secondary school students did not change from 1995 to 2005. In 2006, there were 579 000 students at primary schools and 117 000 students at upper secondary schools. The vocational high education has been developing since 1997 and, because of this, the number of students has increased. In 2006, there were 140 000 student at vocational schools and 128 000 students at vocational high schools. The number of students at universities has grown by a third since 1995 and was 178 000 students in 2006.

The growth of expenditure per student explains the total growth of expenditure at primary schools and at upper secondary schools. In vocational education, the real expenditure per student did not change in 1995–2006. Instead in universities, the real expenditure per student was 80 per cent higher in 2006 than in 1995.

The number of full-time personnel grew five per cent at primary schools, but decreased by six per cent at upper secondary schools and vocational schools. In 2006, there were nearly 53 000 persons employed at primary schools, 6 200 at upper secondary schools, 19 200 at vocational schools, and 10 600 at vocational high schools. At universities, there were 22 300 employees. The number of employees grew most rapidly at vocational high schools and at universities.

Figure 5.13. Returns to education in Finland in 1990–2005



Source: VATT

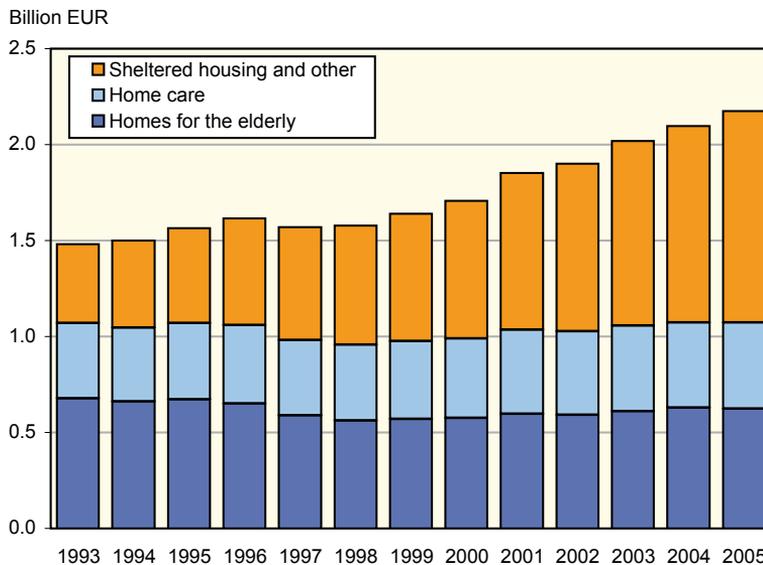
Return to education was in modest decline over the 1990s but has since returned to the level of 1990. One additional year of education was related to a 5.9 per cent rise in wages for women and a 6.5 per cent rise for men in 1990 – in 2005 the corresponding figures were 5.7 and 6.9 per cent. The gender differential in returns to education has remained roughly constant over the observation period. In international comparison, returns to education in Finland are rather high.

Return to education is measured by regressing gross monthly labour income on years of education, age, and age squared. Hence, the regression coefficient of this pared-down human capital wage equation measures the percentage effect of one additional year of education on wages. The data come from the Income distribution statistics of Statistics Finland. Years of education are converted from the highest degree held by the person. The spike in 2005 results from sample variation in the income distribution data rather than reflects a large hike in returns to education.

## Social services

The largest groups of those who use social services are the elderly and families with children. Social services are provided as both institutional and non-institutional services. The most significant of the institutional services are care in homes for the elderly and sheltered housing. Home care supports families with children and helps elderly and disabled people to live at home. Families with children are provided with municipal day care services or private day care through agreed financial subsidies provided by municipalities.

Figure 5.14. Net expenditures of long-term care for the elderly in 1993–2005 billion EUR at 2005 prices



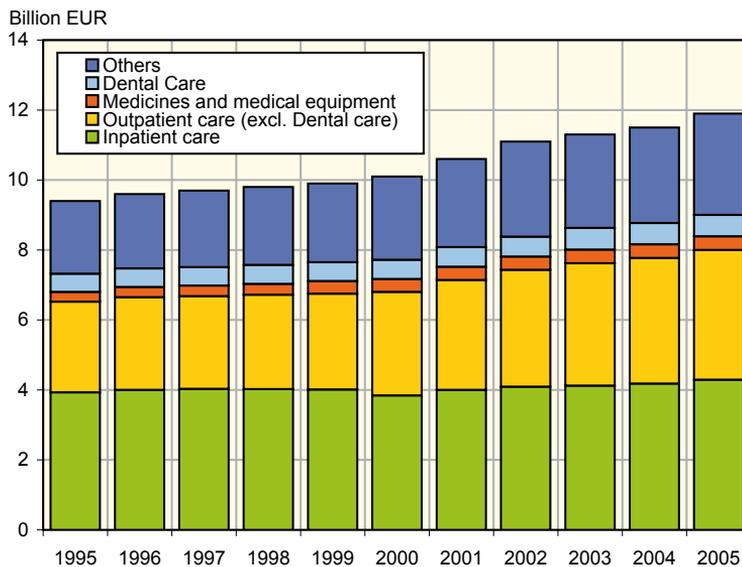
Source: VATT (SOTKA database of the National Research and Development Centre for Welfare and Health)

In 2005, the net running costs for homes for the elderly were approximately 0.62 billion EUR and the net costs for home care were about 0.45 billion EUR. Expenditure on other services, which include costs of sheltered housing as well as costs of services for the disabled, was about 1.1 billion EUR. The total net expenditure on long-term care of the elderly, excluding the costs of long-term care at health centres, was almost 2.2 billion EUR in 2005. The costs of long-term care for elderly patients at health centres were estimated to be about 0.6 billion EUR in 1999. Even if the number of patients has somewhat decreased, the net cost of long-term care for the elderly exceeds 2.5 billion EUR. This means that the care costs for each person over 74 years are over 6 500 EUR.

## Health care

In Finland, municipalities have the primary responsibility to arrange health care for their inhabitants. Municipalities are also mainly the providers of health care services. Formerly, the state played a prominent role in deciding how resources should be used and where they should be directed. Centralised planning and control decreased in the 1990s, and the power of municipalities to influence decision-making increased.

Figure 5.15. Health care expenditure in 1995–2005, billion EUR at 2005 prices



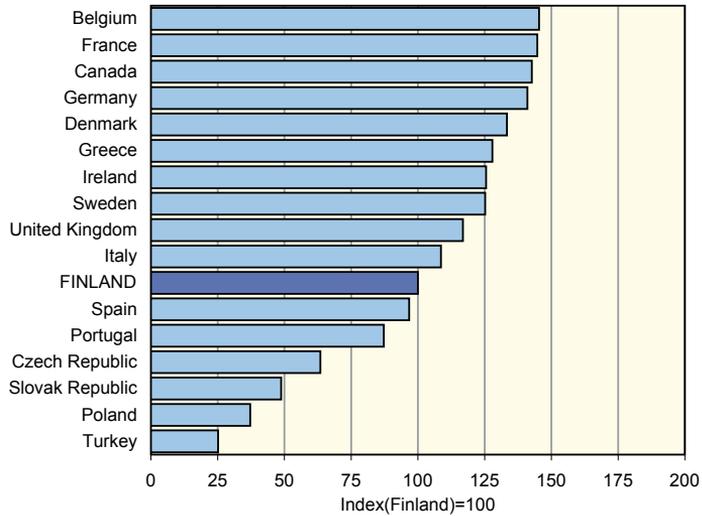
Source: National Research and Development Centre for Welfare and Health STAKES

In 2005, the health care expenditure was almost 12 billion EUR, in real terms 2.5 billion EUR, i.e. 27 per cent more than ten years earlier. Inpatient care accounts for 36 per cent, outpatient care 31 per cent and dental care 5 per cent of the total health care expenditure.

The public sector, i.e. the central government, municipalities and the Social Insurance Institution (KELA), fund three quarters of the total health care expenditure. The shares of expenditure for municipalities, central government and KELA were 40, 20 and 17 per cent, respectively. The share of households was 18 per cent in 2005.

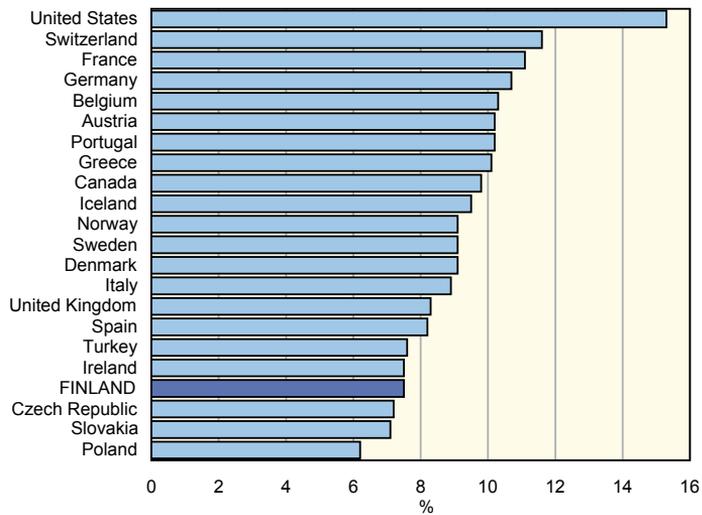
## International comparison of health care

Figure 5.16. Health care expenditure per capita (US\$ purchasing power parity) in some OECD countries in 2005, index (Finland)=100



Source: OECD

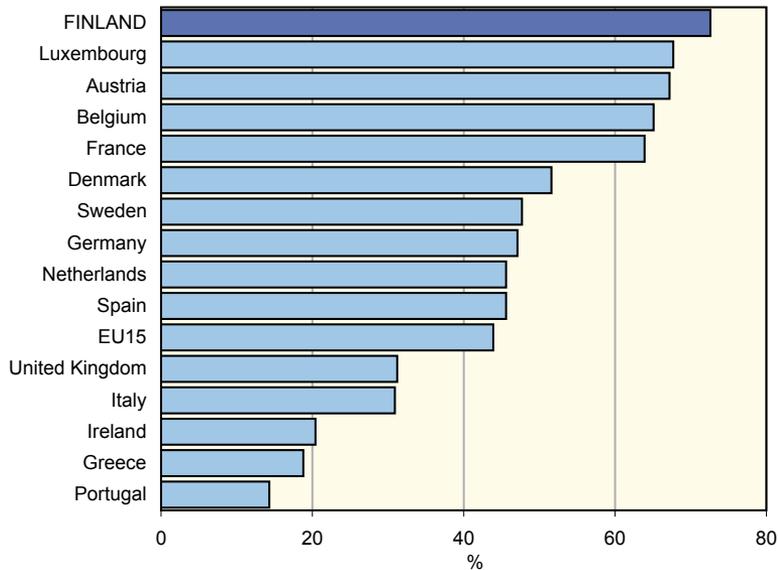
Figure 5.17. Health care expenditure in some OECD countries in 2005, percentage of GDP



Source: OECD

Whether one calculates health expenditure per population or in relation to GDP, Finnish expenditure figures seem quite moderate in comparison to the other OECD countries. Compared to the other Nordic countries, health expenditure per population and in relation to GDP is lowest in Finland.

Figure 5.18. Satisfaction of the public with their own health care system in EU15 countries in 2002, per cent



Source: OECD/Health Data 2006

The effective functioning of the health care system can also be compared by means of the level of satisfaction of the people with their own country's health care. In comparison with the other EU countries the share of those in Finland who are satisfied with the health care is exceptionally high. In Luxembourg, Austria, Belgium and France, the share of those who estimated that the health care system runs well or needs only minor changes is also over 60 percent.

VATT researchers have made several publications on this area. See for example:

Aaltonen Juho (2007): Determinants of Health Care Expenditures in Finnish Hospital Districts 1993–2007. [VATT discussion papers 429](#). Helsinki

Aaltonen Juho – Kirjavainen Tanja – Moisio Antti (2006): Efficiency and Productivity in Finnish Comprehensive Schooling 1998–2004. [VATT research reports 127](#). Helsinki

Ervasti Heikki – Venetoklis Takis (2006): Unemployment and Subjective Well-being: Does Money Make a Difference? [VATT discussion papers 391](#). Helsinki

Kangasharju A. – Moisio A. – Reulier E. – Rocaboy Y. (2006): Tax competition among Municipalities in Finland. *Urban Public Economics Review*, 5, 13–24

Kirjavainen Tanja (2007): Efficiency of Finnish Upper Secondary Schools: An Application of Stochastic Frontier Analysis with Panel Data. [VATT discussion papers 428](#). Helsinki

Luoma Kalevi – Moisio Antti – Aaltonen Juho: Secessions of Municipal Health Centre Federations (2007): Expenditure and Productivity Effects. [VATT discussion papers 425](#). Helsinki

Pekkala Sari – Lucas Robert E.B. (2005): On the Importance of Finishing School: Half a Century of Inter-generational Economic Mobility in Finland. [VATT discussion papers 359](#). Helsinki

Räty Tarmo – Luoma Kalevi (2005): Nonparametric Country Rankings Using Health Indicators and OECD Health Data. Working notes 74. Helsinki

Räty Tarmo – Luoma Kalevi – Aaltonen Juho – Järviö Maija-Liisa (2005): Productivity and Its Drivers in Finnish Primary Care 1988–2003. [VATT research reports 118](#). Helsinki

Suvanto Antti – Vartiainen Hannu eds. (2007): Finance and Incentives of the Health Care System. Proceedings of the 50th Anniversary Symposium of the Yrjö Jahnsson Foundation. VATT publications 45. Helsinki



## **6 Demographics and income distributions**

The Finnish life expectancy rate has risen rapidly during the past 30 years. At present, women may expect to live until they are 83 years of age and men until they are 76.

Despite the lengthening of the lifespan, population growth has slowed down, and it is expected that the number of births will decrease a little during the next decades. The share of old people in the population is increasing, and so is the number of deaths. In the long run, the population can increase only if there is a surplus of immigrants.

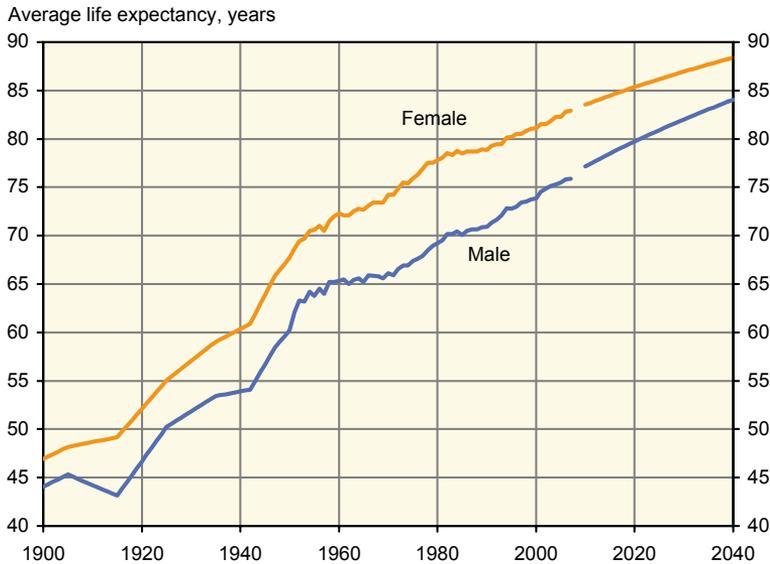
During most of her history, Finland has been a country of emigration. From the 1980s, immigrants have annually outnumbered emigrants. Most emigrants from Finland move to the EU countries. The majority of immigrants come from outside the EU.

In Finland, the distribution of income between labour and capital was stable in the 1980s. At the end of the 1980s, the income share of labour grew quickly but turned down during the years of recession in the early 1990s. The same trend continued through the 1990s. Since then, the distribution of labour and capital income remained stable in the 2000s.

Income differences between Finnish households narrowed until the 1990s. After the recession years 1991–1993, differences in income became larger. The real incomes of the richest tenth of the population, and especially the top one per cent, have increased the most, whereas the incomes of the poorest tenth of the population have increased only modestly.

## 6.1 Demographic change

Figure 6.1. Average life expectancy for newborn Finn by sex in 1900–2007 and forecast for 2008–2040, years



Source: Statistics Finland and VATT

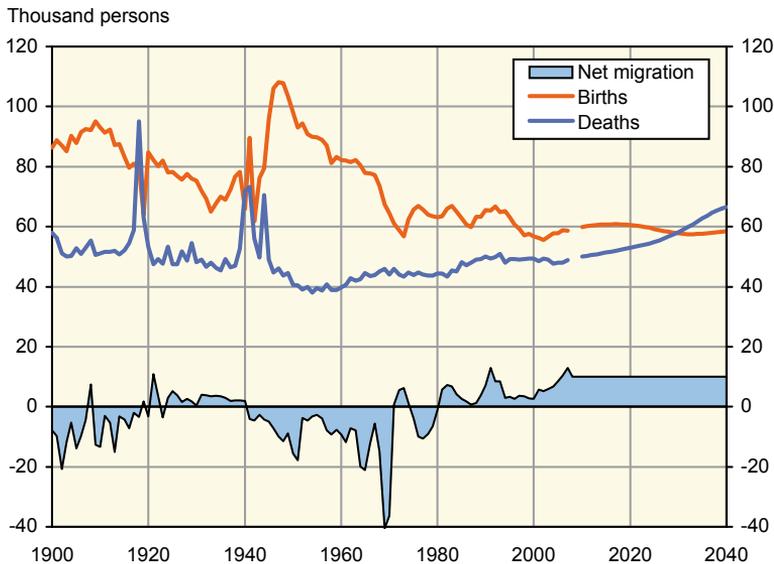
In 2007, a girl born in Finland had a life expectancy of 83 years and a boy of 76 years. The lifespan of an average Finn has lengthened during the last hundred years by more than 30 years. The notable reduction in the mortality rates of infant and young people remarkably increased the lifespan. At present, only 1 per cent of those born alive die before they reach the age of 22. According to the mortality statistics, 91 per cent of women and 80 per cent of men reach the age of 65.

A Finnish female nowadays lives longer than females on average in other rich countries. The lifespan of a Finnish male, on the other hand, does not reach the average lifespan in other rich countries, although the life of a Finnish male has rapidly lengthened during the past decades when compared internationally.

Because the risk of death, even of the oldest, has constantly decreased in nearly every prosperous country, population forecasts assume that the lifespan will also lengthen in future decades. According to the most recent population forecast by Statistics Finland, the life of a Finn will lengthen by two years during each future decade. Because the mortality of infants and young people is already low at present,

lengthening of the lifespan can be explained even more by the reduction in the old adult risk of dying.

Figure 6.2. Number of births and deaths and net migration in Finland in 1900–2007 and a forecast for 2008–2040, thousand persons



Source: Statistics Finland/Population Statistics and VATT

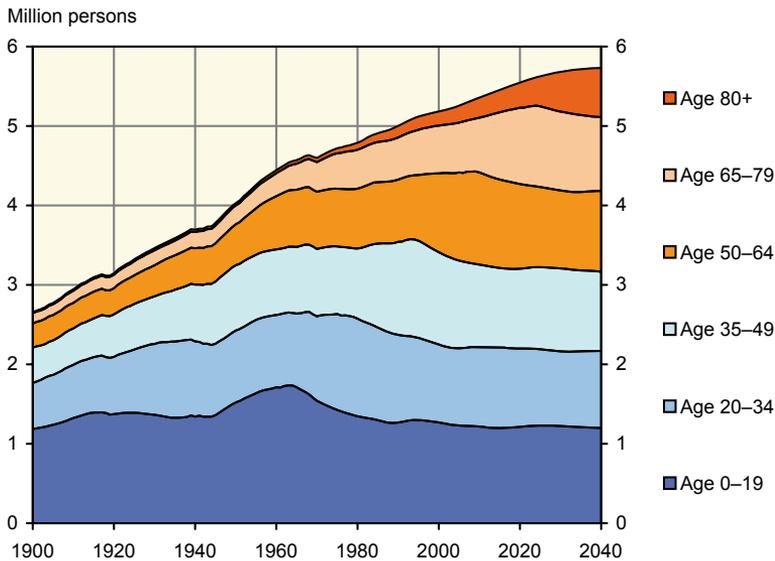
In 1946–1949, over a hundred thousand children were born in Finland every year. After that post-war baby boom, the birth rate fell until the early 1970s. At that time, fewer than 60 000 children were born annually. In the past few years, the number of births has again fallen below 60 000, because the small age groups of the 1970s are now at the best age of reproduction. The annual number of births is likely to stay at present level up to 2040.

In the past few years, almost 50 000 Finns have died every year. Although the life span is estimated to lengthen, the number of deaths will increase to almost 70 000 by 2040. Because considerably more old people will be living in Finland in the future than there are now, the number of deaths will also increase. The number of deaths will overtake the number of births in 2030, after which the population can increase only through a surplus of immigrants.

During the past hundred years, emigrants have outnumbered immigrants by a quarter million persons although, during the last two decades, there have been over a hundred thousand more immigrants than emigrants. In its latest population

forecast, Statistics Finland assumes that this kind of surplus will also be continued in the future. It is expected that Finland will have every year a surplus of 10 000 persons in migration.

Figure 6.3. Population by age groups in Finland in 1900–2007 and forecast for 2008–2050, million persons



Source: Statistics Finland and VATT

The current population of Finland is 5.3 million people. According to the population projection by Statistics Finland, the population will increase by a total of four hundred thousand until 2040. The population forecast has assumed that the fertility rate will remain unchanged and that the lifespan will lengthen by two years for every future decade.

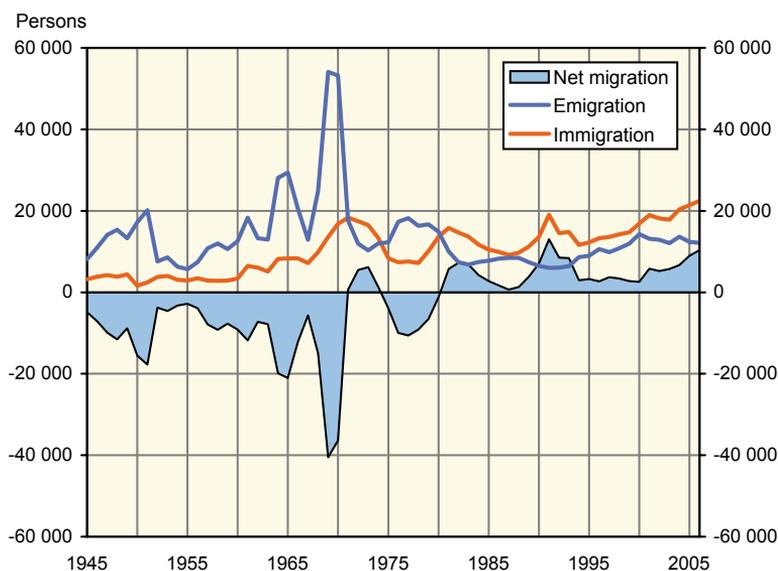
The number of children under 20 years of age was, at its highest, more than 1.7 million four decades ago. There are now and up to 2040 about 1.2 million children living in Finland if the current demographic trends will continue.

The number of 20–34-year-olds was at its highest in the early 1980s, but since then it has fallen by nearly 250 000 to under a million and this amount will prevail up to 2040. The number of middle-aged people (from 35 to 49 years of age) took a downturn during the last decade. This trend has, however, stopped and the number will be stabilised to about one million.

The number of old-age-pensioners (i.e. over 64-year-olds) is currently nearly 900 000. Their number will grow to 1.5 million up to 2040. From the 2020s onwards, only the number of people in their eighties and above will increase. In 2040, there will be as many as 600 000 old people (80 years and more), which is over a tenth of the population at that time.

## 6.2 Migration

Figure 6.4. Immigration, emigration and net migration in Finland in 1945–2006, persons



Source: VATT (Statistics Finland)

For the most part of its history, Finland has been a land of emigration. Both the number and characteristics of emigrants have, however, changed over the years. Earlier permanent emigration of unskilled labour force has been replaced by a temporary work or study abroad of highly educated Finns. 25–29-year-old singles are most likely to emigrate. In addition, the probability of emigrating increases at both extremes of the education and income distribution.

Table 6.5. Immigration to Finland by country of departure and emigration from Finland by country of destination in 1987–2006

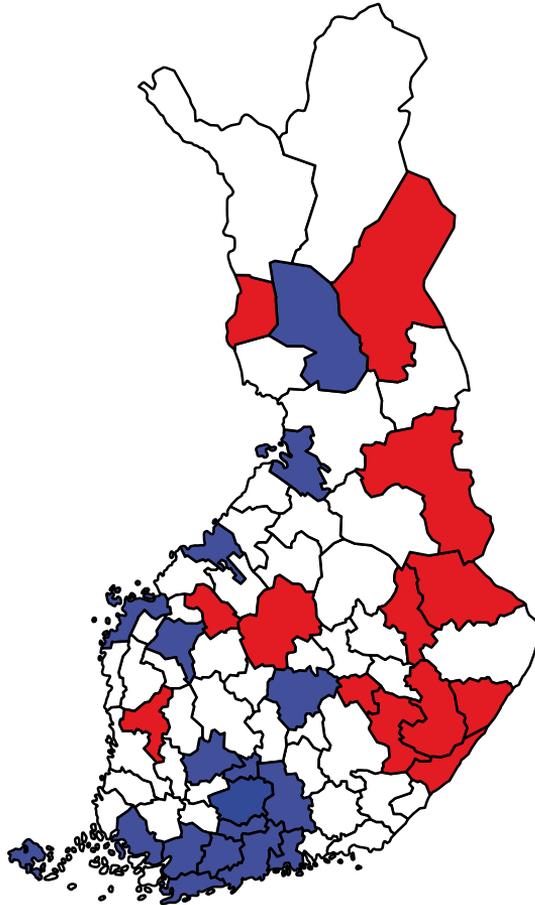
	1987	1990	1995	2000	2006
Immigrants	9 142	13 558	12 222	16 895	22 451
Sweden	57%	44%	26%	19%	15%
Other EU15	14%	11%	16%	19%	21%
New EU members	1%	3%	12%	8%	16%
Other European countries	12%	22%	26%	28%	19%
Africa	2%	3%	5%	3%	6%
Asia	5%	9%	9%	10%	15%
Others	7%	8%	6%	13%	8%
Emigrants	8 475	6 477	8 957	14 311	12 107
Sweden	61%	62%	34%	27%	25%
Other EU15	16%	20%	32%	31%	35%
New EU members	0%	1%	5%	6%	8%
Other European countries	11%	6%	11%	16%	10%
Africa	1%	1%	2%	3%	2%
Asia	2%	2%	5%	6%	7%
Others	9%	8%	11%	11%	13%

Source: VATT (Statistics Finland)

Both the departure countries of immigrants and the destination countries of emigrants have changed during the past two decades. Emigration to Sweden and consequent return migration still dominated the late 1980s. Since 1991, the largest immigrant groups have arrived from the former Soviet Union – in particular from Russia and Estonia. The share of Asian immigrants also increased rapidly. Simultaneously, Sweden lost ground to other Western European countries as a destination for emigrants. Increased immigration and thus larger flows of return migrants also affected emigration patterns.

### 6.3 Standard of living differences within and between regions

Figure 6.6. Sub-regions (NUTS 4) with fastest growing (blue) and slowest growing (red) population in 2007



Source: VATT (Statistics Finland/Population Statistics)

In 2007, the population increased in every third sub-region. The growth in population was fastest in sub-regions formed by growth centres and their neighbouring municipalities. In Finland, population and production seem to be concentrating on a few centres, like in other countries. Especially in areas which are losing population, the age structure of the population is inevitably deteriorating and services are declining, and this further increases the flow of migrants to other areas.

## 6.4 Income distribution and inequality

Figure 6.7. Labour share in Finnish national income in 1975–2007, per cent



Source: Statistics Finland/National Accounts

The distribution of labour and capital income means the division of value added between labour and capital. Value added is obtained by deducting the value of intermediate products used in production from the value of production. A part of this is distributed to the workers as compensation for their labour and a part remains with the enterprise to be used for investments or to be distributed to the owners. The share of labour equals the fraction of wages and salaries and employer social contributions of the national income.

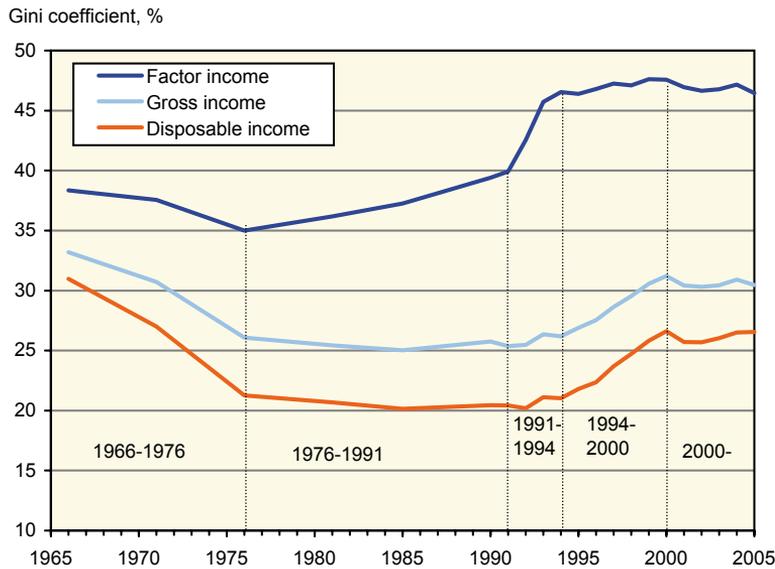
In the national economy, the distribution of income between labour and capital was quite stable for a long time right up to the end of the 1980s. During the years of recession at the start of the 1990s, the income share of labour at first grew at an unprecedented rate in 1991, but then it decreased in a few years to a level for which one would have to go back to the 1950s for comparison. The Finnish national economy went through a period of considerable changes during the whole of the 1990s.

The deepest recession of the industrialised countries, the period of recovery which followed it with its emphasis on exports and the sharp rise of the technology

sector have left their mark in the structures of the economy. During the years of recession, the entrepreneurial structure underwent a vigorous change when the weakest enterprises were forced into bankruptcy and those enterprises which were capable of surviving were obliged to become more efficient. A considerable part of the reduction in the share of labour of the national income can be explained by this structural change. On the plant level, the distribution of labour and capital income has remained more stable.

Although the years of recession are now history, the income share of labour has not risen to its previous level. On the other hand, the pre-recession period cannot automatically be taken as a suitable point of comparison, as powerful globalisation has signalled a permanent change in the environment of economic activities.

Figure 6.8. Income distribution according to different income concepts in 1966–2005, per cent



Source: VATT (Statistics Finland/Consumption Expenditure Surveys, Income Distribution Statistics)

Inequality of factor income, measured by the Gini coefficient, declined from 1966 to the mid 1970s. During the following fifteen years, inequality increased steadily, until it began to rise in a greater amount at the beginning of the 1990s when Finland experienced a deep recession. Unemployment increased and many wage and salary earners had to claim unemployment benefit. When the economy recovered, the growth of factor income inequality stopped. Like factor income, inequality in

gross income and disposable income decreased until the mid-1970s. The decrease in inequality was even larger with these income concepts, because taxation and transfers received by households effectively evened out disparities in income. After mid-1970s, inequality remained unaltered for two decades. Inequality in gross income and disposable income began to increase once the recession had passed, in the middle of the 1990s. In 2001, inequality decreased only temporarily. In 2005, inequality was at the same level as in 2000.

Factor income consists of income received from markets (wages and salaries, entrepreneurial income and income from property). When transfers received by households (e.g. pensions, unemployment benefits, social assistance allowances) are added to factor income, gross income is obtained. By deducting transfers paid by households (e.g. state and municipal income tax and social security contributions) from it, one obtains the disposable income of households.

By definition

disposable income = factor income + transfers received – transfers paid

Income variables are adjusted by OECD consumption unit, which gives weight of one for the first adult, 0.7 for each subsequent adult and 0.5 for each child. The process gives the equivalence scale adjusted income for a household member. For example, a household of 2 adults and one child with disposable income of 22 000 EUR would be treated as three separate individual with income of 10 000 EUR (i.e. the OECD consumption unit is 2.2).

#### **Income inequality as measured by Gini coefficient**

The Gini coefficient is generally used to measure inequality. It can be illustrated by the Lorenz curve drawn inside the (1x1) square. The horizontal axis depicts the cumulative proportion of income recipients, when they have been lined up in ascending order of incomes, and the vertical axis corresponds to the cumulative proportion of income. Point c on the Lorenz curve states how great a part of the income share of the whole population p of the population gets. In the case of perfectly equal distribution of incomes, the Lorenz curve coincides the 45-degree line. The farther away the Lorenz curve is below the 45-degree line, the less evenly incomes have been distributed. The Gini coefficient is determined as the ratio of the area (A) lying between the 45-degree line and the Lorenz curve to the half of the square, i.e.  $A/(A+D)$ .

In the case of perfect equality Gini = 0. In a completely unequal case, in which one gets all and the others get nothing, Gini = 1. The Gini coefficient is often stated as a percentage.

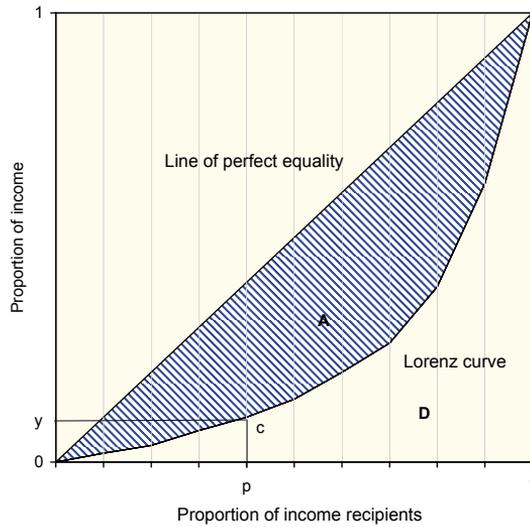
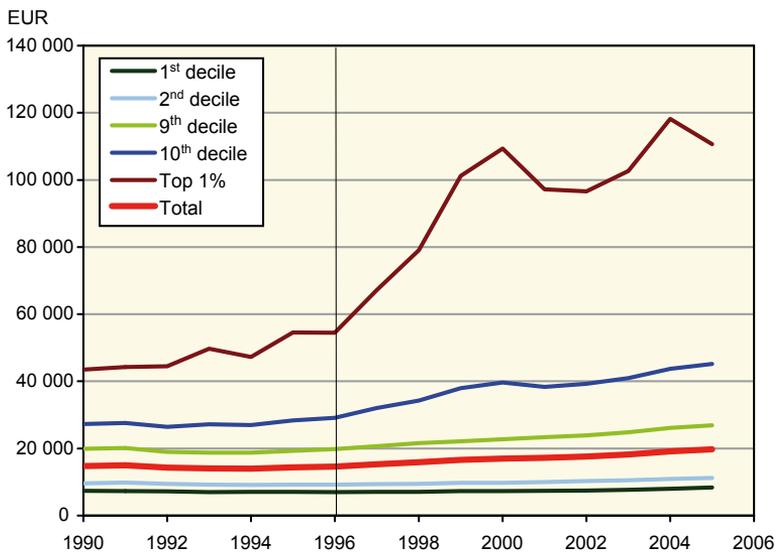


Figure 6.9. Average disposable income in some deciles, top 1 per cent and total population in 1990–2005, EUR at 2005 prices

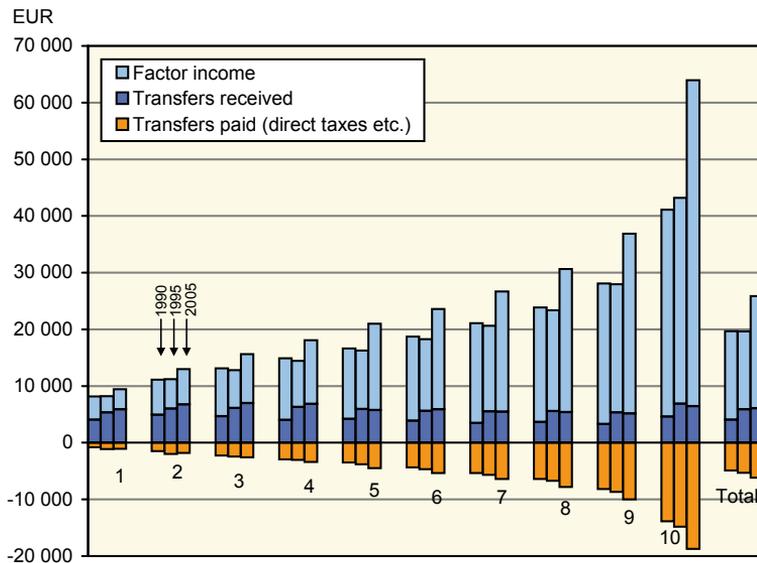


Source: VATT (Statistics Finland/ Income Distribution Statistics IDS)

Real average disposable income declined in consequence of the recession in the early 1990s. On the average, disposable income was in 1997 at the same level as

in 1990. In the bottom decile (1<sup>st</sup> decile), the 1990 level was not attained until 2002. In other deciles, recovery from the recession took place earlier and the growth of income was quite even. The highest decile (10<sup>th</sup> decile) and especially the top 1 per cent made an exception. On average, the disposable income increased by 33 per cent over the period from 1990 to 2005 while in the top 1 per cent income increased by 154 per cent.

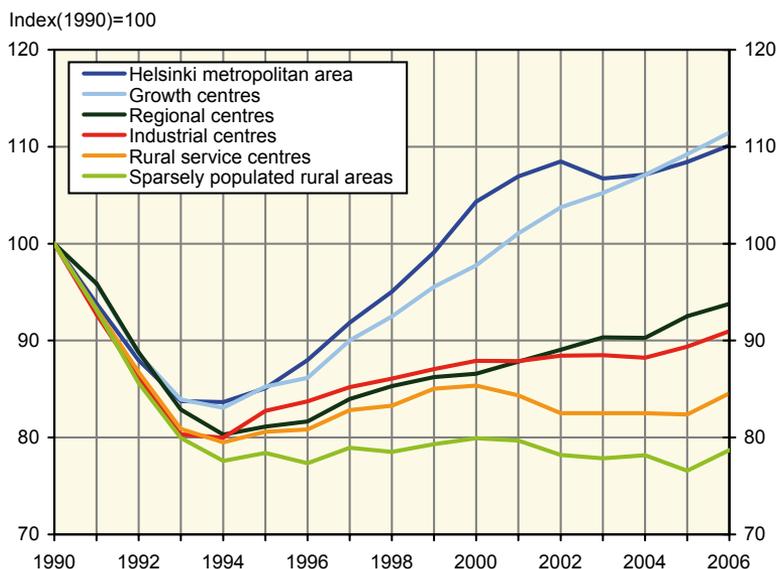
Figure 6.10. Income components in disposable income deciles and in total population in 1990, 1995 and 2005, EUR at 2005 prices



Source: VATT (Statistics Finland/Income Distribution Statistics IDS)

In the first decile (the lowest income earners who form 10 per cent of all income earners), transfers received by households were more than half of their disposable income. Because the transfers hardly change in absolute terms when the factor income increases, the relative significance of transfers decreases in the higher deciles. The structure of transfers received is, however, different in various decile groups. Social and housing allowances are directed towards the lowest deciles. Family allowances, on the other hand, are not dependent on income, and earnings-related pensions are directed towards the upper income deciles. The relative share of transfers received was exceptionally large after the recession in 1995. After that, the growth in factor income was especially rapid in the highest decile. Transfers paid (direct taxes etc.) by those belonging to the highest decile did not, however, rise as rapidly as factor income. This was partly due to the growth in the share of capital income, taxed at a flat rate.

Figure 6.11. Jobs in groups of sub-regional units by degree of urbanisation in 1990–2006, index(1990)=100



The Helsinki metropolitan area covers Helsinki and its neighbouring municipalities. Growth centres denote four university sub-regional units: Oulu, Tampere, Turku and Jyväskylä. Regional centres include fifteen other central sub-regional units. Industrial centres are sub-regional units specialising in industry. Rural service centres are the strongest municipal centres in rural areas. Sparsely populated rural areas include the most sparsely populated sub-regional units.

Source: VATT (Statistics Finland/Regional accounts)

When the recession hit Finland at the beginning of the 1990s, the number of jobs fell fairly evenly throughout the country and reached its lowest level in 1994 when there were, on average, 20 per cent fewer jobs than in 1990. The Helsinki region and growth centres were areas to recover from the recession most rapidly. In 2000, the number of workers in the Helsinki metropolitan area exceeded the 1990 level and was at its highest in 2006 when there were about 10 per cent more workers than in 1990.

The number of jobs in the growth centres reached the 1990 level in 2001 and has been rising rather steadily each year after the recession. The number of jobs in regional centres and industrial centres has also been rising since 1994 and had, on average, reached 90 per cent of the 1990 level in 2006.

In rural service centres and especially in sparsely populated rural areas, the situation has remained at its worst: the number of jobs in sparsely populated rural areas has remained under 80 per cent and in rural service centres under 85 per cent of the 1990 level.

VATT researchers have made several publications on this area. See for example:

Haataja Anita – Mattila-Wiro Päivi (2006): Impact of Alternative Benefit Levels and Parental Choices on the Parents' Income. Micro-simulation Approach on the Finnish Parental Leave. [VATT discussion papers 399](#). Helsinki

Hynninen Sanna-Mari – Kangasharju Aki – Pehkonen Jaakko (2006): Regional Matching Frictions and Aggregate Unemployment. [VATT discussion papers 383](#). Helsinki

Jäntti Markus – Riihelä Marja – Sullström Risto – Tuomala Matti (2008): Long Term Trends in Top Income Shares in Finland. Forthcoming in Atkinson A. B. – Piketty T. (Eds.). Top Incomes over the Twentieth Century: Volume II – A Global Perspective. Oxford University Press

Kyyrä Tomi – Maliranta Mika: The Micro-Level Dynamics of Declining Labour Share: Lessons from the Finnish Great Leap. Forthcoming in Industrial and Corporate Change

Mattila-Wiro Päivi (2006): Changes in the Distribution of Economic Wellbeing in Finland. [VATT research reports 128](#). Helsinki

Pekkala Sari (2005): Economic Impacts of Immigration: A Survey. [VATT discussion papers 362](#). Helsinki

Pekkarinen T. – Uusitalo R. – Pekkala S. (2006): Education policy and intergenerational income mobility: Evidence from the Finnish comprehensive school reform IFAU Working Papers 2006:13; IZA Discussion Papers 2204

Pirttilä Jukka – Uusitalo Roope: Leaky Bucket in the Real World: Estimating Inequality Aversion Using Survey Data, *Economica* (in press)

Riihelä Marja – Sullström Risto – Tuomala Matti (2005): Trends in Top Income Shares in Finland. [VATT discussion papers 371](#). Helsinki

Riihelä Marja – Sullström Risto – Tuomala Matti (2007): Economic Poverty in Finland 1971–2004. [VATT discussion papers 418](#). Helsinki

## 7 Energy and the environment

Energy costs make up about three per cent of Finland's gross domestic product. The highest energy intensities can be found in heavy industry. For example in the basic metal industry, energy costs can be over 10 per cent of value added. In contrast, the energy cost shares of many service sectors remain below 1 per cent of value added. Households spend over 7 per cent of their income on energy, half of which goes to transport fuels.

Fossil fuel use, for whatever purpose, contributes to the reinforced greenhouse effect and to the acidification of the soil, while it is also detrimental to local air quality, especially in cities. Environmental policy objectives have a large influence on energy policies. For example, the use of polluting fuels is discouraged by means of energy taxes. Higher energy prices motivate users to step up energy saving or to switch to cleaner fuels. The energy cost shares vary over sectors, and the possibilities to save energy vary as well, but they are not always commensurate to the cost shares. Increases in energy prices or, conversely, the investment cost of savings cannot always be included in the sale prices of final commodities. For these reasons, the impacts of energy-pricing policies on the structure of the energy economy unfold over a larger time span.

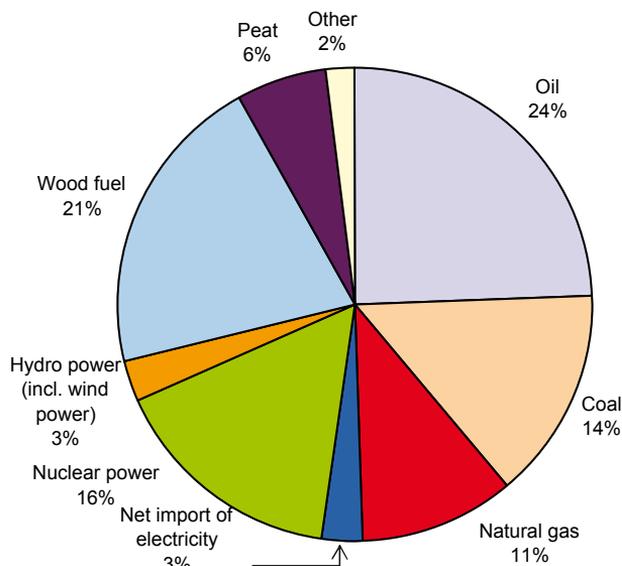
A very dominant factor in energy markets as well as in energy and environmental policy making is the set of policies aiming at the reduction of greenhouse gas emissions. The EU and its member states have ratified the Kyoto Protocol which obliges all member states to take action in order to keep emissions in the period 2008–2012 below country-specific levels. Since the beginning of 2005, designated sectors in all 25 member states of the European Union are included in a compulsory emission trade system (EU ETS). In the current EU ETS, only emission allowances for CO<sub>2</sub> emissions are traded. The designated sectors are the energy conversion industry (electricity, district heat, oil refinery), mining industry, paper and pulp industry, iron and steel industry, and building materials industry. The motivation behind the introduction of EU ETS was that the introduction of one common cap and trade system for CO<sub>2</sub> emissions would enable the energy intensive industries to achieve their reduction targets against lower cost compared to separate national policies.

The current EU ETS covers the period 2008–2012 which coincides with the first commitment period of the Kyoto Protocol. The experiences with EU ETS in the first phase (2005–2007) demonstrated that various design features were not yet mature, for example the frequency of disclosure of actual allowance holdings of obligated parties by country could be raised. Oversupply of allowances in the first phase resulted in a lasting the price collapse for EU ETS halfway the first commitment period.

In order to prevent the recurrence of a price collapse, the distribution of allowances for the period 2008–2012 has been clearly stricter. Up to now, prices for the new commitment period vary between 20 and 25 Euro per ton CO<sub>2</sub>.

## 7.1 Structure of energy supply and demand

Figure 7.1. Primary energy use in Finland by energy source in 2006, per cent



Source: Statistics Finland/Energy Statistics

Gross domestic consumption of energy in Finland amounted to 1 492 petajoules (PJ) in 2006. Half of this was covered by fossil fuels, whereas renewable energy sources covered almost a quarter. The share of nuclear energy was about one sixth. Peat occupies a class of its own. In the context of emission policy, it is regarded as a fossil fuel, in accordance with the guidelines of the IPCC. Yet, it is a local energy source often used in conjunction with wood in combined heat and power plants.

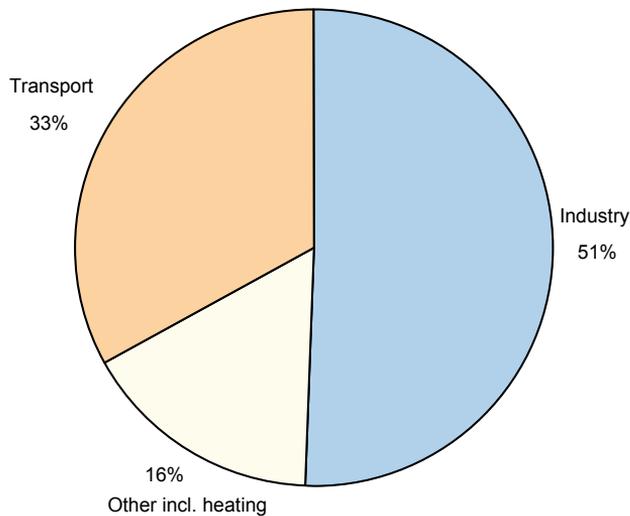
The Finnish energy supply structure is more diverse than in most other OECD countries. This large diversity improves the security of supply and attenuates the sensitivity of the economy to energy price variations. Renewable energy sources, such as biomass and hydro power, are relatively abundant in Finland when compared to the OECD and EU average. Oil and oil products are mainly used in the transport sector and for space heating. Coal, biomass, peat and natural gas are used in power and heat production, especially but not exclusively in so-called combined

heat and power units. Nuclear power and hydro power are used purely for electricity production. Last but not least, a part of the electricity supply is covered by imports from Russia, Sweden and Norway.

The start of EU ETS in 2005 added pressure on the Finnish electricity production sector to reduce the carbon content of electricity generation. As a consequence, appreciably less coal was used in 2005 than in 2004. However, the collapse of emission prices in EU ETS allowed a comeback of coal in 2006 (a share of 14%, almost equal to the share in 2004). In 2006, the share of net electricity import was appreciably below the 2005 figure (from 5% to 3%). Rather high spot prices for electricity in the Nordpool area and low EU ETS prices and no particular upsurge in coal prices (unlike those of oil) were the main reasons for this lower share.

PJ = petajoule = 1 000 000 000 000 000 joule; 1 kWh = 3 600 000 joule

Figure 7.2. Final energy consumption in Finland by sector in 2006, per cent



Transport does not include energy consumed by international shipping and air traffic.

Source: Statistics Finland/Energy Statistics and Adato Energia Oy (owned by Finnish Electricity Association, Finnish Energy Industries Federation and Finnish District Heat Association)

Of the entire final energy consumption in 2006 (1 123 PJ) in Finland, about half is used in industry. Within industry, the paper and pulp industry accounts for about

50 per cent of the final energy use. In Finland, the industry is overall more energy-intensive than in most industrialised countries. In Sweden and Belgium, industry accounts for about 35 per cent of the total final consumption, whereas this share is still lower in many other industrialised countries.

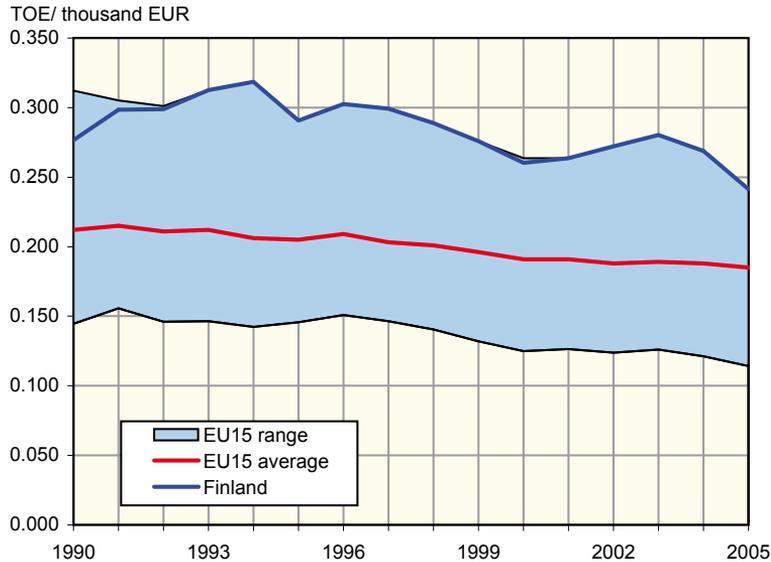
About one fifth of the final energy consumption is meant for space heating. Domestic transport has a similar share.

The EU has agreed with the European car industry in the so-called ACEA agreement that the average new car sold in Europe in the year 2008 should have a CO<sub>2</sub> emission level of less than 140 g/vkm (gramme per vehicle kilometre). This limit translates as approximately 5 litres per 100 km. Despite this target, emissions from road traffic are expected to grow, owing to the increasing number of cars and the still rising average size of newly bought cars. In an attempt to step up emission reduction efforts in transport, Finland introduced as of 2008 a differentiation in the purchase tax of passenger cars based on the emissions per vehicle kilometre.

The remaining segments of final energy use comprise agriculture, construction, and electricity use in services and households. The residential sector represents the largest part of the remaining segments. Energy saving in these sectors is either expensive in comparison to other sectors or, for all kinds of reasons, not easy to realise. However, some policies, such as the EU-mandated energy-labelling scheme for domestic appliances, do help to improve energy efficiency in these sectors. Similarly, the EU building directive, which among others obliges, the member states to introduce an energy certificate system for residential and non-residential buildings, is expected to enhance investments in energy efficiency as the certificate system clarifies the market conditions for energy saving.

## 7.2 Energy intensity and economic development

Figure 7.3. Energy intensity in EU15 countries 1990–2005, TOE/GDP



Source: Eurostat/Sirene data base and VATT

The energy intensity of the Finnish economy has been and still is well above the EU average, but shows signs of convergence in recent years. Although energy intensity in Finland at the level of specific industrial processes is often low compared to other countries, energy intensity (in relation to value added and GDP respectively) is relatively high at the sector and national levels. The location at high latitudes obviously raises the energy requirements for space heating and thereby also the overall national energy intensity. Also, the prominent presence of heavy industry raises energy intensity.

The common trend in the past decades has been that in mature economies a further increase of the GDP per capita came along with a decrease in the energy consumption per unit of GDP. In some EU countries with below average income levels such as Greece and Portugal, an increase of the GDP per capita was still accompanied by an increase of energy use per unit of GDP. The energy intensity of Sweden has been reduced more than that of Finland, even though the countries have rather similar economic structures. During the economic crisis of the early 1990s energy intensity in Finland rose temporarily due to underutilisation effects in heavy industry.

TOE = tonne of oil equivalent, meaning that for all used energy sources, their energy content has been measured with the energy content of oil as the unit

Table 7.4. Energy intensity in 1985, 1990, 1995, 2000 and 2004 in EU25 countries, TOE/capita

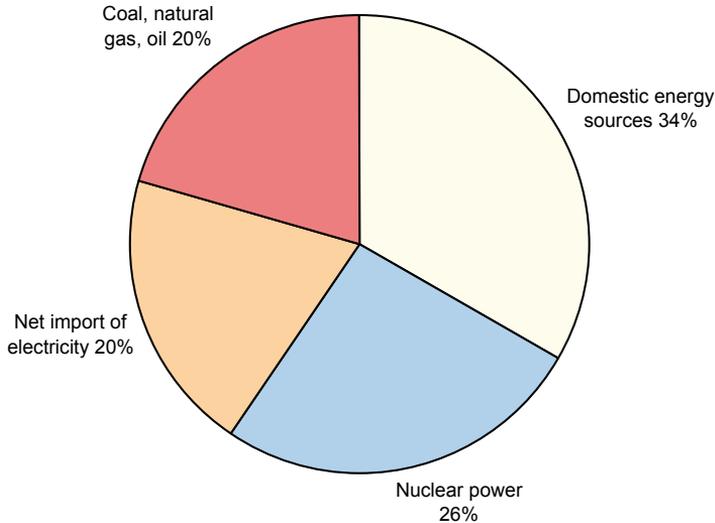
	1985	1990	1995	2000	2004
Luxembourg	8.5	9.3	8.1	8.3	10.4
<b>FINLAND</b>	<b>5.4</b>	<b>5.7</b>	<b>5.6</b>	<b>6.3</b>	<b>7.2</b>
Sweden	5.6	5.5	5.7	5.4	5.9
Belgium	4.4	4.7	5.0	5.6	5.3
Netherlands	4.3	4.5	4.7	4.7	5.1
France	3.7	3.9	4.1	4.2	4.5
Czech Republic	3.9	4.0	4.0	3.9	4.3
Estonia	..	6.4	3.4	3.6	4.2
Germany	4.6	4.5	4.1	4.1	4.2
Austria	3.1	3.3	3.3	3.5	4.0
Ireland	2.5	2.9	3.1	3.7	3.9
United Kingdom	3.6	3.7	3.7	3.9	3.9
Denmark	3.8	3.5	3.9	3.7	3.7
Slovenia	..	3.0	3.0	3.0	3.6
Cyprus	..	3.5	3.1	2.9	3.4
Slovakia	..	4.0	3.2	3.2	3.4
Spain	1.9	2.3	2.6	3.1	3.3
Italy	2.4	2.7	2.8	3.0	3.2
Greece	1.8	2.2	2.3	2.7	2.8
Lithuania	..	4.3	2.2	2.0	2.7
Hungary	..	2.7	2.4	2.5	2.6
Portugal	1.2	1.7	2.0	2.4	2.5
Poland	2.7	2.5	2.6	2.3	2.4
Malta	..	2.8	2.7	2.6	2.2
Latvia	..	1.9	2.0	1.7	1.9
EU15	3.8	3.9	3.7	3.9	4.0
EU25	..	3.2	3.5	3.7	3.8

Source: Eurostat/Sirene data base and VATT

The energy intensity per capita of Finland is much higher than the average of the EU countries. Only Luxembourg has consistently shown higher energy intensity per capita than Finland. Since 1985, the energy intensity per capita was remarkably reduced in Germany, even though it increased slightly after 2000. The main reason for this is the refurbishment of the former East German energy sector. In Sweden, Denmark and Luxembourg, some reduction was achieved up to 2000, but in 2003 the intensity increased again, often even beyond the 1985 intensity level. In the other (EU15) member states, energy intensity per capita has been more or less steadily going up between 1985 and 2004. The intensity per capita in Finland increased by approximately 33 per cent between 1985 and 2004. Most of this increase occurred after 1995. The increase of the per capita energy intensity in Belgium and Italy is remarkably large, and even more so in Spain, Greece, Ireland and Portugal. In the latter four countries, this can be attributed to a relatively larger growth in industrial output as well as substantial increases of domestic appliance ownership. In most new member states, except Czech Republic, Slovenia and Malta, the energy intensity has decreased dramatically since 1990 due to large structural changes in those economies. However, the upturn of the economy in the new member countries after 2000 translated into an increase of the energy intensity per capita in recent years.

### 7.3 Import dependency of electricity supply

Figure 7.5. Import dependency of Finnish electricity supply in 2005, per cent



Source: Adato Energia Oy

The dependency on imports is here distinguished along temporal lines, meaning that the easier and quicker an import flow can be cut or its price changed, the higher the degree of explicit dependency is. Applying the strictest criteria, only the domestic energy carriers, such as biomass and hydro power, imply no dependency. As these sources cover 34 per cent of the electricity supply, the import dependency of the electricity supply would be 66 per cent. Nuclear power production is not instantly dependent on foreign supplies, and therefore counting it as a domestic source reduces the short term import dependency to 40 per cent. Allowing for the fact that the imported fossil fuels for power production are to some extent stored or ensured, it could be interpreted that the instantaneous import dependency is further reduced to 20 per cent.

This figure equals the share of imports of electric power. The import dependency could easily be reduced, at least technically. Commercially, this is not attractive. In years with reasonable to good availability of hydropower in the Nordic countries, imports are cheap. In addition, there is now a continuous flow of rather low-priced imports from the Russian power system. Nevertheless, the flip side of the coin is that, in years with scarce availability of hydropower in the Nordic countries, import

prices and also electricity trade prices in general go up considerably. As transmission connections between the Nordic countries and Western Europe will still be expanded, the abundance of Nordic hydro power may have less price reducing effects in the future, thereby making domestic electricity production in Finland generally more competitive.

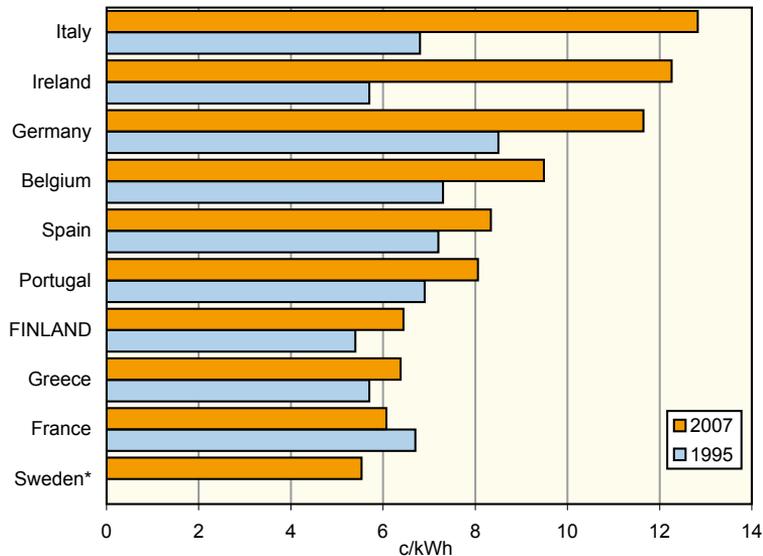
Last but not least, the import dependency of transport fuels is high (95%), just as in most other EU countries.

As oil prices have been going up substantially since 2005 and may even raise more, the security of supply and the import dependency of oil and gas products have received more attention lately, not the least from the point of view of safeguarding balanced growth of the economy. For example, fuel cost rises are substantially affecting the results in the civil aviation sector. To these immediate concerns may be added that the discussion on the long term availability of oil (and natural gas) has flared up again. In the discussion on 'peak oil' some are referring to 'the end of oil' (an absolute global production peak is passed soon). Economists generally would regard that as too pessimistic a statement, but a vision such as 'the end of cheap oil' would already represent a view shared more widely.

OECD classifies nuclear energy as a domestic source, even though for most countries the raw material or even the processed material is imported.

## 7.4 Energy prices

Figure 7.6. Electricity prices for industrial users at 24 GWh/year in selected countries in 1995 and 2007, c/kWh



\* Year 1995 value for Sweden is missing.

Source: Statistics Finland/Energy Statistics

Electricity prices vary considerably between countries, as the primary fuel mix and the dominant conversion technologies differ substantially from country to country. In Finland, the electricity price for large industrial users is still one of the lowest in the Union. Swedish industrial electricity has always been cheap. In 2007, a few countries, namely France and Greece, managed to get below the Finnish level, even though slightly. Only similar users in Sweden get electricity for a still lower price, thanks to a large share of hydropower, next to nuclear capacity.

The liberalisation of the electricity markets leads to lower electricity prices, if there is overcapacity in generation capacity and no collusion of large generators. This price reduction effect was in the first place clearly operative in the Nordic power markets. When the overcapacity fades away after a couple of years, prices start to rise. In many countries, the electricity markets still have strong monopolistic features and, consequently, prices appear to go up much more easily than they go down.

A low electricity price is regarded as very important by heavy industry, in particular by the basic metal and the paper industries. The cost of energy can be lowered by optimising the use of industrial waste as fuel and by using wood (or other biomass) based material as an energy source. For example, the paper industry applies such technologies. Naturally, optimising the overall energy use by introducing combined heat and power production where feasible and optimising end-use efficiency are important as well.

Last but not least, in various member states very large industrial energy users can purchase electricity and/or the natural gas at specifically reduced prices. With the progress of regulatory reform in the EU energy markets, the obligations regarding transparency might help to abandon or at least reduce these implicit subsidies.

## 7.5 Greenhouse gas emissions and cost of climate policy

Figure 7.7. CO<sub>2</sub> emissions in Finland in 1900–2006\* and trend until 2025, million tonnes



\* Estimated by Ministry of Trade and Industry, WM = With measures baseline, WAM = with additional measures

Source: VATT (VTT Technical Research Centre of Finland, Statistics Finland and the Ministry of Trade and Industry)

With the growth of Finnish total output, energy consumption also expanded substantially. The growing energy requirement of the past decades was predominantly met by an increase of fossil fuel use, leading to an almost tenfold increase of Finnish carbon dioxide emissions in the second half of the 20<sup>th</sup> century.

The introduction of nuclear power considerably reduced the emission level in the 1980s. The establishment of the common Nordic electricity market and some favourable hydro power years contributed to the reductions in the second part of the 1990s. After 2000, several years with tight reservoir situations followed, whereas in general the Nordic joint electricity market experienced higher price volatility in recent years. The overall effect has been a larger share of domestic Finnish electricity production, notably by using more fossil fuel based generation units. As a consequence, CO<sub>2</sub> emissions rose sharply up to 2003. In 2004, already some reduction was achieved thanks to the better availability of hydro power. In 2005, (not in the figure), the emission level returned to almost the same level as in the

year 2000. Next to changes in the fuel mix, this emission level reduction was also caused by a slump in industrial electricity demand, which in turn was closely related to a labour conflict in the paper and pulp industry. In 2006, emission levels went up again, ending up almost at the same level as in 2004. Clarifications for this are the resurgence in coal use and diminished electricity imports.

In the national climate strategy, it was estimated that the carbon dioxide level would increase up to an average of 70 million tonnes for the period 2008–2012, if no further measures were taken. The implementation of the national climate strategy ('With Additional Measures' – WAM) is expected to reduce the level of CO<sub>2</sub> and other greenhouse gas emissions sufficiently to comply with the target of the first commitment period of the Kyoto Protocol (2008–2012). However, as was shown above, the varying conditions in the Nordic electricity market, make the development path of future emission levels less predictable. Within the framework of the Kyoto Protocol and the EU Burden-Sharing Agreement, Finland has agreed that the average greenhouse gas emission level of the years 2008–2012 will not exceed the 1990 level.

The most important greenhouse gas is carbon dioxide (CO<sub>2</sub>) which made up 84% of the Finnish greenhouse gas emissions in the year 2000. Other greenhouse gases are methane (CH<sub>4</sub>), di-nitric oxide (N<sub>2</sub>O), and the so-called 'new gases', several kinds of halogens such as HFC, PFC and SF<sub>6</sub>.

The dominant source of carbon dioxide emissions is the incineration of fossil fuels in the energy conversion sector (refineries, power stations) and in engines in means of transport, notably road transport. Energy conversion, in particular power generation, can also be done with carbon-free energy sources such as hydro, wind and nuclear power. Furthermore, in Finland, biomass-based fuels are important. Biomass is a so-called climate neutral fuel, as the carbon dioxide emissions from its burning are compensated by the uptake of carbon dioxide during growth of the plant or tree. Other greenhouse gases are emitted by waste processing (methane), agriculture (methane and di-nitric oxide) and industrial processes (di-nitric oxide and the 'new gases').

Table 7.8. Greenhouse gas emissions in 1990 and 2004, and the target level for first commitment period 2008–2012 in selected countries, million tonnes

Country	Emission level 1990	Emission level 2004	Emission target 2008–2012	BAU 2008–2012
Netherlands	213	218	200	220
Belgium	146	148	135	149
Spain	287	428	330	523
Ireland	56	68	63	71
United Kingdom	764	659	669	626
Italy	520	583	486	612
Austria	79	91	69	96
Greece	109	138	136	156
Luxembourg	13	13	9.0	13
Portugal	60	85	76	92
France	567	563	567	561
Sweden	72	70	75	69
Germany	1 226	1 015	969	932
Finland	71	81	71	88
Denmark	69	68	55	68
EU15	4 252	4 228	3 910	4 276
Malta	2.0	3.0	..	..
Lithuania	51	20	47	..
Latvia	26	11	24	..
Poland	460	386	432	..
Slovakia	73	51	67	..
Czech Republic	196	147	180	..
Estonia	43	21	40	..
Hungary	103	83	97	..
Slovenia	18	20	17	..
Cyprus	6	9	..	..
EU10	978	751	904	..
EU25	5 231	4 980	..	..

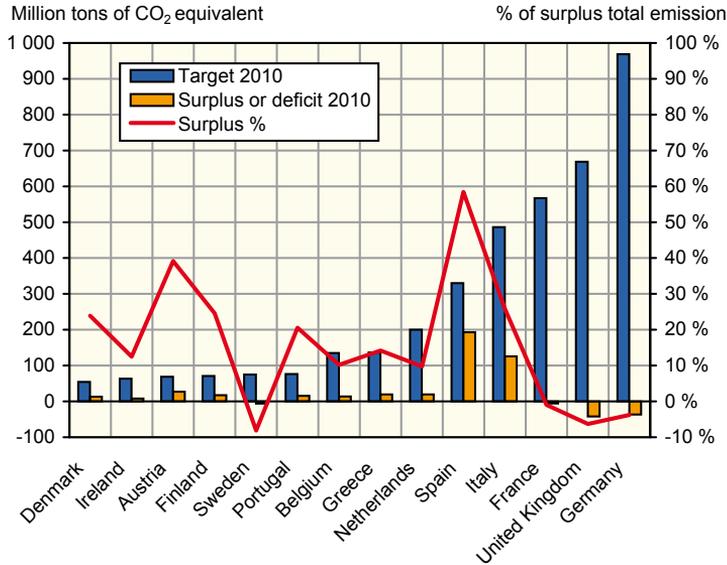
Source: EEA year 2005 report to European Commission and 3rd national report to UNFCCC (for countries marked with asterisk) and Eurostat

In 1988, formal global deliberations concerning climate change started in the Intergovernmental Panel for Climate Change. In 1995, the United Nations Framework Convention for Climate Change was established, thereby allowing the world community to start to make decisions on internationally co-ordinated policies. This culminated in the Kyoto Protocol. With the ratification of the Kyoto Protocol by Russia in 2005, it entered finally into force, implying it is now a binding agreement for all signatories (the so-called Annex B countries).

In that Protocol, the industrialised countries (often referred to as the Annex B countries) have committed themselves to reducing their average greenhouse gas emissions in the period 2008–2012 to the level of 1990 or somewhat lower, depending on the country under consideration. The USA and Australia have, however, not ratified the Protocol. The EU member countries have, apart from a country-specific commitment, also agreed on an overall EU reduction target of 8 per cent (compared to the 1990 level). The target for Finland is to arrive at the emission level of 1990 (or lower).

The amount of policy required to reduce emissions sufficiently depends on the initial situation of each country and on its economic and population growth over time. For example, when the reductions were agreed upon, Germany and the United Kingdom still possessed substantial amounts of old coal-fired power stations, which could be easily replaced by modern more efficient gas-fired power stations. These countries, and probably also France are expected to achieve their targets rather comfortably. On the other hand, countries that experienced faster economic growth and higher motorisation rates than foreseen during the reduction emission negotiations target achievement will require significantly more policy efforts. For Italy, Belgium and the Netherlands, the targets were more difficult to achieve, right from the start. Spain, Portugal, Greece and Ireland were granted some space for growth in total emissions between 1990 and 2010 (15%–25% depending on the country). However, the emissions these countries have been growing strongly in recent years, thereby obliging them in the remaining years to emissions reduce from current levels in order to fulfil their obligations. All in all, especially Spain and Italy are facing rather steep reduction efforts and to a slightly lesser scale the same applies to Austria. In the new EU Member States, such as Poland, the Czech Republic and Estonia, emission levels dropped substantially after 1990 due to dramatic economic restructuring. Even though the emission levels of these countries have started to grow again more recently, these countries will be mostly still be able to sell surplus emission rights to other countries with tight targets.

Figure 7.9. Emission targets of EU15\* countries (million tons) and probable under- or overachievement of targets in 2010 (million tons and percentage shares)



\* excluding Luxembourg

Source: VATT calculations and Eurostat

Sweden, France, the United Kingdom, and Germany are expected to overshoot their reduction targets (i.e. the orange bar in the figure is negative). This means that these countries can sell emission rights. Countries for which the projected underachievement is modest can fill up the gap by buying emission rights. This applies for example to Ireland and the Netherlands. Yet, for other countries such as Austria and Spain, the figure illustrates that trying to depend only on emission trade may be too risky a strategy to fill the gap. These countries have to step up their domestic efforts appreciably more than the average of the EU15. Finland's position is in between these extremes. So, also Finland has to step up clearly its domestic efforts. The fifth nuclear power station which is under construction now would cover about half of the gap, provided the projected delays in the delivery do not worsen.

The development of emissions can, among others, be projected by applying an elasticity with respect to GDP growth. That means how much the emissions change (in %) as a result of percentage change in GDP. In the past for developed countries, this figure hovered between 0.2 and 0.5. The new emission reduction policies (should) get them under zero. With reference to Figure 7.9, this has for example happened in the United Kingdom (positive economic growth but less emissions) and e.g. also in Sweden. In Figure 7.9, the projected under- and overachievements are based on the economic growth projections up to 2012 published by Eurostat. Realised elasticities per country can be derived from emission and economic growth statistics. These figures can be used together with the economic growth projections to produce a simple indicator of expected target achievement when no new policy measures are taken.

VATT researchers have made several publications on this area. See for example:

Honkatukia Juha – Mälkönen Ville – Perrels Adriaan (2006): Impacts of the European Emission Trade System on Finnish Wholesale Electricity Prices. [VATT discussion papers 405](#). Helsinki

Perrels Adriaan (2007): Economic Implications of Differences in Member State Regulations for the European Union Emission Trade System. [VATT discussion papers 412](#). Helsinki

Perrels Adriaan (2008): Wavering between radical and realistic sustainable consumption policies: in search for the best feasible trajectories, *Journal of Cleaner Production*, Vol. 16. (forthcoming) on line available <http://www.sciencedirect.com/science/journal/09596526> -> articles in press

Perrels Adriaan (2008): Market imperfections and economic efficiency of white certificate systems, in Labanca N. and Perrels A. (guest editors), *Energy Efficiency*, Vol. 1, (forthcoming), special issue on white certificates. <http://www.springer.com/environment/journal/12053>

Perrels A. – Oranen A. – Rajala R. (2005): White certificates & interactions with other policy instruments, Eurowhitecert Task 3.3 Report, <http://www.ewc.polimi.it/>

Perrels Adriaan – Ostertag Katrin – Henderson George (2006): Reshaping markets for the benefit of energy saving, in Perrels A. – Ostertag K. – Henderson G. (guest editors), *Reshaping markets for the benefit of energy saving – Special Issue of Energy Policy*, Vol.34, No.2, January 2006

Perrels Adriaan – Tuovinen Tarja (2007): Assessing the overall market potential of Tradable White Certificates in EU member countries, Eurowhitecert Task 4.4 Report, <http://www.ewc.polimi.it/>



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