FINNISH ECONOMY

Structural Indicators
2006

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Foreword

This publication gives a picture of how Finland stands in terms of economic performance and economic policy compared with other countries. It deals with the structure of the Finnish economy and labour markets. The level and structure of taxation and public expenditure are also covered. Attention is paid to the expected demographic development and ageing population, to income differences and to environmental themes, too.

This publication is a shortened version of the original report Talouden rakenteet, a yearly publication in Finnish. The publication can be found on the web site of the Government Institute for Economic Research (VATT) http://www.vatt.fi.

I hope The Finnish Economy - Structural Indicators will be a useful information package for readers interested in the Finnish economy and its performance in the international context.

Helsinki, September 2006

Reino Hjerpe
## Country abbreviations

<table>
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<th>Abbreviation</th>
<th>Country Name</th>
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<td>BE</td>
<td>Belgium</td>
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<td>AT</td>
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<td>USA</td>
<td>The United States of America</td>
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EU19 EU countries members in the OECD
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1 Overview of the developments in the 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 2001–2005 the growth rate was slower, but is was still on average 2.5 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 EU25 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 the GDP is the second highest in EU countries after Sweden.

Skilled labour is still available in most sectors and regions notwithstanding the rapid employment growth.

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 declining capital-output ratio. In the 1990s production capacity was substantially increased, although the investments-to-GDP ratio declined.

Strong economic performance during the last 10 years 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 2005 in comparison to the EU15 average (growth, unemployment, inflation and balance of public finances)

Source: VATT (Ministry of Finance and EU).

In 2005, the Finnish economy grew faster than that of the EU15 area on average. The rate of inflation was clearly below the EU mean, whilst the rate of unemployment was close to the average. The surplus of the public sector was after Denmark and Sweden the third largest in the EU, whereas public finances, on the average, show a deficit in the EU area.

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.
At the beginning of the 1990s aggregate output was reduced in a recession worse than in any other Western country after World War II.

However, after the depression of 1991–1993, the GDP started a long period of sustained rapid growth. Ireland was the only EU country enjoying faster growth than Finland.
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 Baltic countries the real income level is less than 50 per cent of that in Finland.
### Table 1.4. Overview of the economies of the new EU member states (EU10)

<table>
<thead>
<tr>
<th></th>
<th>Total population 2004 mill.</th>
<th>GDP per capita PPS(^1) 2005 EU15 =100</th>
<th>Inflation rate 2005 %</th>
<th>Unemployment rate 2005 %</th>
<th>General government net lending 2005 % of GDP</th>
<th>General government gross debt 2005 % of GDP</th>
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1) Purchasing power standards.

Source: EU.

The accession of the new EU members increased the total EU population by approximately 20 per cent. The population size of Poland, 38.2 mill., is far ahead of those of the nine other countries. For the rest of the new member countries, the population sizes account for a small fraction of the total EU population.

With regard to the GDP per capita figures, income level in the new member states is about half of that in EU15. The richest population lives on Cyprus and the poorest in Latvia.

In 2005, the prices rose more rapidly in new member states than in EU15. The inflation rate was highest in Latvia. Overall, the inflation rate was moderate in the whole Union, 2.2 per cent. As regards the unemployment rates, they vary between 17.7 per cent, recorded in Poland, and 5.3 per cent, found in Cyprus.

Estonia and Latvia were the only countries with surplus in government balance in 2005. Hungary performed worst with general government deficit of 6.1 per cent of GDP. The gross public debt relative to GDP was highest in Malta, 74.7 per cent. The least indebted economies were those in the Baltic countries.
The long-term economic development of Finland can be seen as a gradual catching-up process. In the beginning of the 20th century Finland was a poor country. During the 20th 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. in the beginning of the 20th century only around 1950.

Real income level means the gross domestic product per capita. Purchasing power parity (PPP) calculates the GDP using comparable prices across countries.
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 millennium shift the inflation rate in Finland grew faster than the EU15 average.

The Finnish inflation has again been more moredate than that of the EU15 average. That 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.
During the post-war decades Finnish economy suffered from persistent current account deficits. Often the deepening of 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, when 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 the interest rates. The current account surplus has been big since 1994, which, above all, is a result of outstanding price competitiveness of the export products and a high domestic savings rate. Surplus has, however been decreasing recently mainly because of worsening terms of trade.
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 showed a deficit again. 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 2003 the deficit was largest in France, in 2004 in Greece and in 2005 in Portugal and in Hungary.
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 otherhand has shown a widening deficit in recent years.
In the EU area, the ratio of public sector gross debt to the 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. 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. The share was approaching the criterion, but this trend stopped in 2003. In Finland the public debt remained below the EU mean and the 60 per cent limit even during the depression of the 1990s. In 2005, Finland’s public sector debt was among the lowest in the EU. In Baltic States the public sector debt is also low.
1.2 Growth factors

Figure 1.11. Employed persons and hours worked in 1970–2005, 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 2005 there were 2.4 million employed persons in Finland. The number of employed persons still remains below the pre-depression figure by 100 000. In 2005 employment office registers held 275 000 unemployed job-seekers.

According to the National Accounts, before the depression the annual aggregate hours worked in the economy equalled 4.5 billion hours. During the worst year, 1994, the total of hours worked was only 3.5 billion. Since then, the number has reached 4 billion, but not recovered fully to the pre-recession level. Only the older part, persons aged between 55–64 years, of the working-age population work now more hours per capita than before the depression.
Finland has traditionally been a country of capital-intensive production and high investment rates. Until 1990, the ratio of investments to the GDP fluctuated usually between 25 and 30 per cent. In 1991–1994 the investment rate collapsed by 12 percentage points. During 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 1960–2005, 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 last 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 centres 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.
Labour productivity grew strongly in the depression years of the early 1990s. At the same time, capital productivity fell, and because of that, total factor productivity also either fell or grew slowly. After the recession labour productivity continued to grow steadily, while capital productivity also started growing faster and matched or even exceeded the rate of growth of labour productivity in the late 1990s. Consequent to that, the growth rate of total factor productivity was equal to that of labour productivity. In the beginning of 2000s the growth of capital productivity has been very slow. On average, labour productivity grew annually by 2.3 per cent, capital productivity by 2.1 per cent, and total factor productivity by 2.2 per cent between 1995 and 2003.

Source: VATT (Statistics Finland).
1.3 Knowledge, technology and innovations

Figure 1.15. Finland’s competitiveness compared with small EU countries (the highest rank =1)

Finland’s relative competitiveness is strong if measured by technological indicators. Finland ranks well among small EU countries. However, Finland has been able to attract more foreign direct investments and improve the average annual GDP growth rate in comparison with last years. Low foreign trade indicator value, is explained by the fact that in the comparison group there are some countries with very high foreign trade shares.

The figure is based on an interactive programme of the World Bank Institute, which consists of a set of 80 structural and qualitative variables that benchmark economies. The comparison may be undertaken for a group of 198 countries. In this figure the reference group includes all non-G8-member EU countries i.e. mainly small EU countries, divided by region, income or Human Development Index (HDI). For each variable the point of comparison is the best performing country in the group. The data is from various recent years.
Although the GDP share of fixed investments in Finland collapsed during the depression, R&D spendings relative to GDP went up till this decade. The share tripled from 1980 to 2000, but in latest years has stabilized to 3.5 per cent. Finland is now ranked the forefront of all OECD countries with only Sweden showing higher R&D spending ratios.
The public sector share in research funding used to be larger in Finland than in many other OECD countries. Even during the depression public sector spending maintained the GDP ratio of R&D costs on an upward trend. After the depression business enterprises have improved their profitability at a fast pace and their share in the funding of R&D rose to a level comparable to Germany and USA. This change was largely due to heavy R&D spending in the ICT sector. According to the most recent data Finland’s distribution has changed little, while the private sector share in research funding has fallen in US, Germany and Sweden.
In Finland every third 25–64-year-old has received a tertiary degree education, whereas the EU mean is one out of five. In Finland the share of population with tertiary education has risen steadily. 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. This may partially explain the differences between Europe and the USA.
Figure 1.19. New science & engineering graduates in 2003, per thousand of 20–29 years old

Source: Eurostat.

The labour force with qualifications in science and engineering is an important source for knowledge-based growth. A large part of R&D activities is carried out by personnel with technical education. Consequently, a broad student basis in tertiary education is important for ensuring the continuity of R&D activities.

Relative to population, the Finnish education system produces the fourth greatest number of S&E degrees in the EU. Finland invested extensively in engineering studies in the 1970s and 1980s, which resulted in a good network of technical universities.

The indicator covers all tertiary degrees in Science & Engineering (S&E) and therefore includes problems of comparability. Tertiary graduates in Science & Engineering (S&E) are defined as all post-secondary education graduates in
- life sciences (ISC42),
- physical sciences (ISC44),
- mathematics and statistics (ISC46),
- computing (ISC48),
- engineering and engineering trades (ISC52),
- manufacturing and processing (ISC54) and
- architecture and building (ISC58).
Figure 1.20. High-tech exports in 2004, percentage of total exports

Source: Eurostat

The average share of the high-tech exports in relation to total exports was considerably lower for most EU 25 countries than for the United States. In United States high-tech exports accounted for 27 per cent of total exports. The 18 per cent share of high-tech exports in Finland was slightly under the EU 25 average. Malta, Ireland and Luxembourg seem to have the most high-tech intensive export sector whereas Baltic countries, Slovakia and Poland rely more on traditional export sector.
Figure 1.21. Turnover related to new or significantly improved products in manufacturing industry, as a percentage of turnover for all enterprises in 2003

- New to the market
- New to the enterprise but not new to the market

*Data from the year 2002.

Source: Eurostat

In Finland and Denmark over 25 per cent of the enterprises’ turnover comes from products that are new to the enterprise. In Finland, new products to the market account for seven percent of the enterprises’ turnover. New products to the market seem to have most leverage in Slovakia, where the products have almost 19 per cent share of the turnover. The figures give general picture of the innovation activity at country level. However the methods for collecting the data are not yet harmonized and one has to be careful when comparing data between countries and previous publications.
Fast internet connection is a prerequisite for the provision and usage of electronic services. However there are significant differences between the countries in the European Union. In the Nordic Countries over 80 per cent of the enterprises already have a broadband connection. In many new member states less than a half of the enterprises have acquired a broadband connection. In comparison to the year 2004, notably the small and medium-sized enterprises have increased their broadband connections.
In spite of the increased amount of broadband connections, the share of e-commerce is still relatively low in the European Union. The European Union average was nine per cent. Ireland has achieved the highest standing in e-commerce. The electronic commerce accounted for 14 per cent of the turnover in Finnish enterprises. Low figures can be partly explained with the fact that enterprises still use internet mainly to promote their products and services. The actual commerce still takes place through traditional means and is not counted for electronic commerce.
2 Structure of the Finnish economy

The structure of the Finnish economy has changed rapidly during the last 30 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 a decreasing number of farms and the growth in the average size of farms. That change became faster after the Finnish EU membership in 1995.

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 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, and the number of small enterprises has even exceeded the level of the early 1990s. In 2004 there were clearly more enterprises than before the depression – 230 000 in all. However, the new firms were not in the same sector as the old ones.

The Finnish business sector has globalised fast. Outward investment of Finnish companies has increased markedly since 1993, and currently more than half 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 nearly 40 per cent in the 1990s. Most significantly, the regional distribution of exports changed at the beginning of the 1990s, as eastern exports collapsed with the Soviet Union. However, 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 of paper, pulp and wood processing industries’ exports, mainly at the benefit of electronics exports.
2.1 Changes in the production structure

Of the main branches of manufacturing, electronics increased its value added rapidly during the 1990s. At the same time, the relative share of branches producing consumer goods shrank. The share of other metal products remained practically unchanged during the whole observation period and the share of the wood, paper and pulp declined.
Figure 2.2. Employment in services in 1975–2004, 1000 persons

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 also 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.
The wave of bankruptcies of the early 1990s decreased the number of firms by a fifth. Since then the number of small and medium-sized firms has recovered. During the time of high unemployment many of those who were out of work employed themselves by starting a business. Growing service demand and the outsourcing of activities in large companies further increased the number of small firms. The number of female entrepreneurs has increased as well.

Ninety-nine per cent of Finnish firms are small, employing less than 50 persons. In 2004 there were 230,000 firms in this size group, 2,300 medium-range firms with 50–249 employees, 306 firms with 250–499 employees and 258 firms with over 500 employees.
Structural change in the Finnish economy has taken place late and it has been fast. Employment in agriculture was very high until the 1960s. Since 1965 agricultural employment has decreased from 550 000 persons to a sixth of that number. In 2005 the employment in agriculture numbered 93 000 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 the year 1988 to 3 551 million EUR in the year 2004.
In 2005 the number of farms engaged in active production was 69,000, having declined by 60,000 since 1990. At the same time, the average size of a farm grew by 16 hectares to 33 hectares. Additionally, the average forest area owned by farms was 46 hectares in 2005. The growing average size of farms has increased agricultural productivity.

2.2 Globalisation of the economy

Figure 2.5. Cumulative foreign direct investment of the EU19 in 1997–2003, percentage of the year 2003 GDP

Source: VATT (OECD).

Liberalisation of capital movements and the opening of economies led to increased movements of capital across countries in 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 also received a great deal of investments relative to the size of her economy.
During a seven-year period Finland received a volume of foreign direct investments that amounted to a quarter of the GDP of the year 2003. In Finland the volume of investment abroad was the fifth highest in the EU19. Cumulative direct investment abroad amounted to nearly 40 per cent of the GDP of the year 2003. So in net terms Finland was exporting capital.

Figure 2.6. Foreign direct investments to and from Finland in 1993–2005, percentage of GDP

Source: ETLA and Statistics Finland.

Direct investments from Finland exceeded investments to Finland during the years 1993–2001. Mergers and acquisitions have strongly increased direct investments in the case of Finland. Nordic and Finnish-Swedish mergers, especially, 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 sustained at that level in 2004 and 2005. 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.
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 1995–2004 the employment of these subsidiaries more than doubled and was 234 000 persons in 2004.
Dividend income from direct foreign investments of Finnish companies amounted to only 0.5 per cent of the GDP between 1994 and 1997, a share that 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. The yield from portfolio investments, on the other hand, is 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.
The growth in Finnish foreign trade

Figure 2.9. Exports and imports in 1990–2005*, EUR billion and as percentages of GDP

In the beginning of 1990s, the value of both Finnish exports and imports was around 20 billion euros, reaching little over 20 per cent of GDP. As a result of economic policy that improved the export competitiveness and limited the domestic demand, the export-led growth started in 1992. The exports has grown nominally around 10 per cent annually whereas the growth in imports has remained in 7 per cent resulting in surplus in the current account. By 2005 the share of exports from GDP has reached the level of 40 per cent and the share of imports is 35 per cent. The growth of exports and imports has revived after the sluggish development in 2001–2003.

Source: VATT (Statistics Finland/National Accounts).
In 15 years since the collapse of the Soviet Union and the turbulent first years of Russia, the share of exports to Russia is gaining back its importance for Finland, being over 9 per cent of total exports in 2005. Changes in the relative position of the EU instead, reflect more changes with other trading partners than deepening integration within the EU. The slow growth within the EU has brought its share of Finnish exports back to 60 per cent where it was in the beginning of 1990s.

The importance of the rest of the world has remained quite stable even though some increase in the last few years can be seen.
Finland is importing relatively much oil and other energy products. Because the world market prices of the energy products have multiplied in some years, the import prices have gone up. Finland is exporting relatively much products of the electronic industry and the paper mills. The prices of these products have even gone down and so the price index for Finland’s total exports has fallen for many years. Now Finland’s terms of trade is a quarter lower than 10 years ago, but the balance of trade shows a surplus.
During the period of strong export growth the industry mix of exports has also altered. The share of the traditional wood and paper industries in exports fell from 45 per cent at the beginning of 1990s to under 30 per cent in 2005. Correspondingly, the share of the metal products (which include the production of electronic equipment such as mobile phones) has grown from about 25 per cent to more than third of the exports. In the most recent years, the share of metal industry exports has fluctuated. In the future growth in exports of business services can be anticipated.
3 Labour market

During the 1980s Finland was a country of high employment and low unemployment. However, as a result of the depression of the early 1990s nearly half a million jobs were lost, some of which remain to be restored. Since 1994 Finnish economy has enjoyed a period of rapid economic growth and employment has improved. A decrease in unemployment has been somewhat slowed down by the growing labour supply, and the unemployment rate still exceeds the EU average.

Until the mid-1990s long-term unemployment was a relatively rare phenomenon in Finland. Post-depression long-term unemployment is, however, becoming more and more persistent, since the average durations of unemployment have not shortened. Durations of completed unemployment spells, on the other hand, are rapidly shortening.

Full-time contracts have characterised the Finnish labour market. The annual working-time is, however, among the shortest in Europe. The share of part-time contracts has slowly increased both among men and women and remains at a clearly lower level than in other Nordic countries and Central Europe. On the other hand, fixed-term contracts are more common in Finland than in most of the EU countries. Relative to all contracts, they are more frequently used only in Spain.

The education level of the labour force rises as new generations reach working age and old generations retire from working life. Nearly all labour market entrants have received professional training, and more and more of them have received tertiary education. Returns to education continue to be high in Finland. Education also pays in terms of employment: the lower the education level a person has, the higher the risk of unemployment is.

The recent developments in the labour markets were influenced by the strongly differing occupational structures and skill requirements between growth sectors and declining sectors. That, in part, explains why vacancies and unemployed job seekers do not seem to match particularly well. The number of vacancies has risen close to the late 1980s level, but the unemployment rate is over 5 percentage points higher than it was then.

The functioning of the labour markets is still influenced by a considerable increase in active labour market measures during the depression. Their volume has been reduced, but the share of participants in active measures in total unemployment (unemployed job-seekers and participants in ALMP) remained at approx. 21 per cent in 2002. The government programme of 2003 aims to raise this activation rate to 27–30 per cent (with some reservations). Circling from unemployment to ALMP measures and to short-term jobs is common and exit from this kind of repeated unemployment is difficult.
Many institutional factors, such as the wage bargaining system, the employment protection, and various incentive systems, affect the functioning of labour markets. 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 bargained at the central union level or co-ordinated otherwise. In employment protection Finland belongs to the average range in comparison to other OECD countries.

3.1 Main indicators of the 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. The 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 within sight. Roughly half of the fall in the employment rate and of the rise in the unemployment rate has 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 2005, thousand persons and per cent

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<tbody>
<tr>
<td>Aged 15–64 years, 1000 persons</td>
<td>3 344</td>
<td>3 403</td>
<td>3 496</td>
<td>59</td>
<td>93</td>
</tr>
<tr>
<td>Labour force, 1000 persons</td>
<td>2 564</td>
<td>2 448</td>
<td>2 597</td>
<td>-116</td>
<td>149</td>
</tr>
<tr>
<td>Employed, 1000 persons</td>
<td>2 483</td>
<td>2 040</td>
<td>2 378</td>
<td>-443</td>
<td>338</td>
</tr>
<tr>
<td>Unemployed, 1000 persons</td>
<td>80</td>
<td>408</td>
<td>220</td>
<td>328</td>
<td>-188</td>
</tr>
<tr>
<td>Labour force participation rate, %</td>
<td>76.7</td>
<td>71.9</td>
<td>74.3</td>
<td>-4.8</td>
<td>2.4</td>
</tr>
<tr>
<td>Employment rate, %</td>
<td>74.3</td>
<td>59.9</td>
<td>68.0</td>
<td>-14.4</td>
<td>8.1</td>
</tr>
<tr>
<td>Unemployment rate, %</td>
<td>3.1</td>
<td>16.6</td>
<td>8.4</td>
<td>13.5</td>
<td>-8.2</td>
</tr>
</tbody>
</table>

Source: Statistics Finland/Labour Force Survey.

The statistics of the Ministry of Labour depict a more or less similar picture of the development of unemployment. It is noteworthy that exits to the unemployment pension did not lower 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 2005, 1000 persons

<table>
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<tbody>
<tr>
<td>Unemployed job-seekers</td>
<td>103</td>
<td>494</td>
<td>275</td>
<td>391</td>
<td>-219</td>
</tr>
<tr>
<td>Unemployment pensioners</td>
<td>65</td>
<td>45</td>
<td>48</td>
<td>-20</td>
<td>3</td>
</tr>
<tr>
<td>Participants in ALMP measures</td>
<td>50</td>
<td>98</td>
<td>85</td>
<td>48</td>
<td>-13</td>
</tr>
<tr>
<td>Vacancies</td>
<td>30</td>
<td>7</td>
<td>29</td>
<td>-23</td>
<td>22</td>
</tr>
</tbody>
</table>

Source: Ministry of Labour and Finnish Centre for Pensions.

According to the definition of unemployment used by Statistics Finland, the number of unemployed persons fell to 220 000 in 2005, but according to the Ministry of Labour there were 275 000 unemployed job seekers. Including unemployment pensioners and participants in ALMP measures, the volume of labour force reserves was some 408 000 persons.
The most important statistics on labour markets 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 participants 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 in different sources and with 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, 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 to the deep depression of early 90s and the recovery from it. When 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 overtime working increased. These factors resulted in 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 increase in 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) 1/1991–4/2005, per cent

Source: Statistics Finland.

Changes in hours worked has not been as smooth as changes in employment. This is partly due to the influence of Christmas and other 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.
In the beginning of the 1990s, the employment rate in Finland was 10 per cent higher than the EU average. In particular, the employment rate for women has traditionally been high in Finland. Prior to the depression, the employment rate for men was also above the EU average, owing to low unemployment in Finland. Employment rates collapsed in the depression of the early 1990s. As a result of the common
participation of women in the labour force, the employment rate remained slightly above the EU average.

Since the mid 1990s until to the turn of the 2000s the employment rates in Finland increased faster than the EU average, and even the employment rate for men approached the EU average. In 2004, Italy had the lowest employment rate in the EU. The highest employment rates were found in Denmark, the Netherlands and Sweden. With regard to the employment rate for women, Sweden and Denmark came out on top.

Figure 3.6. Employment rate for older (55–64-year-olds) workers by sex in the EU25 in 2004, per cent

In 2004, a half of Finns aged 55-64 were employed. The employment rate was clearly lower than in other Nordic countries, but higher than the EU average.

The aged Swedes kept on in employment more than in other countries. The other end of the scale is represented by Poland and Slovak: there about 30 per cent of this age group continue to be at work. In eleven EU countries women’s employment
rate is 25 or less. The lowest rate is in Malta and Slovakia, 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 last 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 that influence real working hours. Comparisons are usually carried out by comparing working hours in manufacturing industries. In EU countries the average annual working time ranges from about 1600 hours in the western parts of Germany to nearly 1900 in Lithuania. Finland ranks a little below the average with its 1700 annual working hours.
The share of part-time workers counts for about 17 per cent of total employment but varies a lot among EU countries. The Netherlands has the top share: 45 per cent of the employed work part-time. Greece has the lowest share of part-time work, less than five per cent of the employed. Other Southern European countries and Finland also have low shares. In addition to the Netherlands, part-time jobs are common in six other countries, the UK and Sweden in top, where at least one out of five employed persons works part-time.

In Finland, the share of part-time workers has slowly grown to almost 14 per cent of the employed and is now six per cent below the EU average. Part-time working is typical of women in particular. Every third woman in the EU countries holds a part-time job compared with only 7 per cent of men. Even in Finland part-time working is recognisably more common among women, the gender differences being, however, smaller than in most other EU countries.
The share of fixed-term contracts in total work contracts shows a slight increase in the whole of the EU area, the average figure for 2004 reaching almost 14 per cent. There are, however, large differences among countries. The highest share is in Spain, where nearly one third of the employment contracts are made for fixed periods. The share of fixed-term contracts is at its lowest in Ireland. In the EU countries, Finland’s 16 per cent share is one of the highest rates.
The definitions for the contents of the levels of education follow 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 almost 400 000 persons. At the same time there has been an increase of the same magnitude in the number of individuals who have 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 60 per cent since 1990. During the latter part of the observation period a decline in the number of individuals with primary education has slowed down, and an increase in the number of individuals with secondary education has accelerated.
Figure 3.11. Earnings of the employed by education level, sex and age in 2004, 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 reach the maximum wage level at the age of 55–59. In this age group, men with upper tertiary education earn up to 33 000 euros (115%) more than men with primary education. Women’s wages peak a little earlier at the age of 45–49 and women with tertiary education earn 22 000 euros (99%) more than women with primary education.

Annual wages by education are calculated from the 2004 Income Distribution Statistics. The sample includes all those with at least 6 months of employment. In 2004 income from stock options is included in the wage concept, which causes deviation in the wages of the best-educated workers, in particular.
In the 1990s returns to education decreased slightly in Finland, but in 2004 they had returned to the level of 14 years earlier. In 1990 returns from one extra year of education were 5.9 per cent for women and 6.5 for men. In 2004 the corresponding figures were 5.7 and 6.5 per cent, respectively. Differences between the sexes in returns to education have remained more or less constant. The effect of one extra year of education on the income level continues to rank high in international comparisons.

In the figure, returns to education are measured through the coefficient of the education variable in a regression, where monthly wages are explained by education years, age and age square. Regression equations are estimated using data from the 1990–2004 Income Distribution Statistics. The sample includes all those with at least 6 months of employment. The education coefficient may be interpreted as the relative change in the wage level from one extra year of education. Thus, 6 per cent returns mean that one extra year of education increases wages by 6 per cent.
Figure 3.13. Participation in life-long learning in EU25 countries in 2004, per cent of 25–64-year-olds


The information was gathered by a survey on participation in education. A relatively short reference period of four weeks preceding the date of the survey was chosen to avoid technical, such as recall, problems. For France, the Netherlands and Portugal, information on participation is based on whether education or training is under way on the date of 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 followed for 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 at, for example, open universities and workers’ institutes.
3.3 Unemployment

Figure 3.14. Unemployment rate in EU25 countries in 1991–2004, per cent

Source: VATT (EU/Employment in Europe).

In 1991 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 diminished only slowly.

Unemployment rates vary greatly among EU countries. Spain had the highest unemployment rate between 1993 and 1998, Slovakia between 1999 and 2001 and Poland since 2002. The unemployment rate is about one percentage point higher in the EU25 compared to EU15. Of the new Member States, Cyprus, Malta and Slovenia have relatively low rates, as Slovakia and Poland have the highest.
In the EU, 40 per cent of the unemployed persons, on average, have a history of more than a year of continuous unemployment. The share has lessened somewhat in recent years. At its highest, the share of long-term unemployed persons amounts to over 60 per cent in Italy. Belgium also has high long-term unemployment. The lowest shares are in Sweden and Denmark, while Finland ranks fifth lowest.
At the beginning of the 1990s unemployment rates were low at all education levels: around 5 per cent for persons with primary education but less than 1 per cent for upper tertiary graduates. During the depression the total unemployment rate grew fivefold. The unemployment rate of those with only primary education peaked at 22 per cent, from which it has come down to 14 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 2–5 per cent. Lately, the unemployment rates among these groups have started to slowly increase. In absolute terms unemployment differences across levels of education have grown during the observation period. The gap between the unemployment rates of the least and the most educated groups has widened from 4 percentage points at the beginning of the 1990s to the current 10 percentage points.
3.4 Functioning of labour markets

Figure 3.17. Rate of vacancies and unemployment rate in Finland in 1973/4–2005/4, 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-up 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 durations of vacancies started to lengthen after 1999. In 2001 the market share of employment service also dropped.

Figure 3.18. Labour market status at the end of the years 1988–2003 of those unemployed a year earlier, per cent

Source: Statistics Finland.

At the end of the 1980s the probability of exiting unemployment was high in Finland. More than 40 per cent of the unemployed found work in the open labour market within a year, and, in the case of 25 per cent, unemployment terminated owing to other reasons. During the worst years of the depression only 20 per cent of the unemployed exited to employment. Other reasons terminated unemployment for another 20 per cent. Even since then the probability of exiting unemployment has improved only a little. About half of the unemployed are still (or again) unemployed after a year, a fifth of them have found work in the open labour market, almost a fifth have left the labour market, and the rest participate in ALMP measures. Exiting to the open labour market became slightly easier at the end of the 1990s but has grown more difficult again since 2001.
There is no clear relation between rate of public expenditure in labour market programmes and unemployment rates in EU countries. Austria and Great Britain have acquired low unemployment rate with relatively small investment to the active labour market programmes. On the other hand Netherlands and Sweden make large scale investments to the active labour market programmes and unemployment rate is also low. In most cases, however, countries with high unemployment rates invest only little to the active labour market programmes and vice versa. There might be observed negative dependence between rate of public expenditure in labour market programmes and unemployment rates if Austria and Great Britain were excluded from the figure.
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 2004 it was 44 per cent. The Finnish tax to GDP ratio is the fourth highest among 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 the EU19 countries, i.e. EU countries that are members of the OECD, on average. This is partly a result of the fact that tax deductions and allowances (tax expenditures) have been removed, or that they have been compensated 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 of the labour costs is higher than the average of the EU19 countries. Especially the marginal tax rates are high. Furthermore, personal income taxes are higher than the EU19 average for all types of families and various income levels. The difference is smallest in the taxation of single individuals on low incomes. It is biggest in those families with small children and only one wage earner with high income. The situation becomes more balanced if one takes into account transfers of income to households. If the benefits gained from services provided by the public sector are included, the net earnings of Finnish families changes for the better.

The taxation of profits and capital income in general varies a lot in the EU25 countries. The nominal income tax rate for corporations in Finland is about the EU25 average.

Indirect taxation through consumption taxes is record-high in Finland. 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 the EU15 countries in 1980–2004*, per cent


In 2004 the total tax revenue as a percentage of GDP in Finland was 44.3 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 rise faster from the end of the 1980s. At its highest it was 48 per cent in 2000, since then the tax ratio has decreased by 3.5 percentage points. Among the EU15 countries the Finnish tax ratio is the fourth highest after Sweden, Denmark and Belgium. 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 the 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, respectively, increased.
Figure 4.2. Tax to GDP ratio in EU25 countries in 2004, per cent

The tax to GDP ratios are somewhat higher than the ratios published by OECD due to the differences in calculation methods.

Source: EUROSTAT.

According to Eurostat the Finnish tax to GDP ratio was 44.5 in 2004. It is about four percentage points higher than in other EU countries on average. The Finnish tax to GDP ratio ranks the fifth in all EU countries. Sweden had the highest ratio and Lithuania the lowest one. The tax to GDP ratios of all new member countries were below the EU average ratio. In Slovenia and Hungary it is near the EU average, however.
### 4.2 Tax structure

Figure 4.3. Tax structures in 2003, per cent of GDP

The differences in tax to GDP ratios between EU19 countries are mainly due to the fact as to how heavily personal income is taxed. The highest income tax plus social security contribution in relation to GDP is in Sweden (31 per cent) and the lowest is in Ireland (12 per cent). Finland ranks fourth in this comparison, after Sweden, Denmark and Belgium. The share of corporate income tax in GDP in Finland is (after Luxembourg and Czech Republic) the third highest in the EU19, at 4.3 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 EU19 countries.

Source: OECD/Revenue Statistics.
4.3 Tax recipients

Figure 4.4. Shares of tax revenue by tax recipients in EU19 countries in 2003, 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 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. In Spain the local government share of tax revenues is on the Nordic level, too. 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 recipient.
The average municipal tax rate rose by over 4 percentage points between 1970 and 2006. 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 rise in tax rates was quite modest, apparently owing to the state grant system, which was favourable for 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 raise 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, an exceptionally high number of municipalities have increased their tax rates in 2005 and 2006.
Figure 4.6. The net contributors (-) and net recipients in the EU25 budget in 1995 and 2004, EUR per capita

Source: VATT (Annual reports of Court of Auditors from the budget years of 1995 and 2004, EU)

In 2004 among the EU15 countries net recipients were Ireland, Greece, Portugal and Spain. These countries received more in subsidies from the EU than what they paid to the EU budget. These countries, excluding Ireland, are counted as so-called poor member countries. Their share of the payments to the EU15 budget is lower than the EU average because the EU membership fees are shared between member countries about in proportion to their GDP. For example, the shares of the total payments to the EU budget are slightly higher in Portugal and Greece than in Finland, although the total population in both of these countries rises to over ten million. The population of Spain is about eight times but the total payments to the EU budget sixfold compared with Finland.

Ireland’s large net income is mainly due to the 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 the large subsidies from the structural fund and small payments to the EU budget. Payments per capita were smallest in Portugal and Greece in the EU15.

In 1.5.2004 the EU took in new member countries Czech Republic, Estonia, Cyprus, Latvia, Lithuania, Hungary, Malta, Poland, Slovenia and Slovakia. All these countries were net recipients in 2004. Their payments per capita were smallest in the EU25 in 2004.

### 4.4 Taxation of earned income

**Tax wedge of earned income**

Figure 4.7. Income tax plus employee and employer social security contributions of a single average worker (AW) in 2005, per cent of total labour costs

Source: OECD/Taxing Wages.
The Finnish taxation of earned income (gross wages and employer’s social security contributions) ranks the eighth highest in the EU19 and the tax wedge is about two percentage points higher than the EU19 average. The lowest tax wedge is in Ireland and United Kingdom and the highest is in Belgium. The order of countries changes somewhat, if merely taxes on wage income (gross wages) are considered. In Finland, income taxation without the employee’s social security contributions is the third highest, but in many countries social security contributions are higher than in Finland. Income taxation is lowest in Greece and Portugal.

Figure 4.8. Unemployment rate in 2004 and the taxation of earned income at the average production worker’s (APW) wage level in 1996–2004 on average, per cent

The Slovakian tax wedge data is from 2000–2004. Source: OECD.

In some studies the extent of the tax wedge of the total labour cost has been regarded as explaining the differences in unemployment rates or, at least, structural unemployment rates across countries. However, the tax wedge seems not to have a
clear connection with the unemployment rate in the EU19 countries. Nevertheless, the unemployment rate is often lowest in the countries that have a low tax wedge, for example in Ireland and United Kingdom. However, the unemployment rate is low also in some countries that have relatively high tax wedge, like in Sweden.

Figure 4.9. Marginal tax rate of gross wages (income tax and employee social security contributions less child benefits) at the average worker’s (AW) wage level in 2005

In Finland the marginal average tax rate of earned income in 2005 was 44 per cent for a single person – 2 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 4 percentage points lower than for a single person. Support for
families via taxation is given in 9 of the EU19 countries. In Luxembourg, Ireland and Portugal families with children entitled to largest deductions. In the Czech Republic the child benefits depend on income and diminish as the income rises. Therefore the marginal tax rate of the one-earner family rises above that of the single taxpayer.

Figure 4.10. Marginal tax rate of the labour costs (income tax, social security contributions for both employee and employer less child benefits) at the average worker’s (AW) wage level in 2005

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’s social security contributions. In Finland the marginal tax rate of labour costs is 55 per cent, whereas the EU19 average is 53 per cent for single persons and somewhat lower for families.

Structural Indicators 2006
**Tax wedge in Finland**

Figure 4.11. Total and marginal tax rates of an average production worker (APW) in Finland 1990–2006*, per cent of labour costs

Source: VATT.

The total tax wedge, i.e. the sum of income taxes (incl. employee’s social security contributions) and consumption taxes plus the employer’s social security contribution as a percentage of the 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 the tax rules. In most years the average wage level has risen in real terms. Owing to the 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 increase in taxes on labour costs due to the wage increase. When the marginal tax rate is higher than the income tax rate, as is the case in the progressive income tax system, the income tax is an important component of the tax wedge. A bigger income tax share in the tax wedge, on the other hand, diminishes the net wages disposable for consumption and, consequently, the share of indirect taxes in the tax wedge. The share of the employer’s 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 about 63.5 per cent in 2006. 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 4.12. Total and marginal tax rates of low, average (APW) and high wage production workers in Finland in 1990–2006*, per cent of labour costs

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 2006 the monthly wage of the low wage earner is about EUR 1,700, of the average wage earner (APW) EUR 2,550, and of the high wage earner about EUR 4,250. Between 1991 and 1995 the total tax wedges rose about 5–6 percentage points, but after that they began to decrease in all income levels. In 2006 the tax wedge is even lower than in 1991.
**Tax rate by family type**

Figure 4.13. Average income tax rate (taxes and social security contributions, % of wages) by family type and income level in 2005

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, the other at home.
100-33 = One spouse earns AW wage, the other 33% of it.
100-67 = One spouse earns AW wage, the 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 single 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 spouses’ tax rates. Finland applies a separate assessment of spouses, which means that the tax rate of the spouse who earns less decreases the couple’s average tax rate. A corresponding situation obtains in Austria, Greece, Hungary, Italy, United Kingdom and Sweden. In countries where joint assessment applies, the effect depends on the configuration of the system. Many countries 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 less child benefits by family type and income level in 2005, as 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, the other at home.
100-33 = One spouse earns AW wage, the other 33% of it.
100-67 = One spouse earns AW wage, the other 67% of it.

Source: OECD/Taxing Wages.

The position of different types of family changes somewhat when the child benefits are taken into consideration. Finland’s position compared with the EU19 average remains the same, except for an improvement in the relative position of single parents. Their net tax burden is 3 percentage points higher than the EU19 average, but much heavier in gross terms.
The tax burden of a single person is 8 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.

Figure 4.15. Income tax plus social security contribution less child benefits of a single person and of a one-earner couple with 2 children at an APW wage level in Finland and the EU15 in 1979–2004, as a 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 2004 the tax rate of a single person exceeded the EU15 average by nearly 3 percentage points. The tax burden was at its highest in Denmark 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 2004 the gap was 8 percentage points. Differences within the EU15 are wide, and have narrowed little during the last fifteen years. The tax burden is at its highest in Denmark and at its lowest in Ireland, where received income transfers exceed taxes that have been paid. In Luxembourg the tax rate is also negative. The EU15 average tax rate for persons with a family is 14 percentage points lower than that of a single person. In Luxembourg, Belgium, Germany and Austria 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 4.16. The statutory corporate tax rates of retained profits in the EU15 countries in 1981–2006, per cent

Source: KPMG.

In 1981 the Finnish corporate tax rate was the 3rd 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 most in Finland, i.e. 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 19 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 4 percentage points in 2006.
Figure 4.17. The highest marginal tax rate for distributed profits in 2005, per cent

Source: VATT.

In Finland, the total tax burden for distributed profits is at the average level of EU25 countries, 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, France). Finland taxes 57 per cent, Italy 40 per cent and Slovenia 65 per cent of dividend income. In Greece, Latvia and Slovakia dividends are tax exempt. In Cyprus and Lithuania dividend taxation is relieved by a final withholding tax of 15 per cent. Even though Estonia does not tax retained earnings at all, the company is liable to pay taxes on distribution.

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

The pure statutory tax rates do not give the right picture of the effective tax burden. Several countries have a varied range of tax concessions that lower both the
Statutory corporate tax rate and the shareholder’s dividend income tax rate. The concessions for shareholders often concern smaller dividend incomes. The highest marginal tax rate mainly describes the high income shareholders’ tax burden.

Figure 4.18. The effective marginal tax rate for domestic real investments in some countries in 2005, per cent

![Bar chart showing effective marginal tax rates for different countries.]

Source: VATT (Hietala).

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 is, the more capital is invested. In Finland the effective marginal tax rate is not particularly low compared with other countries. Thus the tax system does not encourage 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%).
The effective average tax rate of foreign investments in certain countries in 2005, per cent

Source: VATT (Hietala).

The tax incentives for direct investments are often described by the effective average tax rate (EATR) on investment. The average tax burden for the investment made to Ireland from other countries in figure 4.19 is 19 per cent, and it is clearly the most advantageous investment country. For almost half of the countries described above, Ireland would be the best place as an investment location. Finland ranks the second in attracting foreign investments.

In the calculations the tax burden of investment made by a foreign parent company in a subsidiary in the destination country is described. The tax burden in the figure is calculated as the average tax burden of the 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 4.20. Value added tax rates in the EU25 countries 1.2.2006

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1) Allowed by the Access Treaty.
2) Temporary tax rate for articles moving to the new tax rate.

Source: EU.

The Finnish standard value added tax rate is 22 per cent and it is the third highest among the EU25 countries. The reduced tax rates are also fairly high in Finland compared with other countries. According to the value added tax directive in the EU, only two reduced rates are accepted. 12 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.
In most countries that apply value added taxation the enterprise becomes liable to this taxation when the turnover exceeds a certain limit. A part of the smallest enterprises is tax exempt for administrative reasons. The limits for the turnover are on different levels across countries. In the EU25 countries the limit for the taxable turnover varies from zero to 84 500 euros. The highest limit is in the United Kingdom. Even those countries which have no special turnover limits give small firms value added taxation relief in some other way. In Finland the limit for the taxable turnover is one of the lowest in the EU25.

Source: BDO International and OECD.
Figure 4.22a. Excise duties on alcoholic beverages in the EU25 countries in 2006

Source: European Commission.

Ethyl alcohol: EUR 1,000 is the minimum level for countries where the tax level exceeded EUR 1,000 in 1992. Even the countries where the tax level at that time was lower than 1,000 are no longer able to lower the tax level.
Figure 4.22b. Other excise duties in the EU25 countries in 2006

Unleaded petrol

Unleaded petrol

Diesel oil

Cigarettes

Motor vehicles

[Detailed analysis of excise duties in EU25 countries]
With the exception of diesel oil the excise duties of Finland are above the EU25 average. The taxation of beer and ethyl alcohol is especially stringent. Motor vehicle taxation became lighter in 2002 and 2005.

Cigarettes: According to Directive 2002/10/EC the minimum excise duty is 57% of TIRSP (Retail selling price, all taxes included) and at least EUR 60/1,000 items, or EUR 95/1,000 items. If the member state applied a tax level of less than EUR 60/1,000 items on 1 July 2001, the directive may be adopted as late as the end of 2004. Spain and Greece are permitted to postpone the adoption until 31.12.2007.

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).

Figure 4.23. The average before-tax prices of certain* passenger cars in the EU25 in 2005, EUR

*The comparison includes the same car models as in Table 4.24.
Source: European Commission.
Figure 4.23 presents a comparison of the average before-tax prices of ten car models in EU25 member states. The highest prices are in Germany and the United Kingdom, where car prices include the extra costs of right-hand steering. The most inexpensive before-tax car prices are found in Cyprus, Greece, Denmark and Finland – that is to say, in member states where the taxes on acquisition of the car are among the highest. Most manufacturers set their prices low in these countries in order to keep the retail price of the car within reason. High car taxation seems to reduce the manufacturer’s prices, but the effect of light taxation is not as obvious. In Germany and the United Kingdom the taxes are low but before-tax car prices are high; in most new member states car prices are below the level of the EU25 average in spite of light taxation. In Sweden both taxation and before-tax car prices are fairly moderate while both are high in Portugal.

Figure 4.24. Before-tax prices of various private cars in the EU25 countries in 2005; index(lowest price in EU25 countries)=100

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| Lowest price in EU25 countries, € | 10738 | 11039 | 10457 | 7851 | 12358 | 20916 | 14640 | 16917 | 15492 | 30938 |

Source: European Commission.

The pricing policy of car manufacturers differs greatly in member states. The biggest price range is in Renault and Volvo. Mercedes-Benz has the smallest price difference. The price profiles of cheaper cars hardly deviate from one another. The comparison includes car models in all size classes.
4.7 Environmentally related taxes

Figure 4.25. Revenues from environmentally related taxes in Finland in 1980–2004*, per cent of GDP

Source: Statistics Finland.

The ratio of environmentally related taxes to the GDP increased in Finland throughout the 1990s. In 2000 revenue from environmentally related taxes fell, and this trend continued in 2001. In 2002 the ratio of environmentally related taxes to GDP was 3.6 per cent. In 2004 nearly 6 billion euros were raised in tax. Of this amount 2.2 billion was from motor fuel and 0.7 billion from other energy taxes. One billion euros came from other environmental taxes. Taxes based on vehicles brought in 1.9 million euros.
The significance of environmentally related taxes varies considerably from country to country. Turkey and Denmark have their own levels in the use of environmentally related taxes. In countries outside Europe the share of environmentally related taxes is clearly lower.
5 Welfare state and public expenditure

Finland’s public sector consists of three pillars: the state (central government), the municipalities (local government) and social security funds. The state is the most prominent of the three. Through the state flow the greatest amounts of money, and it transfers part of the revenues that it has collected for the use of municipalities. The state has the main responsibility for adjusting to economic cycles, and for this reason the balance of the central government varies a lot according to business cycle. The development of local government and the social security finances is more stable. In 2005 the central government had a surplus of 0.4 per cent of GDP. The social security funds have continued to show a surplus because the employment pension system is partly funding.

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 start of the 1990s. The growth of pension expenditure stems from ageing of the population and maturing of the employment pension system. The unemployment expenditure grew at the start of the 1990s, but since then expenditure has shown a downward trend, following the trend in unemployment. The share of the GDP of public expenditure is 50 per cent, which is three percentage points more than the EU25 average. There are, however, differences among EU countries. In Sweden the share is 56 per cent, whereas in Lithuania it is 33 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.
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 the 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 EU25 countries in 2006, percentage of GDP


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

In the EU countries an average of 47 per cent of the GDP was spent on public expenditure in 2006. The share varied from 56 per cent in Sweden to 33 per cent in Lithuania. Finland’s share of 50 per cent was about three percentage points higher than the EU average.
In 2005 public expenditure in Finland amounted to well 72 billion euros. Of this sum, public consumption expenditure was over 35 billion, income transfers and interest payments 32 billion, and public investments 4.4 billion euros.

Public consumption expenditure consisted of costs of collective public goods such as general government, administration and national defence. Almost 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 euros. The share of subsidies is 2 billion and the share of interest costs is 2.8 billion euros. 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 other things, income transfers paid to foreign recipients such as development co-operation.

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

Figure 5.4. The items of general government expenditure in 1995–2004*, percentage of trend GDP

Source: Statistics Finland/National Accounts.
In relation to GDP public demand was noticeably reduced in the years 1997–2002, from about 24 per cent of the trend output to about 22 per cent. After that public demand has been slightly growing. Since 1995 the pension expenditures of the trend output have been slightly reduced but have been growing since 2002. Income transfers without the cyclically varying unemployment benefits have steadily been reduced in relation to trend output since 1995. As one may expect, the greatest variation is in expenditure on unemployment benefits and interest costs. They rose steeply in the beginning of the 90’s. Since 1997 these expenditures have been steadily reduced in relation to trend output.
5.2 Public support to households

Figure 5.5. Income transfers to households and welfare service costs in 1990–2004, percentage of GDP

Source: VATT (Ministry of Social Affairs and Health, The 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 1992. Since then the share has fallen to the level of about 32 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. Since 1994 the GDP shares of both income transfers and welfare services have been falling owing to the recovery of the economy. In real terms, however, public support to households has not decreased.
5.3 Income transfers to households

Figure 5.6. Income transfers to households in 1990–2004, EUR billion at 2004 prices

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

Old age pensions are the most important part of the income transfers to households. Pension expenditure has grown since 1990, in real terms, by almost 4.5 billion euros. In 1993 about 4.9 billion euros (in 2004’s money) was paid in unemployment benefits; since then they have steadily decreased. The disability expenses grew slightly in the years 1991–1993. Since then they have 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, correspondingly, tax deductions for families with children were cut. The reduction in the housing support mainly originates from the structural change in the tax deductibility of interest expenses on house loans that was brought about in the 1993 capital tax reform.
Figure 5.7. Selected social expenditures in 1990–2004

Source: The Social Insurance Institution (KELA), The 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 2004. 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 family allowance system. Thereafter they have decreased rather steadily in line with the number of recipients. From 2003 to 2004 total expenditure and average allowance increased slightly again. The total expenditure on child allowance are almost 60 per cent higher, and the average allowance per family almost 70 per cent higher in 2004 compared to corresponding levels in 1990.

The amount of the recipients of study grant has grown by a fifth between 1990 and 2004. The growth was fastest at the beginning of 1990s during the economic downturn in Finland. The average amount of the grant has risen steadily but slowly and the total expenditure has doubled from 1990 to 2004. 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 study grant.

From 1990 to 1994 the number of the recipients of general housing allowance more than doubled. This was of course mainly a result of the economic recession in Finland. Since 1994 the number of the recipients of the allowance has dropped quite considerably from around 228 000 in 1994 to almost 160 000 recipients at the end of 2004. The average housing allowance has risen constantly, the index in 2004 being 136 compared to year 1990 index of 100. The total expenditure of the general housing allowance has grown fast as a result of increase in 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 a same trend as many other corresponding 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 180 600 and in 1996 around 350 000. The total expenditure on social assistance increased similarly and was in 1997 2.5 times the amount it was in 1990. 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 shows clearly the effect of the recession on employment situation and on households 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. The number of the recipients of the basic unemployment allowance or the labor market support has declined by a quarter from 1994 to 2004. The number of earnings related benefit recipients has had more variance.
The total number of those receiving a pension has grown steadily being 1 161 000 in 1990 and 1 340 000 in 2004. On the other hand, the amount of those receiving only state pension* has declined constantly being 167 000 in 1990 and 106 000 in 2004.

The average amount of pension has risen around 25 per cent between 1990 and 2004. The total expenditure has risen more rapidly, especially during the recent years.

*State pension is a basic minimum pension guaranteed to all Finns older than 64. 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 the public welfare services in 1995–2004*, EUR billion at 2000 prices

The volume of the public education, health care and social services rose by about 8 per cent from 1995 to 2004. The social services grew most strongly, by nearly a fifth. In Finland municipalities have the main responsibility for arranging and providing welfare services. The share of private enterprises and non-profitmaking corporations increased, however, in the 1990s 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 chiefly the responsibility of the municipal sector. Health centres provide basic health care services, and hospitals belonging to hospital districts provide specialised hospital services. In 2004 there were over 3 000 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 2005 there were 3 300 private social welfare providers.

Source: Statistics Finland/National Accounts.
The number of personnel in municipal welfare services calculated as annual full-time employees was about 380,000 in 2004, which was about 12 per cent more than in 1990. Nearly 60 per cent of them were working in social and health care. From 1990 to 2004 the number of personnel grew most rapidly in education, by 20 per cent.

In 2004 the number of employees in children’s day care was over 46,000. There were 32,000 employees in home services and institutional care for the elderly. There were about 49,000 employees in primary health care and about 66,000 employees in hospitals. The professional structure of health care employees has changed considerably in the last ten years. The number of doctors and nurses has greatly increased, while the numbers of auxiliary hospital personnel and carers 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 1995–2003

The number of students in primary, secondary and tertiary educational institutions grew steadily from 1995 to 2003. In 2003 a total of almost 1.2 million pupils and students were attending primary and secondary schools, upper secondary schools, vocational institutes and universities. From 1995 the number had grown by about 12 per cent. The GDP share of public education expenditure fell steadily until 2000, after which it has increased slightly. In 2003 it was 6.2 per cent. The fall in the GDP share of education at the end of 1990s stems from the rapid growth of GDP. In real terms educational expenditure has grown constantly.

Source: Statistics Finland.
Figure 5.11. Typical graduation ages in upper secondary education and in tertiary education in some countries

Students receive a MA degree in Finland at a clearly older age than in other countries that were compared in figure 5.11. There are, on average, eight years between graduating from 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.

Source: OECD, 2005 (USA and Poland, data from the year 2002).
Social services

The largest groups of those who use the social services are the elderly and families with children. Social services are provided as both institutional and noninstitutional 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 5.12. Net expenditures of long-term care for the elderly in 1993–2004
EUR billion at 2003 prices

In 2004 the net running costs for homes for the elderly were approximately 0.64 billion euros and the net costs for home care were about 0.45 billion euros. Expenditure on other services, in which there are costs of sheltered housing as well as costs of services for the disabled, was about 1 billion euros. The total net expenditure on long-term care of the elderly, excluding the costs of long-term care at health centres, was over 2.1 billion euros in 2004. The costs of long-term care for elderly patients at health centres were estimated to be about 0.6 billion euros 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 euros. This means care costs of over 6 500 euros for each elderly person of 75 years of age or more.
At the beginning of the last decade almost a tenth of all persons older than 74 years lived in homes for the elderly, but the share has dropped below 5 per cent by 2005. The share of elderly people living in sheltered housing, on the other hand, rose extremely rapidly in the 1990s, but seems to have reached its saturation point. In 2005 sheltered housing experienced its first recorded decrease in the share of the reference population. The total share of those aged 75 years or more living in homes for the elderly and sheltered housing has dropped only moderately being 10.2 per cent year 2005. The share of those aged 75 and over receiving long-term care at health centres has decreased by one third to 2 per cent of population. Long-term specialized care in hospitals practically non-exists any more.

Source: The National Research and Development Centre for Welfare and Health STAKES/ SOTKA database.
Figure 5.14. Estimates on operating costs of institutional care and noninstitutional services for the elderly by 2030 assuming that the physical ability of the clients improves by 3 years and a higher quality of care, EUR million at 1999 prices

Source: VATT Research Reports no.99 and the Finnish National Fund for Research and Development (Sitra).

It is expected that the number of people over 64 years of age will increase by 81 per cent between 1999 and 2030. Without any changes in the physical ability of the elderly or in the quality of care, this would mean at least a corresponding rise in real expenditure, in non-institutional services and institutional care for the elderly.

Raising the quality of care to the level of "good" as put forward by Kuntaliitto (the Association of Finnish Local and Regional Authorities) and the Ministry for Social Affairs and Health would demand more personnel and raise the level of expenditure even more, In calculations carried out by VATT (the Government Institute for Economic Research), however, it has been estimated that improvement in elderly people’s functional ability would significantly lower cost pressure.

Improvement in elderly people’s ability to function, so that the need to receive services is delayed by an average of three years, has only a slight effect on expenditure in non-institutional services. Improvement in the quality of care, on the other hand, would raise the costs of non-institutional services from the 2030 trend level by about 30 per cent (from 950 million euros to 1 240 million euros).
A corresponding improvement in the ability to function would almost stop the upward pressure in the institutional care costs. Indeed, by raising the quality of care, the costs in institutional care would rise by only about 20 per cent (from 1.9 billion euros to 2.3 billion euros) when the trend scenario leads to 3.5 billion euros. At the present level, the costs of noninstitutional care are only a quarter of the costs of institutional care. Therefore the total costs of care services for the elderly with a better quality of care, but improving elderly people’s ability to function, would rise by just under 50 per cent by 2030.
Health care

In Finland, municipalities have the main responsibility in arranging 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 1990–2004, EUR billion at 2004 prices

Reforms in the system of funding and control have been carried out in social care and health care, and these reforms significantly changed the role of the state and the municipalities in the arranging of services. One of the most important changes of the 1993 reform was that the state grants were changed from earmarked matching grants to formula based general grants. At the same time, the deep recession in the national economy forced health care to become more efficient. Expenditure on health care and the numbers of personnel employed within it began to fall at the beginning of the 1990s after a long period of growth. In recent years expenditure has increased again.

Source: The National Research and Development Centre for Welfare and Health STAKES.
International comparison of health care

Figure 5.16. Real per capita expenditure on health care in some countries in 1990–2004, index(1990)=100

Source: OECD/Health Data 2006.

In international terms, the development in health care expenditure in Finland during the last decade has been quite exceptional. In the 1990s, health care expenditure per inhabitant, in real terms, rose in the EU countries by an average of almost 40 per cent, but in Finland this expenditure had only reached the 1990 level by 2000. From 1991 to 1994 fixed-price health care expenditure fell by about 16 per cent, in Finland. In 2000–2004 health care expenditure in Finland grew 20 per cent, at the same rate as in the EU-countries in average.
In relation to both the population and its GDP, Finland’s health care expenditure is very moderate. In Finland, health care expenditure per inhabitant, adjusted for purchasing power, is clearly below the EU countries’ average. Among the Nordic countries Finland uses least money in relation to GDP.
The effective functioning of the health care system can also be compared by means of people’s level of satisfaction with their own country’s health care. In comparison with other EU countries the share of those in Finland who are satisfied with health care is exceptionally high. In Luxembourg, Austria, Belgium and France the share of those who estimated the health care system runs well or needs only minor changes, is also over 60 percent.

Source: OECD/Health Data 2006.
6. Demographics and income distributions

The Finnish life expectancy rate has risen rapidly during the last 30 years. At present, women may expect to live until they are 82 years of age, and men until 75.

Despite the lengthening of the lifespan, the population growth has slowed down, and it is expected that the number of births will decrease over ten per cent during the next fifty years. 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 its history Finland has been a land of emigration. Not until the 1990s have immigrants annually outnumbered emigrants. Most emigrants from Finland move to the EU countries and Norway. The majority of immigrants come from outside the EU.

Income differences between Finnish households narrowed until the 1990s. After the recession years 1991–1993 the differences in income became larger. Real incomes of the richest tenth of the population have increased the most, whereas the incomes of the poorest tenth of the population have remained as before, and decreased in relative terms.

Regional differences in income and consumption narrowed dramatically from the 1960s until the 1980s. Since then, narrowing has slowed down.
6.1 Demographic change

Figure 6.1.  Average life expectancy for a newborn Finn by sex in 1900–2005 and a forecast for 2006–2050, years

Source: Statistics Finland and VATT.

In 2005 a girl born in Finland had a life expectancy of 82 years and a boy 75 years. An average Finn’s lifespan lengthened during the last hundred years by more than 30 years. The notable reduction in infant and young people’s mortality rates 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 of 2005, 92 per cent of females and 80 per cent of males 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 a Finnish male’s life, during the last decades, has rapidly lengthened when compared internationally.

Because the risk of dying, even of the oldest, has constantly decreased in nearly every prosperous country, population forecasts assume that the lifespan will lengthen in future decades, too. According to the most recent population forecast from Statistics Finland, the life of a Finn will lengthen by more than a year during each future decade. Because infant and young people’s mortality is already low at
present, lengthening of the lifespan can be explained even more by the reduction in adults’ risk of dying.

Figure 6.2. Number of births and deaths and net migration in Finland in 1900–2005 and a forecast for 2006–2050, 1000 persons

Source: Statistics Finland/Population Statistics and VATT.

In the years 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 last few years the number of births has again fallen below 60 000, for the small age groups of the 1970s are now at the best age of reproduction. The annual number of births is likely to decrease further over ten per cent during the next fifty years, because the number of women of fertile age will decrease.

In the past few years almost 50 000 Finns have died every year. Although the life span is estimated to lengthen by over a year for each future decade, the number of deaths will increase to 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. After 2010 the number of deaths will overtake the number of births, after which the population can increase only through a surplus of immigrants.

During the last 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 continue in the future. It is expected that every year 6 000 more people will come to Finland than those who leave for abroad.

Figure 6.3. Population by age groups in Finland in 1900–2005 and a forecast for 2006–2050, million persons

Source: Statistics Finland and VATT.

The current population of Finland is 5.25 million people. According to the population projection by Statistics Finland, the population will increase by a total of one hundred thousand people until the early 2020s, but it will then start to decrease despite the annual immigration surplus of 6 000 people. The population forecast has, in addition, assumed that the birth rate will remain as now and that the lifespan will lengthen by more than a year 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 fewer than 1.3 million children living in Finland, and in half a century there will be only a million, if the current demographic trends will be continued.

The number of 20–34-year-olds was at its highest in the early 1980s, but since then it has fallen by over 250 000 to under a million. In 2050 there will be still more than 800 000 of them. The number of middle-aged people (from 35 to 50 years of age)
took a downturn during the last decade, and the downward trend is expected to continue until 2050.

The number of old-age-pensioners is currently about 600 000. Their number will grow to one million within a quarter of a century. From then onwards, only the number of people in their eighties and above will increase. In 2040 there will be as many as half a million old people (80 years and more), that is, a tenth of the population at that time.

If the new population forecast from Statistics Finland proves to be right, the population of Finland will be at its greatest in the early 2020s.

### 6.2 Migration

Figure 6.4. Immigration, emigration and net migration in Finland in 1945–2005, persons

For the most part of its history Finland has been a land of emigration. Both the number of emigrants and the characteristics have, however, changed over the years. The earlier permanent emigration of unskilled labour force has been replaced by a temporary work or study abroad by 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 1985–2004

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*= EU countries (excl. Sweden) + Norway and Iceland. Year 1985 data comprises the whole of Europe except Sweden.

Source: VATT (Statistics Finland).

Finns have traditionally emigrated to North America, Australia and, above all, Sweden, which is still the most popular single destination. The number of emigrants to Sweden decreased, however, at the beginning of the 1990s, and remained stable at around 3 000 a year. The number of emigrants to other Western European countries, especially Norway, rose throughout the 1990s. Until the first half of the 1990s immigrants to Finland chiefly consisted of returning emigrants and the spouses of Finnish citizens.
6.3 Standard of living differences within and between regions

Figure 6.6. Average disposable income by major regions (NUTS2) in 1990–2004, index(Finland = 100)

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

Regional income trends are studied in relation to the average development in the whole country. Finland has been divided into five regions according to EU’s revised NUTS2 classification: Southern Finland, Western Finland, Eastern Finland, Northern Finland and Åland. Åland is included here in Southern Finland. The analysis has been done using Income Distribution Statistics from the years 1990–2004. Disposable income per OECD unit has been weighted by the number of members in households and sample weights.

In the years 1990–2004 relative income differences between major regions (NUTS2) remained relatively stable. A slight convergence in the early part of 1990s seems to turn to a slight divergence in 1997. In the years 1990–1997 Southern Finland lost and Western Finland improved the position. In the years 1998–2000 the figure indicates some divergence. After 1994 Eastern Finland lost the living standard most. After 2000 slight convergence has happened.
Inequality within every region is defined by Gini coefficient. It is here based on disposable income in the years 1990–2004. The economic crisis in early 1990s decreased real disposable income and the decline in income level was relatively biggest in Southern Finland. The crisis left income distribution almost unaffected. In 1997 average disposable income reached the 1990 level in all regions. Recovery increased Gini coefficient in all regions, especially in Southern Finland Gini coefficient began to grow faster than in other regions. In early 2000 inequality began to decrease in all regions but in 2004 it reached the same high level as it was in 2000.
Figure 6.8   Jobs in groups of sub-regional units by degree of urbanisation in 1990–2004, index(1990)=100

Source: VATT (Statistics Finland/Regional accounts).

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.

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. Helsinki region and the growth centres were the most rapid areas to recover from the recession. In 1999, the number of workers in Helsinki metropolitan area exceeded the 1990 level and was at its highest in 2002 when there were about 7 per cent more workers than in 1990. After a moderate fall in 2003, the number of jobs in Helsinki region started rising again.

The number of jobs in the growth centres reached the 1990 level in 2000 and has been rising rather steadily during the past years. The number of jobs in regional centres and industrial centres has also been rising since 1993 and had, on average,
reached 90 per cent of the 1990 level in 2004. However, the growth in industrial centres seems to be slowing down.

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.
In 2005 the population rose 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 some centres, as in other countries. Especially in the areas that 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.
Traditionally, there are great differences in unemployment among the country’s various regions. Although the number of unemployed persons is certainly greatest in urban areas in Southern Finland, the number of unemployed persons in relation to the labour force (the unemployment rate) is highest in sparsely populated areas in Eastern and Northern Finland.
The lowest unemployment rates can be found in Uusimaa, Ostrobothnia and Varsinais-Suomi. Elsewhere in Southern and Central Finland the unemployment rates were around 8–12 per cent in 2005. The unemployment rate was highest in Kainuu, as high as over 16 per cent. Also North Karelia and Lappland faced high unemployment rates.

6.4 Income distribution, and inequality

Figure 6.11. Labour share in the Finnish national income in 1975–2004, per cent

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. Labour share equals the fraction of wages and salaries and employer’s 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 it then 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 industrialized countries, the period of recovery that followed it with its emphasis on exports and the sharp rise of the technology sector have left their traces 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 that were capable of surviving were obliged to become more efficient. A considerable part of the reduction in the labour share 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. Unemployment, which has remained high, has had a contributory influence on this, and it has curbed the rate at which salaries have risen. 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 activity.
Inequality measured by the Gini coefficient from factor income, decreased from 1966 right up to the mid-1970s. During the following fifteen years inequality increased steadily, but it began to rise much more at the beginning of the 1990s, when Finland experienced a deep recession. Unemployment increased and many salaried employees had to claim unemployment benefit. When the economy recovered from the recession, the growth in the inequality of factor income stopped. Like factor income, inequality in gross income and disposable income lessened until the mid-1970s. The decrease in inequality was even larger with these income concepts, because the received transfers of income and taxation effectively evened out disparities in income. After that, inequality remained the same for two decades. Inequality in gross income and disposable income did not begin to increase until the recession had passed, in the middle of the 1990s. In 2001 inequality decreased only temporarily. In 2004 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 of income (e.g. pensions, unemployment benefits, social assistance allowances) received by households are added to factor income, gross income is obtained. By deducting from it transfers of income paid by households (e.g. state and municipal income tax and social security contributions), one obtains households’ disposable income.

By definition

disposable income = factor income + received transfers of income - paid transfers of income

A household’s income and consumption per OECD unit of consumption is weighted by the number of members in the household and by sample weights.

**Income inequality as measured by the 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 whole population’s income share 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.
In the first decile (the lowest income earners, which form 10 per cent of all income earners) income transfers received by households were more than half of their disposable income. Because the received income transfers hardly change when the factor income increases, the relative significance of transfers decrease in the higher deciles. The internal structure of transfers is, however, different in various income groups. Social and housing allowances are directed towards the lowest deciles. Family allowances, on the other hand, are not dependent on income, and occupational pensions are directed towards the upper income deciles. The relative share of received income transfers was exceptionally large after the recession in 1995. After that, the growth in factor income was rapid and was especially visible in the highest decile. Direct taxes paid 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 tax rate.
7 Energy and 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 almost 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 acidification of the soil, while it is also detrimental to the 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 energy and environmental policy making is the set of policies aiming at 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 CO2 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 CO2 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 2005–2007 and – even though as such compulsory and incurring real costs – is meant as a test period for the second phase of EU ETS, which coincides with the first commitment period of the Kyoto Protocol. The actual operation of EU ETS has demonstrated so far that various design features are not yet mature, for example the frequency of disclosure of actual allowance holdings of obligated parties by country.
### 7.1 The structure of energy supply and demand

Gross domestic consumption of energy in Finland amounted to 1 358 petajoules (PJ) in 2005. 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.

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 economy’s sensitivity 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.

![Figure 7.1. Primary energy use in Finland by energy source in 2005, per cent](image)

Source: Statistics Finland/Energy Statistics.

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 than in 2004 (the share went down from 15% to 10%...
in total gross inland energy consumption), whereas electricity imports rose again compared to 2004. During 2004 and 2005 the hydro reservoir situation normalized compared to the tight years 2002 and 2003 and hence import of hydro power became more competitive again. The year 2005 saw also a slight increase in the share of renewable energy (wood and domestic hydro).

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 2005, per cent

Transport 17%
Heating 22%
Industry 48%
Other 13%

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


Of the entire final energy consumption in 2005 (1,077 PJ) in Finland almost 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 CO2 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.

The remaining segments of final energy use comprise agriculture, construction, and electricity use in services and households. The residential sector represents the biggest 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 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 1990–2004, TOE/GDP

EU15 range and average. Source: Eurostat/Sirene data base and VATT.

The energy intensity of the Finnish economy is and has been well above the EU average. Although at the level of specific industrial processes energy intensity in Finland is often low compared to other countries, at the sector and national levels energy intensity (in relation to value added and GDP respectively) is relatively high. 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 nineties in Finland energy intensity rose, temporarily due to underutilisation effects in heavy industry.
Energy intensity = (gross) energy consumption (in PJ or TOE) divided by purchasing power corrected GDP. This ratio is an indicator of the efficiency with which an economy uses energy. The smaller the intensity, the less energy is needed to create a unit of GDP, i.e. the more energy efficient the economy is.

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.
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Source: Eurostat/Sirene data base and VATT.

The energy intensity per capita of Finland is much higher than the average of the EU countries. In the year 2000 only Luxembourg has consistently a 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 other (EU 15) member states energy intensity per capita has been more or less steadily going up between 1985 and 2003. The intensity per capita in Finland increased by approximately 31 per cent between 1985 and 2003. 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 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 the Finnish electricity supply in 2005, per cent

The dependency on imports is here distinguished along temporal lines, meaning that the easier and the quicker an import flow can be cut or its price changed, the higher the degree of explicit dependency is. Applying the most strict criteria, only the domestic energy carriers, such as biomass and hydro power, imply no dependency. As these sources cover 33 per cent of the electricity supply, the import dependency of the electricity supply would be 67 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 41 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 Nordic countries, imports are cheap. In addition, there is now a continuous flow of rather low-priced imports from the Russia 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.

Source: Adato Energia Oy.
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 rise more, security of supply and import dependency of oil and gas products has 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 much wider shared view.

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

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 the second lowest in the Union. 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. Energy cost 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. Of course, optimising the overall energy use by introducing combined

Source: Statistics Finland/Energy Statistics.
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 natural gas at specifically reduced prices. With the progress of regulatory reform in EU energy markets the obligations regarding transparency might help to abandon or at least reduce these implicit subsidies.

7.5 Greenhouse gas emissions and the cost of climate policy

Figure 7.7. CO2 emissions in Finland in 1900–2004* and trend until 2025, million tonnes

* Estimated by the 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 20th century.

The introduction of nuclear power considerably reduced the emission level in the 1980s. The establishment of a common Nordic electricity market and some favourable hydro power years contributed to the reductions in the second part of the nineties. 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 CO2 emissions rose sharply up to 2003. In 2004 already some reduction was achieved thanks to better availability of hydro power. In 2005 (not in the picture) 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. Considering recent trends in the fuel mix and demand levels a rise in emission levels can be expected for 2006.

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 be taken. The implementation of the national climate strategy (‘With Additional Measures’ – WAM) is expected to reduce the level of CO2 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 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 (CO2), which made up 84% of the Finnish greenhouse gas emissions in the year 2000. Other greenhouse gases are methane (CH4), di-nitric oxide (N2O), and the so-called ‘new gases’, several kinds of halogens such as HFC, PFC, and SF6.

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 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 dinitric oxide) and industrial processes (dinitric oxide and the ‘new gases’).
Table 7.8. Greenhouse gas emissions in the years 1990 and 2003, as well as the target level for the 1st commitment period 2008–2012 in selected countries, million tonnes

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The Polish reduction target has the year 1988 as its reference base. The USA has not ratified the Kyoto Protocol. The figures for the Czech Republic are expected figures as published in the country’s third national report.

Source: EEA year 2005 report to the European Commission and 3rd national reports (for countries marked with an asterisk).

In 1988 formal global deliberations started concerning climate change 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 (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 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).

Some member countries, such as Germany and the UK, had rather large potentials of easily reducible emissions. By the time the reduction was agreed upon, these countries still possessed substantial amounts of old coal-fired power stations, which could be easily replaced by modern more efficient gas-fired power stations. 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, these countries’ emissions have been growing strongly in recent years, thereby obliging these countries in the remaining years to reduce emissions from current levels in order to fulfil their obligations.

As a consequence of strong economic growth in Denmark and the Netherlands between 1990 and 1998 the greenhouse gas emissions grew substantially in those countries. In Spain, in particular, road transport has been expanding its emissions enormously. Sweden is the only one of the EU15 countries, while not having a large share of coal power, that so far succeeded in stabilizing its emission level, inter alia by importing more electricity from various other countries. The former centrally planned economies such as Poland, Estonia and Russia have experienced reductions in emission levels, due to the economic crisis and changes in the economic structure. As a consequence of this, these countries can sell their surplus emissions to other (Annex B) countries. However, this may turn out to be easier to effectuate for new and candidate EU members, such as Poland and Estonia, than for others, such as Russia and the Ukraine. The new so-called ‘Linking directive’ provides nevertheless extra incentives to include emission trade options with non-EU members such as Russia, China, India and Brazil. To put it simply, it regulates the extent of exchange between EU ETS and other tradable allowances which represent greenhouse gas reductions, in particular the so-called flexible mechanisms ‘Clean Development Mechanism’ (CDM) and ‘Joint Implementation’ (JI).
Figure 7.9. The proportional change in greenhouse gas emissions relative to proportional change in GDP (emission elasticity of GDP) for selected EU member states – observed, projected and required pathways for the period 1995–2010

Source: VATT.
From an economic point of view the challenge of a successful climate policy can be summarized as: ‘how to maintain a certain level of economic growth, while safeguarding the achievement of emission reduction targets’. Without targeted (extra) efforts a steady continuation of economic growth would mean a steadily growing energy consumption, albeit – in most cases – at a lower pace than economic growth. Consequently, without significant changes in the share of non-fossil fuels, this trend would result in ever growing carbon dioxide emissions. Targeted extra efforts can consist of changes in the sector structure and product mix, increase of non-carbon fuels, enhancement of energy saving, and adapting mobility, spatial planning and logistics. Evidently such measures may not always impact directly, whereas it was earlier shown that the actual emission pathway can be volatile, e.g. due to weather variations. This means that it is worthwhile to track the performance in emission reduction in conjunction with the economic growth performance. This is done in figure 7.8.

In figure 7.8 for eleven EU member states development of their emission elasticity of GDP is shown. This elasticity can be defined as: the proportional (%) change in greenhouse gas emissions relative to the proportional (%) change in GDP. If countries have a target below the 1990 level, the average elasticity for the whole period should be negative, meaning that they should manage to combine an absolute reduction in their emission levels with a positive growth of GDP (for targets by country see also table 7.8). France and Finland have targets equaling the 1990 level, implying that their average elasticity for the whole period should be zero. Some EU15 countries, such as Greece, Spain, Portugal and Ireland, which were assumed to be still in a development stage, have emission targets above their respective 1990 emission levels, meaning their average emission elasticity for the whole period could still be positive (though well below 1). Owing to its decision to phase out nuclear power Sweden was granted a target somewhat above the 1990 level. For all countries applies that the actual elasticity can vary from year to year.

The solid lines in figure 7.8 represent the observed developments by country from 1995 to 2003. After 2003 the solid lines represent the expected development in a business as usual (BAU) context. The dashed lines starting in 2003 show the required development of the emission elasticity that would allow for accomplishment of the country’s reduction target. It is assumed for all countries that their real growth of GDP between 2003 and 2010 amounts to 2 per cent per year. In the examples only domestic emissions are accounted for. So, accomplishment by means of emission trade is not included in figure 7.8. If the dashed line and the solid line stay close to each other, it means that a country does not need to step up its policy very much compared to current effort levels (or not at all) to achieve its targets. This applies to Germany and the United Kingdom. Sweden has even extra leeway as the dashed line runs above its solid line. All other countries in figure 7.8 appear to need an increase of their current effort level. Remarkable are Greece, Ireland and France where the BAU development represents a rising elasticity. When one accounts for
the possibilities of emission trade (including the other flexible mechanisms via the ‘Linking directive’) many of the selected countries, including Finland, would still be capable of meeting their target without too much difficulties, unless their economic growth is all the time well above 2 per cent annually. According to figure 7.8 Spain seems to have a very large wedge between its BAU elasticity and its required elasticity. This points at a situation in which domestic emission reduction policies may need substantial intensification at any rate, despite the possibilities of emission trade.

VATT researchers made several publications on the cost of climate policy and the economic effects of emission trade. See, for example:


VATT Discussion Paper 328, Pekka Mäkelä (2004), Kariutuneet kustannukset ja omaisuudensuoja päästökaupassa (Stranded cost and protection of ownership in emission trade).


VATT muistio 75. Honkatukia Juha - Perrels Adriaan: Energiatodistusten taloudelliset vaikutukset (the economic impacts of energy certificates)
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