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Finland's response to the challenge of globalisation

Report by the Secretariat of the Economic Council - PART II

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Abstract:

The report examines the adjustment of the Finnish economy to globalisation, Finland's economic strategy and the need to re-assess the strategy. The first six chapters analyse the way in which the Finnish economy has been developing in recent years and the challenges that will result from that development. The analysis focuses on key economic-adjustment phenomena, an assessment of the scale of offshoring of jobs, and the functioning of the labour market. It also discusses issues posing particular challenges for Finland, i.e. the situation of an energy-intensive economy at a time of rising energy prices, agriculture and the regional structure of a sparsely populated country. The analysis in Chapters 1-6 is based largely on contributions by Finnish economic research institutes, which the Secretariat of the Economic Council has turned into a consistent whole.

The last two chapters of the report deal with Finland's economic strategy, the pressures for change it faces as a result of globalisation, the way these pressures have been taken into account in recent years and, lastly, the key aspects of Finland's competitiveness strategy and the need to develop it. The conclusions drawn reflect the views of the Secretariat of the Economic Council.

Keywords:

globalisation, competitiveness, economic strategy, offshoring

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FOREWORD

One of the key economic phenomena of the last two decades has been the substantial expansion of the global flows of goods, services, capital and information, accompanied by the related integration of large developing countries into the world economy. This phenomenon, known as globalisation, is not new, but rather the latest stage of a long-term process of integration. Nevertheless, it has been regarded as a fundamental change and reactions to it have been rather mixed.

The main message of economic theory is that better opportunities for exchange enhance welfare, and many empirical observations support this view. Economic growth has been rapid in large developing countries, and the standard of living has increased substantially for hundreds of millions of people. Economic integration has undeniably benefited developed countries too, e.g. through more inexpensive imports and booming export markets.

Nevertheless, in many countries, particularly in Europe, globalisation is regarded as a threat rather than an opportunity. It is feared that new competition will take jobs away and even destroy the European social model with its emphasis on small income disparities and social cohesion.

It is indeed indisputable that European economies face major adjustment challenges following the emergence of low-wage nations increasingly utilising modern technology on the same markets. Most obviously, the outcome depends on how well economies are able to exploit new opportunities and adjust to unavoidable changes.

Globalisation is a common challenge, but it affects individual countries in different ways depending on a variety of factors such as the size and openness of the economy, production structure, labour market institutions, social and economic policy traditions etc. As a small, open economy, Finland is highly dependent on international trade: on the one hand, rapidly expanding markets provide major opportunities for a small country, on the other hand, international competition can quickly render a substantial part of domestic production unprofitable.

These two factors, the general concern in Europe over the consequences of globalisation and the crucial importance of globalisation for Finland, formed the background to the remit, given to the Secretariat of the Economic Council by Prime Minister Matti Vanhanen in March 2006 to analyse the challenges of globalisation for Europe and Finland. This analysis follows up the "Finland in the global economy" project carried out in 2004 on the Prime Minister's initiative,

examining Finland's competitiveness in the face of globalisation and presenting an array of recommendations to enhance competitiveness.

This report is divided into two parts, published as separate volumes. Part I, "Globalisation challenges for Europe", Prime Minister's Office Publications 18/2006 surveys the phenomenon of globalisation in the light of the latest academic research and discusses, on a general level, the ability of Europe to meet the challenges of globalisation and factors to enhance this ability. This part consists of articles by well-known European experts. The lead article on globalisation is by Professor Richard Baldwin. After the globalisation analysis, European economic performance and structural policies are surveyed. Other articles focus on themes crucial to the development of the EU internal market and innovation system. The final two articles discuss topics related to political governance.

Part II of the report, this volume, analyses the adjustment of the Finnish economy to globalisation and the policies implemented, and assesses possible needs to develop the policy strategy further. Different sectors of economy are analysed at the beginning of Part II on the basis of contributions by several Finnish economic research institutes. One the hand, we examine economic performance and structural change in general (chapter 1), the scale of offshoring jobs (chapter 2) and the functioning of the labour market (chapter 3). On the other hand, the focus is on issues that pose particular challenges for Finland: the situation of an energy-intensive economy at a time of rising energy prices (chapter 4), agriculture (chapter 5) and the regional structure of a sparsely populated country (chapter 6). The Secretariat of the Economic Council has turned the analyses into a consistent whole and bears all responsibility for the conclusions drawn.

Chapter 7 deals with the development of Finland's economic strategy and the pressures it faces as a result of globalisation. The chapter also assesses to what extent the recommendations proposed by the report "Finland in the global economy" have been implemented. The process of assessment was closely coordinated with the preparation of an annual progress report on the Finnish National Reform Programme 2005-2008 tasked with the Ministry of Finance.

Chapter 8 discusses the need to develop Finland's economic strategy with respect to three central themes: an education and innovation system combining excellence in narrow focus areas and a wide competence base, the ability of the economy to respond to emerging needs for renewal and the adjustment to a new energy environment. The conclusions remain for the most part rather general. Nevertheless, a few more concrete policy proposals are put forward in the report, but we do provide an extensive list of recommendations as in the "Finland in the global economy" report.

As part of the overall project, a set of dialogues, originally started in 2004, was activated between employer organisations and unions to develop common views at the branch level on the needs to improve various branches' competitiveness. Central labour market organisations were for the most part in charge of organising these dialogues. The support group coordinating the dialogues included the following representatives of the central organisations: Senior Negotiator, Labour Market Analysis, Margareta Heiskanen (Commission for Local Authority Employers), Deputy Director Eeva-Liisa Inkeroinen (Confederation of Finnish Industries, EK), Secretary General Seppo Junttila (The Finnish Confederation of Salaried Employees STTK), Director, Social Affairs, Markku Lemmetty (AKAVA – the Confederation of Unions for Academic Professionals in Finland) and Deputy Director Matti Viialainen (Central Organisation of Finnish Trade Unions, SAK).

In connection with the project, an international seminar for experts was arranged in August alongside two more extensive conferences in October. The majority of the articles included in the first part of the project were published in English on the Economic Council's website on 20 September.

Those in charge of contributions by research institutions were Jyrki Ali-Yrkkö and Pekka Ylä-Anttila (ETLA, the Research Institute of Finnish Economy), Reija Lilja, Merja Kauhanen and Heikki Taimio (Labour Institute for Economic Research), Raija Volk, Janne Huovari, Perttu Pyykkönen, Kalle Laaksonen, Terhi Latvala, Meri Virolainen and Tapani Yrjölä (Pellervo Economic Research Institute PTT) and Juha Honkatukia (Government Institute for Economic Research VATT).

In addition to the aforementioned research institutes, the project was supported in a variety of ways by an extensive network of experts: Esko Aho, President (Finnish National Fund for Research and Development, Sitra), Mikko Alkio, Special Adviser, Esko Antola, Professor (University of Turku), Pertti Haaparanta, Professor (Helsinki School of Economics), Sirkka Hautojärvi, Permanent Secretary (Ministry of the Environment), Satu Helynen, Technology Manager (VTT Technical Research Centre of Finland), Reino Hjerppe, Director General (VATT Government Institute for Economic Research), Juha Honkatukia, Research Director, (VATT Government Institute for Economic Research), Pekka Huhtaniemi, Under-Secretary of State (Ministry for Foreign Affairs of Finland), Timo Hämäläinen, Research Director (Sitra), Johanna Ikäheimo, Chairman of the Board (Lappset Oy), Arvo Jäppinen, Sixten Korkman, Managing Director (ETLA, the Research Institute of the Finnish Economy), Reija Lilja, Research Director (Labour Institute for Economic Research), Jukka Pekkarinen, Director General of the Economics Department (Ministry of Finance), Matti Pohjola, Professor (Helsinki School of Economics), Jari Romanainen, Executive Director (TEKES, Finnish Funding Agency for Technology and Innovation), Jorma Routti, Professor, Veli-Pekka Saarnivaara, Director General (TEKES, Finnish Funding

Agency for Technology and Innovation), Markku Wallin, Permanent Secretary (Ministry of Labour), Erkki Virtanen, Permanent Secretary (Ministry of Trade and Industry), Raija Volk, Research Director (Pellervo Economic Research Institute PTT), Professor Raimo Väyrynen, President (Academy of Finland), Pekka Ylä-Anttila, Research Director (ETLA, the Research Institute of the Finnish Economy). We have received valuable advice and comments from these experts. However, they are not in any way responsible for the conclusions drawn in this report, which reflect the views of the Secretariat of the Economic Council. On behalf of the Secretariat, I would like to express my warmest gratitude to all participants in the project and those who have supported it for their contributions and comments and forthright co-operation.

From Specialist Services for the Political Leadership at the Prime Minister's Office, the following persons have contributed to the project in various ways: Maarit Lindström, Project Manager, Iiris Koskela-Näsänen, Research Assistant, Markku Harrinvirta, Counsellor, Outi Hiltunen, Departmental Secretary, Riitta Kirjavainen, Counsellor, and Pekka Sinko, Economist. I extend my warmest thanks to all of them, with special gratitude to Maarit Lindström and Iiris Koskela-Näsänen. Without their competent and untiring efforts this project would have been impossible to carry out.

Vesa Vihriälä
Secretary General of the Economic Council

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SUMMARY

Finnish economy highly successful in recent years

In the past 2–3 years Finland has seen strong economic growth and positive employment trends. Total output grew by approximately three per cent in 2004 and 2005, and a growth rate of over five per cent is commonly predicted for 2006, while employment increased by some 100,000 jobs from January 2004 to September 2006. The seasonally adjusted employment rate, exceeded 69 per cent in September, while the unemployment rate fell to under 8 per cent.

Simultaneously, Finland has continued to open up to international trade, measured by any indicator, e.g. the share of foreign trade in GDP, capital flows, international companies' jobs located in Finland, Finnish companies' jobs located abroad, or international mobility of labour. Globalisation seems to have progressed hand in hand with positive domestic economic trends.

Hence, the fears expressed over global competition leading to massive offshoring of jobs from Finland to China or other developing countries have not materialised, at least not in the aggregate economy. Few jobs have been offshored within multinational corporations or via outsourcing in comparison with the number of jobs created in the economy as a whole, or jobs eliminated for other reasons.

Many reasons for success

Several short-term factors have played a role in the solid economic and employment growth of recent years. Domestic demand has developed well due to factors such as moderate interest rates and a growth-supporting fiscal policy. The robust growth in the world economy – partly based on globalisation – has boosted demand in many export industries.

On average, Finnish production has retained its good price competitiveness thanks to moderate pay increases, but there are several other background factors supporting long-term economic growth and competitiveness, alongside the changing operating methods of companies. Efforts to reinforce the economy's skills base, some of which were started decades ago, have now borne fruit. Major public and private investment in research and development, together with the skilled workforce produced by the country's education system, have facilitated the rise of Finnish technological expertise, making Finland a world leader in several fields of production. A generally well-functioning society and, more recently, stable macroeconomic conditions have also promoted the preconditions for economic activity in Finland.

In fact, Finland has been ranked top in various comparative competitiveness surveys seeking to describe factors important to the long-term economic success. In this respect, Finland's ranking is clearly better than that measured by GDP per capita, although Finland has improved its position in some rankings of that kind too over the past few years.

Challenges abound, unfortunately

The mere fact that, measured by GDP per capita, economic success is not fully compatible with the results of competitiveness surveys, raises the question as to how well Finland actually capitalises on its resources. Close scrutiny reveals several problems.

First of all, Finland specialises in production, such as electronics and many forest industry products, where relative prices are tending to fall for a variety of reasons. This manifests itself in declining terms of trade, as a consequence of which increasing production volumes do not fully contribute to increasing real national income.

Secondly, Finland has been able to achieve high productivity in certain branches of industry only. Service sector productivity can only be considered average, regardless of an array of measuring problems. However, the majority of the workforce are now employed in the service sector, which continues to grow.

Thirdly, Finland is not very strong in so-called customer-driven innovation, where the creation of new products is based on anticipating and catering for the preferences of customers together with or even instead of technological novelties. However, the importance of precisely this type of innovation is increasing as developing countries catch up with the developed countries' technological lead.

Fourthly, the population is aging faster in Finland than in most other European countries. This means that the working-age population is declining while pension expenditure, and somewhat later, healthcare and long-term care expenditure, will increase. As a consequence, the sustainability of public finances will come under pressure, while tax rates would need to be reduced rather than increased for reasons of competitiveness.

Updated analysis underlines global challenges

The globalisation analysis in the study does not alter the basic view of Finland's economic environment that has taken shape in recent years: the importance of so-called developing countries is increasing rapidly in the world economy, markets are expanding, competition is intensifying and, in the developed

countries, non-skilled jobs in particular, will continue to be subject to offshoring pressures. In certain respect, however, the analysis does indicate greater adjustment challenges.

First of all, production would seem to be dividing into smaller parts at task level, enabling it to be spread out around the globe. As a consequence, competition from developing countries will focus increasingly on various intermediate products and production-process tasks rather than final products. This will increase the share of added value vulnerable to international competition in developed countries' production. Combined with the size of markets and increasing educational standards in developing countries, this task-level competition will extend to all educational levels, not only to the work of the less educated. Even tasks requiring great analytical powers may become subject to the challenges of international competition, or targets for automation.

Secondly, changes in the advantages of a location for given tasks can be unexpected, and thus hard to predict. Simultaneously, the changes may also be large, meaning that almost all tasks of a certain type may be transferred to another location. Hence, the fact that the direct offshoring of jobs has for the time being only applied to a relatively small fraction of all jobs will not guarantee that such jobs remain in developed countries in the future. It is estimated that some 15 to 20 per cent of service sector jobs in Finland may become susceptible to new kinds of international competition. The unpredictable nature and potentially significant magnitude of change will simultaneously make educational planning more difficult than before.

Thirdly, environmental problems related to global economic growth and the growing demand for energy as such will impose stricter conditions on economic development. For Finland, rising energy prices constitute a bigger than average challenge because Finland has an energy-intensive economy owing to production structures and geographical factors.

Finland's competitiveness strategy has a solid basis

Basically, Finland's economic strategy, emphasising skills and innovation policy, remains a wise solution to globalisation challenges. A country like Finland can succeed in international competition only through continuous innovation based on solid skills, and through increased productivity.

Many of the concrete reforms in the economic strategy proposed in the Finland in the global economy report two years ago under the headings, "competence", "openness" and "renewability" have proceeded well. Thus, R&D expenditure is being increased, efforts are being made to improve R&D quality, and the innovation system is attempting to accommodate, more effectively than before,

the needs of the service sector and the weaknesses in the final part of the innovation chain.

Strategic centres of excellence in science, technology and innovation are being established to support key areas of economic activity, and a new programme has been created to attract international top researchers. Preconditions for job-related immigration have been improved, and more public funding is being channelled into venture capital for start-up enterprises. Income tax rates have been cut, and more concrete measures have been taken to make the public sector more efficient through the municipal and service structure project, for example.

Nevertheless, strategy still requires development and determined implementation

In spite of its solid basis, Finland's economic strategy requires further development. It is at least equally important that the various sectors of society are able to implement the necessary reforms in practical terms. There is a clear danger that strong economic development could lull society and decision makers into thinking that everything necessary has already been done. This is not the case.

Three key sets of issues arise in the area of enhancing competences, which clearly call for further attention: (1) combining investment in excellence with the strengthening of the broad skills base, (2) the education system's ability to produce the capabilities required in working life and Finland's ability to attract international experts and form international networks and (3) the dimensioning of resources as required by the competence strategy.

The ability of the economy to renew faces many types of problems. Businesses are not reforming rapidly enough to enhance productivity and growth sufficiently. The labour market needs to function more flexibly than at present. In the public sector, enhancing the productivity of service provision is not enough. There must also be a re-assessment of the areas in which public responsibility is indispensable and those in which it could perhaps be reduced.

Finally, Finland must give up the idea of being able to base the competitiveness of certain industries on inexpensive energy. Instead, we can continue to enhance the security of energy supplies on the basis of domestic energy sources and, simultaneously, develop energy technology into a significant export product.

Combining excellence and an extensive comptence base requires structural reforms

The policy of creating strategic centres of excellence (SCoE), as approved by the Science and Technology Council, is a natural response to the need to channel limited resources to the key areas of excellence. The creation of SCoEs must aim at the global pinnacle, the business sector must be given a key role in their formation, and an exit strategy must also be prepared.

In order for Finland's very fragmented university and higher education system in general to allocate resources to selected strategic centres of excellence and ensure the quality of research in other respects too, its structure must be developed into a more compact format. The most viable way of achieving this is to enhance the specialisation and profiling of units and to supplement this with better networking of higher education institutions both in Finland and elsewhere and, if necessary, through mergers of units operating in the same area.

On the other hand, an adequate degree of innovation outside the chosen focus areas must be ensured. In order to support this, tax subsidies for R&D expenses, already used by most OECD countries, should be considered. Regardless of such considerations, it is important for the Centre of Expertise programme under reform to be integrated efficiently with the SCoEs to avoid overlapping operations. The complex and incoherent system of regional organisations and programmes implementing innovation, industrial, business and regional policy should be simplified. There is a tremendous need for regional innovative ability since international competition may have a dramatic impact on production and employment in Finland's specialised regional economies.

The ability of the university system to meet the challenge of developing top expertise requires reform of the decision-making system. A higher degree of autonomy combined with a professional management system is the key to this, while new sources of financing must be found. For example donations should be encouraged. Tuition fees should not be considered taboo in all situations either, provided that opportunities are guaranteed for all students to all levels of study, regardless of their family background, through a voucher system, for instance.

Globalisation places demands on the content and phasing of education

Globalisation and rapid technological change emphasise the need to be able to produce the capabilities required at any time at various educational levels. Such an ability requires solid basic capabilities, and Finland's basis is good in this respect. However, it is not clear whether general education sufficiently

emphasises social interaction skills (including language skills), mathematical deductive skills and learning skills.

Education should shift to modules consisting of shorter periods of study than at present, which would allow integration with working life as flexibly as possible. This, in turn, calls for highly flexible opportunities for complementing and continuing previous studies. Simultaneously, it is important that overly-specific study programmes be avoided, because the skills provided by them may prove outdated soon.

Higher education for a high proportion of the population is not an end in itself. It is more important to provide high-quality education at all levels with contents that meet the needs of working life. The higher numbers of students per teacher in many fields of study, due to the expansion of education, poses a clear problem in this respect.

The complex and incoherent adult education system calls for overall reform, which should be based on a consistent financing system providing equal opportunities and the correct incentives for further education and re-education, regardless of who acquires or provides the training.

It should also be acknowledged that the talent reserves of a small country will not suffice to cater for all needs. Hence, in order to ensure top-quality competences, Finland needs not only domestic talent but a considerably higher number of skilled people from abroad, both graduates and talented foreign students. For students, this requires better planning and marketing of study programmes and the development of financing systems.

Investment in competence should be increased, with discretion

The Government's objective of increasing Finland's R&D expenditure to 4 per cent of GDP can be considered justified, given the goals of both advancing the technological frontier in selected focus areas, and ensuring an extensive skills base. However, in order to achieve this objective by 2010, public R&D expenditure must be increased more rapidly than current commitments indicate. The necessary growth rate is probably about seven per cent a year.

The development of the education system in the above-mentioned manner also calls for additional resources, which are unlikely to prove attainable only through savings due to smaller cohorts, or productivity gains. Finland only spends an average amount on education in spite of the good results it achieves. Widening the financial basis of higher education institutions will hardly be sufficient, either.

Reforms in the business sector can be supported in several ways

Sufficiently intensive competition is a key incentive for business development, and it remains important that competition be promoted through an effective competition policy. Regardless of competition, it seems that Finnish companies are not very growth-oriented. In spite of the development of the financial market, this may still be due to problems in the availability and cost of venture capital. To alleviate this, the tax incentives used by certain countries to activate private risk-capital investors should be considered as an option. Innovative companies at the forefront of technology often face exceptionally high risks in new business. To a certain extent, this problem could be alleviated by making innovativeness a criterion for public procurement.

Business reorganisations often require labour force reductions and/or changes in the skills structure, which is naturally easiest when shedding labour does not involve high costs. A key characteristic of Denmark's dynamic labour market is its ease with which employees can be dismissed or laid off, and Finland should consider reducing job protection as part of a larger reform, in which the risks of individual employees and employers and collective risk-bearing are developed in the spirit of so-called change security.

The sphere of Finland's highly technology-oriented economy's innovation activities must be expanded towards customer-driven innovation. There is no single remedy to this, but the development of education may help in the long run, as may and paying attention to this type of "soft" innovation activity in the allocation of public R&D expenditures.

Various forms of ownership have different strengths, which makes a diverse ownership basis advantageous for Finnish business. This should be promoted, if possible.

Ensuring the labour supply requires further action

The forecast reduction in the labour supply will require more efficient employment of existing labour reserves. The best results can be achieved in both the oldest and youngest age groups. In addition to the development of training and working life, it is also essential to ensure there are adequate incentives to offer employment and to take it. From this perspective, continuing reductions in labour taxation would be justified, and social benefits should also be revised. An option worth considering would be to define the basic unemployment allowance as basic income for the older, long-term unemployed, thus uncoupling the payment of allowances from possible earned income.

In addition to enhancing the employment of domestic labour reserves, Finland needs employment-based immigration. To facilitate this, the immigration policy must be revised before long.

In the long run, the most serious problem is related to the willingness of the most highly skilled to settle and remain in Finland. More highly educated people have moved away from Finland than have come in the opposite direction, and the share of highly educated foreigners is exceptionally low in this country. A partial remedy to this may be to continue the special tax arrangements for foreign experts, but more general measures are necessary in addition. To attract skilled people, there is pressure to lower the highest income tax rates, for instance.

Labour mobility is important

Given the varying labour demand caused by globalisation and a lower labour supply, the flexible movement of labour input from one task to another, one company to another and quite often from one region to another is increasingly important as a means of economic adjustment. Although Finnish labour is more mobile in various ways than it is often thought to be, mobility should be further enhanced by removing various obstacles to labour mobility.

With regard to regional mobility, the weak supply of housing in rapidly growing areas is a major factor hampering mobility. This supply must be increased using various methods related to land use planning and economic incentives for the construction of areas with a complete plans (including real estate tax). Measures to increase the mere supply of housing are, however, not enough. How the forms of housing and the residential environments offered meet people's expectations is equally important. Expansion of working areas by further improving the preconditions for commuting is also useful, placing the emphasis on communications and efficient public transport services. In addition, the possibilities provided by technological advances for expanding telecommuting must be exploited more efficiently than now.

In order to promote both professional and regional mobility, there are reasons for tightening the conditions for unemployment benefits in relation to the acceptance of various vacancies. In this respect, Finland would seem to apply more lenient practices than for instance Sweden or Denmark. Lowering the marginal tax rate of labour income would also support mobility to more demanding positions, thus enhancing productivity.

In terms of occupational mobility, the most important factor is probably an effective system of further education, continuing education and re-training.

Despite certain useful reforms in recent years, the system still requires improvement in many respects.

Flexible wage formation essential to an adaptable labour market

The Finnish wage formation model has succeeded well in supporting wage developments that promote competitiveness and employment at the level of the aggregate economy. However, wage rigidity is high and contributes to an exceptionally high concentration of unemployment among the non-skilled.

As globalisation causes production to become increasingly fragmented between different countries, it will become progressively more difficult to maintain wage structures that do not sufficiently reflect the productivity of employees. Moreover, since the changing character of work is increasing the importance of pay incentives, wage formation must be linked more clearly with individual and team productivity to support employment and increase productivity. This requires the determination of wages at company level via local agreements to a higher extent than at present.

The need for enhancing such flexibility of wage formation is acknowledged in Finland, but progress has been slow. Therefore, it is important that, while attempting to maintain the strengths of the current wage formation mechanism, the significance of the company level in wage formation be enhanced.

Balance required between flexibility and risk bearing

The need for rapid change due to globalisation and technological development requires, as described above, not only companies as a whole but work communities and individual employees to be highly flexible and willing to accept risks. However, the ability of individuals to bear the risks caused by these factors is often poor and, for instance, weak job protection may weaken employees' incentives to enhance their skills.

Therefore, higher flexibility must be linked with reform of risk-sharing. The Danish model of "flexicurity" provides a good example, although it is not applicable to Finland as it stands. The change security arrangement introduced in Finland in 2006 is a step in the right direction, but the idea could be expanded by applying a new kind of balance of rights and responsibilities for instance to all employees below a certain age.

Public sector balance requires efficiency and prioritisation

The public sector influences the ability of the economy to change through many measures of regulation, public expenditure and taxation discussed above. The

resulting level of total expenditure and the level of taxation it requires is also an essential issue.

The need for systematic increases in expenditure on research and development, on education and on enhancing the adaptability of the labour market is at odds with trends in public finance. Although Finland's public finances are in good shape at present, and will most probably remain so over the next few years, an aging population will generate substantial pressure for additional expenditure in the long run. There will therefore be a need to raise taxes from what is already a relatively high base. At the same time, however, the need to reduce labour taxation and create new tax incentives for innovation argues in favour of lower taxes.

Therefore, it is important that the productivity of publicly financed service provision be enhanced, and the related measures of the state administration's productivity programme and municipal and service structure project must be implemented in a determined manner. In this context, a further aim should be to promote genuine service innovations for use beyond the public sector.

With Finland's public service production already efficient in international comparison, there are limits to how far productivity can be enhanced. This makes it necessary to assess the boundaries of public responsibility. The pension system is the biggest issue. The scope of the publicly financed pension system (pension age, pension levels) and the time profile of the accumulation of pension funds should be reconsidered. This is problematic, as a major pension reform was implemented very recently. However, postponing the re-assessment of reform needs is not a good option, given the sluggishness of the pension system.

The new energy conditions: adjusting is the only option

Global energy price prospects and the integration of the electricity market in Northern Europe mean that Finland cannot continue to use low energy prices as a basis for industrial competitiveness. It is thus useless to pursue this aim by increasing the supply of domestic energy. Nevertheless, increasing the supply of domestic emission-free energy can support security of supply and thereby also competitiveness. Therefore, it would still be worth further developing all emission-free domestic forms of energy.

The current European climate policy places Finnish industry at a disadvantage compared with many competing nations. This serves to highlight Finland's interest in striving to achieve global solutions for controlling global warming and climate change.

Bioenergy provides a significant opportunity for domestic emission-free energy supply, but owing to the nature of the energy market, wider use of bioenergy requires public intervention by means of regulation and various support mechanisms. However, measures that would lock producers and consumers in to inefficient technologies that are rapidly becoming outdated must be avoided.

No need to give up the goal of equality in order to enhance adaptability

Economic efficiency and the ability to adapt to various pressures for change need not conflict with social equality. Like other Nordic countries, Finland has so far been able to combine efficiency with small disparities in welfare levels quite well, notwithstanding its openness to international competition. For instance, the comprehensive education system offering equal educational opportunities has most likely been a key factor in enhancing the economy's ability to grow and adapt. There is no reason why combining equality with efficiency could not also be possible in the future.

What is essential is the ability to accept unavoidable changes, a readiness to re-consider established practices, willingness to support the adjustment of those hit hardest by the changes, and open-minded exploitation of any new opportunities that arise. Such adaptability is needed across the board, whether at company level, in industry structures, in regional development, in the labour market, in functioning of the public sector or in the scope of public responsibility.

1 PERFORMANCE AND STRUCTURAL CHANGE IN THE FINNISH ECONOMY

1.1 Economic performce, competitiveness and globalisation

A nation's economic performance or success is basically measured by its ability to create welfare or prosperity for its citizens. The material basis of welfare is production per capita, although other factors such as leisure time are also of importance. The distribution of income and consumption possibilities are also important. On the other hand, people's welfare, let alone happiness, does not depend on economic factors alone.

Economic competitiveness means many different things and is measured in many different ways. In this study, we define the competitiveness of the economy as its ability to produce high production per capita in an open economic environment, where the country in question participates in exchange with other countries and where the production factors (including the labour force and technology) move cross the country's borders.[1] In addition to high labour input in proportion to the population, high production per capita also requires high work productivity.[2]

A competitive country is able to utilise the possibilities afforded by free international exchange in such a way that it uses its own resources for production as effectively as possible and is also able to attract mobile production factors when there is a lack of them. Here, competitiveness is not so much regarded as competition against other economies, but more as the ability to utilise one's own resources and to offer mobile production factors the possibility of effective use. In this respect, a competitive country also supports the growth of prosperity from an international point of view.

Globalisation means widening the scope of international exchange and competition to encompass an ever-increasing share of the production of goods and services. Globalisation as expressed by quickly growing flows of goods, capital and technology between countries, has been aided by the removal of obstacles to the movement of goods and production factors. The central force

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1 This definition of competitiveness is close to Cotis and Elmeskov's (2006) view of the kind of content the widely-used term 'competitiveness' should be given in the description of national economies.

2 Living standards are usually measured by the volume of gross domestic product per capita. This can be most simply expressed by the product of gross domestic product per working hour and working hours per capita: $\frac{GDP}{population} = \frac{GDP}{workinghours} \times \frac{workinghours}{population}$

Of these factors, GDP/working hours measures work productivity, and working hours/population the amount of work done per capita.

that stimulates globalisation is technological development, which lowers the costs of moving products, production factors and capital. The development of technology has also supported the rise in total productivity and the introduction of completely new products, services and production technologies.

In the global economy there are ever-expanding market and operative possibilities for efficient commercial activities. Efficiently operating enterprises are also finding it easier to attract mobile production factors. On the other hand, competition is stronger and aimed more and more at domestic production, which is a challenge to many time-honoured ways of doing business.

For these reasons, economic competitiveness requires the ability to make rapid use of new business possibilities. Production structures (products, production methods) have to be adaptable in accordance with the new needs of technological development and consumers' preferences. Otherwise, production factors will remain unused or undeveloped due to competition, and as a result production factors may move to more favourable locations.

1.2 Competitiveness in the light of indicators

In comparisons measuring international competitiveness, Finland has numbered among the top nations already for many years. For example, the World Economic Forum indexes from 2005 rated Finland as the strongest in growth competitiveness and business economy competitiveness, and in 2006 Finland was placed second according to the new 'global competitiveness' indicator (Table 1.1). Also, in the 2004 report measuring the implementation of the Lisbon Strategy (The Lisbon review 2004), all indicators put Finland at the top, making it the EU's most competitive country. Amongst other things, the report measures the effectiveness of the information society and financial services, as well as investments in innovations and research activity.

According to the results of the European Innovation Scoreboard published by the EU, the leading innovative European nations in 2005 were Sweden, Finland, Switzerland, Germany and Denmark. Similarly, in a 2005 comparison by the European Commission, Finland as a country investing in its knowledge-based economy was again situated near the very top. Finland's investment of 3.5 per cent of GDP in research and development is the third highest of the OECD countries after Sweden and Israel. Finland is also among the leaders in the World Bank's economic index comparison, coming directly after Sweden (Figure 1.1 and 1.2).[3]

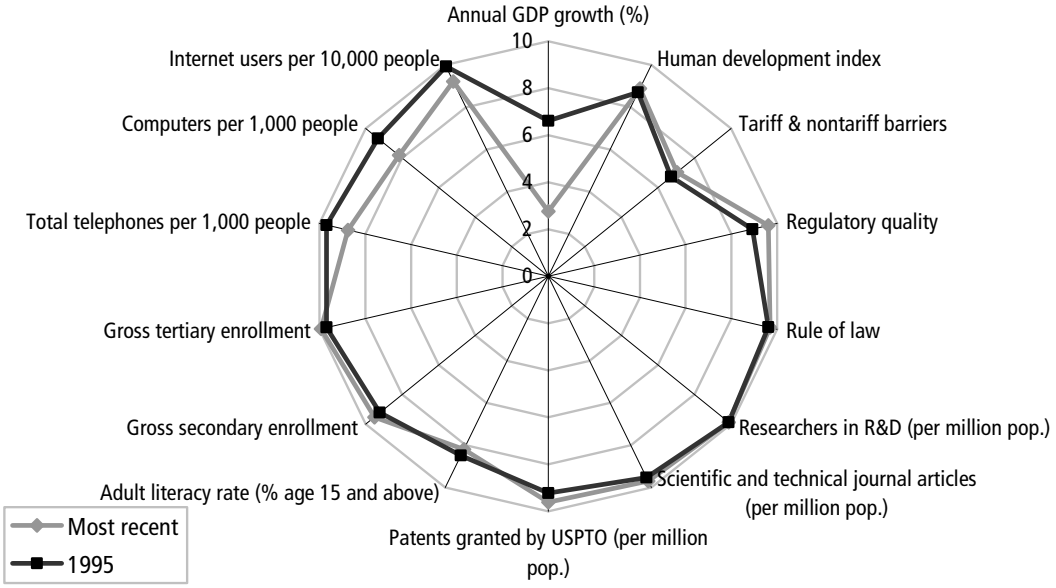
[3] World Bank. Knowledge Assessment Methodology, www.worldbank.org/kam. Factors that determine the knowledge economy include economic incentives, an institutional system, education, innovations, and communication and information technology.

Table 1.1 Competitiveness indicators.

	WEF: Global competitiveness 2006	2005	IMD: Total competitiveness 2006
Switzerland	1	4	8
Finland	**2**	**2**	**10**
Sweden	3	7	14
Denmark	4	3	5
Singapore	5	5	3
United States	6	1	1
Japan	7	10	17
Germany	8	6	26
Netherlands	9	11	15
Great Britain	10	9	21
Hong Kong	11	14	2
Norway	12	17	12
Taiwan, China	13	8	18
Iceland	14	16	4
Israel	15	23	25
Canada	16	13	7
Austria	17	15	13

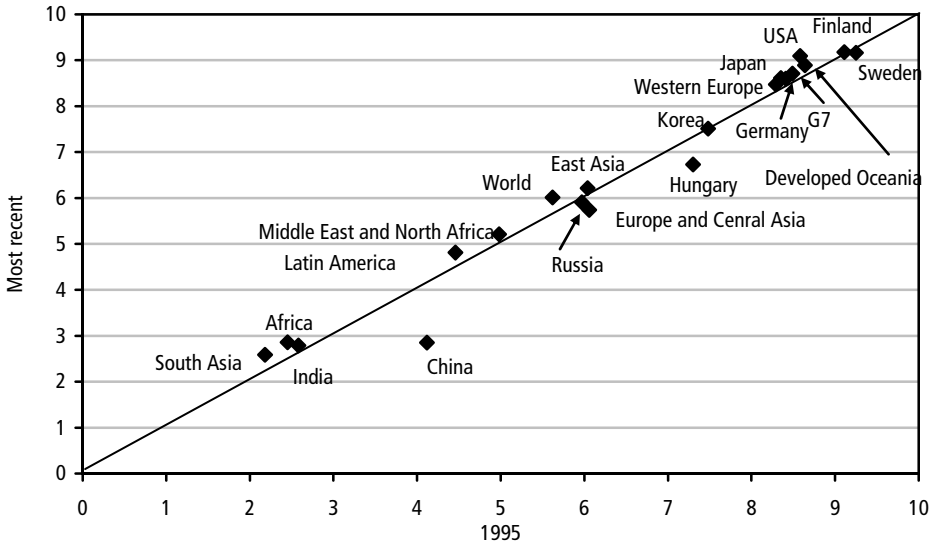
Sources: WEF and IMD.

Figure 1.1 Dimensions of the Finnish knowledge economy.



Source: World Bank, Knowledge Assessment Methodology. www.worldbank.org/kam. The Knowledge Economy Index (KEI) contains 80 structural or qualitative variables. The comparison covers 128 countries. The KEI is an aggregate of 12 key variables, which have been normalised to a scale of zero to ten (0 = worst and 10 = best).

Figure 1.2 Knowledge economy index (KEI) by country and region, 1995 and the most recent year.



Source: World Bank. www.worldbank.org/kam.

These competitiveness indicators catalogue the many background factors assumed to have an effect on economic competitiveness. Finland's significant overall success in competitiveness comparisons using these indicators is based on many different factors, the most important of which are education, technology, well-functioning public institutions and economic openness, and general integration into the international economy and international systems. In addition, flexible and rapid adaptability is considered to be one of Finland's advantages. All in all, in Finland's economic and industrial policies a microeconomic emphasis has been observed in the long-term development of national competitiveness, the results of which have been reflected in high rankings in international comparisons.[4]

Competitiveness comparisons used in the calculation of indexes are based on those factors which economic theory assumes to influence the economy's ability to perform well.[5] It is, however, unfortunate that the resulting indicators are not especially good at forecasting output growth after the measurement date (Rouvinen 2002, Rouvinen & Vartia 2002). This indicates that the basic factors that can be measured with competitiveness indicators can be utilised in many different ways in different economies. Competitiveness indicators therefore do

[4] See also Micro Policies for Growth and Productivity: Final Report OECD (2005).

[5] I.e. using resources effectively so that productivity is high and the labour force is to a large extent employed.

not tell us directly how economies will perform in future; instead, they indicate which economies have the best chances of success.

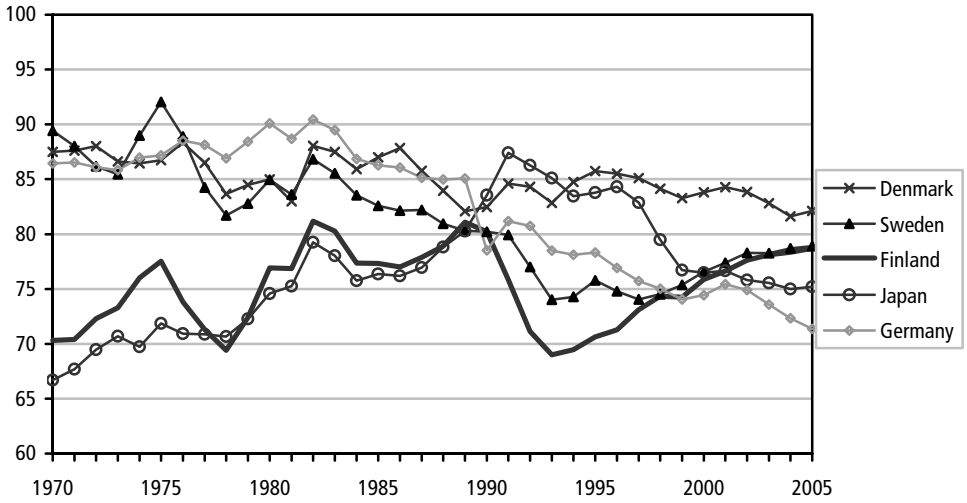
1.3 Living standards, labour input and productivity

Finland is a good example of the difference between competitiveness indicators and GDP per capita comparisons. Although Finland belongs to the top on the basis of various competitiveness measurements, its gross domestic product per capita is clearly lower than in the best performing countries. According to the latest University of Groeningen comparison concerning the year 2005, Finland's GDP per capita ratio was the 15th highest in the world, taking the correction for purchasing power into account. According to the IMF comparison, Finland has already reached rank 12 in the world passing such countries as Sweden and the Netherlands.[6] In any case, Finland would seem to be a sub-standart performer in terms of material prosperity with regard to measurable competitiveness factors. Why is Finland not better placed in living standards comparisons?

One possibility is that the effect of competitiveness factors on economic performance materialises with a long time lag. This is to some extent supported by the fact that during the last decade the growth rate of the Finnish economy has been faster than the average of developed countries. However, the explanatory power of this factor is weakened by the fact that during the same period Finland was recovering from the depression of the early 1990s, when production was at exceptionally low levels. Faster growth can therefore at least be partly explained by recovery from the depression (Figure 1.3). A closer examination reveals that despite respectable growth, the Finnish economy has certain features that impede the transformation of general competitiveness into high real income per capita.

[6] Comparing GDP per capita figures adjusted for purchasing power parities is plagued with difficulties, especially with regard to estimating the relevant price levels. Among the researchers in the field, the calculations by the University of Groningen are often considered the most comparable. The Groningen database is described in detail on the homepage of the University of Groningen. http://www.ggdc.net.

Figure 1.3 GDP per capita in 1970–2005, United States=100.

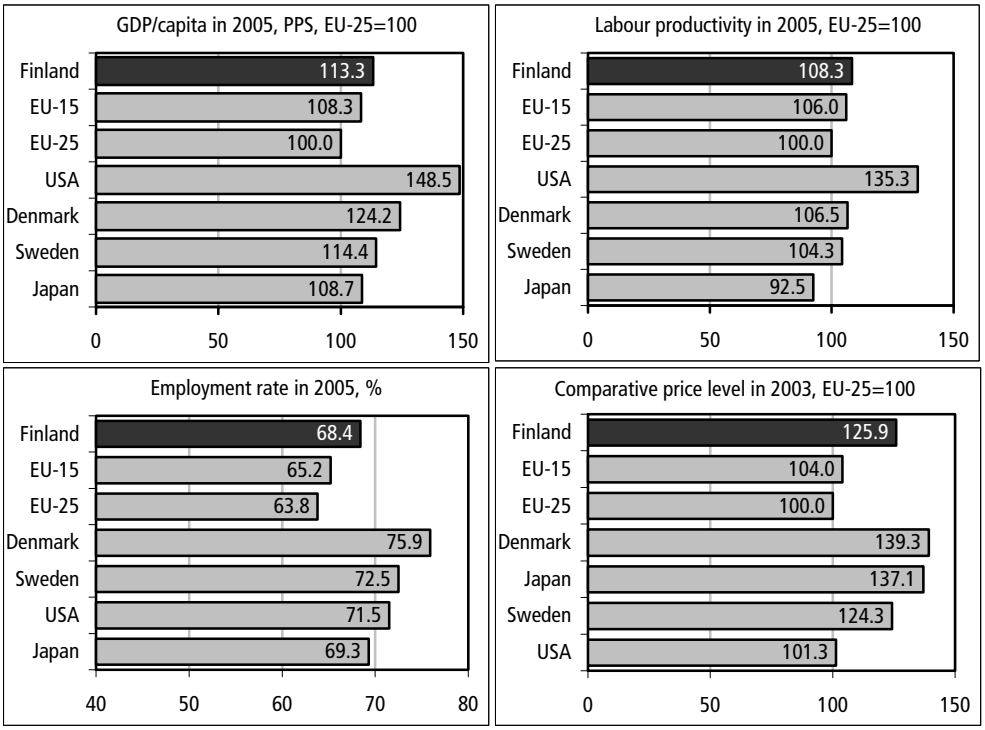


Source: University of Groningen http://www.ggdc.net.

If the GDP per capita ratio is divided into the amount of labour input and productivity, then it becomes clear that Finland has performed less well than the most successful countries in both the utilisation rate of labour input as well as in productivity (Figure 1.4). In Europe, the standard of living is in general lower than in the United States, where both work productivity and labour input are high. In Japan, the living standard is nearly at the same level as in Finland due to the high labour input, although productivity is lower. With regard to Finland it is conspicuous that the present employment rate (the proportion of employed persons in the working-age population) is noticeably lower than in the other Nordic countries and also lower than it has been in Finland.[7] The annual working time of the employed has decreased as it has in other developed countries, but it is still noticeably longer than in the other Nordic countries. In Finland there are thus fewer people of working-age employed, but they put in more hours than people elsewhere.

[7] The proportion of employed persons of the working-age population in Finland is approximately 69 per cent, whilst it was 74 per cent before the depression of the early 1990s.

Figure 1.4 GDP per capita, labour productivity, employment rate and comparative price level.



Source: OECD, Eurostat.

Although Finland is not at the very top in terms of productivity and employment, it has managed to improve the situation after the depression with respect to both factors (Table 1.2). Finland has even achieved the same productivity development as the United States and its employment rate has increased faster.

Also most recently, since 2004, the Finnish economy has performed well. The GDP grew by slightly over 3 per cent a year in 2004 and 2005 on average, despite the loss of production caused by an industrial dispute in the paper industry in 2005. Furthermore, a growth rate of over 5 per cent is commonly forecast for 2006.

Employment has increased since the beginning of 2004 untill early autumn 2006 by some 100 000 jobs, seasonally adjusted. This implies an annual growth rate of 1.6 per cent. The seasonally adjusted employment rate has surpassed 69 per cent and the unemployment rate declined just under 8 per cent in September 2006. Price and wage inflation has remained moderate at the same time.

All this suggests of quite strong competitiveness in view of Finland's capacity to increase GDP per capita. Nevertheless, one should be cautious in interpreting the latest figures as reliable indicators of longer term competitiveness. The growth witnessed in the most recent years has been supported by both expansionary macro economic policies (tax cuts and low interest rates in the euro-area) and booming export markets. In fact, Finland appears to have lost markets share a bit in the recent years.[8] Neither the stance of macro policies nor export market growth will necessarily support growth as much in the future as in the past few years.

Table 1.2 Production growth (%) and its contributory factors 1995–2004.[9]

	Finland	Euro area	USA
GDP	3.6	2.1	3.3
Population	0.3	0.4	1.2
GDP per capita	3.3	1.7	2.1
Productivity (GDP/hours)	2.3	1.4	2.3
Working hours (hours/employed persons)	-0.2	-0.4	-0.2
Employment rate (employed persons/working-age population)	1.2	0.8	-0.1
Population structure (working-age population /population)	0.0	-0.1	0.1

Source: Eurostat, OECD Productivity Database.

Increasing productivity is a more important determinant of material living standards than labour input, in that there is an upper limit to labour input growth whilst there are no limits to growth in productivity. In the long term, economic growth in Finland can only be based on an increase in productivity. With regards to productivity, Finland has been catching up fast. In manufacturing the level of labour productivity is already among the world's highest. This is due to the strength of the high-productivity ICT industry and capital-intensive and partly very efficient production in the forest and metal industry. In the services sector, however, labour productivity in Finland is lower than average.[10]

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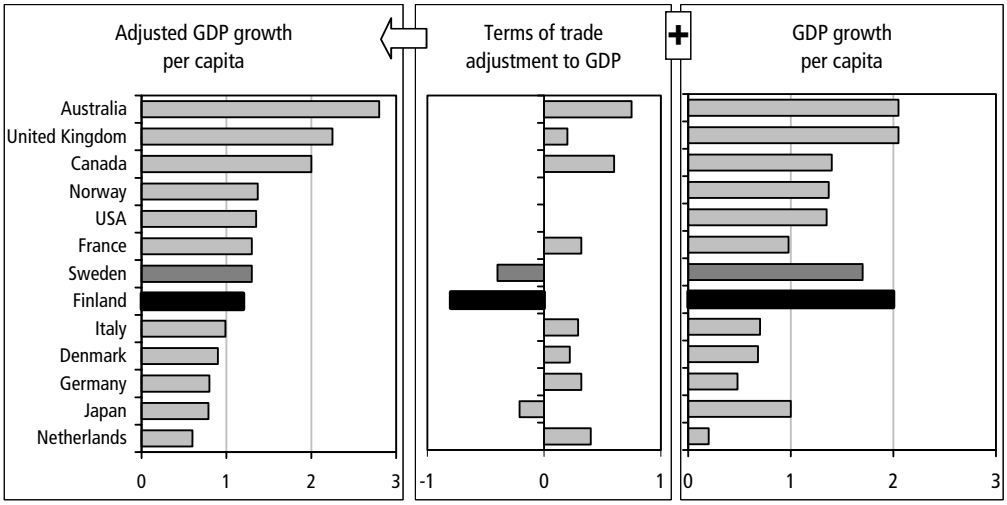
8 This is the result when one compares the OECD estimate of the weighted import growth of Finland's export countries (OECD Economic Outlook 80).

9 Economic well-being (GDP/capita) can be divided into the more specific contributory factors by which it is determined. These are productivity, working time, employment rate and population structure.

10 This applies expressly to individual service production. The productivity of public service production cannot be measured in the same way as the productivity of service products sold on the market, a fact that complicates the comparison.

One factor that weakens Finland's position in income comparisons is the decrease in the terms of trade. The prices of products exported by Finland have decreased in comparison with imports. This situation meant, for example, in the beginning of the decade that nearly half of the growth in production per capita has been 'lost' due to the weakened terms of trade (Figure 1.5). This reduction, which has continued over the last ten years, is mainly due to the fact that export prices, especially of electronics, have only slightly increased, as have those of paper products. In recent years, the increase in energy prices has also weakened the terms of trade. None of these three factors are expected to disappear in the next few years, which means that the challenge of increasing material living standards is greater than that of increasing productivity.

Figure 1.5 GDP growth adjusted to the terms of trade in 2000–2004, per cent[11].

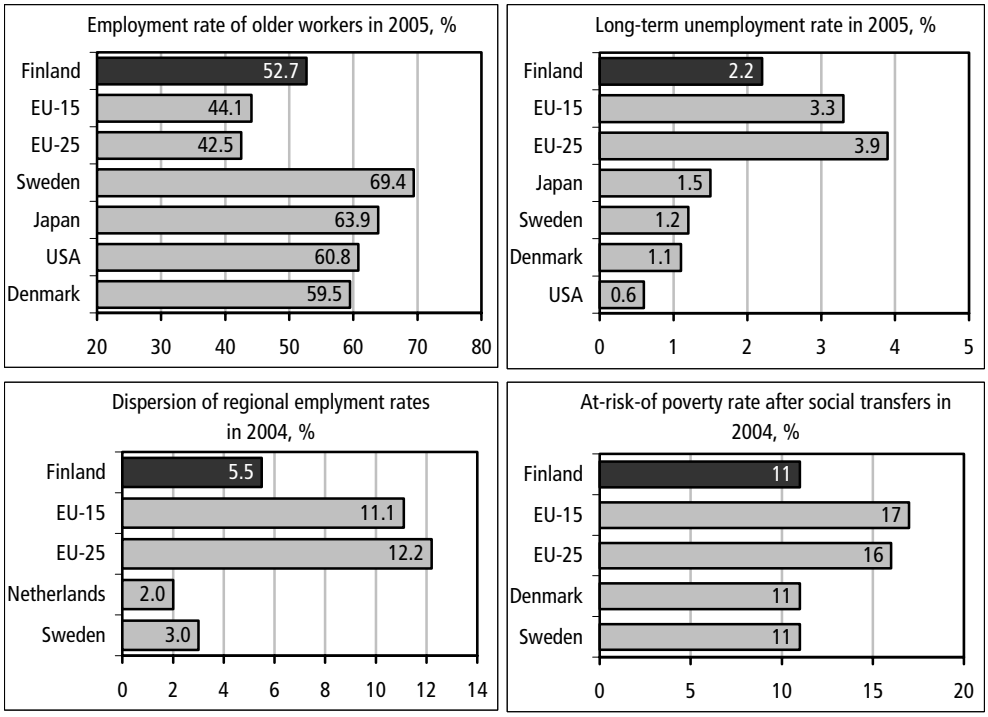


Source: OECD (2006d).

The Finnish wage level is average in Europe, but price levels are clearly higher than average, which reduces the purchasing power of Finns, although in comparison with the other Nordic countries Finland's price level is not that exceptional (Figure 1.4). Important social values in Finland, in addition to competitiveness and the effectiveness of economic activity, are the typical Nordic values of equality and social cohesion. Most social cohesion indicators show that Finland has succeeded well in avoiding poverty, inequality and exclusion, without having to compromise over efficiency (Figure 1.6) (cf. e.g. Dahlman et al. 2006, Sapir 2005).

[11] The figure on the right shows that average GDP growth in 2000–2004 was greatest in Finland. The figure in the middle shows the effect of the terms of trade, which was negative in both Finland and Sweden during this time period. The figure on the left shows the end result, taking the terms of trade into account.

Figure 1.6 Social cohesion indicators.



Source: Eurostat.

It is obvious that although productivity growth determines the overall development of available economic resources, employment is of fundamental importance to welfare. The generally valued equal distribution of income is more easily realised when the greatest possible fraction of the working-age population obtains its income from gainful employment. At the same time, the equilibrium problems of the public-sector economy, worsened by the ageing of the population, are more easily controlled with higher employment rates. Employment is also of notable importance as such with regard to wellbeing.[12]

1.4 Structural change in the economy

The structure of the Finnish economy has changed drastically over the last 15 years. At industry level, the proportion of basic industries as a source of value added and employment has continued its long-term declining trend. Correspondingly, the service sector's share has grown, following the example of other developed countries (Table 1.3). The development of manufacturing has

[12] This is e.g. shown by the so-called happiness studies, which look at the effect of unemployment on perceived wellbeing. Long-term unemployment is one of the most important underlying factors causing exclusion.

been more complex. After the depression, industrial production increased rapidly, and its share of both production and employment rose. In the beginning of the present decade the relative importance of manufacturing decreased, but lately industrial production and employment have again seen auspicious growth due to the favourable economic situation.

There have been fundamental changes in the structure of the economy due to the increase in the importance of technology. The fastest growth in production has been associated with the application and development of state-of-the-art technology and significant R&D investments. This especially applies to the ICT sector, whose research and development expenditure constitute more than half of the total R&D costs of all sectors.

The internationalisation of the economy has continued at a rapid pace. In addition to the increase in the proportion of exports and imports in GDP, more and more companies operating in Finland are under foreign ownership, and Finnish companies are moving their production abroad in ever-increasing numbers.

A significant aspect of structural change has been the regional concentration of growth in production, employment and population. Although the development of different regions has varied, and for example the size and direction of migration has often changed, the main direction has been the concentration of operations in or on the outskirts of areas that are already densely populated.

The change in the structure of the economy is due to various factors. An important common denominator seems to be the increased pressure to raise production efficiency, i.e. to raise productivity, which is caused by increased competition due to globalisation, and to utilise the possibilities afforded by new technology, new markets and new types of division of labour.

In the following section, a closer look will be taken at development by sector and 'inside' the sectors.

1.4.1 Development by sector

There have been major differences between the levels and growth rates of different sectors within Finland. The labour productivity in manufacturing in Finland has been high in comparison with other countries, and Finland has caught up with and overtaken many industrial nations including the United States, if one takes the value added of manufacturing industry per working hour as a measure. The productivity of the service sector, however, has been lower.

Table 1.3 GDP by sector in Finland: value added and employment in 1995 and 2003, %.

	ISIC Rev.3	Value added		Total employment	
		1995	2003	1995	2003
Agriculture, hunting, forestry and fishing	01-05	4.5	3.4	7.9	5.2
Mining and quarrying	10-14	0.4	0.3	0.3	0.3
Total manufacturing	15-37	25.1	22.6	20.1	18.7
Wood and products of wood and cork	20	1.3	1.0	1.4	1.3
Pulp, paper, paper products, printing and publishing	21-22	6.6	4.3	3.6	3.0
Basic metals and fabricated metal products	27-28	2.9	2.5	2.2	2.5
Machinery and equipment	29-33	6.1	8.2	5.2	5.3
Radio, television and communication equipment	32	1.7	4.6	1.1	1.5
Electricity, gas and water supply	40-41	2.7	2.3	1.0	0.7
Construction	45	4.5	5.3	5.8	6.5
Transport and storage and communication	60-64	9.5	10.8	7.7	7.2
Finance, insurance, real estate and business services	65-74	19.1	21.4	9.8	11.8
Computer and related activities	72	0.9	1.8	0.9	1.9
Research and development	73	0.4	0.5	0.5	0.6
Other business activities	74	3.4	4.3	4.4	5.8
Community social and personal services	75-99	22.7	22.1	32.6	33.7
Total services	50-99	62.8	66.2	64.9	68.7
Business sector services	50-74	40.1	44.0	32.3	35.0
Non-agriculture business sector	10-67, 71-74	62.6	63.1	57.9	59.6

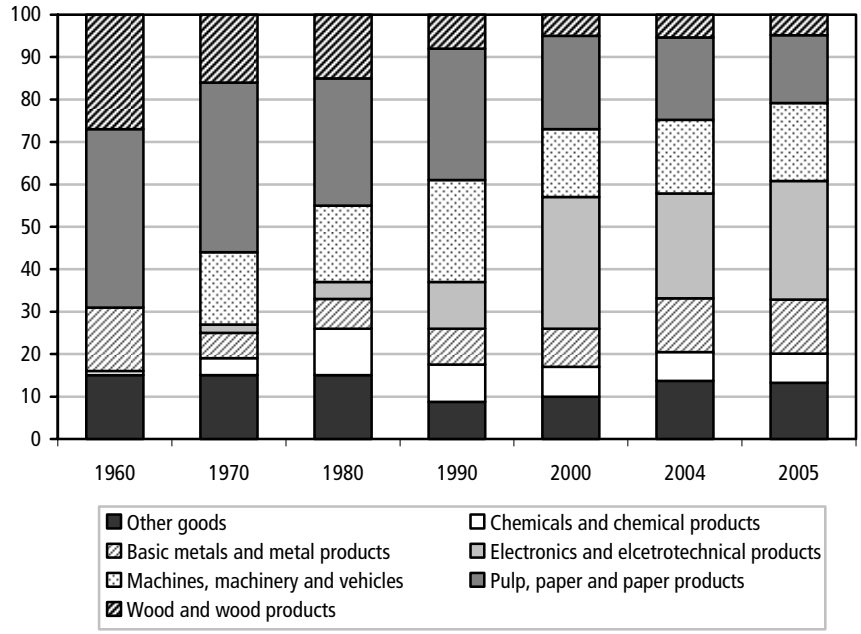
Source: OECD, STAN database.

Unlike most other Western industrial countries, the share of manufacturingin total production increased in Finland after the beginning of the 1990s for nearly ten years. The electric equipment and electronics industry functioned as the driving force of structural change, becoming the largest industrial sector in terms of both production and exports.

From a historical point of view, Finland's economic growth (and its fluctuations) had its origin in the forest industry. In 1960 approximately two thirds of export revenues came from the forest industry. In 1990 the proportion of forest industry products still made up approximately 40 per cent of Finland's exports. After the depression (1991–1993) and the rapid structural change following it, the share of the forest industry has, however, declined despite the growth of the sector's production, and in 2005 its share was just over 20 per cent (Figure 1.7). The technology industry has taken the forest industry's place as the largest industry, mainly due to the rapid growth in production in the ICT industry after the depression. However, a significant part of the technology industry is linked

with the forest industry, through the production of equipment for this sector forming a part of what can be called forest cluster.

Figure 1.7 Structural change in Finland's exports in 1960–2005.



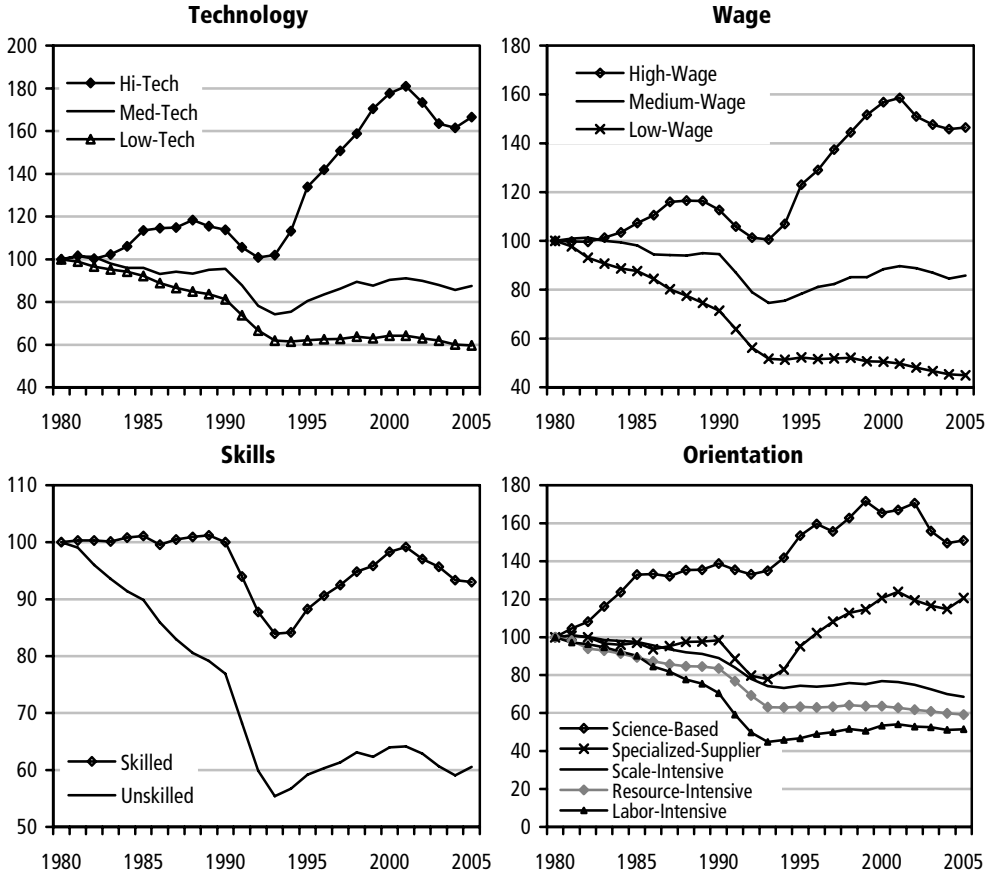
Source: Finnish Customs.

In the beginning of the 2000s the growth in communication technology production slowed down, but since then it has picked up again. At the same time the production of machines, machinery and vehicles, and basic metals and metal products has increased substantially. In all, the dependency of Finland's exports and total production on the production of communication technology decreased somewhat since the end of the 1990s.

The structural change in manufacturing has been reflected strongly in the nature of employment (cf. Figure 1.8). After the depression, growth in manufacturing employment was concentrated in high technology and knowledge-driven production. This also led to an increase in well-paid jobs with higher-than-average skill levels. The number of less demanding jobs, however, stagnated or, in certain sectors, even decreased.

During the present decade the dip in ICT production has had a clear impact on the nature of manufacturing employment. The number of jobs with higher-than-average skill levels decreased significantly in the beginning of the decade. Since 2004, the improving economic situation has led again to growth in industrial employment.

Figure 1.8 Structural change in manufacturing employment in Finland in 1980–2005, 1980=100.



Source: ETLA Sarja B:144, updated. Sources: 1980–1994 OECD Stan, 1995–2005 Statistics Finland, industrial statistics; data for 2005 is a preliminary estimate.

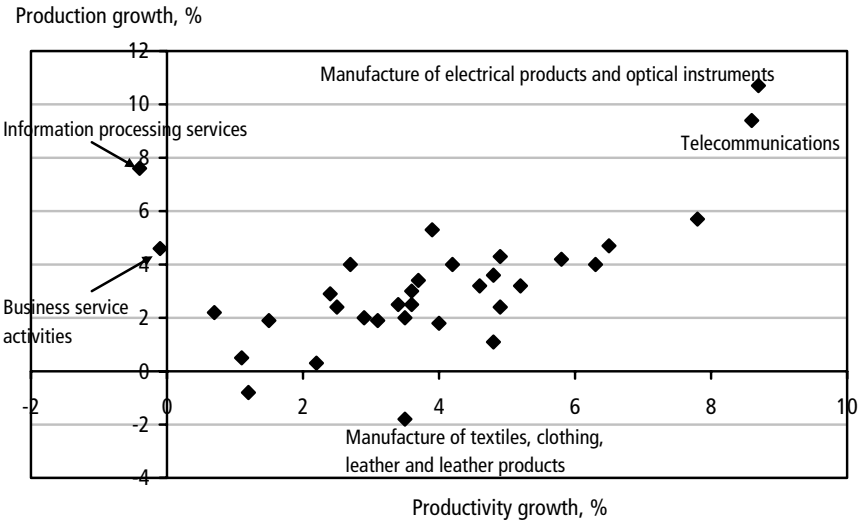
The structural change in industry has also been accompanied by growth in productivity, which has been strongest in sectors subject to global competition, such as the electronics, base metals and paper industries. It is in these sectors that Finnish products come top with regard to global productivity. In sectors which are less exposed to international competition, productivity has clearly lagged behind; e.g. in agriculture and the retail trade productivity is 20 to 30 per cent belowthe global productivity frontier.

The positive effect of the structural change in industry on production manifests itself in the development of different sectors: for instance, growth in production has typically been fastest in areas where productivity has also grown rapidly (Figure 1.9). ICT production and teleservices are good examples of this. At the other end is construction activity, where development in both growth and

productivity has been weak. In agriculture and forestry productivity has increased comparatively quickly, but due to the special nature of the sector it has been mostly reflected in a reduction of the workforce, whilst production has increased only slowly.

Business services and ICT services make up an interesting group. The growth in their productivity has been slow[13] and growth in production fast. Despite low increases in productivity, information processing services are knowledge-intensive, high technology services. The productivity of a sector measured in terms of value added can be high, even though growth in productivity has been low.

Figure 1.9 Growth in production and productivity in different sectors. Average change in 1976–2003, % of previous year.



Source: Berghäll et al. (2006).

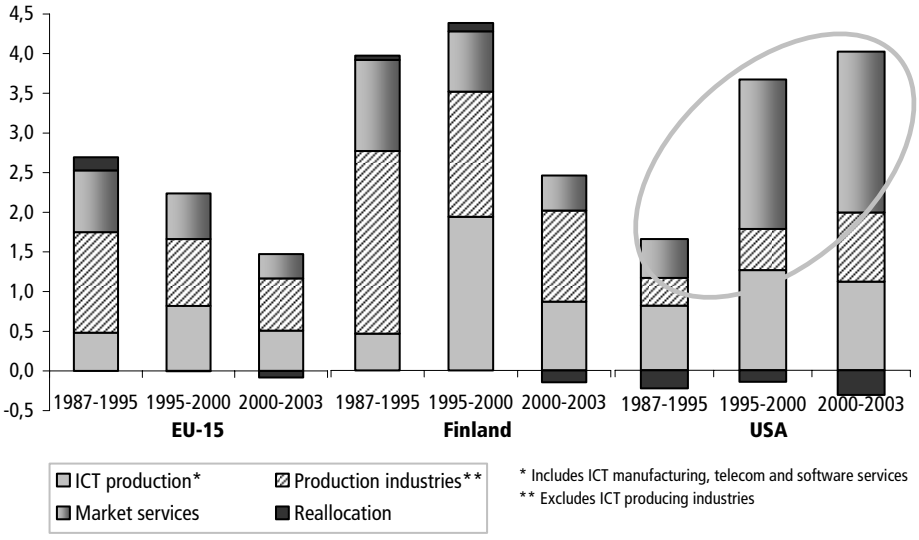
Although production typically grows faster in sectors with high productivity growth, rapid growth in productivity also frees up labour for other uses. This has been especially common in primary production, where growth in production is limited due to various reasons. However, in manufacturing too the employment share has been in decline, except for a temporary increase in the second half of the 1990s.

[13] Business services are labour-intensive and measuring their output and productivity is problematic. In 1996 to 2003 productivity development has been positive, which must be interpreted to mean that the development of information technology and its utilisation has slowly started to become visible in the sector's productivity.

Increasing income levels deriving from economic growth have also led to growth in the demand for services. As in many service sectors, the level of productivity and the possibilities for increasing it have been weaker than in manufacturing, and this structural change has raised the question of whether the increasing service orientation of the economy necessarily leads to a decline in the growth of productivity. The answer is not automatically affirmative. In many service sectors modern information technology and the novel organisational models that it enables can be applied in order to increase productivity. The United States, a country that is highly service-oriented, has managed to achieve faster productivity growth in the second half of the 1990s than many countries with a higher reliance on industry.

The low productivity of services poses a significant challenge for Finland, because the service sectors are the biggest employers, and their share of total employment will continue to grow; the high productivity growth in the US economy is to a great extent based on the rapid growth of productivity in the service sector (Figure 1.10).

Figure 1.10 Industry contributions to market sector labour productivity growth in EU-15, Finland and USA, 1987–2003.



Source: Bart van Ark, University of Groningen.

In Finland, too, the productivity of service sectors has clearly increased over the last 10 years. The level of productivity, however, is still low compared to many other countries. This is a cause for concern, although it must be remembered that in individual services the measured productivity level in relation to comparison countries depends on the analysis methods and sources used (cf.

e.g. Kaitila et al. 2006), such that the conclusions drawn must be treated with caution. In the special focus below, the importance and productivity of the service sector is considered in greater detail.

1.4.2 Change in enterprise structure as a source of productivity growth

The productivity growth of the sector described above shows how rapidly productivity grows on average in enterprises belonging to the sector.[14] It does not, however, say anything about the mechanisms of productivity change in these sectors. Besides the fact that the productivity of an individual enterprise increases through the utilisation of new technology and new procedures, the change in enterprise structure is also of importance. In other words, productivity improves through enterprise replacement, i.e. through the elimination of enterprises and plants with low profitability and productivity and the establishment of enterprises that are more efficient. This also takes the form of the growth of enterprises with lower productivity being weaker than that of faster-growing enterprises. Correspondingly, an important source of productivity growth for enterprises with multiple plants is production growth in the most productive plants.

The importance of such productivity-increasing structural change at microlevel is significant (Maliranta, 2005). For example, in the textiles, clothing, leather and footwear sectors, the metal industry and the electronics sector, growth in productivity due to structural change accelerated in the 1980s, and in the foodstuffs industry in the 1990s. In retail trade, the increase in growth took place at the end of the 1990s. There are also regional differences in Finland with respect to productivity-increasing structural change. Böckerman and Maliranta's (2006) calculations show that in the county of Uusimaa the effect of productivity due to structural change is clearly greater than elsewhere, especially compared to eastern Finland.

The structural change that increases productivity is linked to competition. When competition is stepping up, inefficient enterprises disappear and the efficient ones grow rapidly. In general, an increase in competition also increases enterprises' innovativeness (Aghion et al. 2005, Kilponen & Santavirta 2004), and being open to international competition through international trade creates structural changes that in turn boost productivity (Melitz 2003).

This view is also supported by the results obtained with Finnish plant level data. According to Maliranta, an increase in imports in particular accelerates structural change, and high R&D investments also seem to have a positive effect.

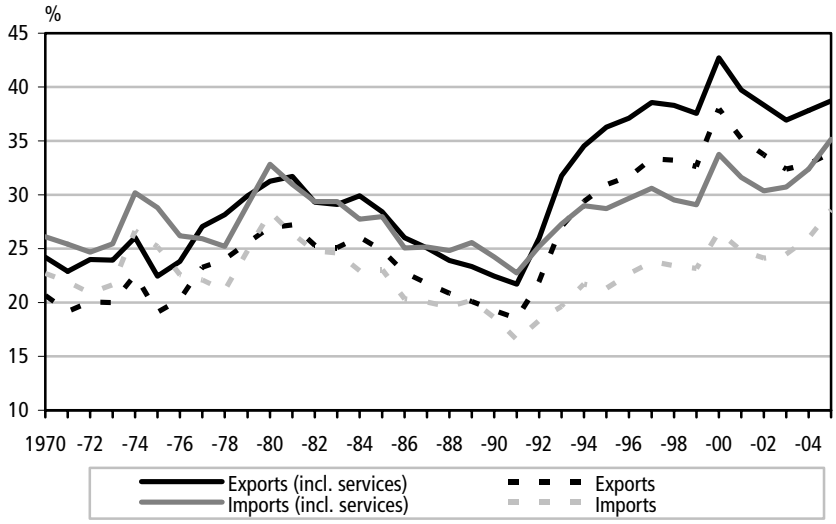
[14] In the literature, the productivity growth of so-called representative enterprises is referred to as the 'within component'.

Additionally, R&D expenditures and training are important elements that stimulate productivity. Effective training is especially necessary in the initial stages of plants' and enterprises' life cycles, when new technologies are adopted. The increase in competition due to globalisation can be assumed to have strengthened competition leading to increased productivity in Finland, although there is as yet no new research on the topic.

1.4.3 Internationalisation

In addition to changes in sector structure, one of the major changes in the Finnish economy has been the increasing internationalisation of Finnish companies in all sectors. Strong integration into the world economy can be seen most easily in the relation of foreign trade to GDP, which by 2005 had grown with respect to exports to 38 per cent of GDP and with respect to imports to 35 per cent of GDP (Figure 1.11). The openness of the economy, measured by the share of foreign trade, no longer increased appreciably during the current decade. This may, however, be a temporary phenomenon related to a temporary drop in global economic growth, to which the growth in the proportions of imports and exports in 2005 points.

Figure 1.11 Exports and imports in 1975–2005, current prices, % of GDP.

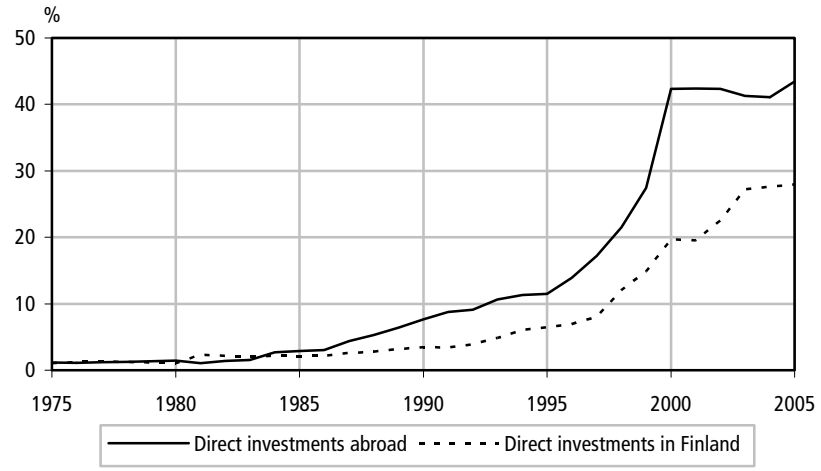


Source: OECD.

The internationalisation of Finnish business is also shown in the robust growth of foreign holdings in Finnish listed companies. In 2006, the foreign-owned proportion of the market value of all shares at the Helsinki stock exchange was

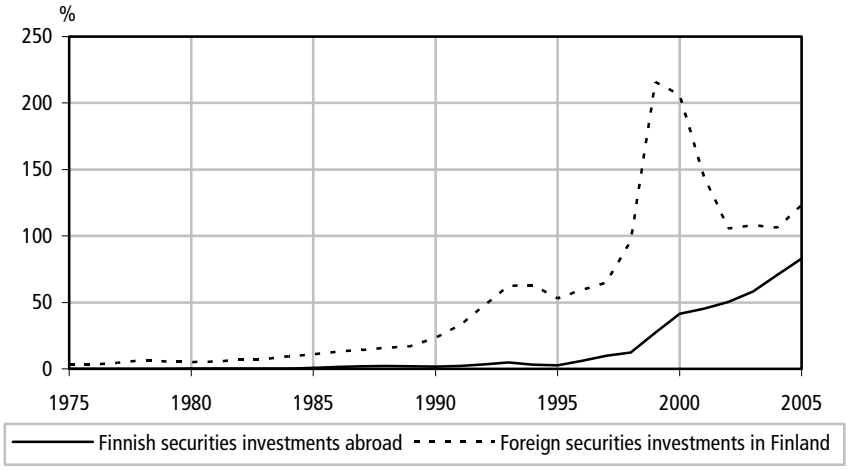
approximately 51 per cent.[15] Concurrently, direct investments and investments in securities abroad by Finnish companies have increased rapidly since the middle of the 1990s (Figures 1.12 and 1.13). At the beginning of the current decade, growth in direct investments abroad by Finnish enterprises had ended. On the other hand, as direct investments in Finland by foreign enterprises have continued to increase, the difference between the investment stocks has diminished since 2000, but direct investments abroad by Finnish enterprises are still clearly greater than those by foreign enterprises in Finland.

Figure 1.12 Direct investments in 1975–2005, stock, per cent of GDP.



Sources: Bank of Finland and Statistics Finland.

Figure 1.13 Securities investment in 1975–2005, stock, per cent of GDP.



Sources: Bank of Finland and Statistics Finland.

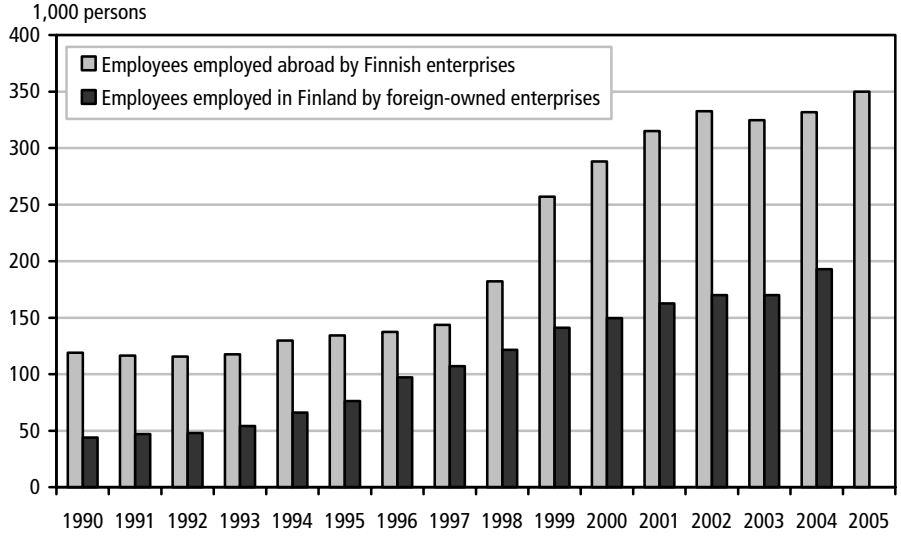
[15] Restrictions on foreign ownership of Finnish enterprises were lifted in 1993, and the proportion of foreign ownership of enterprises quoted on the Helsinki stock exchange, one of the highest in the world, is especially due to the internationalisation of Nokia's holdings.

Finnish investments in foreign securities, which in terms of quantity clearly exceed direct investments, have also continued to increase. Nevertheless, large fluctuations in share prices have also led to fluctuations in the portfolio of investments in securities.

In terms of production locations, internationalisation is farthest advanced in manufacturing, where the increase in personnel has been especially high. In 1995 the number of employees employed by the foreign subsidiaries of Finnish manufacturing enterprises was approximately 115 000, whilst in 2005 it had increased to nearly 240 000. Altogether, Finnish enterprises employed nearly 350 000 people abroad in 2005 (Figure 1.14). The slower growth of the global economy at the beginning of the decade is reflected in the number of employees employed abroad by Finnish enterprises, as it is in the proportion of GDP in foreign trade. After growth picked up again, production located abroad concomitantly increased its labour force.

It is interesting in light of the available data that the workforce of foreign enterprises in Finland has continued to grow. This is in agreement with the continuation of direct investments in Finland noted above. This development can be considered a positive sign of the strengthening of Finland's position in the competition for enterprise locations.[16]

Figure 1.14 The number of employees employed abroad by Finnish enterprises and the number of employees employed in Finland by foreign-owned enterprises, thousand persons.



Sources: Bank of Finland and Statistics Finland.

[16] The majority of direct investments in Finland are enterprise acquisitions.

The acceleration of globalisation has also led to an increase in the number of empirical studies on the effect on national economies of the internationalisation of enterprises. An interesting issue is whether production abroad displaces domestic production. Although the results vary, the majority of studies show that direct investments by enterprises are more likely to further exports than to substitute them (Lipsey 2004, Jones 2005). The newest results obtained based on Finnish data seem to show that the overwhelming majority of foreign investments made by Finnish enterprises have not displaced domestic investments (Oksanen 2006).

Similarly, the results concerning the effect on growth of foreign investments in Finland are partly contradictory, though they clearly indicate that they increase competition and raise productivity and salary levels (Lipsey 2004).[17]

When examining the internationalisation of enterprises, the question of the decrease in domestic investments often comes up. Finland's investment rate level clearly decreased in the 1990s.[18] However, its investment rate has been of the same range as in the US, Germany, France and Sweden, and only slightly lower than the average in the Euro area. In fact, during the last decade Finland has switched from investment-driven growth to knowledge-based growth (Dahlman et al. 2006). It is typical of this phase that investments are made in the form of R&D and intangible capital rather than through investments in real estate, machines and instruments (cf. e.g. Corrado et al. 2006).

On the other hand, Finland's investment rate in the previous decades seems to some extent to have been unjustifiably high. Investments were encouraged with low interest policies, repeated devaluations and tax policies that supported investments. In the 1980s the liberalisation of the financial markets also temporarily boosted investment. In this regard, the decrease in investment rates has meant more efficient use of capital.

The internationalisation of enterprises means that they have to operate wherever their markets are and where production costs are low. In particular, the growth period of the Finnish pulp and paper industry's production capacity seems to be over. Investment rates have also decreased in the electronics industry and in traditional engineering industries.

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[17] Pajarinen and Ylä-Anttila's (2006) study examines the connection of ownership and ownership form to the success of enterprises. According to this study, foreign-owned enterprises are on average more profitable than listed and state enterprises, but on the other hand they have also grown more slowly than enterprises of the other three (incl. family enterprises) ownership groups.

[18] The investment rate in manufacturing industry decreased from 1975 to 1990, on average by some 25 per cent.

1.4.4 The adjustment of some key sectors

The forest cluster in the midst of changes

Finland's forest industry – and especially its core, the paper industry – is undergoing one of the greatest changes in its history. The cause of this is the change in global division of labour between countries and different regions of the world. Paper production and consumption is mainly increasing in Asia, South America, Russia and in the eastern Central European countries.

Demand for many types of paper has either dried up or diminished in Western Europe and the United States. Information and communication technology has begun to replace paper, and demand for newspaper and office paper has risen weakly. The paper industry in Western Europe and the United States is beset by overcapacity, a situation that has continued for many years. Relative prices for the types of paper in which Finnish companies have specialised in have diminished, resulting in low profitability for the sector. The profitability of forest industry enterprises based in Finland plummeted after 2000. It is estimated that this trend, which sees paper prices decreasing further, will continue for at least the next five to ten years. The paper sector is in dire straits.

The advantage based on technology is slipping away

The global competitiveness of Finland's forestry sector was based on knowledge and technology, which for decades were at higher levels than those of its competitors. This technological advantage was based to a significant extent on a high level of investment: production machinery was always of the best available technology. Productivity therefore grew faster than elsewhere, which compensated for production costs that rose faster than those of competitor countries. In addition, competitiveness was sometimes supported by exchange rate policies.

Since the middle of the 1990s, the investment ratio of Finland's forest industry (the ratio of fixed investments over value added) has been about half that of the previous two decades. Enterprises based in Finland have invested mostly abroad: after the end of the 1990s investments abroad by forest industry enterprises have been three times greater than investments in Finland. Due to this low level of investment, Finland as a forest industry location has been losing its technological lead.

The other main factor that has been of central importance to the competitive success of the forest industry has been a strong supporting forest cluster – a concentration of knowledge, based on related fields and supporting industries, and a high-quality training system. This cluster is still in existence, but waning,

because the manufacturing of machines and instruments, as well as research activities, has partly moved to growing markets, following the forest industry.

The key question thus is: What can competitive advantages be based on in future, if production capacity in Finland is no longer growing, and the technology-based competitive edge that is dependent on this capacity can no longer be maintained?

Innovations and new products

The challenges created by changes in the global operational environment have been recognised as being very similar by two new studies on the future of the forest industry ('Prosperity Based on Finland's Forests 2015 published by the Finnish Forest Research Institute and 'The Paper Industry – the Situation at Present and Future Challenges', an outlook report published by labour market organisations). Both studies state that the competitive advantages of Finland's forest industry in the global economy have changed decisively, and that the trends underlying this change have already been apparent for a long time – at least since the middle of the 1990s.

By developing the present production structure, some measure of adaptation can be achieved within a short timeframe. This involves reducing overcapacity and making present production more effective. Increasing productivity and efficiency is possible with changes in procedures and new labour arrangements. This requires measures internal to enterprise, as well as network creation and the partial transfer of operations to other enterprises.

Reducing capacity and increasing efficiency are, however, only part of the solution. In order for the sector to grow in future, new products, organisations and enterprises are needed. Finland's role in the global economy can only be based on knowledge, and this also applies to the forest industry. Finland has created a forest cluster knowledge concentration that is unique in the world, where the central elements are training and cooperation between the cluster's actors.

Along with the development of the current structure, the study by the Finnish Forest Research Institute also presents a scenario of active change. Its point of departure is the growth of production, employment and in the use of domestic wood raw material. The scenario is based on new products and innovations: bioenergy, biomaterials and processed bioproducts, the linking of information and communication technology to paper and packaging materials (functional printing, hybrid media) and chemical products. The realisation of such an outlook requires changes in all operations of the forest industry – from forestry and the wood market to industrial production.

Whilst the growth perspectives at the core of the forest cluster – the wood and paper industry – are uncertain, the cluster is gaining strength on the margins: the prospects for growth in maintenance and upkeep services, consultancy and other services related to the forest industry are good. In any case the whole forest cluster, which is still strong, can expand into new fields and new technologies; examples of the latter include the chemical industry, bio- and nanotechnology, and information and communication technology. The forest industry's research system is changing, and investments in research are on the up, aimed at new technology areas in accordance with cluster thinking. These changes, however, are only beginning.

The technology industry: globalisation has increased exports, but what will happen after the boom?

The driving force behind exports and research

The technology industry (the electronics, electric equipment, machine and metal industry, and metal processing) is without doubt Finland's largest industrial sector. Among individual sectors, it has had the greatest effect on the change in the enterprise and sector structure that has taken place since the beginning of the 1990s. Technology industry sectors represent approximately 45 per cent of total industrial production and employment, but the proportion is even larger in the core sectors of economic structural change, accounting for over 80 per cent of industrial research and development investments, and two thirds of exports of industrial products. The technology industry is the main channel through which changes in the global economy that transform industrial structures find their way to Finland.

The technology industry sectors are very different. Some are heavily reliant on investments and the construction industry; others produce consumer goods. The technology intensity of these sectors also varies considerably. The electronics industry is responsible for approximately two thirds of all industrial R&D investments; Nokia's share alone is nearly 60 per cent. Research and development activities are thus strongly concentrated in one area and one enterprise.

The effect of changes in the global economy on the technology industry

The structural changes in the global economy and rapid growth during the current decade have affected the technology industry, primarily in two ways.

Firstly, the exceptional growth of the global economy has increased demand on the international market for investment goods and industrial intermediate products, i.e. Finland's traditional strong points. E.g. the shipbuilding industry, the engineering industry, and the manufacture of metals have been able to take advantage of this. The development of the global economy is in a phase where investments and industrial production are growing strongly, especially in East Asia and many eastern Central European countries. These countries are industrialising or changing their industrial structure in the same way as the Western industrial nations did after the war.

Production and exports of the Finnish technology industry have undergone a powerful spurt in growth as a result of this change in the global economy. As a consequence, there is a dearth of technically trained workers in many technology industry sectors, which has already slowed the sectoral growth of production and investments. This can be observed for example in the shipbuilding industry, where production will grow rapidly in the coming years, due to the rapid growth of the global economy and to the excellent competitiveness of the Finnish shipbuilding industry. Of the OECD countries, Finland has one of the highest degrees of specialisation in shipbuilding, to a large extent due to specialisation in the construction of passenger ships. Finland has access to special knowledge in the field, supported by the utilisation of enterprise and sector restructuring over recent years.

Secondly, the opening up of the global economy and, in particular, the rapid growth of the markets of developing countries, is attracting an ever-increasing amount of investment from Finnish enterprises to foreign countries. The technology industry has been at the forefront of this development. Next to the internationalisation of production, research and development activities have started to become more international. It is in developing countries that R&D investments have grown the fastest, although the main proportion of the technology industry's foreign research operations are still in the United States and Europe.

According to the latest studies, the main reasons for investments abroad are proximity to markets and the acquisition of extra capacity. However, more important than these havebecome increases in flexibility and cost savings. This applies to both production and research operations.

The research and development activities of enterprises are also continuously being split into parts or different activities. In such value chains, the beginning consists of research related to strategic core knowledge, and the end comprises development work that adapts goods and production to local markets. However, this only forms part of the picture. Leading companies also increasingly carry out research related to their core knowledge abroad, wherever the optimal resources for their operations are to be found.

Research activities within the technology industry are more internationalised than other industry activities. Approximately half of R&D expenditure of technology industry enterprises are spent abroad, although less than 30 per cent of R&D staff work in units abroad. This mainly applies to the electronics industry and to Nokia: this enterprise buys a significant amount of research services on the global market.

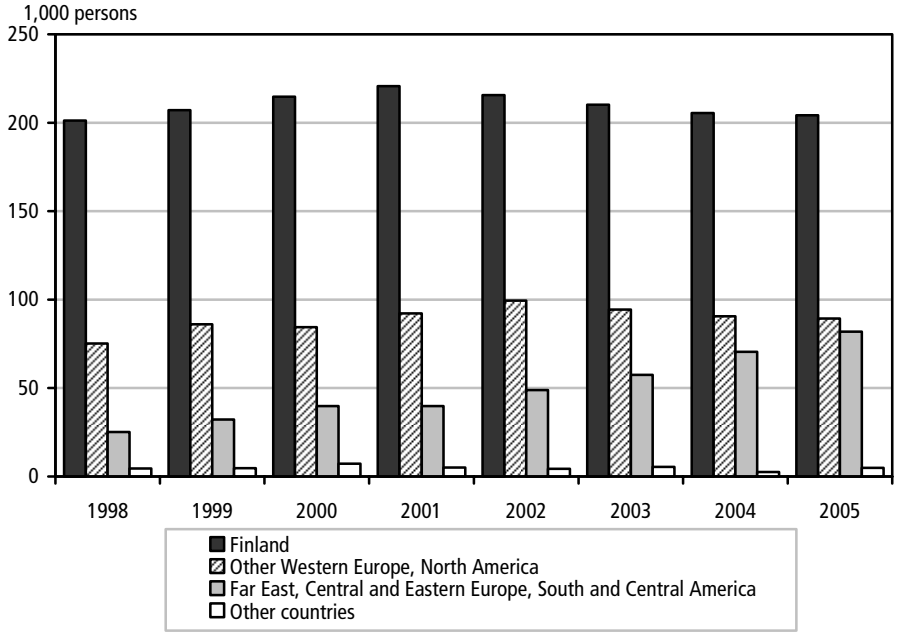
Few research activities have been directly transferred abroad. The greatest part of the technology industry's foreign R&D units have either been obtained through enterprise acquisitions or have been founded as so-called greenfield investments.

The internationalisation of research activities, or of production, is not only a one-way process. Many Finnish multinational enterprises have transferred their activities abroad (offshoring) as well as to Finland from abroad (inshoring). Investment flows in both directions demonstrate the importance of international specialisation: countries and regions also specialise in research activities in accordance with their own competitive advantages. Finland seems to have a special locational advantage for research in ICT and forest industry technology.

The technology industry functioning in a global network

The technology industry – especially the electric equipment and electronics industry – is globally networked. Partner enterprises, suppliers and subcontractors in a network internationalise along with their client enterprises. As a result, the number of people employed by technology industry enterprises based in Finland has grown, especially in the Far East, Central-East European countries and also in Latin America (Figure 1.15). Concurrently, the sector's employment in Finland continuously has diminished until the middle of the current decade.

Figure 1.15 Technology industry employees in Finland and abroad in 1998–2005, thousands of persons.

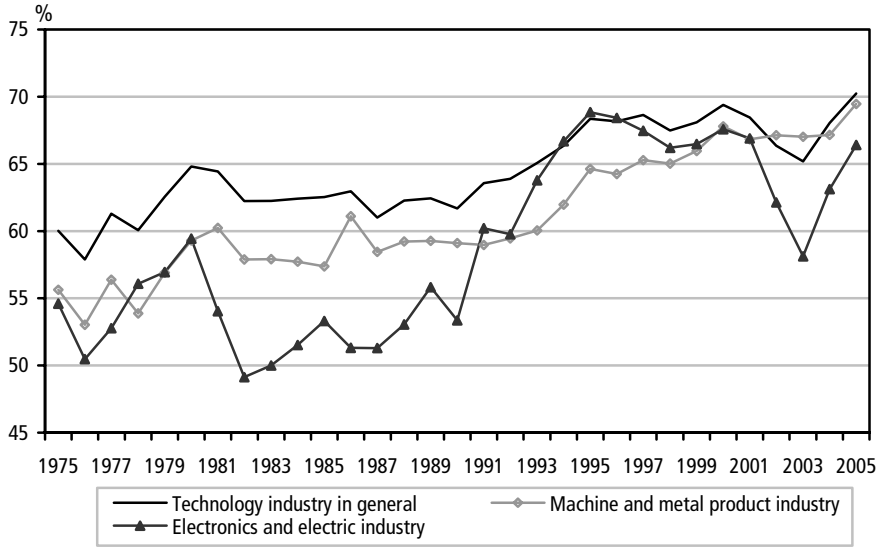


Sources: Statistics Finland and Technology Industries of Finland.

As a result of network-like procedures, the structure of technology industry production has changed considerably in Finland. In particular, the proportion of intermediate products, components and subcontracting (incl. bought-in services) in the electronics industry in terms of production value or turnover has rapidly increased (Figure 1.16). This has resulted in an increase in the sector's turnover that is considerably greater than value added (GDP share), partly obscuring the real growth in the field. The proportion of intermediate investments in the electronics industry increased strongly in the beginning of the 1990s, when the production of information and communication technology was just at the beginning of its life cycle. Then, both domestic and foreign component suppliers and contract manufacturers expanded their operations in Finland. At the end of the 1990s and the beginning of the 2000s growth dipped, but during recent years it seems to have picked up again.

An increasing part of the technology industry's production in Finland thus consists of various intermediate products, of which an ever-increasing number are manufactured outside Finland. Finland is part of an international production network, within whose framework various countries and regions specialise, following their owncomparative advantages.

Figure 1.16 The proportion of raw materials, components, subcontracting and other intermediate investments in the turnover of technology industry' enterprises, as a per cent.



Source: Statistics Finland.

What share of production will then remain in Finland? It is difficult to obtain an overall view of the future of a particular sector, because the internationalisation of enterprises occurs operation by operation.

Challenges

In the Finnish technology industry, production increased at the beginning of the 2000s approximately two times faster than industrial production on average. It is assumed that growth will continue rapidly, but the gap with regard to other industries will narrow. However, the structural change in the sector will gain strength and the challenges that have arisen during the 2000s will intensify. The most important challenges concern the ICT industry and guaranteeing the knowledge needed by the technology industry in general.

The expansion of the ICT sector had the greatest effect of all individual sectors on the growth and structural change that took place at the end of the 1990s. Between 1995 and 2000, the sector's effect on growth in GDP was on average one per cent unit annually. Nokia's effect alone during this period was of the order of approximately half a percentage point. In the beginning of the 2000s the ICT sector has contributed considerably lessto growth. It is obvious that the growth contribution of the magnitude that occurred at the end of the 1990s will not happen again in the coming years, though growth in the ICT sector will continue. The central challenge for the economy as a whole, as well as for the

technology industry, is how to convert the effect of growth and productivity in ICT production into advantages in using ICT.

Finland will remain one of the world's leading producers of information and communication technology for a long time to come. Since the end of the 1990s, however, new globally acting challengers from Asia and eastern Central Europe have arisen, who specialise in the same products as Finland. As a result of global competition and technological development, world market prices for products have rapidly declined and the terms of trade have weakened. To a great extent, it has been possible to compensate for this with rapid productivity growth, but to keep doing so may turn out to be problematic.

This is a challenge for the technology industry in general, and in many of its sectors productivity development has been slow. An important part of productivity development has turned out to be the continuing change in enterprise and location structure, i.e. what is known as creative destruction. Productivity growth is also supported by R&D activities and the right allocation of training investment. In the technology industry, there is not so much a labour shortage as a lack of qualified personnel. Anticipating competence needs, however, is becoming more difficult in rapidly changing market conditions. On the one hand, choices must be made that entail creating narrow pinnacles of expertise in university teaching and research, and on the other hand possibilities must be created through training for flexible and extensive professional identities, as work assignments in enterprises become subject to rapid change.

Importance and productivity of the service sector[19]

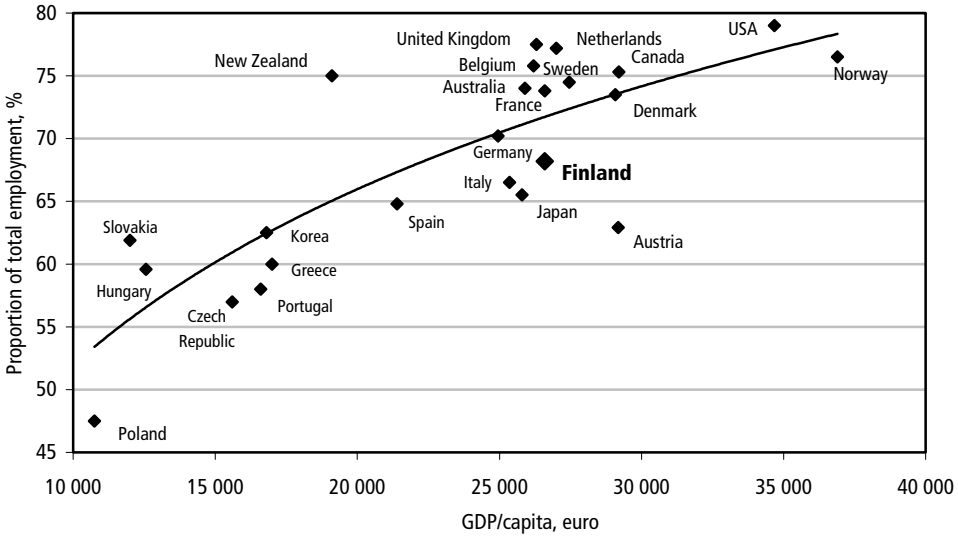
The importance of the service sector as part of the economy has been increasing in all developed countries, both in terms of production value and employment. The growth in services aimed at households is related to trends occurring in the structure of consumer demand such as the increase in living standards and the ageing of the population. On the other hand, various business services in industrial value chains are also growing rapidly. The development and digitalisation of information and communication technology are creating many more international, even global market opportunities for various services.

In terms of the proportion of production and employment, the Finnish private sector is smaller than in countries at a similar level of development. The export of services in proportion to the size of the economy is average among the EU-14 and exceeds the OECD average. The proportion of services with respect to total exports remains relatively low in Finland. The relatively small production and

[19] Based on the study, *Palvelualojen kehitys, tuottavuus ja kilpailu* (2005). Valtioneuvoston kanslian julkaisusarja 11/2005.

export proportion of services is partly explained by Finland's strong export-oriented manufacturing sector.

Figure 1.17 The share of the service sector in employment and the level of GDP per capita in 2003.



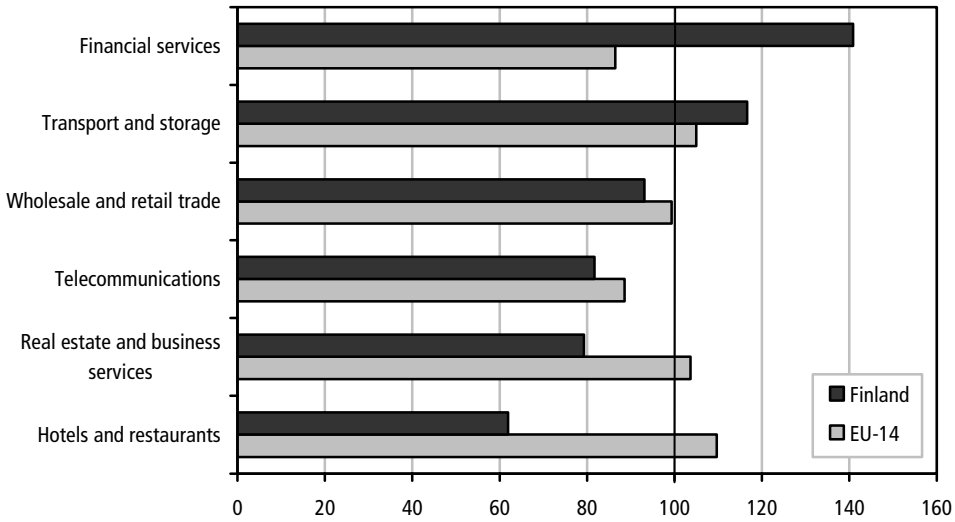
Source: OECD 2005, Enhancing the Performance of the Services Sector.

In Finland, the average labour productivity of private services is approximately five per cent lower than the EU average, although there are large differences in the productivity of different sectors. In sector-specific terms, productivity is at its highest in the EU-14 countries in the accommodation and restaurant industry, as well as in the real estate and business services. In the transport and storage as well as the finance and insurance sectors, productivity in Finland exceeds the EU average, which is mainly due to the effective utilisation of new ICT technology.

The capital intensity of business services is relatively low in Finland, but there is an element of inefficiency in the use of labour as well. The low productivity of business services causes indirect problems too, because such services represent important intermediate product inputs for industry and services aimed at consumers. Low productivity in the production of intermediate products generally raises their price and decreases their use. This may be shown in the weak renewal and productivity in the production of the final product[20] (Cf. Wölfl 2005, Pilat & Wölfl 2005).

[20] The small size of the Finnish services sector could partially stem from the possibility that Finnish manufacturing companies have not outsourced services as extensively as companies in other countries. This hypothesis is in line with the observation that for many companies classified as manufacturing enterprises services constitute a major fraction of total sales; an example is the lift producer Kone Ltd. To the extent these services produce high value added, such behaviour by the manufacturing companies may also explain a part of the mediocre productivity performance of Finnish private services.

Figure 1.18 Productivity per employee in Finland and the EU-14 countries in relation to the OECD average (OECD=100) in 2001 (PPP).



Source: OECD, STAN (the corrections made to the 2006 national economy figures has been taken into account).

There is no single reason for the underdevelopment of the service sector. For example, R&D investments are higher than average in Finland, although they do not achieve the highest levels of the OECD countries. In addition, the educational level of the labour force is exceptionally high in the Finnish service sector. The reasons for underdevelopment are perhaps related to the use of resources and/or the functioning and special features of the service markets: in addition to low capital intensity, the utilisation of information and communication technology is low in many areas. There are also reasons to believe that there is not enough competition in all service industries. From the point of view of the service sector, the labour market does not function in the best possible way, either. In addition Finland's low population density curtails the possibilities that an effective service production scale can achieve.

In Finland many service sectors were previously protected from international competition. Opening up the market through membership of the EU and the possibilities of new technologies have, however, changed and will continue to change the operational conditions of the service sectors. The opening up of the market and deregulation are powerful methods for improving the productivity of both labour and capital. Open markets also reduce the price level of services. Increasing knowledge capital and more intensive product development (through the adoption of effective procedures developed elsewhere or the development of new service innovations) can improve productivity in service fields.

To increase the productivity of the service sector in future it will also be important to develop completely new products and service concepts, both technical and commercial. A completely new service can create a market which was not there previously or where the value added per labour unit is significantly higher than before.

1.5 Conclusions

Finland's economic growth has been strong after a period of slower growth, the result of the bursting of the technology bubble at the beginning of the 2000s and the dip in the growth of the world economy. A stronger world economy and strongly developing domestic demand have been the main drivers of the rapid economic growth in Finland. It is interesting to note that many of the so-called traditional industries have done well over recent years.

It should be borne in mind that the economy has continued to open up during the 2000s and economic growth has been supported by the opening up of the markets. There also seem to be faint indications that Finland's competitiveness as a location for enterprises is slowly improving. Direct investments in Finland have increased, as has employment in Finland by foreign enterprises. With regard to its GDP per capita ratio, Finland is richer than the EU-15 average. This result is based on increased productivity and an increased employment rate. Finland is still behind the richest EU countries and the United States, despite the fact that for years various competitive indicators have shown it to be one of the most competitive countries in the world.

Finland's 'underachievement' is partly due to time lags. Competitiveness can only be realised in phases; i.e. it occurs as faster growth than in other countries, which over time is also reflected in GDP per capita. Various factors, however, indicate that achieving a GDP per capita ratio corresponding to competitiveness measurements is still a long way off.

The terms of trade are one such factor. They have developed weakly and will most probably continue to do so. Finland's industry is specialised in products the pricesof which, for various reasons, tend to decrease. Productivity benefits, therefore, flow to a significant extent to foreign consumers. Finland's energy intensiveness is also the same sort of effect on the terms of trade.

Another important structural problem is the fact that Finland has achieved high productivity in manufacturing, but in many service sectors productivity is clearly lower than the international level, although due to measurement difficulties exact figures are not easy to come by. As the proportion of services is large in

all developed countries and will increase, especially in Finland, the low productivity of the service sectors will be a significant problem in the future.

In addition, demographic change will affect Finland earlier than it will other European countries, and the nature of globalisation is changing in ways which may set new challenges to a country like Finland. It would be a mistake to believe that Finland can just wait for competitiveness measurements to transform into prosperity.

2 OUTSOURCING AND OFFSHORING

Given the current stronger role of the developing countries in the global economy and their increasing share in global output, businesses with their headquarters in the industrialised countries tend to select a developing country as a location for their new units. In addition to these greenfield investments, *offshoring* to low cost countries is a challenge for Western industrialised countries. Offshoring is no longer a matter of production but also concerns other operations. Digitalised information and fast telecommunications allow some service tasks to be performed in one place and consumed in another. The development of information technology together with low telecommunication costs has enabled the transformation of business activities towards global production networks, where companies and their sub-operations are decentralised and function in different countries using linked data networks.

Tasks are offshored from one country to another both due to internal reorganisations of corporate groups and offshore outsourcing of tasks. Outsourcing can also be domestic (Figure 2.1).

Figure 2.1 Outsourcing, offshoring and their combinations.

		Own production vs. buying	
		Internal to group	**External to group**
Task location	**Home country**	No changes	Domestic outsourcing
	Foreign countries	In-house offshoring	Offshore outsourcing

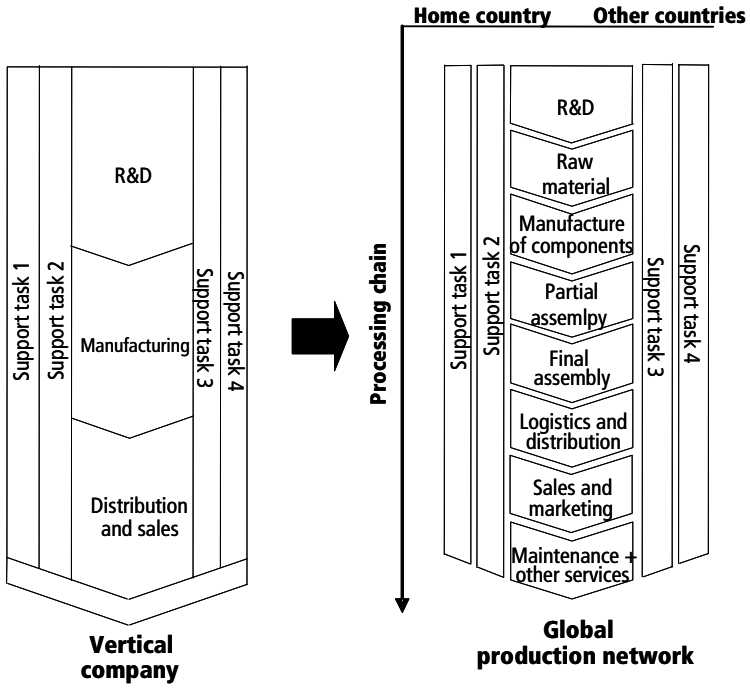
Outsourcing as such is not new in Finland. Previously, many large companies managed a large part of the processing chain for their products themselves. In the main, the different stages of the processing chain were conducted inside the company: it refined raw materials, transformed them into components, combined the components into products and provided the logistics needed to bring the products to the market. In the late 1980s, large companies started to hive off various business operations. Multi-sector companies became single-sector companies and within their selected sectors they focused on specific parts of the processing chain. Selling parts of the processing chain partially entailed outsourcing. In many cases, the seller company became an important customer of the sold unit.

In the late 1990s and the 2000s, companies operating in Finland have become more integrated into global clusters. Among individual companies competing in

the market, there are also global business networks which are partly overlapping. As a slight overstatement, one could say that many traditional manufacturing companies seek to do everything but manufacture. Instead, they try to design products, market them and perhaps perform their final assembly. Actual manufacturing is mainly farmed out to partners and subcontractors. As a result, the importance of intermediate products (components, semi-finished products and component assemblies) as companies' production inputs has increased. The processing chains of various service operations have also become fragmented. For example, new product development is no longer conducted entirely within single companies, but some of this work is purchased from other companies or organisations. The fragmentation of the processing chain has lead to the specialisation of companies. Companies have been focusing on specific parts of the processing chain only, instead of trying to manage the whole chain – which they may not be able to handle. For each processing chain, each company needs to answer this question: "Should we carry out the manufacturing ourselves or should we buy it in?"

Depending on the answer, the next question is: "Where should we manufacture it?" or, "Where should we buy it?" Two simultaneous developments have occurred: 1) Cluster structures have changed due to the fragmentation of value chains into ever smaller parts, and 2) Parts of companies and clusters have been decentralised between different countries (Figure 2.2).

Figure 2.2 Company structure transformation towards global production networks.



In global production networks, different companies have different roles. Typically, the network core is occupied by companies possessing a strong distribution chain, trademark or essential technology. The extremities of global production networks are producer-led networks and buyer-led networks (Table 2.1).

Table 2.1 Main characteristics of producer-led and buyer-led production networks.

	Producer-led production networks	**Buyer-led production networks**
Core operations	R&D, production management, brand management	Design, marketing, distribution channels
Barriers to entry	Scale economies	Scope economies
Typical sectors	Durables, investment goods	Consumables
Typical products	Cars, mobile phones, aeroplanes	Textiles, clothes, shoes, toys
Ownership of production units	Multinational trademark owners, multinational supplier companies and local supplier companies in different countries.	Local companies, or multinational company units in developing countries
Examples of companies	Nokia, Boeing, Toyota	Wal-Mart, IKEA, Nike

Adapted from classification by Gereffin (2001).

Durables and investment goods are product groups, often with producer-led production networks. Producer-led sectors typically require large investments in factories and/or R&D. Due to the large company size required for large investments and scale economies, new competitors are not continuously emerging in the markets. It is typical of producer-led sectors that only a handful of companies occupy most of the global markets. These multinational leading companies increasingly require their supplier companies to operate worldwide. The global operating model is thus spread further as suppliers too require their own subcontractors and service providers to be able to operate on several continents.

At the core of buyer-led production networks there is usually a wholesale and retail trade chain (such as Wal-Mart) or a company with a well-known brand (such as Nike). The core companies make use of the global production network but do not participate in the actual production activities. Design, product development and distribution are separated from manufacturing activities as much as possible. There is a clear reason for this. In buyer-led chains, the core companies seek to render the actual manufacturing subject to competitive

tendering. There are often a large number of potential manufacturers and, for manufacturing, the barriers to entry are usually minor. No wonder, therefore, that manufacturing within buyer-led chains is mainly conducted in low cost countries.

The leading Finnish companies are almost always involved in producer-led processing chains. For example, Nokia, Kone, Stora-Enso, UPM-Kymmene and Metso all operate in sectors where the producer is at the core of the processing chain. Their operations are strongly internationalised as regards production and procurement as well as distribution and sales.

In contrast, the Finnish situation is completely different for buyer-led chains. In Finland, there is almost a complete absence of buyer-led chains with significant expansion in foreign countries. These rare internationalising companies have begun building their distribution and sales mainly in neighbouring countries, i.e. the Baltic countries, Sweden and Russia. Whereas the internationalisation of distribution chains remains minor, most procurement units in retail chains operate on an almost fully global basis. As procurement has become more internationalised, there are also more store or chain brands available in addition to familiar producer trademarks. The products sold under private labels are designed by the stores themselves, and are typically very strictly defined. This makes it easy to make actual production subject to competitive tendering. As the following example illustrates, a product's value is not generated in production but elsewhere:

"*If our company's private labels are sold in Aleksi 13 stores, nearly 80 % of the end price remains in Finland, even if the products were produced elsewhere.*"

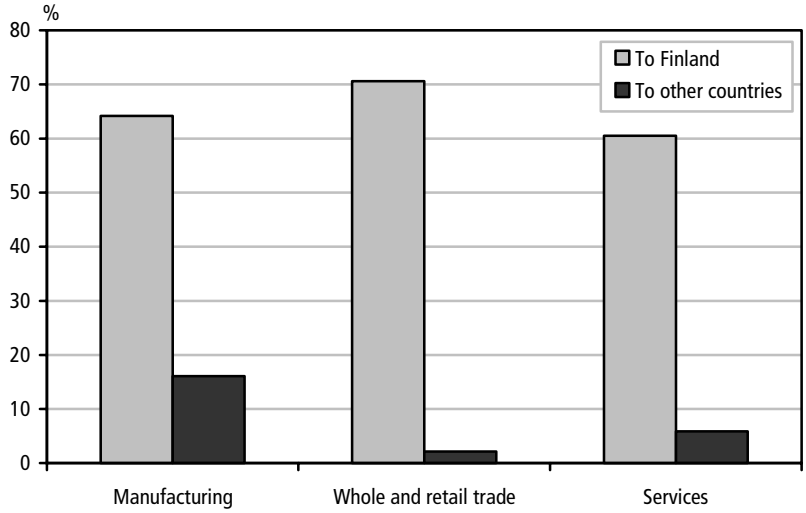
Source: Citation from Grundström (2004).

It is in design, logistics, marketing and distribution that a product's added value is mainly generated. The same applies more generally to buyer-led networks.

2.1 Outsourcing

In the 2000s, outsourcing has become a normal part of business. According to a survey conducted during the summer of 2006 by Etlatieto Oy, no less than two thirds of companies operating in Finland with more than 10 staff outsourced tasks to other companies at the beginning of the century (figure 2.3). Outsourcing has been most common in the wholesale and retail trade sector. Nearly three quarters of wholesale and retail trade companies have outsourced some of their tasks, but it is also common in the manufacturing and service sectors, although their share remains slightly smaller than that of the wholesale and retail sector.

Figure 2.3 Frequency of outsourcing in different sectors, % of companies in sector.



Source: Survey by Etlatieto Oy, for further information see Ali-Yrkkö (2006).

Most outsourcing from Finnish companies has been domestic. Operations have remained in Finland, but the party performing them has changed. Contrary to the generally-held belief, outsourced tasks have usually not been offshored but transferred to another company in Finland. However, some outsourcing has been directed at foreign countries. In the industrial sector, offshore outsourcing has been clearly more common than in the wholesale and retail trade and service sectors. More than 15 per cent of industrial companies have been outsourcing their tasks to foreign countries. In the wholesale and retail trade and service sectors, offshore outsourcing is notably more unusual.

Global competition is not limited to sectors and companies. The use of information and communication technology has introduced global competition in companies' sub-operations and even with respect to individual jobs (Baldwin 2006). The following table (Table 2.2) shows domestic and offshore outsourcing in manufacturing, R&D and service tasks.

Table 2.2 Outsourced tasks and their target location, percentages.

	Outsourcing	Domestic outsourcing	Offshore outsourcing
Manufacturing and production[a]	32.3%	30.8%	12.3%
R&D[b]	22.6%	22.3%	6.6%
Services[c]	60.2%	59.6%	2.7%

a) Share of industrial companies, b) Share of companies conducting R&D activity, c) Share of all companies. Note: The 'Offshore outsourcing' column includes companies which have conducted both domestic and offshore outsourcing of the relevant activity.

Source: Survey by Etlatieto Oy, for further information see Ali-Yrkkö (2006).

A third of industrial companies with more than 10 staff have outsourced at least part of their manufacturing. Generally, operations have remained in Finland, since at least two thirds of outsourcing companies did so only within Finland. On the other hand, the nature of manufacturing generally allows offshore outsourcing, at least in theory. A total of over 12 per cent of industrial companies have outsourced some of their manufacturing activities offshore. In such cases, manufacturing has not usually been entirely offshored but part of it has been outsourced within Finland.

Outsourcing by Finnish companies is not limited to manufacturing. Nearly a quarter of companies conducting research and development have outsourced R&D related tasks. This share is surprisingly large. Often, R&D is considered an activity that companies want to carry out internally only. For some R&D, outsourcing is a better solution. R&D outsourcing has generally been at least partly domestic. In practice, all companies outsourcing R&D offshore have also outsourced some of it inside Finland.

Outsourcing has chiefly concerned service tasks. Nearly 60 per cent of companies have outsourced at least one of their service tasks to another company. This large share can be explained by the fact that service activities include a variety of tasks from accounting and property security services to the maintenance of machinery. Many of these service activities are tasks that support the company's actual business. Outsourcer companies have sought to surrender the parts that are not their core operations. A significant proportion of service tasks require a local presence. Calculated in person years, over 95 per cent of service task outsourcing has been domestic (see Table 2.2), which can also be seen in the service sectors' growth. In recent years, business activities have formed one of the sectors with the highest growth. To some extent, the sector's growth is apparent. Before outsourcing, the same tasks were conducted internally within companies and registered in those sectors accordingly.

Globalisation and outsourcing survey by Etlatieto Oy

Between June and August 2006, Etlatieto Oy conducted a survey charting companies' international activities and views on Finland as their geographic location. The survey focused on domestic and offshore outsourcing and offshoring conducted by companies in the 2000s, and on their motivating factors.

The survey was targeted at companies employing at least 10 staff in manufacturing, retail, transport, financial or insurance services or business services. This specified target population included a total of 12,475 companies, for which stratified random sampling was conducted. The sample consisted of a total of 1,827 companies, of which 1,650 could be reached. Of these, 653 (40%) answered the survey. The respondents represented the companies' top management.

To calculate the target population statistics, weighting coefficients were elaborated for the subsamples.

Distribution of respondent companies by sector and size (in numbers of companies)

	Company size (by number of staff)			
	10–49 staff	50–249 staff	Over 250 staff	Total
Manufacturing	51	162	137	350
Knowledge intensive services	33	64	26	123
Other private services and retail	41	53	86	180
Total	125	279	249	653

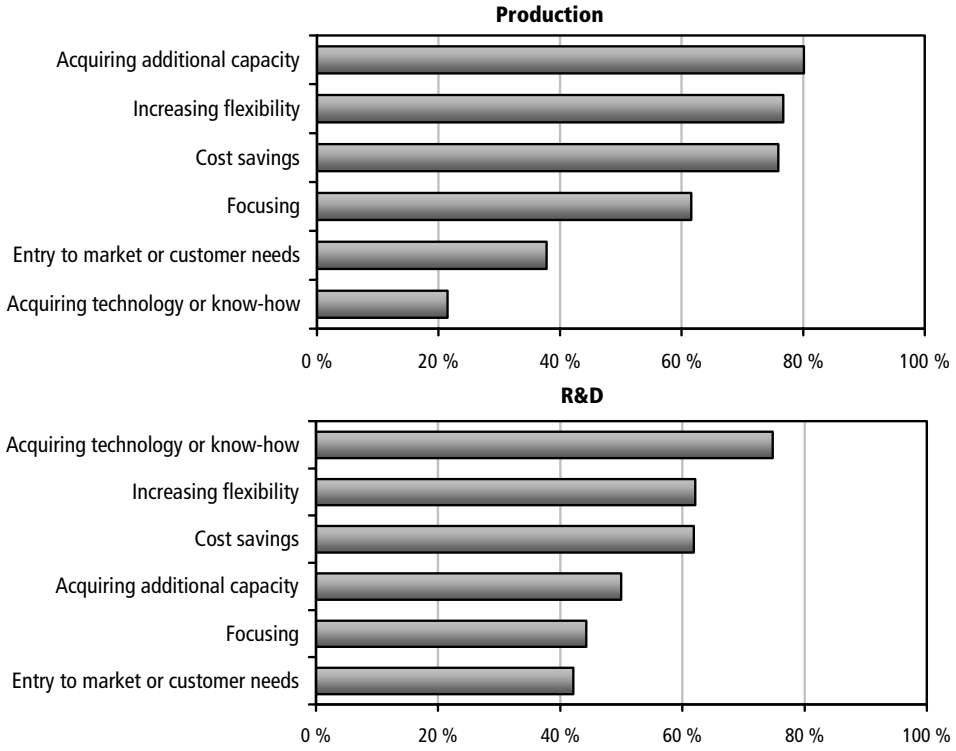
The aggregated global staff in the respondent companies totalled 625,000. In Finland, these companies employed a total of 375,000 persons, which accounts for a quarter of the staff in the entire Finnish business sector. In 2005, the aggregated turnover of the respondent companies amounted to nearly EUR 165 billion.

What are the drivers of outsourcing? The motives and objectives of outsourcing can vary depending on the task (Figure 2.4).

Companies have had several objectives for outsourcing their production. The most important has been acquiring additional capacity. Through outsourcing, companies can increase their capacity without making investments. The saved investment amount is thus freed up for other uses or investment targets. In part, the objective of acquiring additional capacity is related to another major objective, that of increasing flexibility. For a large part of outsourcer companies, outsourcing offered a solution for increasing their flexibility. This need to increase flexibility is related to the current operational method according to which the goal is to minimise stocks. Since both raw material stocks and end product stocks tie up capital, companies seek solutions for avoiding them. Furthermore, because customers do not want stocks either, incoming orders

require a short delivery time. The need for flexibility arises from the fact that short delivery times cause major variations in the utilisation of capacity. Adaptation to variations in demand may become easier if part of production is outsourced to other companies. Outsourcing has indeed represented a method of managing companies' own production capacity and its variations. A third, central objective for outsourcing is obtaining cost savings. Companies aim at lowering their production costs by commissioning manufacturing partly or entirely from other companies.

Figure 2.4 Motives for outsourcing manufacturing and R&D.



Note: Share of companies that have outsourced the related task and that have characterised the corresponding motive as significant in making the outsourcing decision. Both domestic and offshore outsourcing are included.

Source: Survey by Etlatieto Oy, for further information see Ali-Yrkkö (2006).

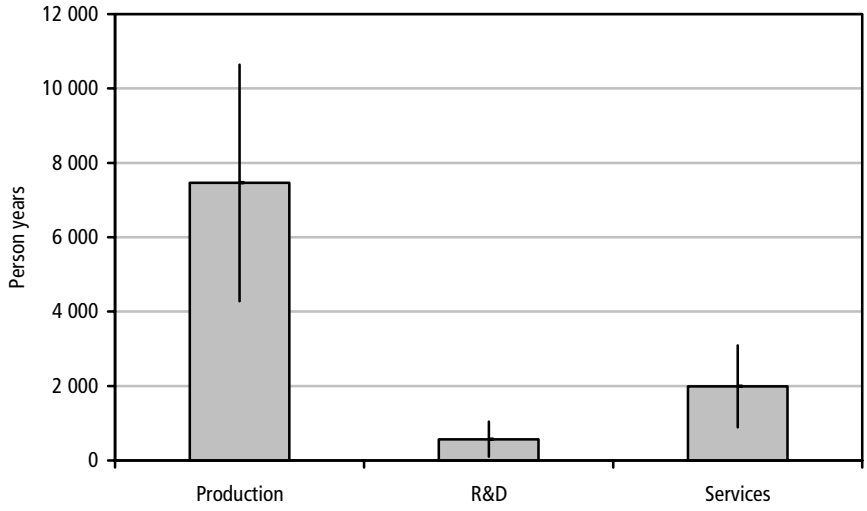
In part, R&D has been outsourced for the same reasons as manufacturing. Acquiring technology or knowledge has, however, clearly been the most important reason for outsourcing R&D. Companies use outsourcing in order to utilise technological know-how from other companies. In addition to seeking know-how, outsourcing has been a means of acquiring additional capacity in R&D operations. With additional capacity, companies have often aimed at

accelerating their product development process and thus being able to introduce products to the market faster. A third essential motive for outsourcing has been the desire to obtain cost savings. Over half of R&D outsourcer companies have conducted outsourcing of their R&D activities in order to reduce costs. On the whole, outsourcing R&D has been driven by the aspiration to obtain various benefits, including cost savings and know-how.

2.2 Offshoring

After the quiet phase at the turn of the century, the internationalisation of Finnish companies[1] has continued rapidly. In 2000, Finnish companies employed a total of 288,000 staff outside Finland, but by 2005 this number had increased to a total of 350,000 (Bank of Finland 2005). Thus, the increase in the number of posted staff was about 60,000. Such intensive growth raises the question of how much of this growth is due to offshoring tasks from Finland.

Figure 2.5 Offshoring between 2000 and June 2006, in person years.



Note: The vertical lines related to each bar indicate a confidence interval of 95%.

Source: Survey by Etlatieto Oy, for further information see Ali-Yrkkö (2006).

In the 2000s, approximately 7,000–12,000 jobs have been transferred from Finland to foreign subsidiaries of corporate groups. Clearly, most of these transfers have been related to production activities, but service tasks have also been transferred totalling an equivalent of approximately 2,000 person years. On the contrary, offshoring of R&D tasks has been scarce, which at least partly

[1] Finnish companies, regardless of their form of ownership.

suggests that Finland is a competitive location for R&D (see also Ali-Yrkkö & Palmberg 2006).

All in all, increases in foreign staff in Finnish companies during the 2000s have been mainly due to the expansion of foreign activities. Offshoring tasks from Finland clearly accounted for a smaller proportion of the increase in foreign staff: some 15–25 per cent of this increase was due to offshoring.

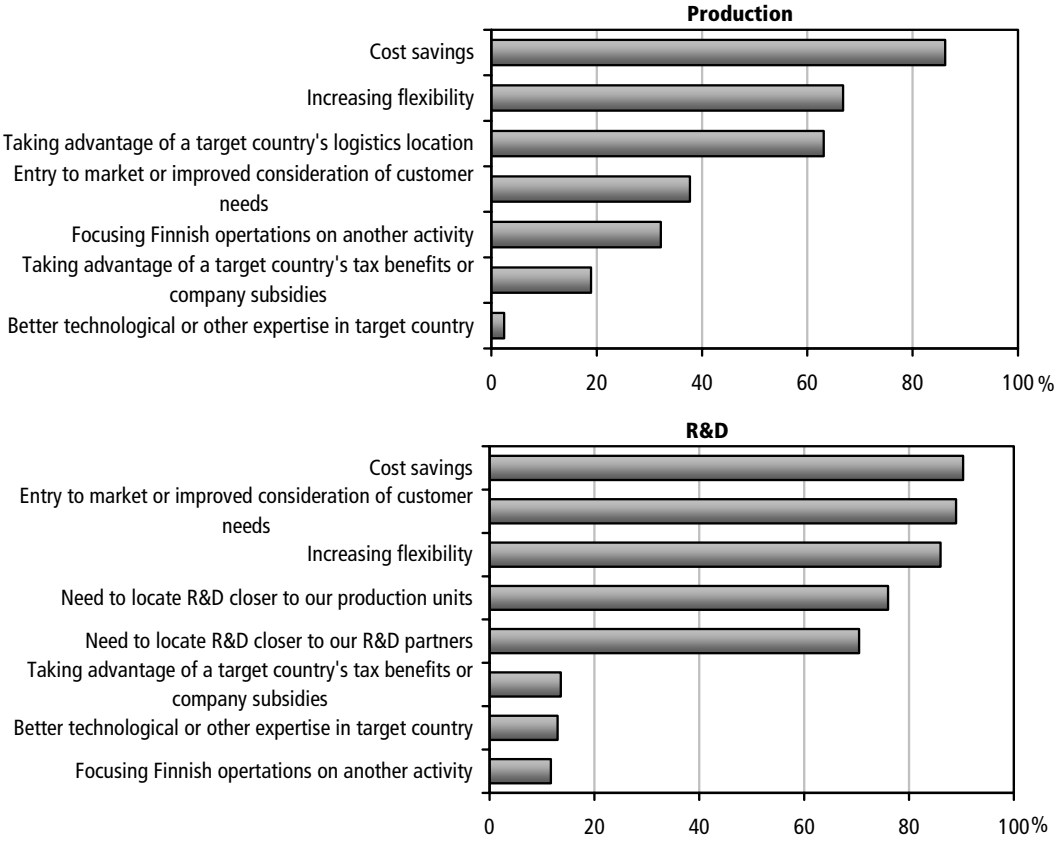
Offshoring is bidirectional, i.e. tasks are offshored both from Finland to foreign countries and vice versa. Internationalised companies aim at locating each task or subtask in optimal areas. Some companies have indeed offshored some tasks from Finland, but on the other hand, some have transferred other, previously cross-border tasks to Finland. Roughly 10 per cent of companies that have offshored tasks from Finland have also inshored tasks from foreign locations to Finland.

The motives for offshoring are diverse. In many cases, costs have played a significant role, but offshoring has also rested on other goals (Figure 2.6).

Offshoring production tasks has nearly always been related to cost savings. In particular, offshoring to lower cost countries has been a way of decreasing production costs. Offshoring has also often been targeted at obtaining other savings. The relocation of manufacturing closer to markets can also generate transport costs. Clearly, for over a half of offshoring companies, taking advantage of the logistics location of the target country has been a motivating factor. The companies have benefited from the target country's logistics location not only in the form of reductions in transport costs but also in other ways. In some sectors, customers expect short delivery times that would be impossible to meet if production operations were located far away. In addition to costs and logistics, increasing flexibility has also been an essential factor in offshoring production. Close to two thirds of companies that have offshored production tasks have aimed at increased flexibility. Increasing flexibility has been a central objective both of offshoring (Figure 2.6) and outsourcing production (Figure 2.4).

For R&D, motives for offshoring are more complex than for production. This complexity is due to the fact that R&D is not similar in all companies but its nature can vary. Even R&D internal to individual companies can often include highly varied R&D activities. Some R&D activities include long-term technology development that can eventually be productised, but only after several years. Other R&D activities can be described as taking account of minor customer specific needs.

Figure 2.6 Reasons for offshoring from Finland.



Share of companies that have offshored the corresponding task and qualified the corresponding motive as central in making the offshoring decision.

Source: Survey by Etlatieto Oy, for further information see Ali-Yrkkö (2006).

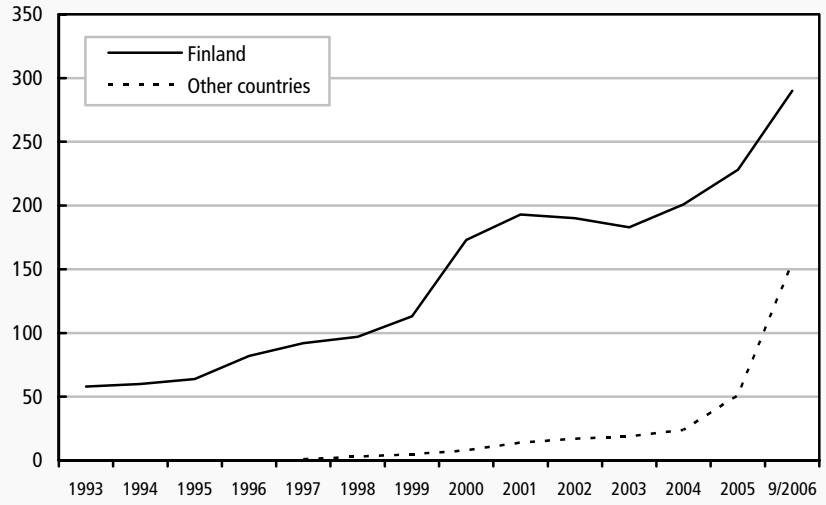
Offshoring R&D has mainly been based on entering a market, improved consideration of customer needs or cost savings. Local markets and regulations often necessitate making changes in products. The easiest way for implementing such changes may be through local operations close to the customer. Operating in the developing countries also generates cost savings since the cost of R&D staff is, evidently, lower in comparison to Finland. However, some R&D tasks have also been offshored to industrialised countries where R&D staff salaries and other direct staff expenses are notably higher than in Finland. In such cases, cost savings have been sought elsewhere than in direct staff expenses. For example, savings from the geographical concentration of certain development activities can exceed the increased costs incurred from higher wages.

Maintaining separate locations for R&D and production is a challenge for the company, as it must find a solution to ensuring interactivity between these operations (see Ketokivi 2006). One solution is to transfer R&D close to production units. In many cases, this has been one of the reasons for offshoring R&D (see lower part of Figure 2.6). Often, the customer wants minor changes to the product, and the easiest solution to this is to combine it with the production phase. Sometimes, the difference between product development and sales-related customer-specific customisation is minimal. In some sectors, local manufacturing therefore requires local product development or product customisation. A larger macroeconomic concern is that, alongside manufacturing, process expertise related to manufacturing may disappear from Finland. When manufacturing is essentially offshored, the development work of manufacturing processes will follow sooner or later. Another concern relates to whether R&D offshored from Finland will include long-term technology development. In such a case, offshoring would no longer mean adjusting products or technology to local markets, but transferring fundamental expertise from Finland.

SPECIAL FOCUS: A COMPANY'S GROWTH INTO A MULTINATIONAL PLAYER – PEIKKO GROUP CASE STUDY

Peikko Group, established in 1965 and formerly called Teräspeikko Oy, manufactures fastening products made from steel for concrete structures. Its turnover for 2006 is estimated at EUR 55–60 million, of which nearly half will come from foreign countries. The group employs around 450 employees. Roughly a third of the group employees work outside Finland. Currently, there are foreign subsidiaries in 13 countries. Its products are manufactured in four locations: Finland, Germany, Slovakia and Lithuania.

Figure Number of staff.



For the first 20 years, the company operated solely in Finland. In the second half of the 1980s, the company also started to export minor quantities of its products. However, these exports were unsystematic, rather than representing a determined search for international markets. Then, the recession at the beginning of 1990s created a slump in Finnish demand. The volume of construction and hence demand for construction supplies decreased significantly. At the same time, Peikko reduced its operations by almost half. As the economy began to recover from the recession, the company began seeking a new direction. Alongside European integration, the EU markets began to seem attractive. International success, however, required better products. The chosen solution was to rely on product development, aiming to develop new, further refined products and to improve the characteristics of old products. In the 1990s, the company's internationalisation strategy was to manufacture products in Finland and serve other countries through export activities. In 1997, Peikko established its first foreign subsidiary. The German subsidiary first functioned as a simple sales company, as did the foreign subsidiaries established or bought during the next 6 or 7 years. Originally, part of international sales in certain countries was assigned to local representatives. Later, the decision was taken that it was best to keep the distribution chain in the company's own hands.

As the mid-2000s approached, demand for Peikko Group's products was rapidly increasing. More capacity was thus required. Simultaneously, there was growing demand for customer specific customisation. This, together with the short delivery times desired by some customers, meant that production operations centralised in Finland could not provide a sufficient level of service. A local presence was required.

Moving into Eastern Central Europe

A new product line based on clear, existing demand in Central Europe represented a stepping-stone for setting up new manufacturing operations in Eastern Central Europe. The challenge was to meet the customers' requirements for very short delivery times. In addition, manufacturing the product required considerable amounts of manual work. Production had to be located near the markets in order to be able to keep delivery times to customers short. In addition, competitive prices required lower manufacturing costs. Poland and the Czech Republic were potential locations for the factory in the short run, but the company presumed that their cost level would rise swiftly. Hungary was also an option, but it was rejected, since the transport time required to the German markets would have been too long.

At the same time, Peikko was involved in another project related to manufacturing cooperation with a design office located in Slovakia. This generated the idea of locating the new factory in Slovakia. Among Slovakia's benefits was a short distance to other Central European countries. In addition, labour costs were approximately a sixth of the Finnish level and it was assumed that they would not rise as rapidly as in Poland and the Czech Republic. A decision on starting up production in Slovakia was made towards the end of 2004, and operations began during the autumn of 2005. Investment in the first phase amounted to approximately EUR 0.5 million.

Current production in the Slovakian factory is labour-intensive. Its products are mainly sold to Central and Southern European markets. During the autumn of 2006 further investments were being carried out in order to extend the production capacity for current products. At the same time, the product range for the Slovakian factory will be further extended, especially in product groups for which the Finnish production costs are not competitive. In the third phase, the automation level of Slovakian production will be increased in order to strengthen international competitiveness.

In the autumn of 2006, Peikko Group considered another investment in a new factory. The future factory's distance from Central European countries, and thus the transport time of the finished products, had to be short. Manufacturing costs also played a role, and the unit will be established in one of the Eastern Central European countries. Several criteria are being considered in the evaluation of potential locations, including traffic connections, the area's infrastructure (the availability of electricity and water, waste water treatment), the price and availability of land required for the factory, labour availability, salary levels and investment and other support provided by the area.

In the forthcoming years, Peikko Group plans to continue the internationalisation of its operations. In addition to Europe, the search for further markets will be targeted at both East and West. The company will probably also operate in Northern America and the Middle East.

Activities extended within Finland

In addition to foreign operations, production capacity has also been increasing in Finland. During 2005–2007, domestic investments will amount to EUR 6–7 million. These investments will be targeted at a new factory, new production equipment and robots, the expansion of final assembly and storage space and increasing office space. Since the beginning of 2004, the number of staff in Finland has grown by over a hundred. One of the central factors pertaining to the growth in the company's domestic operations was an order related to the construction of a new nuclear plant in Olkiluoto. The value of the contract, including fastening products made from steel, is over EUR 9 million. The received order will open up new territory for various other projects concerning power plants that will be built in Europe in the near future.

Alongside the internationalisation of its production activity, the company's product development has been extended outside Finland. To some extent, these operations include customer specific customisation that is best carried out at the same location as production. On the other hand, some of the foreign units will also take part in the development of entirely new products. Product development engineers with knowledge of local conditions are also needed for managing local technical assistance and transmitting customer needs from different countries to the product development team.

With regard to the manufacturability of the products, it is essential that the new product development be carried out in the proximity of the manufacturing unit. In order to ensure competitiveness, the product design process takes account of the product's manufacturability. This allows the optimisation of the product's manufacturing process. At the same time the new product's manufacturing costs can be identified and this, in turn, will enable the estimation of the end product's potential price.

Outsourcing centralised in service tasks

Outsourcing carried out by Peikko has almost entirely concerned various service tasks. Outsourced tasks include the operations of a personnel restaurant, healthcare, cleaning, real estate management, transport and part of machinery maintenance. The development of computing software and some product development related activities have also been outsourced from the group. On the other hand, production has remained almost untouched by outsourcing. Manufacturing and production are the core expertise of the company and the intention is to keep these operations mainly internal.

Summary

On the whole, the EU's internal markets have been a key driver in transforming Peikko Group from a domestic market company into a multinational. European integration and the abolition of customs duties and tariffs that followed have transformed Central Europe into an attractive market for the company's products. Moreover, the company has launched export efforts and created foreign units specialising mainly in sales and marketing. The EU's enlargement to the East in May 2004 created a new situation. Numerous countries neighbouring large Central European countries with a significantly lower cost level than the old EU countries became part of the internal market. The Eastern Central European countries offered for an excellent logistics location for Peikko Group's operations, enabling the delivery of products to Central European end customers within short delivery times. In addition, low cost levels enable the company to encompass product ranges which would otherwise not be profitable, given domestic manufacturing and transport cost levels.

2.3 Effects of outsourcing and offshoring in Finland

Decisions on outsourcing and offshoring are made for commercial reasons. The objective is to improve the company's potential for success within a certain time frame. From companies' point of view, success in achieving this goal means improved profitability and securing the continuity of operations.

At the macroeconomic or sector level, the effects of outsourcing and offshoring are different than at company level. Both outsourcing and offshoring indicate the specialisation of an economy. Outsourcing dissociates the various parts of value chains into different companies. Instead of one company taking care of everything all the way from processing raw materials to manufacturing components and assembling the final product, the various parts of the processing chain are decentralised to different companies that form networks and clusters. Outsourcing is also reflected in sectoral statistics. For example, the service tasks that industrial companies outsource to specialised companies appear as strong growth of the business activities sector. From a macroeconomic perspective, the growth of this particular service sector becomes apparent in the areas corresponding to existing tasks that were previously included in industrial sector figures.

Offshoring and outsourcing manufacturing tasks form part of a development where most value added is created elsewhere than in manufacturing. Previously, manufacturing expertise was the main source of competitiveness for industrial companies. Nowadays, manufacturing expertise is widely distributed and increasingly available in the leading developing countries, such as China. As a consequence, the success of the leading industrial companies is based on factors other than manufacturing.

Table 2.3 gives an estimate of outsourcing and offshoring by companies operating in Finland.

Table 2.3 Outsourcing and offshoring by Finnish companies, from January 2000 to July 2006.

	Quantity in person years	Share of labour in corporate sector
Domestic outsourcing	46,000–84,000	3.5–6.0%
Offshore outsourcing	5,000–9,000	0.4–0.6%
In-house offshoring	5,000–14,000	0.4–1.0%

Source: Survey by Etlatieto Oy, for further information see Ali-Yrkkö (2006).

Outsourcing conducted by companies is mainly domestic. In other words, these tasks have remained in Finland, but have been transferred to another company. A similar phenomenon can also be seen in Italy. There, outsourcing is mainly domestic (Cusmano et al. 2006). Table 2.3 indicates that domestic outsourcing concerned 46,000–84,000 employees in Finland in the 2000s. With regard to employment in the entire corporate sector, these figures correspond to some 3.5–6 per cent.

Offshore outsourcing has resulted in the loss of 5,000–9,000 jobs from Finland. In-house offshoring within corporate groups has affected 5,000–14,000 employees, corresponding to 0.4–1 per cent of labour in the entire corporate sector. In all, internal reorganisations and outsourcing conducted within corporate groups during the 2000s have caused the offshoring of a total of 10,000–23,000 jobs from Finland. This equals 1.0–1.5 per cent of the total gross employment in the corporate sector. It is interesting to compare the Finnish figures to those of other countries. Proportioned to total gross employment, 0.3 per cent of German jobs have been offshored to Eastern Central Europe; the corresponding share in Austria being approximately 0.7 per cent (Marin 2004). If tasks offshored to other countries – such as to Asian countries – were also taken into account, their shares would most likely be near the Finnish figures. Falk & Wolfmayr (2005) also suggest a similar magnitude in estimating the effects of outsourcing on employment in seven EU countries. According to them, the average annual decrease in employment

imputed to offshore outsourcing was 0.25 per cent in these seven countries. During the six-year period of 2000–2005 the total decrease in jobs would have thus been approximately 1.5 per cent.

In relation to the continuous creation and extinction of jobs in the Finnish economy, the quantity of offshored jobs is minor. During six years (from January 2000 until July 2006), outsourcing and reorganisation within corporate groups caused the offshoring of 10,000–23,000 jobs from Finland, corresponding to 1,500–3,500 jobs annually. This amounts to approximately 1.0–2.5 per cent of the jobs that annually disappear (or are created) in Finland.

2.4 Demand for production inputs is changing

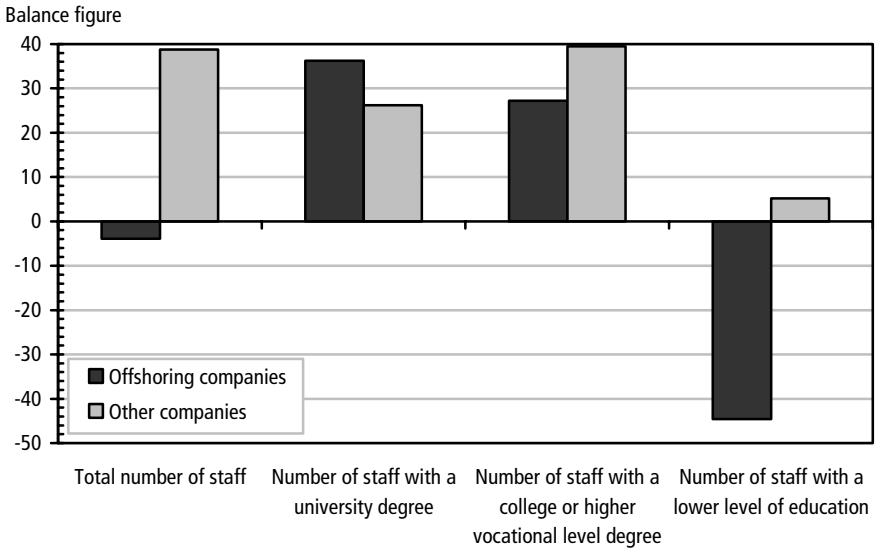
Both offshoring and outsourcing changes the demand for production inputs, namely investments, intermediate products, R&D and labour.

The relocation of production activities, offshore outsourcing and building new production capacity, mainly in foreign locations, all reduce the need to carry out domestic fixed investments. Instead, domestic outsourcing does not affect investing in fixed assets at macroeconomic level. In lieu of fixed investments, domestic efforts will be increasingly targeted at the development of expertise, software, brand building and R&D. In the future, companies will probably have to augment their investments in staff training. For staff, an even larger proportion of working time will be spent acquiring and absorbing the latest information.

As processing chains become fragmented, using intermediate products as production factors will be intensified. The use of not only product parts and components but also of immaterial intermediary products will become more customary. For example, part of the development work of products or production processes will be purchased from outside the company.

Offshoring a task directly diminishes the work input in Finland. Long term effects will be determined by the kind of activity which replaces offshored tasks. The following figure (Figure 2.7) illustrates expected growth in domestic employees in companies which have offshored tasks compared to those which have not.

Figure 2.7 Expected change in number of staff over the next 3 years, balance figure.



Note: Results are shown in balance figures. The balance figure represents the proportion of companies expecting growth from which the share of companies expecting a decrease has been subtracted. When, for example, 21% of the companies having relocated tasks intend to increase their total number of staff in Finland, 54% intend to conserve the current number of staff and 24% intend to reduce it, the balance figure is 21 – 24 = -3.

Source: Survey by Etlatieto Oy, for further information see Ali-Yrkkö (2006).

It seems that most of the offshoring companies will cut their total number of staff in Finland over the next three years. In other companies, intentions are usually the opposite as they plan to increase their labour in Finland.

However, changes in the number of staff vary greatly depending on the staff's level of education. The number of staff with a low level of education will be downsized, especially in companies that have already offshored tasks. Over the next three years, over half of these companies intent to cut their number of staff in Finland with a low level of education. Only six per cent of offshoring companies plan to increase their number of staff in Finland with a low level of education.

In contrast, the number of staff with college or higher vocational level degrees will grow. Both offshoring and other companies envisage hiring more staff with a secondary education. In addition, the number of staff with a university level education will be augmented in both company groups. In the offshoring companies, the prospects for increasing staff with a high education are somewhat greater than in other companies.

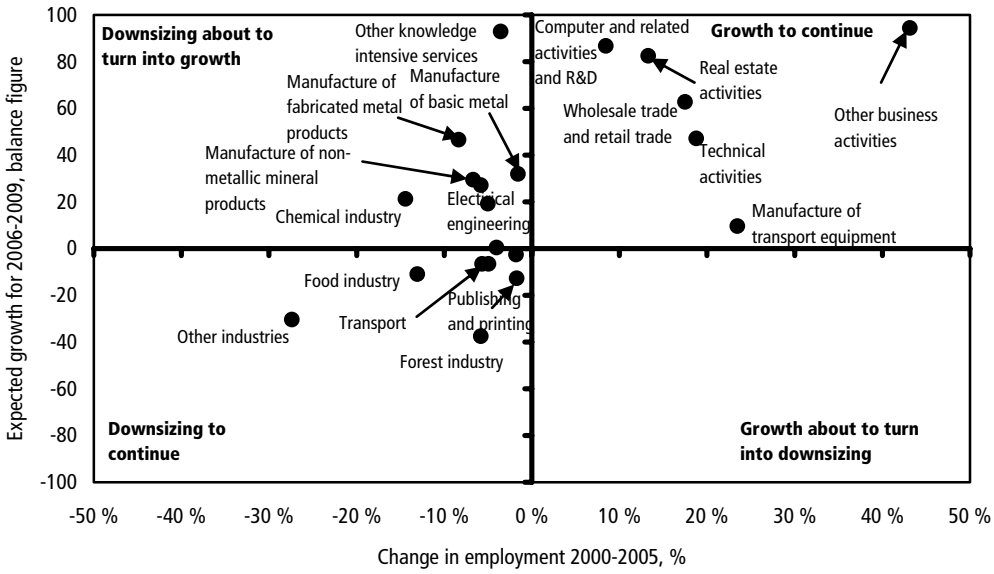
For offshoring companies, the tasks carried out in Finland will therefore essentially be tasks that require a high level of education. This is supported by the fact that nearly half of companies which have offshored some of their manufacturing plan to increase their number of R&D staff in Finland. For other industrial companies, the corresponding share remains at 17 per cent.

At the macroeconomic level, a remarkable decrease in manufacturing activities may bring about major challenges. Manufacturing affects its environment and creates a need for people with different skill levels. Production requires warehouse employees, lorry drivers as well as machinery and equipment maintenance staff. As production activity reduces, the demand for these vocational groups will decrease.

Which Finnish sectors will see an increase in jobs?

Evidence from a survey directed at a large group of companies shows that the outlook on staff changes is, on the whole, very positive. The number of jobs in Finland will increase in many sectors (see upper half of Figure 2.8). However, there are also many sectors in the economy that intend to decrease their domestic staff (lower half of the figure).

Figure 2.8 Increase (%) in number of jobs in the beginning of the 2000s and expected growth sectors for 2006–2009 (balance figure).



Note: The responses have been weighted by the domestic staff of companies. See also the footnote for Figure 2.7.

Source: Survey by Etlatieto Oy, for further information see Ali-Yrkkö (2006).

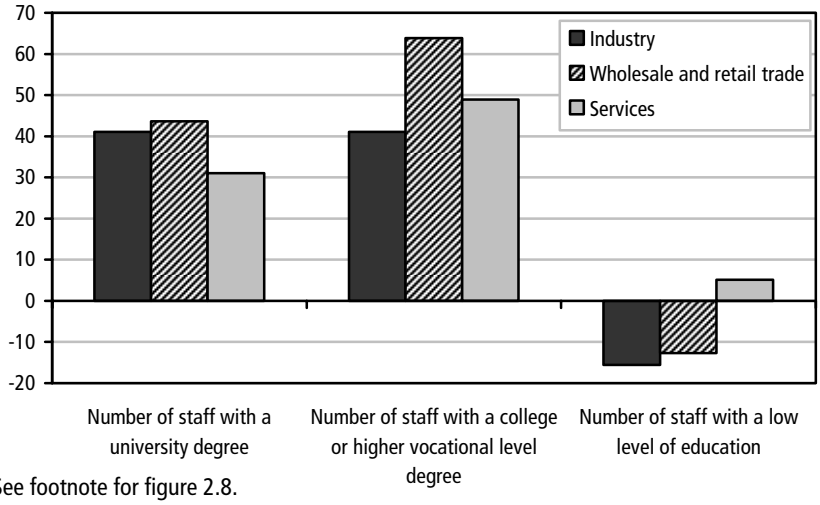
Many of the companies providing business services will continue to increase their staff in Finland (see the right upper corner of the four-fold table). In particular, companies providing data processing and R&D services will further increase their domestic staff. Despite the fact that both software development and hardware maintenance are increasingly carried out in low cost countries, tasks related to data processing seem also to be augmenting in Finland. Vehicle manufacturing and other business services will also require more staff over the forthcoming years.

Many sectors that reduced their staff in the beginning of the 2000s are positive about the forthcoming years and intend to increase their domestic staff (upper left corner in the figure). In industry, these sectors include the basic metal industry and engineering industry. In addition, the electrical engineering and chemical industries plan to hire new staff in Finland.

Nevertheless, there are important sectors in Finland where downsizing staff will continue (lower left corner in the figure). Jobs will particularly be lost in the forest industry, publishing and printing and the food industry. In the service sectors, the number of staff will be reduced, to some extent, in transport and in financing and insurance.

A simple examination of the need to decrease or increase labour at sector level is not sufficient to illustrate major structural changes on the labour market. Jobs requiring a low level of education will decrease while companies require more highly educated staff (Figure 2.9).

Figure 2.9 Change in staff over the next 3 years in different sectors, balance figure.

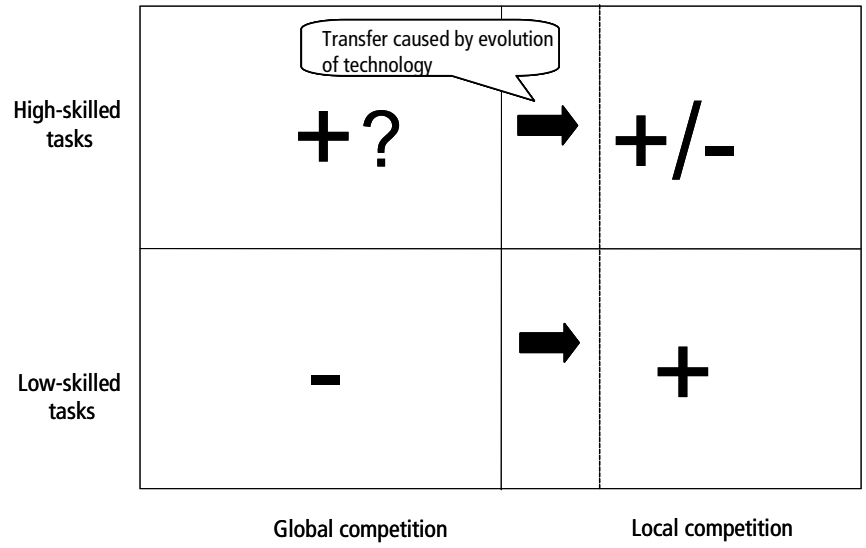


Note: See footnote for figure 2.8.

Source: Survey by Etlatieto Oy, for further information see Ali-Yrkkö (2006).

As an example, the intentions in the forest industry to reduce staff will especially concern staff with a low level of education, while more staff with a higher level of education will be hired in the sector. However, increases in highly educated staff will be minor compared to reductions of staff with a low level of education. A similar change is occurring in other sectors where the trend is to reduce staff, such as in the food industry, finance and insurance. It is probable that in the future Finland there will be both labour shortages and unemployment – a significant proportion of workers losing their jobs do not have the know-how required to qualify for vacancies. Finding a job will necessitate either major further training or transferring to a sector where the level of education is not an obstacle to finding a job (cf. Figure 2.10).

Figure 2.10 Change in demand for work and nature of competition.



Finland is facing the same situation as other traditional, industrialised countries. Low cost countries more often represent an alternative location for those tasks that are currently still located in the industrialised countries. From this, the question arises as to which types of tasks will be reduced in the industrialised countries and which will eventually experience growth (Figure 2.10). The vertical axis represents the skill level required for a task. The horizontal axis represents a task's vulnerability to international competition or potential offshorability, meaning that the work can be carried out in a different country (location) and the output consumed in another. The border between international and local competition is continuously changing. The development of transport technology and, especially, of information and communication technology is rendering ever more tasks subject to international competition (cf. Blinder 2006 and Baldwin 2006). ICT has enabled information, knowledge and ideas (see also Grossman &

Rossi-Hansberg 2006) to be spread rapidly around the world, and both developing and developed countries are seeking to take advantage of this phenomenon.

The lower left corner shows low-skilled tasks subject to international competition. In the industry sector, these tasks include many manufacturing and assembly jobs and in the service sector, telephone services and typing services. These tasks will be reduced in the industrialised countries and, to a large extent, offshored to developing countries. For Finland, language has been a barrier and a delaying factor for offshoring certain services. Offshoring to India, for example, has not been possible, because there the supply of Finnish-speaking staff is insufficient. However, Estonian is closely related to Finnish, and therefore these tasks have been offshored to some extent from Finland to Estonia.

The nature of some low-skilled tasks requires carrying them out on site (lower right corner of the four-fold table). For example, the maintenance of real estate and equipment or nursing tasks require a local presence and cannot be entirely carried out from a distance. It is likely that the use of local services (such as services related to health and wellbeing or to real estate management) will increase, entailing a demand for additional labour in these sectors.

From a small country's perspective, the left upper corner of the figure contains the tasks offering the best possibilities for future economic growth. Developing countries offering potential locations for high-skilled tasks (cf. Baldwin 2006) constitutes a challenge. China and India are the often-cited examples of countries that compete with industrialised countries for high-skilled tasks, and Hungary and the Czech Republic have a similar position with respect to certain sectors and tasks. It is therefore far from certain that more jobs will be created in relation to the tasks located in the left upper corner of the above figure. This will require success in competition against both developing countries and other developed countries.

The tasks located in the upper right corner of the figure require high skill levels, and their potential offshorability is weak. This quarter typically includes doctors and lawyers. Many design services have so far demanded a local presence, but now the significance of distance is losing its importance.

2.5 Offshoring potential of services

Given the developments of recent years, offshoring from Finland has been quite limited. Most of this has been realised within the manufacturing sector, whereas

offshoring of services has been scarce.[2] Similarly, estimates for the near future indicate a distinctly moderate development. These observations are in harmony with calculations and estimates concerning developments in other countries.

There is reason to believe, however, that offshoring service tasks may be surprisingly extensive and rapid, when certain costs related to co-ordinating production in different locations decline below certain threshold levels (Baldwin 2006). Nevertheless, all service activities do not have an equal potential for offshoring, or such potential is nonexistent. It would therefore be useful to be able to estimate just how great a part of services and which types of service jobs in Finland are potentially at risk of offshoring. The research offers two main options for this type of study.

The nature of tasks can be examined by classifying them, e.g. according to Autor, Levy and Murnane (2003) or to Spitz (2004), by capabilities required in different tasks. This is not directly possible using the Finnish data. A similar, although slightly rougher, classification has been conducted by van Welsum and Vickery (2006). Their estimate suggests that approximately 19 per cent of jobs in the EU-25 countries are potential targets for offshoring. Their estimate for Finland is of an equal order, approximately 20 per cent.

An alternative method of assessment is offered by the review by Jensen and Kletzer (2005). This method aims at estimating offshoring potential and its allocation by starting with the idea that the most vulnerable targets are services already produced in a geographically concentrated manner and thus located at a distance from some of their customers within a country. If a service can be produced far from where it is consumed, it can also be assumed to be tradable to another country. Essentially, this method, applied to the United States by Jensen and Kletzer, compares the regional distribution of service sector demand with the regional distribution of service sector jobs.

Naturally, geographical concentration within national boundaries does not necessarily indicate potential for offshoring.[3] Many transport services are a good example of this. Language requirements and eventual administrative limitations pertaining to services can in practice prevent offshoring. Taking these limitations

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[2] Furthermore, the service export data do not indicate significant offshoring. If the offshoring of service production were strong, it would be seen in the foreign trade of services. According to the latest statistics, during the past five years, trade in most service items has been in surplus, and the level of the surpluses has not been subject to significant fluctuations. Only the foreign trade balance for legal, accounting, administration and PR services has been negative and distinctly deteriorating.

[3] Local services are also concentrated if their demand is concentrated.

into account, it would prove interesting to estimate offshorability on the basis of concentration. This type of calculation is presented below.[4]

Method

The starting point is to calculate local demand for all service sectors from data obtained from their input/output tables and employment statistics. This input/output table data provides information on the structure of demand in each sector; on which sectors use the service sectors' output; and on how large a part of it is destined for household consumption. By combining sector-specific demand data and data from employment and population statistics, the demand for different service sectors in each region can be calculated as follows:

$$IDS_{i,p}=\Sigma_j(Y_{i,j}/Y_i * E_{j,p}/E_j)$$

where $Y_{i,j}/Y_i$ = the output of sector i used by industry j (private households are also considered a "sector"), calculated from the input/output tables, and
$E_{j,p}/E_j$ = share of region p in the output of sector j (employment statistics and households/population).

In the second phase, indicators for the geographic location of production, adjusted by regional demand, are calculated for the service sectors. The regional distribution of service sectors differs from their regional demand, if the geographic concentration of these sectors deviates from the geographic concentration of their demand. Geographic concentration is examined using a centralisation indicator of the type used by Ellison-Glaeser (1997), comparing a region's share of a sector's employment and its share of the sector's demand:

$$EC_i = \Sigma_p(s_{i,p} - IDS_{i,p})^2 ,$$

where $s_{i,p}$ = the share of region p of sector i employment.

An alternative measure of geographic concentration, the Gini coefficient, is calculated as follows:

$$G_i = |1- \Sigma_p(\sigma Y_{i,p} +\sigma Y_{i,p-1})*(\sigma IDS_{i,p} - \sigma IDS_{i,p-1}) |,$$

where σ refers to the cumulative share and p refers to the region. Regions have been ranked by the region's share of employment in the related sector.

The data is calculated for the years 1995 and 2003, the first and last years in the input/output tables. Sectoral division is the most disaggregated division used that is common to both input/output data and the employment statistics.

[4] The calculations were performed by Raija Volk and Janne Huovari (Pellervo Economic Research Institute, PTT), but the interpretations are attributed to the Secretariat of the Economic Council of Finland.

Results

The results from the indicators for geographic location of production are intuitive and both measures suggest an almost identical sectoral ranking (Figure 2.11). Social and health services, the activities of membership organisations and industrial cleaning are examples of services with a low potential for offshoring and low tradability. Instead, activities auxiliary to financial intermediation, computer and related activities, research and product development are highly concentrated and also offshorable. There was distinct growth in geographical concentration in activities auxiliary to financial intermediation and in data processing from 1995 to 2003. Water transport and air transport are highly concentrated, but this is due to special reasons. Below, they are grouped together and not interpreted as offshorable. The EC coefficient and the Gini coefficient show the most difference for rail transport[5]. Rail transport has been grouped together with air transport and land transport.

When assessing the effects that potentially offshorable service tasks have on employment, an essential phase involves identifying the geographic concentration indicator value that indicates that a sector is tradable. Jensen and Kletzer (2005) divide production sectors into three groups. The same principle is adhered to here and the sectors have been classified as nontradable, partly tradable and easily tradable.

For the geographic concentration indicator, there is no self-evident threshold value which would determine an activity as tradable.[6] Kletzer and Jensen divide services into three groups: for nontradable services the Gini coefficient is less than 0.1, for partly tradable services the coefficient is 0.1–0.3, and for easily tradable ones it is greater than 0.3. This classification gives a largely similar result for the Finnish material as for the United States, and the sectors are divided into three, quantitatively and approximately equal groups. The limits, however, were not entirely natural, since public administration, postal activity and motor vehicle trade and fuel sale are located in partly tradable sectors. This is why the maximum limit for the nontradable sector is set in the following review at 0.14. This classification determines nearly all manufacturing sectors in Finland as tradable. The average Gini coefficient for 22 manufacturing sectors is 0.61.[7]

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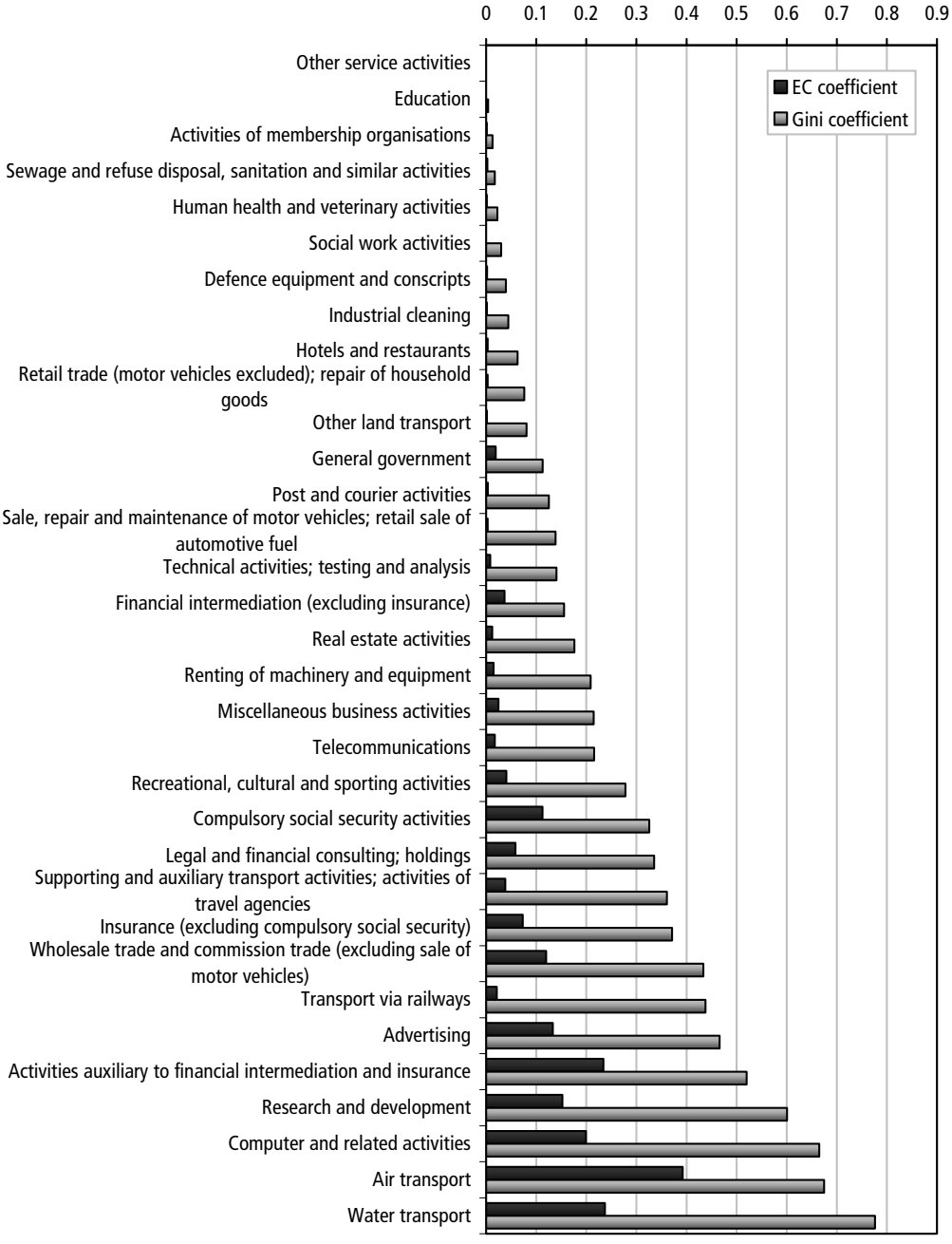
5 The Gini coefficient is attributed a large value, since railway transport does not exist everywhere. This can be illustrated with the so called Lorenz curve that is horizontal in the beginning.

6 For illustrative reasons, suggestive classification values are used in the following.

7 It was interesting to discover that the export share of manufacturing sectors and the Gini coefficient used as a geographic concentration index correlate positively; the correlation coefficient is in the order of 0.4 depending on whether the export share is calculated from gross value or added value. Geographic concentration is therefore related, at least in manufacturing, to the scale of foreign trade.

Figure 2.11 Geographic concentration indicators by sector, Gini coefficient and EC coefficient in 2003.



Note: The scales of the EC coefficient and the Gini coefficient are different, and therefore these coefficients cannot be compared to each other, for example by concluding that the EC coefficient results would systematically indicate less offshorability for different sectors.

Jobs with a high potential for offshoring

According to the selected threshold of geographic concentration index, approximately 230,000 employees, or 15 per cent of total employment in all service sectors, are involved in easily tradable tasks (Table 2.4). Similarly, sectors classified as partly tradable employ 15 per cent of service sector employees. Most of these employees, 68 per cent, work in sectors classified as nontradable. On average, the easily tradable sectors employ more staff with a high education and, correspondingly, fewer staff with only a primary and secondary education.

Table 2.4 Tradability of jobs and their educational distribution, 2003.

	Service jobs		Persons employed, by educational level, %				
Tradability of sectors	Persons	Share, %	Comprehensive	Upper secondary	Lowest level tertiary	Lower degree-level tertiary	Higher-degree tertiary and doctorate level
Air and water transport	21,860	2	22	49	18	8	4
Easily tradable	**234,432**	**15**	**16**	**33**	**23**	**12**	**15**
Partly tradable	226,677	15	19	39	20	12	10
Nontradable	1,046,130	68	19	44	18	8	12
Total	1,529,099	100	18	41	19	9	12

The sectors with different tradability are not evenly located around Finland. Potential relocation concerns the Helsinki region in particular, since 25 per cent of the services in the Helsinki region are classified as easily tradable.[8] Since approximately a third of all services are located in the Helsinki area, this means that over half of easily tradable services are located in the Helsinki region (Table 2.5). Over half of nontradable services are located in central areas in provinces, or in smaller sub-regional areas.

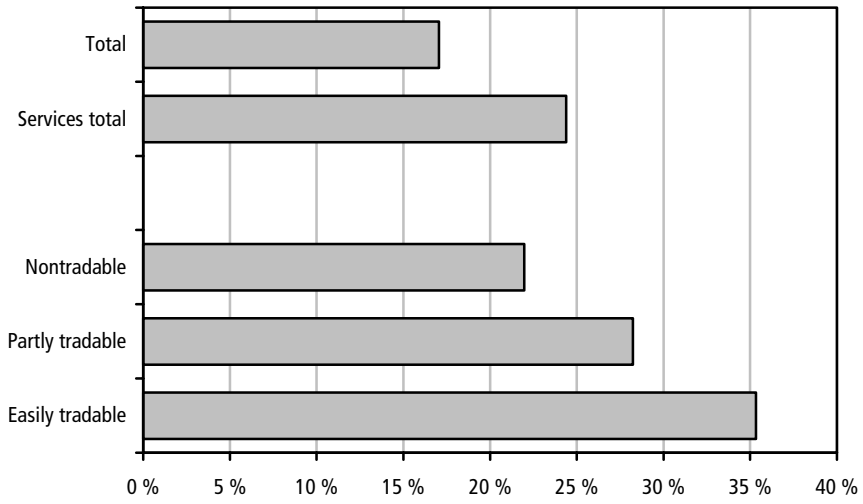
Table 2.5 Tradability and location of jobs.

	Helsinki sub-regional area		Other large university towns		Other provincial centres		Other sub-regional areas		Country	
	number	%	number	%	number	%	number	%	number	%
Air, water and rail transport	9,600	2	3,600	1	6,100	2	2,600	1	21,800	2
Easily tradable	132,300	25	39,000	13	33,800	10	29,300	8	234,400	15
Partly tradable	91,700	18	46,200	16	46,800	13	42,000	12	226,700	15
Nontradable	288,300	55	207,000	70	262,300	75	288,400	80	1,046,100	68
Services total	**521,900**	**100**	**295,800**	**100**	**349,000**	**100**	**362,300**	**100**	**1,529,000**	**100**

[8] On the other hand, the share of those industrial sectors within the Helsinki region that are vulnerable to outsourcing is minor.

The growth of employment in easily tradable services during the period of 1993–2003 has been clearly more rapid than in services classified as partly tradable or nontradable (Figure 2.12). First, this means that at least for this period, offshorability as defined above has not been harmful to employment. Second, it indicates that the structural change in the economy seems to be continuously increasing jobs for which offshoring will be an interesting option in the future.

Figure 2.12 Employment growth during 1995–2003.



What conclusions can be drawn from these potentiality calculations?

Of services, as measured according to employment and by using the method selected here, 15 per cent or 230,000 jobs are classified as easily tradable from their current region or to another country, and therefore also vulnerable to offshoring. For these sectors, the educational level is higher on average, and they are often located in the Helsinki region and other university towns.

This estimate represents only one figure and is based on strong assumptions. Interestingly, the obtained share of employment under the threat of offshoring is, however, of nearly the same magnitude as the estimate of 20 per cent by van Welsum mentioned previously. Also, some figures related to the United States are of the same order (Blinder 2005).

Naturally, tradability according to this calculation does not mean that these tasks or even a considerable part of them will necessarily be offshored to countries with lower labour costs. In a similar way to industry subjected to global competition already, exchange will probably increase in services, i.e. services

will be exported and imported more than now. Different regions and countries can also try to specialise in those tasks in which they have acquired a competitive advantage. Nevertheless, the estimates of 15–20 per cent, obtained using different methods, indicate that a substantial proportion of service tasks will be subject to international competition.

2.6 Conclusions

Offshoring in Finland has been small compared to the overall turnover in jobs. Furthermore, companies' estimates of this type of offshoring do not suggest a major change in the short term. The motives expressed for offshoring include cost savings, increasing flexibility and the need to take advantage of the target country's favourable location (logistics location, customers and partners).

It seems that companies that have offshored tasks from Finland intend to focus their domestic operations on tasks requiring a higher level of skills. At best, this type of structural change is advantageous at company and macroeconomic level. Higher-skilled tasks may lead to higher value added and productivity levels in Finland, which will allow a higher salary level for staff. On the other hand, for an individual worker or region, this change can be extremely difficult: it is far from certain that new tasks with a higher value added level will be created in the same areas as the old tasks, or that workers who have lost their jobs can easily adapt to new and more demanding jobs.

The evolution of globalisation and technical development may, however, radically change the scale and structure of offshoring already realised or expected to happen. Various methods give an estimate that up to 15–20 per cent of service sector jobs may be at risk of offshoring. At the same time, the affected group of jobs may change significantly, and a large number of tasks requiring a higher level of education will also be at risk. Adaptation is, however, facilitated by the fact that this new type of competition will most likely affect tasks located in employment areas that are large and versatile in terms of their number of jobs.

It should be emphasised, though, that high potential for offshoring does not entail that such a large number of jobs will actually be offshored. Nor does it mean that the total number of service jobs will decrease due to competition. Just as in manufacturing, the comparative advantages of different countries will play a critical role in the selection of locations for services open to competition. If Finland manages to be a competitive location for such services, it will also be able to create more jobs in service activities subject to international competition. Furthermore, the jobs that will be created will, at best, be better than those lost.

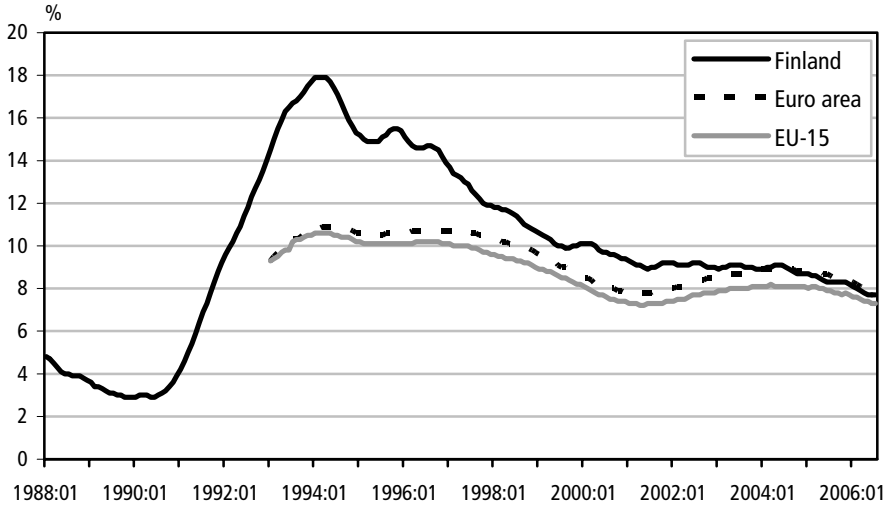
3 EMPLOYMENT DEVELOPMENTS AND LABOUR SUPPLY

How have the restructuring of production in the Finnish economy described above and the internationalisation of various operations been reflected in the Finnish labour market? How have changes in demand for labour manifested themselves in recent years' developments in employment? The following sub-chapters discuss the supply of labour and major developments in the Finnish labour market since the early 1990s, as well as the employment situation in Finland vis-à-vis the European average. Chapter 3 concludes with a consideration of future challenges in the labour market.

3.1 Economic crisis of the early 1990s

In 1990, at the end of the rapid economic growth of the 1980s, the Finnish unemployment rate stood at 3.2 per cent and the employment rate at 74.1 per cent. However, in 1991 gross national product (GDP) fell by 6.2 per cent and the unemployment rate began to increase swiftly. When the Finnish economy plunged into a deep slump, unemployment grew more drastically in Finland than in any other OECD country after the Second World War (Figure 3.1).

Figure 3.1 Unemployment rate (January 1988–July 2006, seasonally adjusted) in Finland, Euro area and EU-15.



Source: Eurostat and Statistics Finland.

The Finnish unemployment rate reached its peak, 16.6 per cent as an annual average, in 1994, with the number of jobless exceeding 400,000. At the same

time, the employment rate declined to 59.9 per cent. During the economic slump, the number of employed people fell by 18 per cent, or by 450,000. Around five per cent of labour became economically inactive in the labour market.

During the slump, several industries saw a drastic fall in employment – the construction sector by half and the manufacturing, trade and hotel and restaurant sectors by a quarter. In relative terms, men were harder hit by unemployment than women because male-dominated industries, such as manufacturing industry and construction, were more dramatically affected by the slump. In terms of the level of education, employment decreased and unemployment increased the most among those with a lower secondary education only.

3.2 Finnish labour market developments in 1995–2005

The economic slump bottomed out in 1993 or 1994, depending on the indicator used, followed by seven years of rapid growth. Between 1994 and 2000, GDP grew by an annual average of 4.5 per cent and employment rose by a total of 313,000 people. A markedly slower period of growth was followed by the bursting in 2001 of the so-called technology bubble. Between 2001 and 2003, GDP rose by an annual average of only 2 per cent, resulting in a slight fall in employment in 2003. However, unemployment did not worsen, since some labour became economically inactive in the labour market due, for example, to the pursuit of studies. With GDP growing by 3.5 per cent, employment rebounded in 2004, since when it has improved at a fairly rapid rate while unemployment has come down to close to the EU-15 average.

During 1994–2005, the unemployment rate decreased by a total of 8.2 percentage points while the employment rate rose from 59.9 per cent to 68.0 per cent. The employment rate gauging full-time employment[1] improved from 56.5 per cent in 1995 to 64.8 per cent in 2004. In 2004, the Finnish full-time employment rate was 6.3 percentage points higher than the EU-15 average, while the Finnish unemployment rate was 4.6 percentage points higher (Table 3.1).

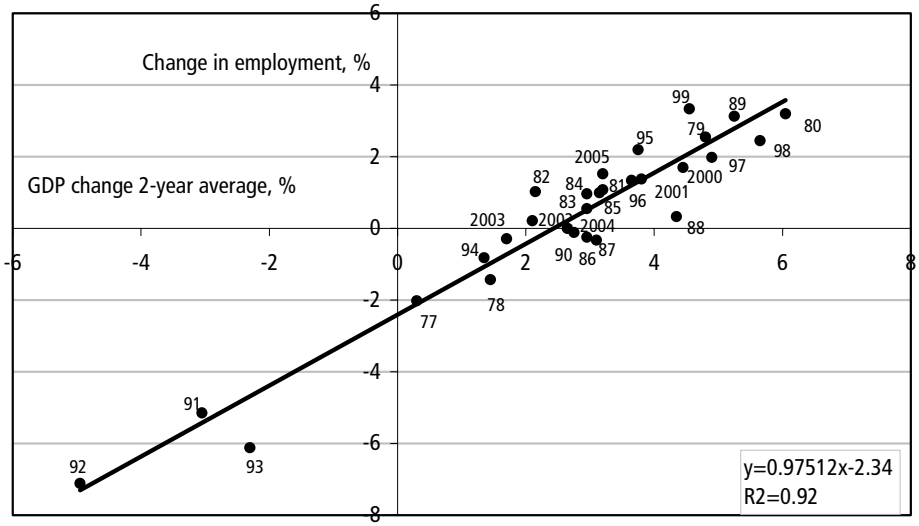
[1] The full-time employment rate derives from converting part-time jobs into full-time ones. This reduces the employment rate most in countries where part-time employment is common practice.

Table 3.1 Employment rate and full-time employment rate in Finland, Sweden, Denmark and the EU-15 average in 1995, 2000 and 2004.

	Employment rate			Full-time employment rate		
	1995	2000	2004	1995	2000	2004
Finland	61.6	67.2	67.6	56.5	64.9	64.8
Sweden	70.9	73.0	72.1	63.9	65.1	66.2
Denmark	73.4	76.3	75.7	66.8	69.3	68.6
EU-15	60.1	63.4	64.7	55.6	58.0	58.5

Figure 3.2 shows that changes in employment are quite closely related to changes in GDP. Maintaining employment unchanged has required an average economic growth rate of around 2.4 per cent. One-percentage-point growth (or a fall) in employment pertains to one-percentage-point growth in GDP above (or below) the rate of 2.4 per cent. Employment underwent an exceptionally sharp fall in 1993, whereas it experienced a particularly vigorous increase in 1999.

Figure 3.2 Interrelation between changes in GDP and employment in Finland in 1977–2005.



Source: Statistics Finland.

Patterns of employment growth

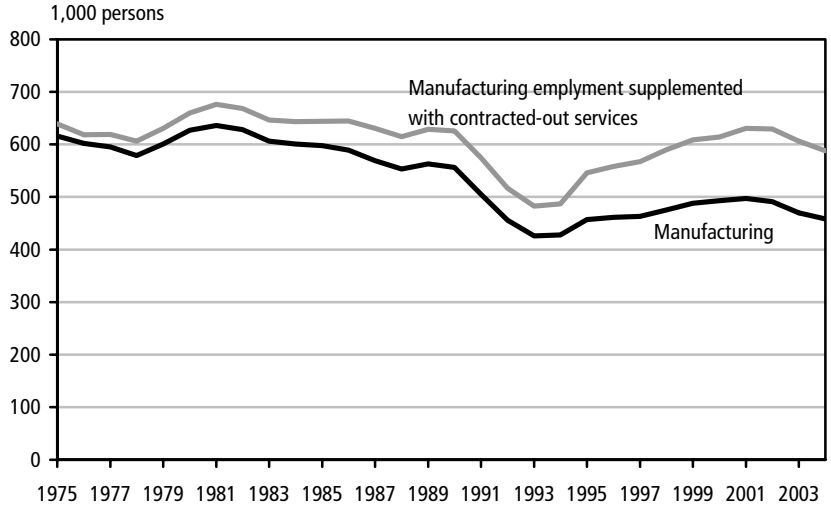
During the post-slump economic recovery, employment improved in high-technology and knowledge-based industries in particular, such as the electrical engineering industry and the business services sector. The broad information sector, covering the production of goods, services and content, employed over 44,000 more people in 1999 than in 1995. However, other sectors, primarily the

services sector, were behind the majority of jobs created, with public-service providers hiring more people, in addition to providers in the private sector.

Strong export-led growth was reflected in seven years of a marked increase in manufacturing jobs lasting until 2000, as opposed to the typical trend in other developed countries during the same period. If we take account of manufacturing industry's simultaneous outsourcing of jobs to domestic service providers, the use of labour input closely related to manufacturing industry can be said to have risen to its pre-slump level during the early years of the current decade (Figure 3.3).

During the years of recovery from the economic slump, economic restructuring was reflected in a significant reduction in the number of jobs within some industries. Employment in agriculture and forestry continued its steady downward trend. As a result of banking-sector restructuring caused by the banking crisis, the sector's employment diminished from the pre-slump level of 56,000 jobs to around half of this towards the late 1990s. The number of public-sector jobs shrank as a result of streamlining the operations of, and corporatising, government institutions.

Figure 3.3 Manufacturing employment and manufacturing employment supplemented with contracted-out services in Finland during 1975–2004.



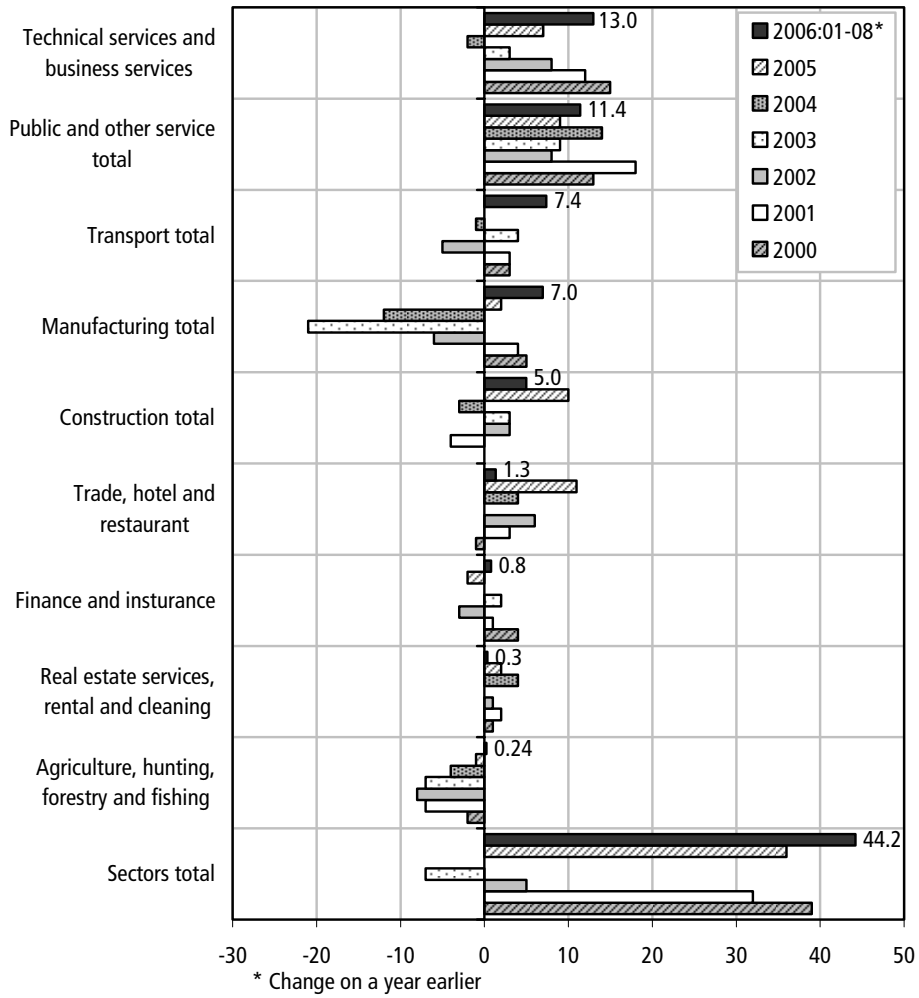
Source: The Confederation of Finnish Industries.

Manufacturing employment has varied during the current decade. Export-industry employment weakened at the decade's beginning before perking up to the extent that the number of manufacturing jobs has increased since 2005, whereas employment in the service sector has risen throughout the decade. The

healthcare and social services sector and the business services sector have experienced the largest relative increases in employment. The retail and whole trade sector and the hotel and restaurant sector have also considerably increased their number of jobs (Figure 3.4).

During 2006 in particular, a pick-up in manufacturing production has been reflected in employment growth. This has also resulted in a swift rise in employment within technical and business services for industry as well as transport services. Among manufacturing industries, buoyancy in the metal industry has stimulated demand for the industry's labour, whereas the number of employed has declined in the consumer goods industry. Social services and construction have also made a good contribution to employment.

Figure 3.4 Employment by sector in 2000–2006, change on a year earlier.



Source: Labour Force Survey by Statistics Finland.

3.3 Finnish employment and unemployment – European comparison

On the whole, Finnish employment has improved significantly since the economic slump, despite its deterioration at the beginning of the current decade. In a European comparison, Finnish employment rate is rather typical, markedly exceeding the EU-15 weighted average. The difference from the EU-15 average rate stems primarily from females' major participation in the Finnish labour market. The employment rate among older people has also risen higher than average, thanks to favourable developments in recent years (Table 3.2).

Table 3.2 Employment indicators in EU-15 and Norway in 2005[2].

	Employment rate										Part-time, share		Temporary employment share		Unemploy-ment rate		Long-term unemploy-ment*	
	15–64 yrs		15–24 yrs		55–64 yrs		Women		Full-time (2004)									
EU-15	**65.2**	Rank	**39.8**	Rank	**58.5**	Rank	**57.4**	Rank	**58.5**	Rank	**20.3**	Rank	**14.3**	Rank	**7.9**	Rank	**41.3**	Rank
Finland	**68.4**	**7.**	**40.5**	**8.**	**64.8**	**4.**	**66.5**	**4.**	**64.8**	**4.**	**13.7**	**11.**	**16.5**	**3.**	**8.4**	**5.**	**25.8**	**10.**
Sweden	**72.5**	**4.**	**38.7**	**9.**	**66.2**	**2.**	**70.4**	**3.**	**66.2**	**2.**	**24.7**	**4.**	**16.0**	**4.**	**7.8**	**7.**	**15.8**	**16.**
Denmark	**75.9**	**1.**	**62.3**	**2.**	**68.6**	**1.**	**71.9**	**1.**	**68.6**	**1.**	**22.1**	**6.**	**9.8**	**11.**	**4.8**	**10.**	**23.4**	**13.**
Norway	**74.8**	**2.**	**53.4**	**3.**	**-**	**-**	**71.7**	**2.**	**-**	**-**	**28.2**	**2.**	**14.3**	**6.**	**4.6**	**13.**	**18.7**	**15.**
Belgium	61.1	14.	27.5	13.	55.8	13.	53.8	12.	55.8	13.	22.0	7.	8.9	13.	8.4	5.	51.7	3.
Germany	65.4	10.	42.0	7.	56.6	14.	59.6	9.	56.6	14.	24.0	5.	14.2	7.	9.5	4.	53.0	1.
Greece	60.1	15.	25.0	15.	58.8	8.	46.1	15.	58.8	8.	5.0	15.	11.8	10.	9.8	1.	52.2	2.
Spain	63.3	12.	38.3	10.	58.3	10.	51.2	14.	58.3	10.	12.4	13.	33.3	1.	9.2	3.	24.5	12.
France	63.1	13.	30.1	12.	58.7	9.	57.6	11.	58.7	9.	17.2	10.	13.3	8.	9.7	2.	41.2	6.
Ireland	67.6	8.	48.7	6.	61.0	7.	58.3	10.	61.0	7.	-	-	3.7	16.	4.3	14.	33.4	8.
Italy	57.6	16.	25.7	14.	54.3	15.	45.3	16.	54.3	15.	12.8	12.	12.3	9.	7.7	8.	49.9	4.
Luxembourg	63.6	11.	24.9	16.	56.9	11.	53.7	13.	56.9	11.	17.4	9.	5.3	15.	4.0	15.	26.4	9.
Netherlands	73.2	3.	65.2	1.	56.5	12.	66.4	5.	56.5	12.	46.1	1.	15.5	5.	4.7	11.	40.2	7.
Austria	68.6	6.	53.1	5.	61.6	5.	62.0	7.	61.6	5.	21.1	8.	9.1	12.	5.2	9.	25.3	11.
Portugal	67.5	9.	36.1	11.	66.3	3.	61.7	8.	66.3	3.	11.2	14.	19.5	2.	7.6	8.	48.2	5.
United Kingdom	71.7	5.	54.0	4.	61.6	5.	65.9	6.	61.6	5.	25.4	3.	5.7	14.	4.7	11.	21.1	14.

*As proportion of unemployed.

Source: LFS by Eurostat.

[2] The broad unemployment rate shown in Table 3.1 above was calculated as a proportion of the working-age (16–64 years) population which, in examining broad unemployment, is actually more meaningful and the most widely-used unemployment rate with respect to that shown in this table calculated as a proportion of the labour force.

However, the employment rate is markedly lower in Finland than in the other Nordic countries resembling Finland with respect to female labour market participation, especially in Denmark and Norway. On the other hand, part-time employment is still at a low level in Finland despite its growth throughout the post-slump years. Finland also differs from the other Nordic countries in this respect. As a result, its full-time employment rate being the highest in Europe after the other Nordic countries.

It is interesting to note that while Finnish part-time employment is at a relatively low level, temporary employment accounts for a higher share in Finland than in the rest of Europe on average. This phenomenon originates from the slump years and the first few post-slump years; the proportion of temporary employees has remained steady during the current decade. Temporary employment is more common among women than men.

The Finnish unemployment rate has dropped close to the EU-15 average although it is markedly higher than in the best-performing countries, Denmark, Norway and Ireland, and somewhat higher than in Sweden. Considering that the EU-15 is rated a region of high unemployment among the OECD countries, it is questionable to regard the region's average unemployment rate as a good achievement, even from a broader perspective.

An eye-catching feature of Finnish unemployment pertains to its high dependence on the level of education. Among the EU-15, Finland ranks second after Germany with respect to the widest gap in unemployment rates between the least educated (below upper secondary vocational education and training) and the most educated (higher education) (Table 3.3). Prevailing in all of the surveyed countries to some extent, this gap widened dramatically during the slump years although all educational levels were affected by a substantial increase in unemployment (Figure 3.5). The slump destroyed the largest number of jobs requiring a low level of education, in relative terms, whereas post-slump employment growth has focused on high-skilled jobs, as noted in Chapter 1. Then again, the educational level of the working-age population has simultaneously improved apace: 43 per cent of the working-age population lacked post-basic-education in 1994 whereas the proportion came to 33 per cent in 2004. Similarly, the same period saw an increase in the proportion of higher education qualifications from 21 per cent to 27 per cent. Thanks to this, the educational gap in unemployment has narrowed although it has not returned to anywhere near the pre-slump situation and is, as stated above, still wide by European standards.

The extent of the slump's shock effect can make understandable that the abovementioned polarisation between the low-educated and higher-educated in the labour market has not worsened but rather diminished over the last 10–15 years when global competition has had its most profound effect on developed countries' manufacturing industries using low-educated labour. In Finland, the economic slump meant an end to a large amount of production, which in many other countries has only gradually had to face adjustment pressures caused by global competition.[3]

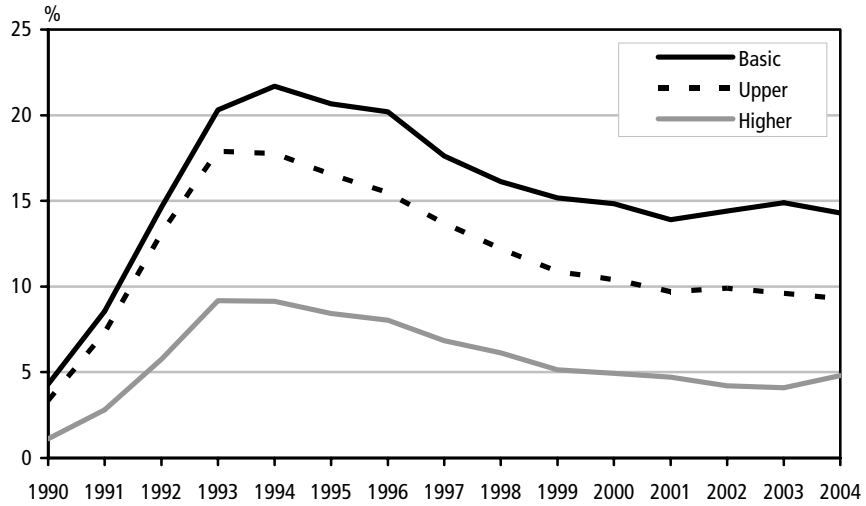
Table 3.3 Gap in unemployment between the lowest and highest educational levels among those between 25–64 years of age in certain OECD countries in 1995, 2000 and 2004.

	1995	2000	2004
Netherlands	3.8	1.7	2.9
Australia	4.5	3.9	3.4
Belgium	9.8	7.1	6.8
Spain	6.1	4.2	3.7
Ireland	12.2	4.9	4.3
United Kingdom	8.5	6.8	4.4
Italy	2.8	4.1	3.0
Austria	3.7	4.7	4.9
Canada	6.5	6.1	5.2
Greece	–1.8	0.7	1.5
Norway	4.1	0.3	1.2
Portugal	3.0	0.8	2.0
France	7.5	8.8	5.9
Sweden	5.6	5.0	2.2
Germany	8.4	9.7	15.0
Finland	14.0	7.4	7.3
Switzerland	3.9	3.7	4.4
Denmark	10.0	3.7	3.9
New Zealand	3.5	4.2	1.8
United States	7.3	6.1	7.2
EU-15	7.9	6.3	4.7
OECD	8.1	4.4	6.4

Source: OECD (2006a).

[3] The literature on the labour market highlights labour-market institutions' role in how changes in technology and competition affect. A general view is that in countries with flexible wage formation both change drivers have widened pay differentials whereas less flexible wage formation (typical in Continental European countries) has resulted in a proportionately higher rate of unemployment among low-educated people (see e.g. Alesina & Zeira 2006). This simplification does not, however, provide an exhaustive description of the situation. Pekkarinen and Taimio (2004), for example, criticise 'the transatlantic consensus'.

Figure 3.5 Finnish unemployment rate by educational level in 1990–2004.



Source: Statistics Finland.

The economic crisis and the resultant structural change in demand for labour are undoubtedly partly to blame for Finland's persistently high unemployment rate. The slump eliminated a host of so-called ordinary jobs: employment weakened due to a collapse of Eastern trade, particularly in the consumer goods industry. This was accompanied by an investment slump in the construction sector and construction-material production, budget cuts in the public sector, a crisis in the banking sector and the resulting multiplier effects on private-sector services and domestic manufacturing across the board.

During the post-slump years of economic recovery, it was not easy for the unemployed to find a job corresponding to their previous experience, the resulting prolonged period of unemployment eroding their capabilities and skills. Employment has grown most vigorously among those at the best working age, 25–54 year-old people, followed by young people. However, employment has remained weak among youngsters with only a basic education. Employment among older people, over 55 years of age, began to grow much later but has grown faster than among other age brackets during the first few years of this decade. Finding a job has been most difficult for older unemployed people with only a basic education.

However, none of this answers the question as to why, after 15 years from the beginning of the economic slump, the employment rate remains clearly lower and the unemployment rate higher than before the slump. A large number of new people having joined the ranks of the chronically unemployed (long-term and repeatedly unemployed people) throughout the years of recovery suggests that this is not solely a question of the non-recurring exclusion of workers from the labour market caused by the slump, see Aho (2004).

There is no consensus on the reasons for the persistent, problematically high Finnish unemployment rate. Some researchers underline macroeconomic factors. For example, Kiander (2001 and 2005) holds the view that the overly austere fiscal policy during and after the economic slump played an important role in explaining sustained unemployment. A number of structural factors have also been stated as reasons for unemployment in Finland, as follows: heavy labour income taxation, inadequate incentives for labour supply created by unemployment benefits and other social security, the level of employment protection, wage rigidities and insufficient efforts to conduct active labour market policies, not to mention ineffective competition in the product market coupled with ineffective housing markets, see e.g. OECD (2006d).

For a variety of reasons, it is difficult to evaluate the significance of single structural factors, given that their effects are hardly independent of other institutional characteristics. Some labour market institution indicators show that Finland is not a particularly exceptional EU member state (Table 3.4). From this perspective, an approximate average employment and unemployment performance is not perhaps very surprising, despite the economy's strong competitiveness based on a variety of measurements.

Table 3.4 Some indicators of labour market institutions in EU-15 and Norway in 2004.

	Benefit replace-ment ratio, early stage of unemploy-ment		Benefit replace-ment ratio, 5-year unemploy-ment average		Unemploy-ment benefit duration, month		Entitle-ment to unemploy-ment benefit		Employ-ment protection index, permanent employ-ment		Active labour market policy expenditure in proportion to GDP		Real wage rigidity		Tax wedge	
	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank
Finland	**70**	**5.**	**65**	**5.**	**23**	**7.**	**3.0**	**7.**	**2.17**	**6.**	**0.87**	**6.**	**0.50**	**2.**	**36.66**	**6.**
Sweden	**75**	**2.**	**63**	**7.**	**28**	**4.**	**2.9**	**9.**	**2.86**	**12.**	**1.09**	**3.**	**0.52**	**1.**	**42.04**	**1.**
Denmark	**70**	**5.**	**70**	**1.**	**.**	**.**	**3.2**	**5.**	**1.47**	**2.**	**1.56**	**1.**	**0.13**	**11.**	33.57	**9.**
Norway	**68**	**8.**	**58**	**9.**	**36**	**36**	**3.7**	**2.**	**2.25**	**7.**	**0.66**	**8.**	**0.22**	**9.**	**29.81**	**12.**
Belgium	61	11.	61	8.		1.	2.7	12.	1.73	4.	0.95	5.	0.28	5.	39.70	2.
Germany	69	7.	66	3.	12	10.	2.8	10.	2.68	11.	0.97	4.	0.12	13.	37.75	5.
Greece	55	12.	35	14.	12	10.	.	.	2.41	9.	.	.	0.03	14.	34.80	8.
Spain	67	9.	49	13.	21	8.	3.0	9.	2.92	13.	0.67	7.	.	.	33.53	10.
France	75	2.	57	10.	30	3.	3.1	6.	2.47	10.	0.88	5.	0.50	2.	38.10	4.
Ireland	49	15.	64	6.	15	9.	2.6	13.	1.60	3.	0.54	11.	0.26	7.	10.18	15.
Italy	54	13.	22	15.	6	13.	2.8	10.	1.77	5.	0.55	10.	0.16	9.	38.76	3.
Netherlands	74	4.	66	3.	24	5.	4.4	1.	3.05	14.	1.20	2.	0.11	12.	35.57	7.
Austria	63	10.	57	10.	9	12.	3.5	3.	2.37	8.	0.50	.	0.27	6.	31.03	11.
Portugal	83	1.	68	2.	24	5.	3.5	3.	4.33	1.	0.58	9.	0.31	4.	24.29	13.
United Kingdom	54	13.	53	12.	6	13.	2.4	14.	1.12	15.	0.43	12.	0.23	8.	20.66	14.

Sources: The employment benefit ratio represents the proportion of unemployment benefits, averaged over family type of recipient, of average earnings before tax. For more detailed information, see OECD (2006c, p. 60). Entitlement to unemployment benefit is an index derived from taking account of several components, such as occupation mobility requirements, geographical mobility requirements, participation in active labour market programmes, valid reasons for the refusal of job offers etc. Employment protection (OECD 2006b) applies to workers employed on a permanent basis. Active labour market policy is defined as follows: OECD (2006c), expenditure on active labour market policies, excluding employment benefit administration. Real wage rigidity: Dickens et al. (2006), an index including averages over several years. Real wage rigidity is in relation to the consumer price index.

3.4 Wage formation

Wage formation understandably plays an important role in labour market adjustment. Table 3.4 above shows that Finland is an exception in this respect. As shown in the table, Finland ranks second in the degree of its labour-market

real wage rigidity. This may partly explain its exceptionally high rate of unemployment concentrating on low-educated people, as stated above. Inflexible wages may also partly explain the major differences in unemployment rates between regions to be discussed in Chapter 6. In the context of strong real wage rigidity, various types (by educational level and region) of wage do not adapt to the extent required for maintaining sufficient demand for all labour groups.

With respect to wage rigidity, it is necessary to make a difference between the general wage level's weak response to unemployment, on the one hand, and real-wage rigidity at individual level. Real wage rigidity in Table 3.4 refers to the latter. On the level of the aggregate economy, there is no reason to regard real wages as unusually rigid in Finland, as evidenced by a major fall in the proportion of wages to national income due to higher unemployment resulting from the economic slump. However, this implies no necessary incompatibility with respect to individual-level wage rigidity. In fact, it is plausible that the latter has been instrumental in achieving the former.

Wages in Finland are largely determined by a centralised income policy agreement and in the last 15 years general pay increases have chiefly been small in view of productivity growth. Consequently, nominal wages reach the EU-15 average whereas real wages are among the lowest, due to Finland's fairly heavy taxation and high price levels. However, one condition set for small pay increases has been that all wage earners have enjoyed similar pay increases throughout wage brackets, except for supplements for low-wage earners. There is evidence that while aggregate wage developments have come to support demand for labour during the post-slump years, wages in the lowest bracket have risen to high levels in relation to the general wage level, Johansson (2006).

3.5 Labour mobility

In addition to wage formation, labour mobility is a major determinant of labour market efficiency. Labour mobility refers to labour's propensity to move from one job, workplace, industry or region to another.

In certain respects, Finland boasts a very mobile labour market. Flows into and out of employment are considerably large, every year seeing more than 900,000 periods of unemployment begin and end. Finland ranks third after Denmark and the United Kingdom in job-to-job mobility as a percentage of its labour force (Memo 05/229). At the same time, the average duration of employment with the same employer seems to be shorter than the EU average. Surveys also suggest that Finnish employees show a considerably higher degree of willingness to change their jobs on average (EU 2006).

Inter-industry labour mobility, for its part, appears to be approximately at the same level in Finland as in the rest of Europe but below the US level, for instance (Elmeskov 2006). This type of labour mobility increased throughout the 1990s but seems to have diminished somewhat during the current decade (Virjo et al. 2006), with young people and the highly-educated proving the most mobile between industries.

The extent of geographical mobility is difficult to assess between countries, since the territorial units used in the study vary considerably in size. Based on an OECD comparison, geographical mobility in Finland was markedly lower than on the average in the OECD countries in the beginning of this decade (Elmeskov 2006). However, this OECD study probably underestimates Finnish labour's geographical mobility[4]. The underestimation hypothesis is supported by the abovementioned survey suggesting that Finland ranks third after Sweden and Denmark in terms of often people have moved from one area to another. Similarly, Finns' willingness to move in the future is near the top of the European table (EU 2006). Moving has also clearly increased since the early 1990s and inter-municipal migration, for example, is at its highest level ever. Commuting outside the domicile has seen a steady upward trend since the early 1990s, as well.

3.6 Conclusions and future challenges

The situation in the Finnish labour market has improved, measured in terms of both employment and unemployment rates, throughout the post-slump years, save a few years at the beginning of the current decade. Quickening economic growth since 2004 has resulted in a marked upward trend in employment and a downward trend in unemployment.

The past few years' rapid improvement in employment has led to a shortage of labour in some industries and regions, reflected for example in the larger number of vacancies and longer recruitment periods. However, survey data of various kinds do not yet suggest a general dearth of labour (VNK 2005b), a conclusion borne out by the fact that pay increases have remained moderate up to the present day.

[4] The OECD's analysis is based on NUTS 2 regions of which Finland has 5, Sweden 8 and Germany over 40. Because of Finland's large size, this type of mobility analysis ignores intra-region migration, a major part of which actually relates to that between commuting areas. The inter-region migration figure used in the OECD's analysis comes to around 50,000 per year, while the number of people migrating between counties has annually totalled over 120,000 and that between economic regions around 160,000 during the current decade.

It is, however, certain that if the economy continues to grow at a relatively rapid rate and productivity growth does not speed up, labour will become increasingly scarce. This is due to faster ageing of labour in Finland than in many other European countries. The baby-boom generation, born during the post-war years, is approaching the age when labour market participation wanes rapidly, the younger generation entering the labour market being markedly smaller than the older generation leaving it.

The ageing of labour will alleviate the exceptional polarisation in the unemployment rate between highly-educated and low-educated people. The level of education among those leaving the labour market is relatively low, whereas that among the younger generation is at a good level by international standards.

At the same time, the average age of labour will continue to rise for a while, presenting a problem for productivity in two ways. First, older workers' productivity lags behind that of those at the best working age. Second, older people are less willing to change job and domicile than young people, as such undermining the economy's opportunities to re-allocate labour in a way that improves productivity. Bearing in mind that the average age of labour will, however, begin to fall again from the turn of the current decade, the unfavourable effect of this factor will be mitigated until the favourable turn during the 2010s.

While the supply and quality of labour will change, demand for it may also be expected to change substantially in the future. There is no reason to expect any slowdown in technological progress. Moreover, we can postulate that, in many respects, the application of information and communications technology to production is only in its infancy, see e.g. Pohjola (2005). Consequently, technological progress will continue to directly transform the pattern of demand for various types of job during the next decade. The underlying trend is obvious: routine, well-definable functions will become automated. As a result of technological progress and learning by organisations, automation will cover a wider range of functions on an ongoing basis.

Then again, technological progress will affect labour demand in Finland through globalisation. On the basis of the evidence presented in earlier chapters, globalisation has so far mainly had a favourable effect on employment. Finland has been able to export an increasing number of goods to expanded markets and, through its specialisation in high technology, improve labour productivity while experiencing a low level of job migration abroad (offshoring) in view of employment developments as a whole.

The analyses discussed suggest that globalisation will probably continue to have major effects on demand for labour in Finland. It is likely that a more extensive range of jobs of various skill levels will be exposed to competition. At the same time, these changes may become less predictable and more rapid. Although the extent of offshoring has so far remained limited, it may broaden considerably in the future and extend to cover service-sector jobs on a widespread basis.

All of these factors highlight a dual challenge presented to the labour market. On the one hand, it is important to ensure the availability of labour for which there is a strong demand in a country like Finland with respect to the ever-changing international division of labour. On the other hand, one needs to be able to ensure that a larger proportion of the working population becomes employed as productively as possible while so-called conventional jobs continue to disappear not only in manufacturing but also the services sector.

These challenges set requirements for labour-market effectiveness in three respects. First, it will be necessary to increase the supply of labour from the current level while the ageing of labour proceeds.

Second, labour should move as flexibly as possible from one job to another even if this requires changing the occupation or the workplace's location. Although certain indicators show that labour mobility is rather high in Finland, raising it further would be important.

Third, we should be able to adjust wage formation in such a way that wages would be increasingly determined by productivity at employee or employee-category level. This will require wage determination shifting to a larger extent than currently to company level based on local agreements. Moreover, at the same time one should ensure that the benefits of economy-level wage co-ordination, of which Finland has good experiences, are not lost.

4 ENERGY MARKET DEVELOPMENT

An examination of the impacts of globalisation on Finland's economy highlights certain special issues more distinctly than previously. A key issue is energy market development. Growing global demand for energy in particular, impacting on the Finnish economy via rising energy prices, is a major influence. Global energy market developments and their effects on the Finnish economy are examined in the following. The comparative development of various forms of energy is highly significant when considering the options available to Finland. Finnish industry is among the most energy-intensive in OECD countries, which means that climate policy and energy prices and availability have a considerable bearing on its competitive status, constituting the reason for the current emphasis on the ability of domestic energy production to adjust and renew itself.

4.1 World energy market

After the oil crises, energy markets continued to operate in relative calm for a long period. However, the energy market has undergone several changes in the last few years, with new factors emerging to transform it permanently.

Energy demand continues to grow intensely, although at a slower pace. The International Energy Agency, IEA's, long-term energy scenario projects that world energy demand will expand by as much as 60 per cent between 2002 and 2030, with the majority of growth originating in the developing countries. In all, primary energy demand is predicted to grow by an average 1.7 per cent per year.

Rapid structural change has spurred energy demand growth in Asia, China and India in particular, where industry's share of the economy has grown, increasing the share of energy-intensive processes. To a certain extent, the decreasing share of industry in the OECD countries accounts for this trend, but the growth of the industrial sector in rapidly developing and growing economies has undoubtedly also had a major impact in this respect. Increasing traffic volumes are contributing to the rapid increase in energy consumption in Asia, while in the OECD countries, the service sectors account for an increasing share of energy consumption.

The vigorous growth of Asian economies in particular has been reflected intensively in the energy market in recent years. Demand for oil should grow by 1.8 million barrels a day in 2006, with China accounting for some 27 per cent of

this growth[1]. In China, energy demand has increased as intensively as the nation's GDP. In the old industrial countries, energy demand is growing at a distinctly slower pace than GDP, and in fact the growth in demand in China can be expected to level off in time, but based on the experiences gained from certain other rapidly-growing Asian countries, this may yet be some way off, whereas the OECD countries' share of primary energy consumption has clearly been declining. In the early 1970s, the OECD countries accounted for over 60 per cent of total world consumption, but by 2003 their share had declined to approximately one half of the total, and in 2030 the OECD countries are predicted to account for a mere 40 per cent of total world consumption. The OECD's share is expected to decrease even more sharply in the oil market, from 70 to 47 per cent.

In addition to the focus of primary energy demand being transferred to Asia, the structure of demand is also changing. Although oil will remain the single most important source of primary energy (with a 34 per cent share projected for 2030), natural gas will overtake coal as the second-largest primary energy source. The IEA scenario projects fossil fuels to retain their position as the most important primary energy sources in the future, meeting 85 per cent of the increase in primary energy demand. Traffic and power generation will continue as major energy consumers, with an increasing share. In the longer term, however, it is possible that as a consequence of rising fossil fuel prices, the use of renewable energy sources will increase and energy intensity decline as businesses and private citizens invest in new and more efficient energy systems.

4.1.1 Factors influencing energy supply

The IEA predicts that the primary energy supply will be able to meet growing energy needs, providing a sustainable basis for the growing energy demand in this respect. However, growth will require significant additional investments in energy production. The introduction of new production areas will facilitate increases in production, which will alter the focus of production and emphasise the significance of global energy trade, since the majority of the increasing energy need will actually be met with energy originating in non-OECD countries. Particularly in terms of oil, the OECD countries will grow more dependent on imports, which will make the world economy more sensitive to price shocks caused by disruptions in supply. More natural gas will be imported from the Middle East and transition economies, particularly to Europe and North America, with Russia remaining the world's largest producer of natural gas until the 2030s.

[1] At the turn of the 1990s, China was still exporting oil.

The IEA projects that power generation and transmission in particular will require major additional investments, and that oil production cannot be increased without considerable investments in production, distribution and refining. In fact, the IEA views refining capacity as forming one of the most significant bottlenecks at present. Today, much heavy crude oil, which is harder to handle, cannot be brought to the world market due to restricted refinery capacity. Therefore, the OECD countries' insufficient refinery capacity is an important factor in high oil prices. The IEA projects that the investments needed will amount to almost 600 million dollars annually, with major uncertainty related to implementing these investments influencing energy prices and availability.

Fossil fuel prices have surged in the last few years, enhancing the profitability of alternative energy sources in principle. However, for the time being price levels have not resulted in an extensive transition to renewable energy sources, due perhaps partly to the OECD countries' considerably lower current energy intensity than at the time of the 1970s oil crises. Hence, the share of renewable energy sources of primary energy is not likely to increase in any significant way in the next decade, but in the long term the significance of renewable energy sources may be emphasised, for instance in levelling out price peaks.

4.2 Energy market development in Europe

The European energy market is undergoing radical change in terms of liberalisation and integration, with many environmental and energy policy objectives, which influence both demand and supply, applying to the market. Although the economic growth that drives energy demand is expected to pick up in Europe, growth has been modest over the past few years. Differences in growth between the new and former member countries will remain marked in the next few years, but in the long term, both the EU Commission and the OECD are expecting the pace of growth to converge.

The EU has enacted several directives influencing the energy market and energy demand, including the regulation of energy markets at national level. Directives primarily influencing market performance and energy prices include those on the electricity and gas markets and energy services. In compliance with these directives, consumers must be able to shop around for gas and electricity suppliers by 2007, which will enhance competition in the electricity market. The directives will also boost competition by separating distribution from production, and will include stipulations on the regulation of the electricity market and opening it up to competition. EU-wide regulations can be expected to facilitate competition and, in the long term, boost investments in energy production, in principle at least. This development will also influence energy prices. In

integrated market areas, electricity prices can be expected to converge in various countries, and enhanced competition can be assumed to lower prices in many. However, integration of the gas and electricity markets is limited by the restrictions set by transmission networks and links.

The active energy policy pursued by the EU, and its relatively moderate economic growth, are also mirrored in anticipated energy consumption. From 2002 to 2030, the IEA projects that primary energy consumption in the EU will increase by only 0.7 per cent annually, and the consumption structure is also expected to change markedly. Consumption of coal will decrease by 10 per cent, with its share of energy consumption dropping from 18 to 13 per cent, whereas the share of natural gas will increase from 23 per cent to 32 per cent. The share of nuclear power is estimated to fall to 7 per cent, i.e. to one half of the current level, while demand for natural gas will increase first and foremost as it replaces coal. Simultaneously, the EU's own oil and natural gas production will peak, which will render it more dependent on imports. The share of renewable energy sources is projected to grow primarily in power generation.

4.3 Energy market development in Finland's neighbouring areas

The Finnish energy market is closely connected to those of its neighbouring areas. Its electricity market is pooled with that of other Nordic countries, in addition to which Finland imports a significant amount of electricity from Russia. With respect to fossil fuels, Russia is in a key position as a supplier of both oil and natural gas.

The inter-Nordic electricity market has influenced energy costs in Finland both positively and negatively. When the common market was first created in the 1990s, competition increased and the efficiency of electricity production improved in the Nordic area, as a consequence of which price levels clearly fell at first. In the last few years, concerns have been expressed about a competitive market producing too few incentives to invest in new production capacity. In comparison with the 1990s, production capacity is indeed being exploited more fully and electricity prices have increased throughout the 2000s. The Nordic market is also gradually being linked with the North European electricity market, bringing Nordpool prices closer to European ones, which in practice means that prices will rise.

Over 10 per cent of the electricity consumed in Finland is imported from Nordpool and Russia. For natural gas, the country is totally dependent on Russia, although gas procurement has been based on long term contracts until now. In future, demand for gas from Russia will increase in Europe and elsewhere. With a major part of oil also originating in Russia, production developments in Russia involve significant uncertainties for Finland.

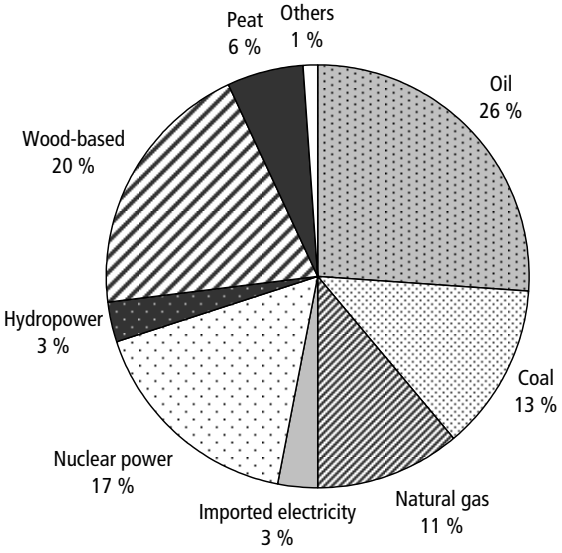
Income from exported energy is extremely important to the Russian economy, but major investments are required in order to increase exports. The IEA estimates that such investments will total USD 900 billion by 2030. The changing structure of energy exports will increase the need for investments, the IEA forecasting that Russian oil production will increase from 8.5 million barrels a day in 2003 to 10.4 million in 2010, but after 2010 Russia's share of world oil exports will begin to decline. Hence natural gas export volumes must increase in order to gain more export revenues. Contrary to oil production, where private oil companies have been responsible for additional investments, gas production has not been opened up to competition. Both natural gas production and distribution rely largely on Gazprom, which is unlikely to be able to bear sole responsibility for increasing production and transmission links. Therefore, liberalisation of the gas market is emerging as a key factor creating uncertainty in natural gas price formation.

4.4 Energy in the Finnish economy

4.4.1 Energy demand in Finland

The Finnish economy is dependent on imported energy, and with Finland being one of the most energy intensive nations in the OECD, energy supply plays a key role in economic development. A systematic energy policy has been used as a tool for compensating for the nation's dependence on imports, one of the key goals being the securing of energy availability through a diverse production structure. Hence, the demand structure for primary energy is diverse, as shown in Figure 4.1.

Figure 4.1 Primary energy demand structure in Finland in 2002.

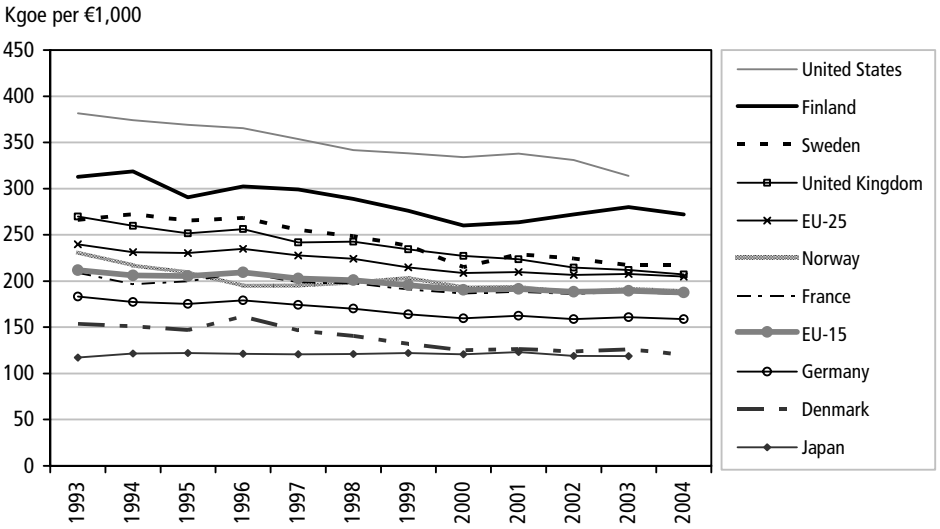


Source: VATT (Government Institute for Economic Research).

The National Energy and Climate Strategy outlines energy demand development in the next few years, estimating total electricity consumption to increase from 85.2 TWh in 2003 to over 95 TWh by 2010, and to approximately 108 TWh by 2025. In addition to increasing energy consumption, greenhouse gas emissions, which Finland has committed itself to reducing, have emerged as a major factor. The Climate Strategy projects that emissions will exceed the Kyoto Protocol target level unless measures are taken, and reducing emissions by influencing the use of energy and enhancing its efficiency, and through flexible mechanisms, is becoming a key energy policy challenge. According to the Strategy's basic scenario, carbon dioxide emissions from fossil fuels and industrial processes in 2010 would (unless measures are taken) amount to approximately 67 million tonnes, while the target level is around 55 million tonnes. The objective set for the Kyoto Protocol period can be achieved primarily by reducing emissions from fossil fuels and processes, but other measures could contribute to achieving reductions of some two million tonnes. It is estimated that in order to achieve the Kyoto Protocol objectives, carbon dioxide emissions within emissions trading should be reduced by approximately 14 per cent through national economic steering and flexible mechanisms. There is no international agreement on the need for reductions in the longer term. However, the EU is committed to implementing higher reductions after 2012. At present, it seems clear that reduction objectives will also be set after the Kyoto Protocol period, besides which meeting the Kyoto Protocol objectives could hardly be justified without further objectives.

Industry's share of energy demand has been relatively higher in Finland than in most other OECD countries where, in turn, housing and traffic account for a higher share. Although the energy efficiency of Finnish industry is among the best in the world, Finland ranks clearly above the OECD average in terms of energy intensity. Figure 4.2 compares the energy intensity of various countries.

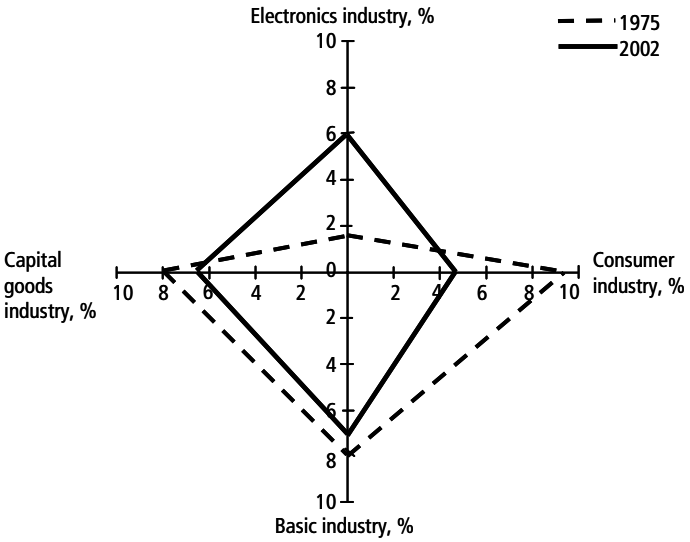
Figure 4.2 Energy intensity in Finland and certain OECD countries in 1993–2004.



Source: Eurostat.

Figure 4.3 illustrates the structural change in Finnish industry, revealing a distinct shift of focus from consumables to electronics. The Energy Strategy expects Finnish industry to continue its relatively rapid growth in the first few decades of the 2000s due to comparatively rapid increases in productivity, particularly in industry. These will release production factors for services, resulting in the economy becoming more service-dominated as the demand for services increases due to aging of the population. Therefore, the energy intensity of the economy is probably decreasing. However, this would require a more service-dominated society to manage with less consumption than the prior, industry-oriented one. Such growth poses challenges to the economy, since in Finland the focus of growth in productivity lies mostly in the electronics industry, according to the OECD, in addition to which it is also based on innovations by the electronics industry. In other industrial sectors, productivity has increased more modestly and, in certain service sectors, it has even decreased.

Figure 4.3 Key industrial sectors' share of added value in 1975 and 2002.



Source: VATT.

4.4.2 Climate policy impacts on the energy sector

In the next few years, the key energy policy challenges will be linked to meeting the emissions reduction objectives of the Kyoto Protocol by reducing the use of fossil fuels, using flexible mechanisms, and increasing the use of renewable energy sources. Above all, the EU Emissions Trading Directive regulates the steering methods to be used, in addition to which several other directives set additional objectives, for instance on promoting the use of renewable energy sources and the use of biofuels.

It is obvious that climate policy will influence the structure of energy production and change the status of various forms of energy, with the impact of EU emissions trading on the costs of fossil fuel use playing a key role, and the most significant impact of emissions trading evident in electricity prices. Table 4.1 shows the aggregate change in electricity production costs based on certain production technologies (Honkatukia et al. 2003).

Table 4.1 Increase in direct electricity production costs due to emission allowance prices, EUR/MWh based on various production methods.

Production method	Price of emission allowance EUR/tCO_2		
	Efficiency %	10	20
Coal condensing	38	8.8	18.0
Peat condensing	38	10.0	20.0
Oil condensing	40	6.9	14.0
Natural gas condensing	51	3.9	7.9
Coal co-generation	90	3.7	7.4
Peat co-generation	88	4.2	8.5
Natural gas co-generation	92	2.2	4.4

The table indicates a very clear increase in the costs of the most expensive production methods, which would be reflected throughout the Nordic electricity market area as increasing electricity prices. The costs of the marginal production method determine the price of electricity, which means that with emission allowance prices of €20, the market price would increase at an almost equal pace in situations in which there was such high demand for electricity that even coal condensing production was in use. Electricity prices did take this kind of a leap – a higher one in fact – when emissions trading began.

As regards domestic energy policy, the significant issue in the face of increasing electricity prices is that the Nordic market price can be determined on the basis of production in Denmark or, increasingly, Germany, not Finland. Hence, it is extremely difficult to influence the energy sector through national measures in what is currently an integrated market. In fact, emissions trading increases the pressure to harmonise the taxation of sectors involved in emissions trading, at least as far as emissions are concerned. Because emissions trading as such is a method for restricting emissions that enhances cost-efficiency, it is questionable whether energy taxation should be applied to the emissions trading sector at all. Taxation is not necessary in terms of climate policy cost efficiency, and may not be desirable in terms of cost efficiency either. On the other hand, the aims of energy taxation have not concerned climate policy alone. For instance, Finland has levied carbon dioxide tax for a long time, but has allowed exceptions for various purposes, for instance in order to influence the relative status of production methods or certain fuels. Such exceptions have entailed the exclusion of separate electricity production from carbon dioxide taxation while allowing more lenient taxation of peat and natural gas than of coal. Electricity taxation provides more examples, such as favouring the use of wood, as does the taxation of transportation fuels, where diesel fuel taxes have been lower than those of gasoline in order to provide genuine support for heavy goods vehicles.

However, it is clear that if taxes and exceptions are applied in energy production, they can steer production structure in a different direction than emissions trading alone. Emissions trading as such would increase the share of cogeneration and renewable energy sources in electricity and heat production, and the use of wood for instance would become even more profitable in relative terms if sectors involved in emissions trading applied fuel taxes on fossil fuels. In this case, however, the costs of reducing emissions would rise. Then again, if the emissions trading sector were made exempt from energy taxes, tax revenues would be lost, and the method for compensating such losses may have negative consequences throughout the tax system.

Finland differs from most EU countries in that the cogeneration of heat and electricity, and district heating, account for a major part of the entire energy sector. Hence, in this country enhancing the efficiency of energy production by increasing the share of district heating is only possible to a limited extent, because the need for heat sets a limit on district heat production. District heat and co-generation also differ from electricity in that their market is local and they thus allow the implementation of solutions based on local circumstances. There are therefore several examples of local energy system integration in Finland, where the exploitation of local special characteristics of the industrial and energy sector has facilitated the enhancement of the efficiency of energy utilisation and increasing the use of biofuels, for instance.

4.4.3 The status of renewable energy

Steering environmental policy via economic steering methods always creates incentives for the development of technology and the introduction of new technologies. However, the EU has proposed several incentives in an attempt to create clearer technology-related incentives. Such incentives are hard to justify from mere environmental perspectives, but other reasons for an active environmental technology policy can be found. The most apparent is the possibility that the financial markets will adopt an excessively prudent approach to the financing of technological innovations offering very uncertain profits, which may slow down technological development. In such cases, the appropriate economic steering could have an impact on gaining sufficient financing. However, it must be noted that this steering works best if performed using nationally distinct steering methods.

For instance, emissions trading creates an incentive for reducing the use of fossil fuels and increasing the use of renewable energy sources. Honkatukia et al. (2003) have estimated that the use of biofuels and windpower will clearly increase if the price of emission allowances settles at €20 per tonne of carbon

dioxide. However, the EU directive on renewable energy sources sets additional targets for the use of renewable energy sources.

Finnish energy policy has attempted to support the use of renewable energy sources via favourable taxation policies. This is possible in an integrated market, but many countries have separated energy taxation from other objectives and introduced new steering methods to promote goals other than those related to emissions trading. The renewable energy source programme sets the goal of increasing the use of renewable energy sources by 50 per cent from 1995 to 2010, which is equivalent to 3 Mtoe in energy consumption. The EU biofuel directive requires, as a voluntary objective for biofuels, a 5.75 per cent share (as energy) of fuels sold for road traffic use in 2010. All in all, renewable energy should exceed 20 per cent of the use of primary energy by 2010.

For Finland, the key source of renewable energy that can be increased is bioenergy. VTT, the Technical Research Centre of Finland, estimates that the use of bioenergy can be increased in current and new community and industrial plants and heating by 1.2 Mtoe over its use in 1999, which would be divided almost equally between industry, real-estate and district heating. This constitutes a significant increase, corresponding to a reduction of 2.8–3.7 million tonnes of carbon dioxide in comparison to an equal amount of energy being produced with fossil fuels. The VTT considers a considerably higher increase in the use of biofuel possible if the use of bioenergy increases considerably in district heat production. Increasing the use of bioenergy is also possible in traffic, but the production of transportation fuels based on bioenergy still seems questionable in economic terms, even though many operators have already decided to invest in this, which would indicate a change in the current situation.[2]

Biofuel is primarily produced as a by-product of the forest industry, and in the form of logging waste. The waste flows of communities and industry suitable for energy production form another source of biofuels. With respect to forest industry by-products, black lye generated in chemical pulp production is the most important, accounting for approximately two thirds. Forest processed chips are produced in both regeneration cutting and intermediate felling, with an estimated realistic potential of 9.5 TWh per year, and almost double at its most extensive volume.

It is obvious that the use of wood as a raw material is, for the time being, its most important application in Finland, but with changing price relations other uses may become more interesting than before. According to VTT, wood chips produced as a forest industry by-product and other side flows are, however, clearly the most profitable form of wood fuel. Therefore, scenarios on biofuel

[2] E.g. St1, NesteOil

use are strongly based on growth predictions for forest industry production – increasing the use of wood fuels at the expense of forest industry raw material use would also reduce side flows. Instead, further processing of by-products may constitute a future option worth considering. Here we refer to biorefineries, which would process wood into several products, including biofuel.

The use of biofuels in traffic has attracted wide international attention, which is perhaps understandable considering the fact that traffic emissions can constitute a visible local problem and that in many EU countries they are the fastest growing type of emissions. Globally, however, traffic emissions only account for slightly over ten per cent of all emissions. Biofuel production is increasing globally, too, but according to the Economist, biofuel costs are still 20 per cent higher than those of oil-based fuels, which means that without tax subsidies they cannot compete with oil.

With respect to transportation fuels, the mapping out of biofuel possibilities is in its initial stages in Finland. The VTT has prepared a preliminary comparison of the production costs of various biofuels in Nordic conditions. At present, biological raw material is processed into vegetable oil-based biodiesel, ethanol and biogases, while the production of methanol and synthetic fuels based on biomass and the production of ethanol from lignocellulose-based biomass (straw, wood) are under development. Research is also underway into refining tall, oil-based products based on bio-oil produced via pyrolysis technology. These new technologies offer lower cost production possibilities in comparison with current products grown in fields. The comparison indicates that of biodiesel products, the production costs of rapeseed-based biodiesel would be highest, whereas the production costs of diesel produced with new technologies based on the reprocessing of forest industry by-products would be lower. As for gasoline, methanol would involve the lowest production costs, while those of grain-based ethanol would equal those of rapeseed-based biodiesel. Since costs depend on the size of production plants, very large plants could decrease cost levels significantly. However, the VTT estimates that Finland would not be able to achieve such a scale without importing raw timber. A comparison of domestic bioenergy sources indicates that cellulose-based solutions would be more promising in the long term than solutions based on grain.

According to VTT estimates, current biofuel alternatives would not be commercially viable without government subsidies, particularly in terms of taxation but, for now, the fuel tax on biofuels equals that of oil-based products. Engine technology sets special restrictions on the use of biofuels since engine emission control equipment in particular would not be able to handle poor-quality biofuel. The VTT projects that the share of transport biofuels based on domestic raw materials could rise to three per cent by 2010 in Finland. However,

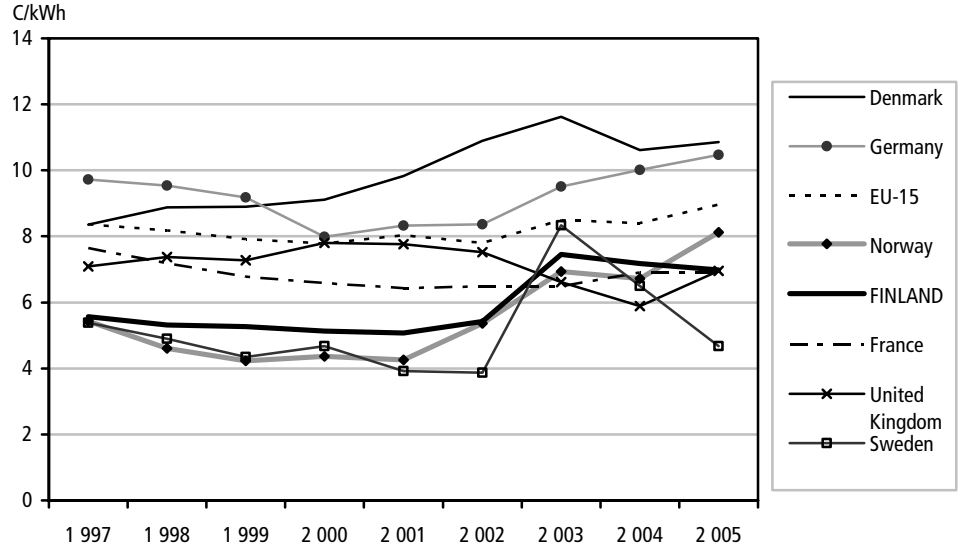
the possibilities of biofuel use extend beyond domestic production, and for the time being, it remains profitable for Finland to import biofuels.

4.5 Impacts of changes in energy prices and availability on industry

Several factors, some of them conflicting, will influence energy prices in the future. In addition to increasing world energy market prices, integrating markets are transferring various price fluctuations to the Finnish market. Securing energy supply has characterised Finland's energy policy, and the significance of this will probably not decrease in the future. Diversified use of primary energy will not, however, isolate the Finnish market from energy market price fluctuations. Instead, sufficient indigenous production capacity can help diminish, for instance, the risks involved in electricity supply, which could be of major importance to the energy-intensive process industry.

Until now, electricity prices in Finland have enhanced competitiveness rather than weakening it. Figure 4.4 shows a comparison of the electricity prices paid by industry in various countries.

Figure 4.4 Average electricity prices for industry 1997–2005.



Source: Eurostat.

It is obvious that climate policy will influence economic structures and economic growth significantly, but the cost efficiency of climate policy can be enhanced through economic steering methods. Emissions trading is another method for

enhancing cost efficiency, although the first experiences of the system have been contradictory. Emission allowance prices have increased to a considerably higher level than anticipated, and electricity consumers in particular are paying higher energy prices. However, such price signals are necessary in order to reduce energy consumption and generate investments in enhancing energy efficiency and cleaner production. Higher energy prices hamper the competitiveness of energy-intensive industries in comparison with countries that do not restrict emissions. For instance, a considerable share of competition for the Finnish steel industry originates in such non-EU countries.

Several studies assess the costs of climate policy in Finland. The estimated need for reductions in Finland in 2010 is 15–20 per cent in comparison with ordinary development. In order to achieve this objective, investments in energy production and energy savings are necessary in addition to emissions trading. National energy taxation is also striving to incentivise such investments. It is estimated that GDP will decrease by 0.5–0.9 per cent in comparison with the basic scenario, if the price of emission allowances is assumed to settle at €10–20 per tonne of carbon dioxide (see also Honkatukia ym. 2005). Higher prices are possible, however, which will raise costs. GDP will decline, above all because of lower consumer demand, due not only to the direct impact of rising energy prices but also to the income effect – consumers will spend a relatively high share of their income on energy – and lower income as a result of slower economic growth.

With regards to industry, energy intensity is the driver of climate policy impacts. In sectors with energy accounting for a high share of total costs, rising energy prices will weaken competitiveness and profitability, resulting in lower production. The impact will be greatest in metal production, where emissions trading will significantly increase the volume of emissions controlled.

The position of the paper industry will also suffer, albeit for a different reason than the metal industry. Fossil fuels account for a distinctly smaller share of paper industry energy consumption than that of the metal industry, but because the paper industry is a major electricity consumer, rising electricity prices will raise paper industry costs and its competitiveness will suffer.

The emissions trading system compensates for lower profitability due to weaker industrial competitiveness with the initial allocation of free emissions allowances. This can influence profitability as such, but the system creates uncertainty and expectations of higher impacts in the future. However, European competitors are all in the same position, and competitiveness should suffer less due to more countries joining the UN Climate Convention and emissions trading system. On the other hand, the Finnish economy is more open than average in the EU

countries, making the impact of price competition higher than average within the EU.

In the long term, changes in domestic competitiveness depend on the commitments formed after the Kyoto Protocol period. EU Ministers of the Environment have proclaimed that the Community goal could be as high as a 15 per cent reduction over the level of 1990 by 2010. If this commitment still applies to Europe only, Community competitiveness will naturally suffer. However, to prevent climate change, the aim should be to establish a system enabling as many countries as possible to join.

The Kyoto Process has only defined one way of reducing emissions, but there are many contractual arrangements that can provide more positive incentives than the Kyoto Protocol for developing countries and rapidly growing new industrial countries to join the Climate Convention. Since an objective applicable to European countries alone cannot suffice in curbing climate change, it would be very important both in terms of the environment and economy to examine all options available.

4.6 Conclusions

The IEA predicts that energy demand will continue increasing, but over the next few years the energy market will undergo several changes. According to the IEA, new sources of primary energy will be located in new areas, and most energy will originate in non-OECD countries. With respect to oil in particular, OECD countries will grow more dependent on imports, and the import of natural gas from the Middle East and transition economies will increase, particularly to Europe and North America, with Russia remaining the world's largest producer of natural gas until the 2030s. Hence, the world economy will become more sensitive to price shocks caused by disturbances in supply. In terms of disturbances in supply, the need for additional electricity production and transmission capacity in particular will contribute to uncertainty, as will oil refinery capacity in OECD countries and production capacity in certain producing countries. The European energy market is undergoing liberalisation and integration and, furthermore, many environmental and energy policy objectives, influencing both supply and demand, apply to the market and cause complexities in predicting the future of the energy market.

The Finnish energy market is closely linked to international markets, the other Nordic countries and Russia in particular, with electricity imported via Nordpool and directly from Russia accounting for a significant share of the total electricity supply. Regarding fossil fuels, Russia holds a major position as a supplier of both oil and natural gas. The inter-Nordic electricity market has raised electricity

prices in Finland over the past few years, and linking the Nordic market to the North European electricity market will enhance this trend. Growing demand both at home and in other parts of Europe is influencing import prices from Russia.

Energy price increases will weaken the competitiveness of Finnish industry if competitors' energy costs increase less than national costs. Rising energy costs due to EU emissions trading will undoubtedly raise prices in comparison with competitors outside Europe. The Finnish economy is more open than the EU average, and Finnish industry is more energy-intensive than average, which makes price competitiveness more significant here than on average in the EU.

In the current integrated energy market, the methods available for domestic energy policy are limited. Future electricity prices can be determined on the basis of production in Denmark or, increasingly, Germany, but not Finland. However, domestic energy policy can eliminate uncertainties related to energy supply. For the purposes of climate policy, energy policy could also be managed in such a way as to avoid multiple steering, which would require new steering methods for promoting goals other than those related to energy policy.

5 AGRICULTURE, AGRICULTURAL POLICY AND THE FOOD SECTOR

Agriculture is probably the Finnish industry that faces the greatest challenges in terms of pressure to adapt to expanding international trade. Due to Finland's natural circumstances, the nation's preconditions for agricultural production are less promising than in other EU countries, not to mention major producer countries outside Europe. Moreover, due to the small average farm size, average productivity is low. For these reasons, the operating preconditions of this sector depend critically on the European Union's agricultural policy which, in turn, is being influenced fundamentally by the liberalising process in world trade. The following is a review of the development prospects of Finnish agriculture, and partly of those of the food sector on a wider basis, based on the assumption that the WTO negotiations will proceed in line with the objectives set by the EU.

5.1 The starting point

EU agricultural policy primarily determines the conditions for agricultural operations in Finland, and the main impact of global development comes through this: the implications of WTO negotiations on the liberalisation of world trade on EU agricultural policy. In addition to pressures for change due to the WTO, the pressures to reallocate resources for other purposes within the EU budget are influencing the Union's agricultural policy.

Negotiations aiming at the liberalisation of world agricultural trade are covering three key topics: facilitating access to the market (lowering of tariffs), the reduction of domestic support and the lowering of export subsidies. Domestic support is divided into three categories: the so-called amber, blue and green boxes, of which reduction commitments only apply to subsidies in the amber box, classified as trade-distorting subsidies. Subsidies in the blue box are also classified as trade-distorting.

The previous negotiation round, the so-called Uruguay Round, concluded with an agreement to lower tariffs by an average of 36 per cent in developed countries and by an average of 24 per cent in developing countries, to reduce domestic trade-distorting support by 20 per cent in developed countries and 13 per cent in developing countries, and to lower the volume of subsidised exports by 21 per cent in developed countries and 14 per cent in developing countries, alongside reducing monetary export subsidies by 36 per cent in developed countries and 24 per cent in developing countries. The developed countries implemented these cuts by the end of 2000, and the developing countries did so by the end of 2004.

These negotiations formed the aforementioned blue box for domestic support, including the European Union's key agricultural support under CAP. Both LFA and environmental subsidies fall into the so-called green box, i.e. subsidies that do not distort trade. As for Finland's domestic support, some (milk-price support) are viewed as distorting competition most (so-called amber box), but because the amount of this support paid by the EU is already lower than the reduction commitment, Finland has not had to make any cuts here.

The objective is to continue the liberalisation of trade, but the WTO negotiating round that began in 2001, named the Doha Round, remains far from complete at the end of 2006. In fact, at the end of July 2006 the negotiating parties disagreed so profoundly that the negotiations were suspended.

In these negotiations, the EU aims to continue the liberalisation of agricultural trade, but wants to implement this in a manner that is fair from the European perspective and which observes, for instance, the principles of sustainable development. According to the original EU offer for the negotiations, issued in 2003, tariffs would be reduced by an average of 36 per cent, similar to the Uruguay Round, while export subsidies would be cut by 45 per cent and domestic trade-distorting support by 55 per cent. However, as negotiations proceeded, the EU was prepared to facilitate market access somewhat further. Similarly, the EU was prepared to negotiate on reducing domestic support. Furthermore, had an agreement been reached, export subsidies would have been abandoned entirely by the end of 2013.

The EU offer was largely based on the reform of its own agricultural policy, based on a decision made in 2003. The fundamental change in the policy was to decouple CAP support from production in order to make it more suitable for the support category (subsidies not distorting trade) that need not be reduced. The reform also contributed to cuts in domestic support by lowering the intervention prices of dairy products and beef. Similarly, the sugar sector reform, adopted in 2005, facilitated the EU's preparations for the WTO offer.

5.2 Change prospects for the agricultural produce and food market

The WTO scenario

At present, it seems possible that a multilateral WTO agreement will not be reached in the near future - in fact, it seems that the odds favour delays in negotiations or their being broken off altogether. The latter option would put the entire credibility of the WTO to the test and, in the worst scenario, the consequence could be trade wars instead of freedom of world trade. This can hardly be the objective of any negotiating party.

The outcome outlined in the following is based on the assumption that the negotiations can achieve a multilateral result within a certain time span, based on a solution of the type that the EU has been prepared to accept for the time being, given the limits of its CAP reform. Even if a WTO solution could not be reached, liberalisation of trade is inevitable in the future, but in this case it would proceed via bilateral and regional agreements.

As concerns market access, the assumption is that the reduction of tariffs will be agreed on a product-specific basis, with tariffs cut more intensively the higher tariffs are levied on products now. The average tariff cut would, at a minimum, be on a par with the one implemented after the Uruguay Round, i.e. over 36 per cent. In fact, the latest EU offer promised to cut the highest tariffs by 60 per cent. The developing countries will again be allocated lower tariff cuts than developed countries. However, the fact that all countries will be allowed to name products that are important to them, i.e. so-called *sensitive products,* for which tariffs can be cut considerably less than for other products, will diminish the actual impacts of tariff cuts. Developing countries will be allowed to name more products important from their own perspective, so-called *special products,* than developed countries. No tariff cuts are required for special products. Moreover, so-called bound tariffs will be the target of cuts, which means that tariffs will not actually decrease correspondingly, because the tariffs applied in real terms are much lower. For instance, EU bound tariffs averaged some 20 per cent in 2001, but the actual level was around 12 per cent (Jean et al. 2005).

The assumption is that domestic support will be decreased similarly to tariffs so that those who pay out more trade-distorting, so-called amber box support, would have to cut tariffs most. In addition to reducing amber box support, there is pressure for imposing reduction requirements on other forms of support remaining outside the green box, i.e. the blue box and *de minimis* support which remained outside reduction requirements after the Uruguay Round. For any reduction of the aggregate volume of these and amber box support measures, a system involving most cuts for those paying out most support would apply.

Moreover, blue box terms will be stricter for domestic support, the major change being to set a ceiling for the blue box support measures at 2.5 per cent of the value of production, no later than at the end of the implementation period. Green box conditions will also be made clearer, but that will not affect the conditions set for support decoupled from production in any substantial way.

As a whole, the European Union will be committed to reducing support outside the green box by over 70 per cent during the agreement implementation period, while the figure applicable to the United States will be over 50 per cent. This will exert pressure favouring the alteration of the structure of support so that a larger portion of this is support decoupled from production. The 2003 reform of

EU's Common Agricultural Policy anticipated this need, which means that were the WTO agreement reached, the need for cutting support coupled with production from its current level would hardly increase.

A gradual reduction of export subsidies is expected to lead to no export subsidies being paid for agricultural products in developed countries by the end of 2013. The annual reduction commitments for export subsidies are set so that they will be cut considerably in the first years of the implementation period. Developing countries will also eliminate export subsidies gradually, but will be allocated a longer transitional period. Various kinds of export credits, state trading enterprises, food aid and other measures parallel to export subsidies must be eliminated or altered so that their effect is not comparable with export subsidies.

Impacts around the world

Reductions of export subsidies and tariffs will cause changes in EU trading and agricultural policy. No analysis exactly in line with the current EU offer is available, but several other scenarios on how liberalisation of trade would influence world trade flows (see e.g. Kerkelä et al. 2005) have been prepared. These provide a sound basis for assessing the impacts of the EU offer. In most cases, the result is clear for EU agriculture: trade liberalisation would lower internal market prices, production and export volumes.

According to Kerkelä et al. (2006a), for instance the elimination of export subsidies would decrease producer prices at a maximum of one per cent only, and production at a maximum of six per cent, but exports would decline by as much as 20 per cent. Kerkelä et al. (2006b) have also prepared an alternative scenario involving not only the elimination of export subsidies but also a considerable reduction of tariffs (approximately corresponding to the EU offer). This indicates only slightly higher impacts, but they would vary considerably by country.

So-called developing countries, such as Brazil, Argentina, many ASEAN countries, South Africa and South American countries would be the most obvious winners if agricultural trade were liberated, while China, almost all African countries, Mexico, Vietnam, India and Bangladesh would suffer most. This is the conclusion that, for instance, Polaski (2006) came to in an extensive analysis covering several alternative scenarios with respect to the Doha Round's final result. Welfare analyses indicate that rich nations, too, would benefit from the liberalisation of world trade, even though the producers in these countries would suffer.

Contrary to popular belief, world trade in agricultural products and foodstuffs would decline in several cases, partly due to lower volumes of subsidised exports, but also due to the fact that rising world market prices would result in many foodstuffs-importing countries cutting down import volumes.

According to Bouët et al. (2006), developed countries would gain almost 60 per cent and middle-income countries almost 40 per cent of the additional income resulting from market access changes and the elimination of export subsidies in line with the probable WTO agreement (approximate to the EU offer), which would leave only less than two per cent of the additional income to the least developed countries. If the WTO were to reach an agreement in line with the EU proposal, entailing the totally free import of agricultural products by the least developed countries to the OECD countries (according to the previously described scenario, 97 per cent of developing countries' agricultural product exports to the OECD countries would be exempt from tariffs), developing countries would gain substantially more, i.e. approximately 10 per cent of the additional income.

Therefore, at least in the short term, world trade liberalisation would affect the welfare of the poorest nations negatively in the worst scenario. For instance, the welfare analysis results by Kerkelä et al. (2006b) indicate clearly that this would be the case. Without special arrangements for the least developed countries, it seems that those who should gain from world trade liberalisation would not.

Table 5.1 illustrates the welfare effects of further liberalisation of agricultural produce trade, and their trends and volume in relation to other operators. The estimates are mainly based on the abovementioned studies. A plus sign in the table indicates a positive impact, while a minus sign indicates a negative one. The number of signs illustrates the magnitude of change (the more signs the higher the impacts on welfare). In spite of the fact that the scenarios of the abovementioned studies involve many uncertain factors, which the researchers themselves have pointed out, the forecast changes listed can be considered indicative.

Table 5.1 Welfare impacts of agricultural produce trade liberalisation.

	Producers	Consumers	Taxpayers	Total
Finland	---	+	+	+
EU	--	+	++	++
USA	-	+	+	+
Major exporting countries	+++	-	+	++
The poorest countries	-	--	-	---
Total	+/-	+	+	+

However, in the long term the position of the poorest countries may be better than illustrated above, provided that they are able to develop their own production and make it competitive in the world market.

5.3 Changes in the position of Finnish agriculture in a changing operating environment

The higher than EU average negative impact of world trade liberalisation on Finland's agriculture, as established above, is crucially based on Finland's natural circumstances, which are more disadvantageous to agriculture than, for instance, those of the nearby Sweden and Denmark, not to mention the major agricultural countries in the EU and, especially, large agricultural producers outside Europe. Therefore, in a free trade environment, Finnish agriculture is more dependent on support than European agriculture in general. In addition to this, the average size of farms is smaller (and the farmland structure fragmented), which is certain to raise costs and hamper the competitiveness of production (table 5.2).

Table 5.2 Structural data from selected EU countries in 2003.

	Finland	Sweden	Denmark	France
Efficient heat summation ˚C of the growing season in the main agricultural area	800–1,300	1,000–1,600	1,400–1,600	2,000–2,600
Crop of wheat kg/ha (2000–2005 average)	3,474	5,996	7,237	6,999
Average farm size / area under cultivation, ha	29.9	36.6	54.1	42.5
Share of farms with over 50 hectares of area under cultivation	17%	29%	38%	44%
Number of dairy cows per dairy farm	17.2	41.4	75.0	35.6
Dairy farms with over 50 cows, share of production	6%	51%	87%	39%
Number of meat pigs per pig farm	214	342	691	171
Pig farms with over 1,000 pigs, share of production	20%	52%	64%	39%

Sources: Eurostat, Finnish Meteorological Institute.

Lower profitability is reflected in farmers' income levels, which over time decreases employment and production in agriculture. However, changes in both employment and production could remain minor in the short term, because farmers usually cease production as investment needs arise, in other words old capital stock is often used up despite poor profitability. Hence, with a WTO negotiation scenario corresponding to the EU offer, employment in agriculture would probably continue its relatively even declining trend, highly dependent on

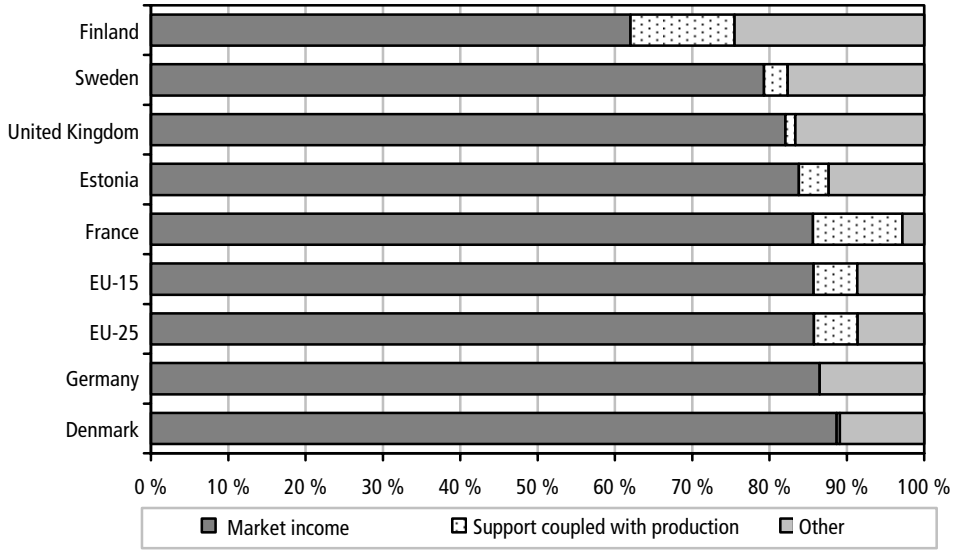
the aging process of agricultural producers. Correspondingly, production would undergo relatively minor changes as productivity continued to increase.

A more radical change in the EU support policy would potentially have major impacts

However, the situation could be fundamentally different if, either in connection with the WTO solution, or due to other reasons, the EU were to revise its support policy to a clearly greater extent than the outlined WTO scenario would require.

Lower domestic support in particular would influence the extent of Finnish agriculture, because Finland's natural circumstances render its profitability much more dependent on subsidies than is usual in the EU countries. The EU Commission has continuously advocated that Finland should decrease its domestic support (domestic support to Southern Finland in particular), and that support or a larger portion of it should be decoupled from production. At present, the majority of domestic support is directly coupled with production, either in the form of price support (milk) or animal unit-based support (production of meat and eggs). Also, CAP support is still partly coupled with production. In Finland, support coupled with production and support in general constitute the highest portion of agricultural income within the EU (Figure 5.1).

Figure 5.1 Agricultural income structure in selected EU countries in 2005.



Source: Eurostat, EAA.

Following the complete implementation of the CAP reform in all EU member countries in 2006, the share of support coupled with production has fallen both in the EU and in Finland, so that on the EU level only some 10 per cent of CAP support remains coupled with production. The share of CAP support coupled with production is highest in France, where it accounts for around 26 per cent (Agra Europe 2006), while in Finland, having accounted for over one third of all support in Finland in 2005, its share has fallen to approximately one fifth. Due to Finland's natural circumstances and high unit costs, the share of income gained from the market, even including support coupled with production, is so low for many products that it does not even cover variable costs. Against this background, the incentives for enhancing the efficiency of production are not necessarily very high, particularly with respect to cereal production.

Decoupling support from livestock production would probably change the production structure considerably. If support were decoupled from production in a manner similar to the EU's CAP reform, and converted to a hectare basis, the relative profitability of crop farming and livestock production would change markedly. On the one hand, this would accelerate the abandonment of livestock production and decrease production, and on the other it would probably enhance the concentration of production and lead to quests for efficiency in larger production units in domestic animal farming. Decoupling support from production would probably also influence the regional structure of production considerably, by concentrating production in certain areas faster than otherwise.

Factors enhancing competitiveness

The European Union's agricultural policy has so far been based on the principle that all member countries must be able to practice agriculture in the form in which it has been practiced there previously, and in order to adhere to this principle, the inevitable prerequisite is that Finnish agriculture will be allowed to enjoy higher aggregate levels of support than the European average.

This principle is obviously based on the presumption that practicing agriculture in various countries yields benefits beyond the actual foodstuffs produced, such as ensuring food security in various crisis situations, supporting economic activity and income generation in the countryside, preserving the landscape, ensuring the prerequisites for so-called organic production, adhering to ethical and sustainable development principles related to the treatment of animals etc. In addition, factors related to food quality can support domestic production.[1]

[1] For one reason or another, domestic foodstuffs are considered better than those of foreign origin in most countries. This may be due to greater certainty of good hygienic practices at various stages of the production chain. In Finland's case, the standard of hygiene is undeniably high, there are few animal diseases and levels of pesticide residues are extremely low in comparison with other European countries.

Many of these factors are partly linked to family farms as the predominant form of agricultural enterprise.

The aforementioned factors may, to a certain extent, influence consumers' readiness to pay more for foodstuffs produced in Finland under certain conditions than for other foodstuffs, but primarily this is a question of the aforementioned factors partly justifying subsidies to domestic agriculture.

Certain aspects of the pressure to revise the EU support policy may also support Finnish agriculture. This concerns the relationship between the so-called first and second pillars of the CAP, with first pillar subsidies comprising pure agricultural support, or CAP support, while second pillar support comprises rural development support, of which environmental support to agriculture and LFA support are the most crucial for Finland. Finland's share of first pillar support is very low today, because this support is based on the former reference crops, on the basis of which countries with high harvest levels, such as France, gain more support than countries with low crop yield levels. Although the present EU support is decoupled from production, its historical background has ensured that the situation has remained unchanged. The pressure to cut the EU's agricultural budgets may result in enhancing the significance of second pillar subsidies, and with Finland's share of these second pillar supports being higher than that of first pillar supports, Finland's relative position as a receiver of EU agricultural support would improve.

Bioenergy crops represent a new form of agricultural production which has emerged lately as a significant option in addition to traditional food production. The increasing production of bioenergy around the world is changing the situation in the international food markets. New, alternative uses of raw material are raising the world market prices of certain agricultural products, particularly cereals and sugar plants. This is evident on a more general basis in the bioenergy market, where demand for fuel wood has already increased markedly and prices have risen both in Finland and particularly in other parts of Europe.

Bioenergy is also creating new opportunities in Finland. According to the bioenergy scenario of the national cereals strategy, production of bioethanol would require 15 per cent of Finland's area currently under cereals, and production of biodiesel could double its current area under oil plants. As fields facilitate the production of thermal energy (reed canary grass in particular), in principle up to one fourth of Finland's arable area could be harnessed for energy production purposes.

In practice, such a structural change in production is hardly likely to occur at a rapid pace, because with the existing technology the costs of agricultural bioenergy production, particularly fuel production, are in most cases far too high

in comparison with fossil fuels, given current prices. In most cases, domestic bioenergy production is also clearly more expensive than production based on foreign raw materials.

However, the current technology would already seem adequate for the profitable production of biofuels, provided that the biomass can be utilised effectively in full. Altia's decision to invest in the production of ethanol is probably based on this, and NesteOil's decision on biodiesel production is an indication of the possibilities of profitable biofuel production in Finland with existing technology.

However, the use of biomass for the cogeneration of heat, and heat and electricity, probably offers greater immediate potential than liquid fuels, because transportation fuel processing as such requires the use of fossil energy. Emissions trading is motivating large power plants in particular to utilise renewable energy sources in power and heat generation, but for the time being, wood-based biomass is less expensive than agricultural biomass.

Advancing technology, the price trends of fossil fuels and the demands of climate policy may, however, change this scenario rapidly, which may entail more extensive opportunities for utilising bioenergy in Finland than those in view now.

5.4 Structural development of agriculture in various regions

Finnish agriculture has been subject to an uninterrupted, powerful trend of structural change for over 40 years, with the number of farms and labour input declining in line with the changing industrial structure in all developed countries. The number of farms was highest in the early 1960s, at over 300,000 after the after-war settlement policy, but the present number of farms is slightly under 70,000.

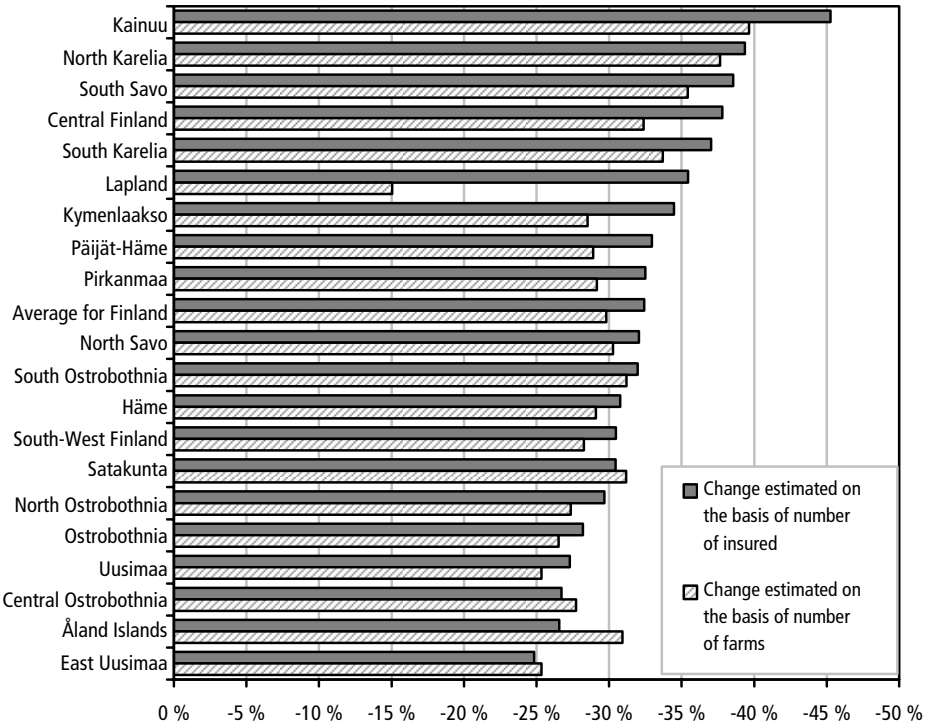
In the past ten years, i.e. during Finland's EU membership, the number of farms receiving subsidies has declined by some 25,000, which means that over one fourth of farms have gone out of production. This entails an average annual reduction of around 3.5 per cent. However, structural development does not involve a change in the number of farms alone, but changes in the production structure and regional location of farms too. In recent years, the predominant trend has been to increase the size of farms faster than before, with investment subsidies directed more towards large investments, and with subsidies accounting for a distinctly larger share of investment financing.

The following presents an initial basic scenario on structural development until 2013, based on actual developments within the previous ten-year period. The assessment is based on a study by Lehtonen and Pyykkönen (2005). Following our presentation of the basic scenario, we will predict the pressures for change affecting the basic scenario based on globalisation.

Basic scenario until 2013

Lehtonen and Pyykkönen (2005) forecast that the number of farms will decline to some 50,000 by 2013. Farmer surveys indicate a similar trend, linked with regional concentration of production. Livestock production in particular has grown in traditionally strong production areas, with certain milk regions in Ostrobothnia and Northern Savo producing an increasingly higher share of Finnish milk. The revised price ratio of cereals and green fodder is evident in the decreasing area under grass and the increasing share of cereals outside the traditional grain-growing regions. The number of farms has also declined differently in different parts of the country, with more remote regions experiencing a more intensive structural change than the national average (see Figure 5.2).

Figure 5.2 Change in the number of farms 2004–2013, based on two different methods.



Source: Lehtonen and Pyykkönen 2005.

Due to the declining number of farms, less labour is needed. In 2005, agriculture employed a total of some 153,000 people, as statistics by the Information Centre of the Finnish Ministry of Agriculture and Forestry indicate. With the majority of farms operating on a part-time basis, according to Statistics Finland, in terms of man-work-years agriculture employed around 91,000 persons, or 3.9 per cent of all those employed in Finland. The number of employees has fallen by some 4 per cent a year and no change is in view with respect to this trend. Work is being replaced by capital on a continuous basis, and by 2013 the number of employed should fall clearly below 70,000, in which case the share of agriculture with respect to the aggregate workforce would only be some 2.5 per cent.

Hence, productivity has clearly increased, with an annual increase of over 3 per cent in agriculture in the past ten years, the corresponding figure for the entire national economy being 2.4 per cent. The development of capital productivity has not been equally positive (Suomen maatalous 2006, Myyrä & Pihamaa 2006), but in livestock farming, where large investments have been made, overall productivity has clearly increased.

Pressures for change affecting the basic scenario as a consequence of globalisation

If the above estimate is updated with the described globalisation pressures, the conclusions are obvious. First of all, the number of farms will decline at a somewhat faster pace than projected in the basic scenario, with the number of farms and production declining more rapidly than estimated, particularly in milk production. However, the adaptation process would still be slow because farms would use up their existing capital stock, and demography would be the predominant factor determining the pace of giving up farming.

Globalisation pressures will be more obvious in terms of generational change activity and production decisions. Therefore, a more intensive focus on livestock production is probable with respect to the basic scenario, particularly due to the lower competitiveness of agriculture in remote areas within the country.

On the other hand, the centralisation of production will create opportunities for the specialisation of farms in a new way, and for revising their operating methods in other respects. In practical terms, large livestock farms will focus more on indoor production and outsource the cultivation of fields. The use of contracting services in field farming will increase on smaller farms, because investments in machinery will no longer be profitable for them. Therefore, this development may also create jobs in rural areas. However, the possibilities for outsourcing vary in different parts of the country.

According to Lehtonen and Pyykkönen (2005), lower domestic subsidies for livestock production would contribute to faster termination of production on small farms in particular, where production costs per unit produced are higher than in larger farms, and where the possibilities to invest profitably decline to a relatively greater extent alongside falling product-specific profits than on large farms. However, there would be a delay in this becoming evident in structural development. The differentiation of producer prices, either regionally or based on farm size, would speed up this type of change. Due to the competitive situation in industry, the pressure for such a change in pricing exists in that sector.

Correspondingly, the number of employed would decline somewhat faster than the basic scenario indicates, with still larger investments, which would also result in higher increases in the productivity of labour as a consequence of specialisation and outsourcing.

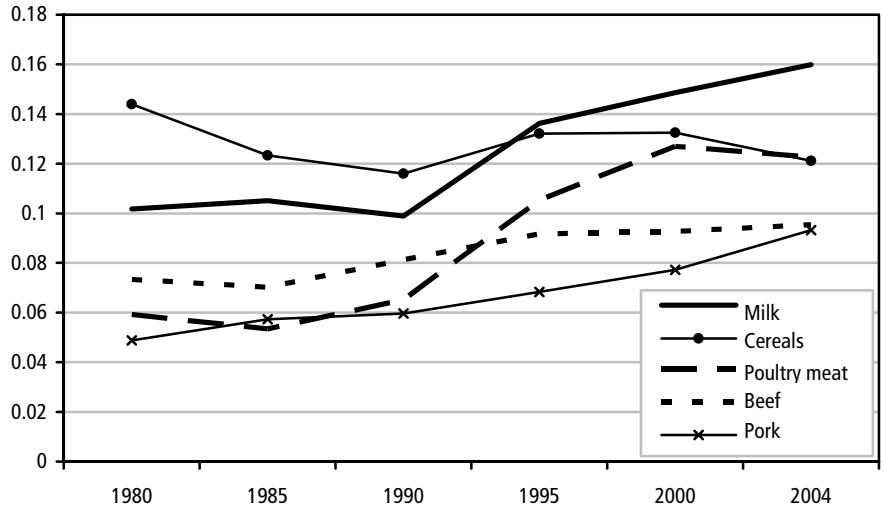
5.5 Challenges to the food industry

Traditionally, Finnish agriculture has been closely linked to the Finnish food industry: the majority of food industry raw material is of domestic origin and producers own a considerable share of the industry. This link will probably weaken due to competitive pressures caused by globalisation in the food industry, but hardly decisively. The majority of the food industry will continue to require domestic raw materials, and agriculture cannot become a significant exporter of raw material.

The links between national agricultural production and the food industry are tight in other countries too, because the majority of production is consumed in the home country. As a rule, less than 20 per cent of aggregate production is exported. However, trade in livestock products in particular has increased both in absolute and relative terms in the last two decades (Figure 5.3).

Internationalisation of trade is a key factor in transferring the impacts of globalisation both to the food industry and through it to agriculture. Retailers are purchasing goods on a more international basis, and their negotiating power with suppliers is constantly increasing. This will inevitably intensify competition in the home market even if no more foreign retail chains enter the Finnish retailing sector. However, it is possible that more international chains will launch operations in this country.

Figure 5.3 The share of world trade of certain agricultural products.



Source: FAO.

Increasing competition in imports puts pressure on enhancing exports. Given increasingly intensive competition, particularly in the EU internal market, Finland cannot export any products with a low degree of upgrading. Instead, the degree of upgrading must become higher, especially in terms of enhancing the quality of products. Functional foods are a potential sector, where thanks to the heavy focus on research in some sectors, the Finnish food industry could be highly competitive. Its high level of hygiene in raw material production, its relatively few problems in terms of animal diseases, and low pesticide residues support the possibility of enhancing added value. Correspondingly, an increasing share of "bulk product" consumption is targeted at imports.

Since domestic consumption volumes of foodstuffs cannot increase very intensively, companies must seek growth either through increasing their market share, or by going international. Then again, market shares cannot be increased without major structural arrangements both in Finland and beyond. Since production volumes are not increasing, production plants are being closed and production is focusing even more than before in Southern Finland, closer to consumers and the export market. There is obvious pressure in this direction, with the current capacity utilisation rate of the food industry at only slightly over 75 per cent, clearly lower than in many other industries.

Competition pressures can also be reflected in the region-specific or production unit size specific differentiation of producer prices, as procurement costs become a competitive asset. The food industry is largely controlled by farmers and, until now, one of the basic principles of the Finnish co-operative system

has been to ensure equal prices for all producers. However, under the growing pressure of globalisation this principle will be put to the test.

One way the industry can respond to the internationalisation of trade is to become international itself. Finnish companies have a history of success in terms of establishing themselves abroad and operating there, which means that the liberalisation of trade is opening up opportunities for the Finnish food industry. The internationalisation of industry is also facilitating the flexible transfer of production from one country to another. Certain industrial sectors are dependent on local raw materials (such as the dairy industry to a large extent), but others are fairly free to choose what to produce and where. Consumer tastes and habits are highly local in part, which ties industries to each country. On the other hand, the production of different product varieties does not necessarily require local production.

The intensive growth in consumption in the emerging economies of Russia and Asia (including China and India) provides a regionally significant opportunity for the food industry. Purchasing power is still growing clearly in these countries and their markets are substantial. This contributes to increasing demand in the world market, which provides a reason to expect rising prices. In such a case, competition between imports from non-EU countries would not intensify this process greatly, resulting in a more stable situation in the EU internal market. From the Finnish perspective, growing demand in Russia in particular represents major opportunities.

5.6 Conclusions

The structural change in agriculture will continue under all future scenarios currently on offer, entailing a lower number of farms and declining labour force participation rates in agriculture, with production concentrating not only on larger units but regionally within some sectors. Production will vanish in particular from remote rural areas. According to the basic scenario, the number of farms will decrease from approximately 70,000 in 2005 to some 50,000 in 2013 and employment, in terms of man-years, from 91,000 to fewer than 70,000, i.e. around 2.5 per cent of those employed. As a result of the adaptation process, productivity will increase, which will enhance the price competitiveness of the industry.

Liberalisation of agricultural trade in the projected way, closely linked to globalisation, will speed up the process in comparison with a situation where trade did not undergo liberalisation. However, as a whole, the change will not be dramatic as such because the EU agricultural policy has largely adapted to the projected WTO solution already.

The pressure for further change will be considerably higher if subsidies to Finnish agriculture, particularly its share of domestic support, are cut beyond the level required by the anticipated WTO solution, and changed further in a direction independent of production. The direction of changes will be similar to the abovementioned. Although it is difficult to produce accurate estimates, the changes may be markedly greater, particularly if cuts in subsidies coupled with livestock production lead to marginal costs exceeding marginal income from the market and subsidies in large production areas.

However, global development entails features tailor-made for supporting the retention of agricultural production in Finland. One of these factors, which has already materialised to a certain extent, is the increasing use of bioenergy. In the near future, this will be based primarily on wood-based biomass in heat and, to a certain extent, power generation. This will help to create not only full-time entrepreneurship in rural areas, but also to provide those engaged in agriculture with income opportunities based on part-time work. Later on, as technology advances and the prices of fossil fuels increase, agricultural biomass will probably provide opportunities for profitable production. However, the utilisation of new opportunities will require extensive research and product development.

In addition to this, values related to food safety, health aspects and widely accepted ethical production methods may become significant in a manner that supports the competitiveness of Finnish agriculture in conditions where agricultural trade is more liberalised than today. In this respect, the utilisation of new opportunities requires substantial investments in research and development, and solid marketing competencies.

6 GLOBALISATION AND REGIONAL DEVELOPMENT IN FINLAND

An important consequence of globalisation has been the pressure on production to cluster in areas of high market potential, both globally and within Europe. For the remote and sparsely populated Finland, this may mean an extensive regional structural change. The following is an account of recent regional development within Finland and the role of globalisation in this process. This is followed by a discussion of future trends and challenges in regional development.

6.1 Forces behind regional development

In the long run, the liberalisation of economies and increasing integration have benefited the countries concerned. Nevertheless, different economic sectors and regions within a country are capable of utilising various aspects of globalisation in different ways. For certain regions, the disadvantages may outweigh the advantages, at least in the short run. Some other regions, on the other hand, may be able to derive the maximum benefit from globalisation.

A flexible economic environment helps regions adapt to the situation, by means of regional wage flexibility and labour mobility. In Finland, regional wage differences are small, and experience so far indicates that labour mobility has failed to reduce regional disparities. Regional economies have adjusted to various region-specific employment shocks through changes in labour force participation and unemployment (Böckerman 1998, Pekkala & Kangasharju 2002). In so far as the shocks caused by globalisation are region-specific, it is likely that they will be dealt with correspondingly.

The most prominent phenomenon related to regional development is agglomeration, which takes place both at national and regional level. There are several factors behind agglomeration, and it is not easy to determine the corresponding cause-effect relations empirically. It is possible that agglomeration is triggered by various localisation benefits related to concentration within a single sector, or by more universal urbanisation economies which are related to the size and nearness of the market, as well as to the external effects caused by a number of companies located close to each other. If companies are clustered close to each other, the corresponding markets are likely to become deeper. In such a case, both customers and intermediate product suppliers are located close by, which has a positive effect on all the companies in the region, generating so-called external scale economies. Knowledge-intensive sectors and workers are likely to benefit from agglomeration, because they are often capable of utilising the externalities

associated with this phenomenon. Geographical clusters can also be assumed to reduce business-related search costs, whether it is suppliers, services or employees that are needed. Similarly, clusters and the resulting co-operation may promote information and knowledge transfer.

Different operations, sectors and jobs are vulnerable to agglomeration in different ways. Agglomeration is typical for sectors with production scale economies, market power, close relations with intermediate product suppliers, a high proportion of mobile production factors (capital or skilled labour instead of e.g. land or unskilled labour), rapidly changing production processes and tasks (e.g. ICT sectors), and high value added (see e.g. Ottaviano & Pinelli 2004).

However, agglomeration can also be caused simply by the concentration of natural resources in a certain geographical area, or internal production scale economies. It is for these reasons that a number of sectors within traditional industry, such as the forest industry in Finland, keep clustering in certain regions.

6.2 Globalisation and the location of production

The same factors that cause global reallocation of production and differentiated growth patterns across countries are also important at regional level, within countries. Of special significance are "transportation costs" which are related to the transportation of goods, people and ideas, and which have been cut down by technological development and the tendency to deregulate administrative procedures. These costs have their impact on the concentration of production and the cost-effectiveness of the location. However, there is no linear relationship between these parameters.

In economic geography, several theoretical models describe the process of agglomeration as a spiral. The starting point is the classic article by Krugman (1991), in which it is pointed out that low transportation costs result in agglomerated production, while high transportation costs lead to decentralised production. Ottaviano and Pinelli (2004) distinguish between five effect types with respect to regional structure caused by "transportation costs", on the basis of the forces behind the agglomeration and decentralisation of production:

1) Easier communication and lower communication costs change the level of search and matching costs in business. In particular, various rapidly developing knowledge-intensive sectors typically have rapidly changing needs to find e.g. customers, new employees or partner companies. In this respect, decreases in communication costs diminish the need for agglomeration and decrease its positive effects. On the other hand, it has also been argued that these are actually made more powerful, as

the management of close, face-to-face contacts becomes faster and more efficient.

2) Lower trade costs and lower institutional barriers decrease costs in the trade of products and services. This may decrease the importance of nearness in trade and thus decrease agglomeration economies. It also increases competition in the sense that due to the growing role of the markets outside the region, the intensity of competition is no longer dependent on local markets.
3) Lower trade costs, lower institutional barriers and lower communication costs combined make it easier for companies to split and transfer production between units in different regions. Among other things, this facilitates specialisation within different company units and reduces offshoring costs.
4) Lower communication costs foster personal interaction and knowledge transfer, and decrease the importance of nearness. This may decrease agglomeration economies.
5) Lower trade costs, lower institutional barriers and lower communication costs also facilitate the relocation of companies, which makes them more footloose. According to Ottaviano and Pinelli, to a certain extent this applies to educated workers as well. In itself, this has no clear effect on agglomeration economies.

The forces behind globalisation thus affect the regional localisation of production in different ways, depending on the case. However, as far as "transportation costs" are concerned, these effects can be assumed to be non-linear, due to the fact that while lower trade costs, lower institutional barriers and lower communication costs first increase or accelerate agglomeration, they will later, while still falling, decrease the significance of agglomeration economies. However, theories say nothing precise about the number or size of concentrations or clusters, or about the level of "transportation costs" at which agglomeration economies actually become decentralisation economies.

In any case, in principle, the process of globalisation will at a certain point reduce agglomeration economies. On the other hand, globalisation is connected to the rapid development of knowledge-intensive sectors such as information technology, which tend to reap benefits from agglomeration. Indeed, in the 1990s the development of communication technology together with reduced costs prompted a discussion on whether the improvement of information technology would facilitate the increasing decentralisation of production, due to its diminishing effect on the significance of geographical distances (see e.g. Gillespie et al. 2001, Mariussen 2004).

In economic geography, there is also an ongoing discussion about the importance of nearness in the transfer of so-called silent or empirical knowledge and the extent to which it can be regarded as a precondition for the success of

e.g. innovation activities (see Boschma 2005). The exchange of empirical knowledge presupposes face-to-face interaction and, according to the classification by Autor-Levy-Murnane (2003), the related tasks are non-routine, which makes them difficult to decentralise within a country or offshore abroad.

6.3 Regional development in Finland and globalisation

Regional development in Finland has been influenced by a long-term and permanent tendency towards the agglomeration of both economic activities and populations into bigger clusters. However, there is a clear variation in the speed and precise nature of agglomeration. In the 1980s, regions with lower production and a lower income level on average grew faster than regions with a high income level (see e.g. Ottaviano & Pinelli 2004). The recession in the 1990s marked an end to a long period of regional economic convergence, and in the late 1990s the gaps between production levels per capita began to grow again.

On the other hand, in the 2000s regional income disparities seem to have narrowed. In 2000–2004, the level of household primary income[1] increased more in low-income regions than in high-income regions (see Figures 6.1 and 6.2.). As far as the value added is concerned, this turn is not as clear, but there is still a clear indication that regional divergence has stopped. When analysed more closely, this would seem to be caused by smaller disparities in productivity. It seems that employment rates have continued to improve slightly more in regions (NUTS4) with a high GDP/capita ratio.

The economic boom in the 1990s was accompanied by a structural change that involved the rise of the electronics industry to a dominant position, and various measures to rationalise production in other sectors. This raises the question of the extent to which regional development was also connected to the rise of ICT sectors and therefore to globalisation, or whether it was a reflection of the recession of the 1990s, or whether it reflected the interruption and subsequent temporary, post-recession acceleration of the "normal" agglomeration process of a production structure that had been subject to decentralisation during the recession.

[1] Primary income refers to income that is received by households in return for their contribution to production, e.g. wages, capital income and forestry income. In this case, assignment profits and losses as well as employee option income have been included, since they have a significant impact on regional income disparities.

Figure 6.1 Relationship between household income growth and regional (NUTS4) income level in 1995–2000.

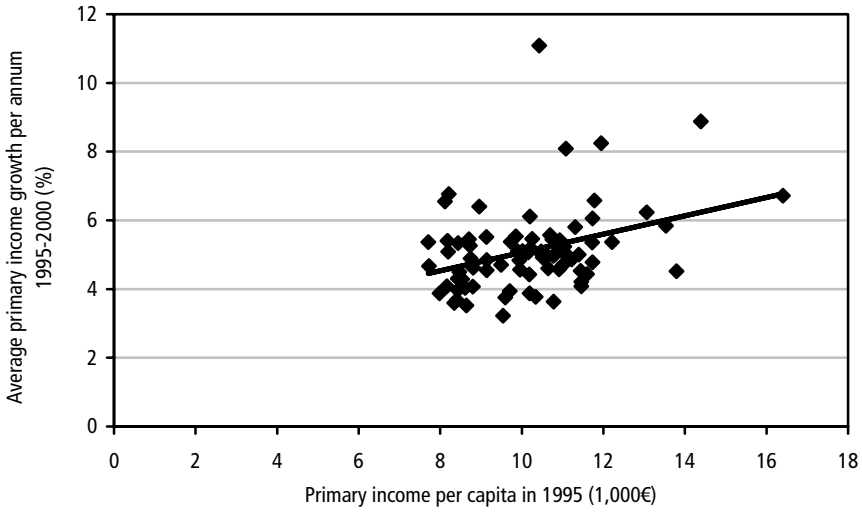
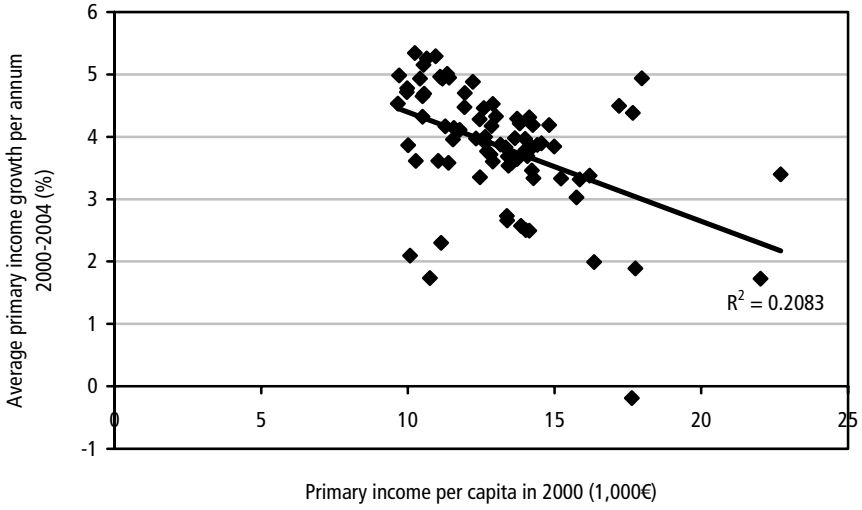


Figure 6.2 Relationship between household income growth and regional (NUTS4) income level in 2000–2004.

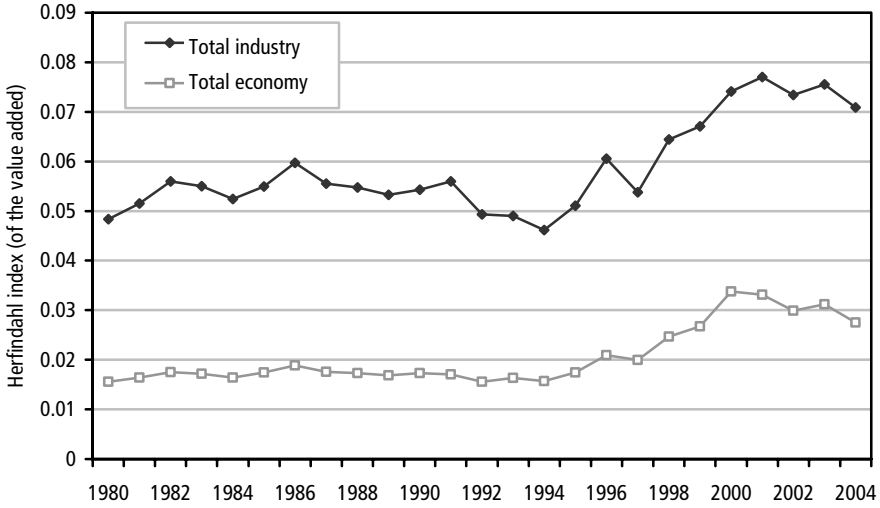


Industrial production and, to a certain extent, service sectors were concentrating heavily the 1990s. According to the Herfindahl index[2], however, the process of concentration ceased (Figure 6.3.) in the early 2000s, while migration was decreasing and the rate of employment improvement was slowing down and

[2] The Hehrfindah index is the region-specific sum of the squares of the value added share of the sectors, i.e. $H = \Sigma^{n}_{i} (x_i/X)^2$, n = number of regions, x_i denotes sector-specific production located in region i, while X denotes the total production in the country. The closer the index value is to 1, the more concentrated the sector, or the more specialised the region.

finally stopped. The concentration process slowed down or ceased in nearly all sectors that had developed remarkably in the 1990s: real estate and business services, wholesale and retail trade, traffic and telecommunications as well as catering and accommodation services. Compared to these, the development of most other sectors has been stable. Finance and insurance services are a clear exception, since the concentration process in these sectors was still intense in the 2000s.

Figure 6.3 Regional (NUTS4) concentration of production in 1980–2005.



6.3.1 Which regions have succeeded?

In the 1990s, when Finland became remarkably specialised in the production of high technology products, production growth was most intense in the Helsinki Metropolitan Area as well as in other major university cities. Furthermore, several regions dominated by a single industrial sector showed high growth. Thus, in addition to electronic industry clusters such as Salo, a number of municipalities with paper industry production became stronger. The fact that the highest production growth rates were limited to only a few regions is not just something peculiar to the ICT era of the 1990s, but this phenomenon was observable as early as in the 1980s when the Helsinki Metropolitan Area served as the growth engine. In the longer run, regions with a diversified production structure have been capable of utilising market demand in particular during rapid economic growth (Huovari et al. 2006). This can be regarded as some kind of proof of the existence of general urbanisation economies.

Even though some regions with a specialised production structure showed rapid growth in total production in the 1990s, the results by Tohmo (2005) suggest that in 1995–2001 there was little interaction between specialisation and the

growth of production at regional level. On the other hand, the regions growing fastest in the 2000s do not constitute a uniform group, and the Helsinki Metropolitan Area, for example, does not belong to it. The results by Piekkola (2006) suggest that the factors facilitating growth in the 2000s do not differ remarkably from those in the late 1990s.

The growth competitiveness index by Piekkola emphasises the know-how of the region's top companies, various factors related to regional innovativeness (research and development expenditures, patents, proportion of innovative work positions, share of value added in high technology) and the accessibility of the region (airport connections, industry's connections abroad). However, growth competitiveness explained only about 30 per cent of the growth disparities in 2003–2004, taking into account the size of the region (Piekkola 2006). This may be partly due to the shortness of the period, since annual variation in production growth tends to be high. Piekkola's results, however, correspond to the observation made by Huovari et al. (2006) that a high fraction of Finnish regions develop roughly at the same uniform rate of growing production, while a small number of regions with a diversified production structure or a strong industrial base tend to outperform average regions, in particular during economic booms.

In the 1990s, the idea emerged from discussions on regional development that the change in information technology would decrease agglomeration economies and facilitate the decentralisation of knowledge work as well as the promotion of remote work. This has not happened in Finland. Remote work has not increased significantly, even though routine call centre type work has been decentralised to a certain extent (Ministry of Labour 2004). Most remote work is done in urban areas. As a matter of fact, it is probable that the change in communication technology will not promote the decentralisation of production within the borders of developed countries such as Finland to the extent that was originally thought.

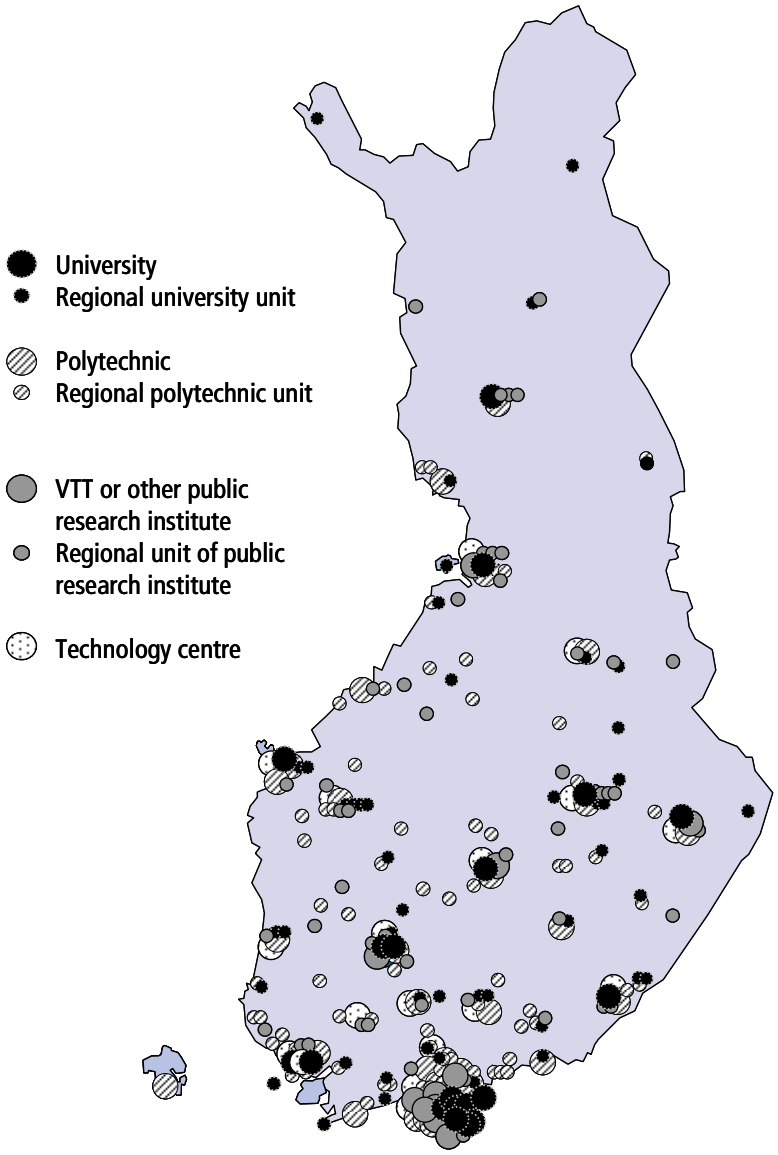
The role of remoteness has perhaps too often been regarded as the most significant barrier to the development of remote regions. Gillespie et al. (2001) refer to the possibility that instead of remoteness, the real problem is the weak competitiveness of companies located in remote regions. This is due to the fact that they are not subject to competitive pressure in the local market, such pressure being typical to companies located in agglomerated regions. If distances in themselves do not constitute the main barrier to development, the development of communication technology alone will not provide a boost sufficient to change the direction of these regions. On the other hand, in a study on the efficiency of the production of municipal services in Finland, it was pointed out that distance to big population clusters is an important explanatory variable for municipal inefficiency, unlike e.g. the population size of the municipality (see Loikkanen & Susiluoto 2005).

It is clear that the agglomeration economies brought about by urbanisation are not the only force behind the agglomeration of high technology production, as proved by the formation of production clusters in Salo and to some extent in Oulu. According to Mariussen (2004), current ICT production in Finland and Sweden is located in cities that have been homes to the electronics industry from the beginning. This development was promoted by the existence of various education and research organisations in such areas. Since the formation of clusters is due to historical reasons, it is not easy to create a corresponding universal development model. However, the appropriate development efforts with a view to technology and market development may provide regions with an unfavourable location and size with a significant and long-term boost. Oulu is an excellent example of this as well.

Studies on the regional impact of higher education institutions have pointed out that short geographical distances promote knowledge transfer from universities to companies (see e.g. Mansfield & Lee, 1996; Lievonen & Lemola 2004). Universities provide companies, even in small towns, with highly-educated employees as well as opportunities to participate in research co-operation and utilise the information produced and disseminated by universities. A higher education institution, or a cluster formed around it, is thus capable of creating new business in the region and attracting new companies to it.

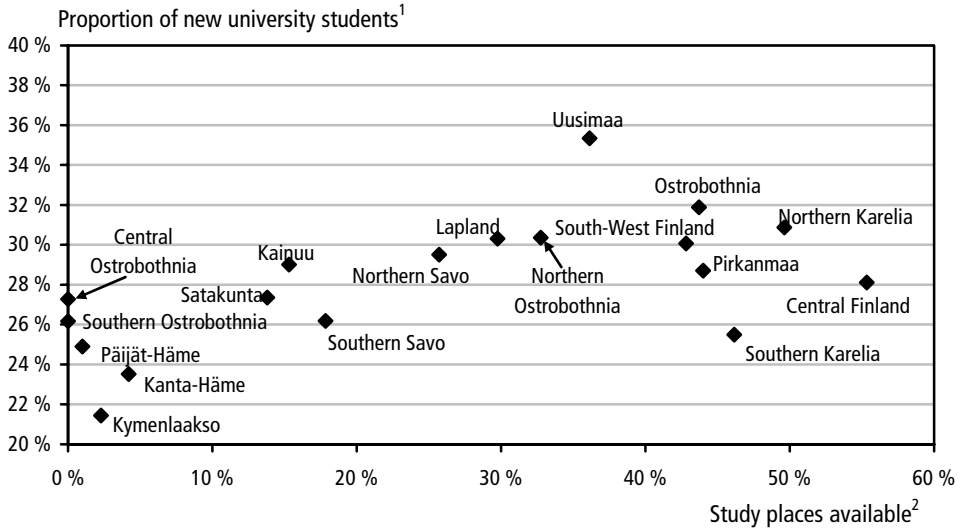
In Finland, there such effects have been strived at by an extensive regional network of universities, polytechnics and research institutions, which has been supported by Regional Centre and Centre of Expertise Programmes in the implementation of regional innovation policies (Figure 6.4). At the same time, the extensive network of higher education institutions has served well to bring students to higher education institutions. The proportion of those starting university studies (at any university) is lowest in counties without university places (Figure 6.5). The extensive network of higher education institutions has thus succeeded in supporting the extensive utilisation of talent reserves, in addition to promoting social mobility and equality.

Figure 6.4 The network of universities, polytechnics, public research institutions and technology centres in Finland.



Source: Tekes.

Figure 6.5 University admissions and available university places per region.



[1] The number of new university students living in the region in the previous year, in relation to the age group of 19-21 years.
[2] The number of new students at thed universities located in the region , in relation to the age group of 19-21 in the region.

Source: Ministry of Education.

6.3.2 Regional disparities exist in productivity as well

From the viewpoint of production growth and concentration, it seems plausible to draw the conclusion that while a few big, diverse centres and some of the most vital university regions have managed to benefit from the opportunities brought about by globalisation and the related technological development and reduced communication costs, these have not affected more remote regions. Production in such regions has not changed remarkably when compared to average ones.

Indeed, production in Finland is clustering in areas with higher productivity than average. Higher productivity in big cities may result from urbanisation economies, i.e. the fact that companies are able to utilise a wide service selection and diverse markets (external economies), as well as from localisation economies, i.e. the concentration of production within a single sector in a given location. In accordance with most international studies, the study by Huovari, Kiander and Volk (2006) suggests that in Finland also, big regions and units are more productive than small ones. In Finland, doubling the area means a 4 per cent increase in productivity, whereas doubling the average size of regional plants increases productivity by 3 per cent. The trend is clear, but size is still not very significant, as the annual increase in overall productivity is of a similar magnitude.

In Finland, regional disparities in productivity are significant, and they are larger in manufacturing than in the service sector (Huovari ym. 2006). Regional disparities cannot be explained by different production structures, for most of the disparities stem from productivity differences within sectors.

6.3.3 Does globalisation affect the labour market?

In rapidly developing sectors, production focuses and also locations can change quickly and flexibly on a global basis. In developed countries, globalisation is associated with the reduction of the share of manufacturing employment, and it is possible that service production may be offshored at an increasing pace. Indeed, whole plants in Finland have been offshored to lower-cost countries in the 2000s. There is no extensive information available on the regional distribution of the offshored jobs within the country. Manufacturing plants are often located outside big cities. This raises the question of whether globalisation is contributing to the loss of jobs and increased unemployment in peripheral areas and manufacturing-based regions, due to the fact that new knowledge-intensive jobs are located in centres. In the 1990s, when the ICT sector was expanding and the economy was recovering from the recession, a high degree of industrialisation correlated strongly with increased employment. Due to the development of information technology and the liberalisation of markets, jobs in sectors such as finance and telecommunications were vanishing everywhere outside big cities in the 1990s (Huovari & Volk 2004).

In the early 2000s, this correlation turned, and the growth of employment in manufacturing-based towns has been slower than average. However, this correlation is not too strong, and due to the slow process of data compilation, the observation period is only four years. On the other hand, it seems that there is no correlation at all between changes in the unemployment rate and the share of manufacturing jobs. This may be explained by the fact that the size of the labour force has decreased in several regions, due to migration and the ageing of the population.

The development of some individual towns is insufficient to prove that there is a clear correlation between offshored jobs and regional unemployment. It seems that during the economic boom, some of the jobs lost have been replaceable by other sector jobs, especially in towns located close to a larger labour market area.

Working areas have expanded, and commuting to another area has increased markedly, especially around big city areas (Nivalainen 2006, Myrskylä 2006). While the share of workers commuting to another municipality was 25 per cent in the late 1980s and early 1990s, this figure rose to 33 per cent in 2004. There

are a total of 750,000 workers commuting to another municipality and 140,000 to another county (NUTS3), which is a relatively large number compared to the annual number of those migrating to another municipality (290,000) and to another county (120,000). Of the latter, around 50 per cent are employed and unemployed.

In the more remote regions, jobs have been disappearing in such sectors as agriculture, telecommunications and financing, due to the constant rise in productivity. This stems from general technological development and it has affected almost all regions. Furthermore, certain towns have been subject to the offshoring of production. In remote regions, the unemployment rate has been counterbalanced by migration out of the region and partly also by the decrease in the size of the labour force resulting from the ageing of the population. For example, in 2004 alone, Kemijärvi, which is located in northern Finland, lost as many as 260 jobs, mostly in industrial subcontracting, which amounts to 8.5 per cent of the total number of local jobs. However, the unemployment rate in Kemijärvi remained unchanged, staying at its usual high level, even though the total number of jobs decreased by almost 200. This accords with the results obtained by Pekkala and Kangasharju (2002), who suggest that region-specific shocks have only short-term effects on unemployment and participation rates, while its effects on employment are permanent. Such peripheral regions located far from the biggest centres are vulnerable to occasional changes. The example of Kemijärvi highlights the fact that during a certain phase of globalisation, a host of new jobs may emerge in some areas, but they may also be offshored quickly. The mobility of jobs may be a problem, especially for regions with a heavy specialisation in a single sector.

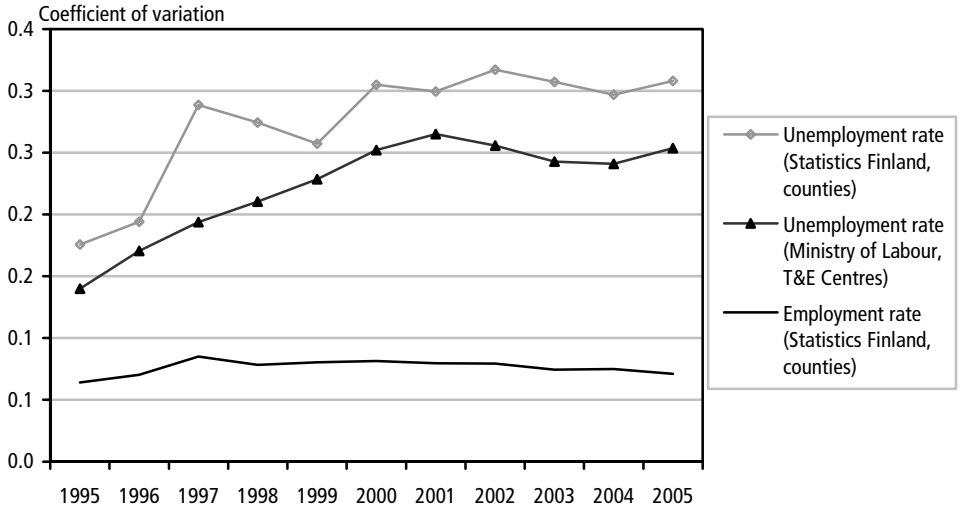
In the 2000s, the loss of manufacturing jobs is hitting several middle-sized regions that can be classified as industrially strong. Such regions include Varkaus, Äänekoski, Heinola, Kotka-Hamina, Kemi-Tornio, Imatra, Pori and Rauma. Some of these are dominated by the forest industry, while some others, located by the sea, are characterised by e.g. port operations. This development may reflect the regions' insufficient ability for renewal at least in the short run, in the face of sudden and dramatic changes in the main sectors.

The basic picture of successful regions in the 2000s is similar to that in the 1990s, i.e. it is still the case that regions in a cycle of positive development keep succeeding. The total picture of the evolution of employment in the 2000s, however, is different from that of the 1990s. Regions with the greatest increase in the number of jobs in the 1990s have not managed to maintain their good performance in employment growth. Instead, regions with poor employment growth in the 1990s have managed to create new jobs during this decade, due to the growth in domestic demand. In the 1990s, certain regions managed to benefit from the global market created by the technological revolution, whereas

the economic growth of the 2000s has been based on domestic demand, which has increased jobs in such sectors as wholesale and retail trade, construction and transportation. Regional disparities in the growth of jobs have narrowed due to the considerably more even distribution of such jobs throughout the country, compared to manufacturing and especially high-technology jobs.

To a certain extent, developments in the 2000s can also be indirectly associated with the progress of globalisation. This is because global competition has remarkably reduced the prices of high-technology products and certain services, which has made increased consumption possible. This, in turn, has benefited all regions. Indeed, regional disparities in employment and unemployment rates have remained stable since the first years of the decade (Figure 6.6).

Figure 6.6 Development of regional (NUTS4) disparities in unemployment and employment in 1995–2005.



Sources: Statistics Finland, Ministry of Labour.

6.4 Migration affects the formation of human capital

The existence of first-mover advantages is typical of the new economy. Innovative and dynamic companies may identify opportunities for success earlier than others. In such cases, an adequate supply of skilled labour is required for the formation of successful regional clusters. In particular, the location of research-intensive services and manufacturing is determined by the supply of skilled personnel and the related location of universities. Correspondingly, as Midelfahrt-Knarvik et al. (2000) suggest, the location of non-manual, labour force intensive sectors is affected by the proportion of those with intermediate or higher education among the total labour force.

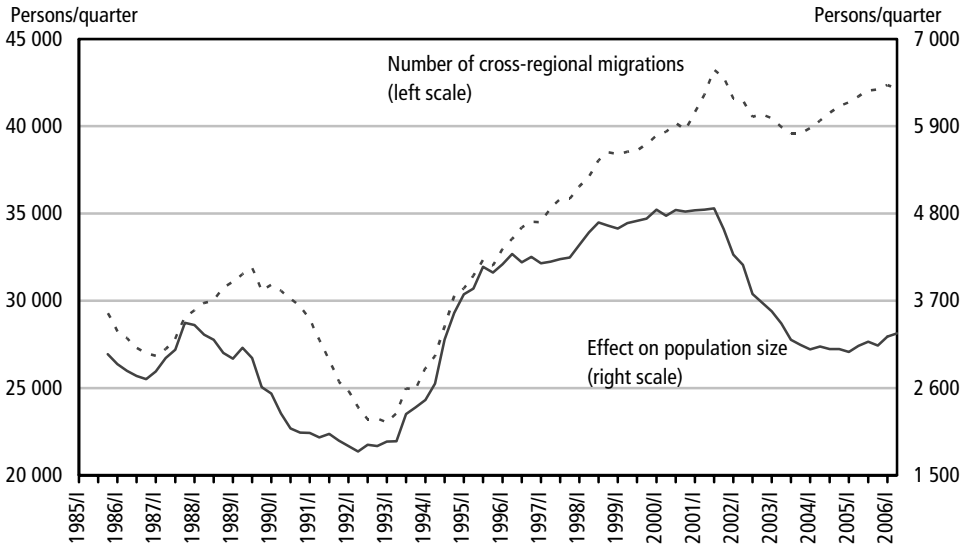
Migration, which has been going on in Finland for decades, has brought young people to university cities to obtain a higher education and has thus increased the growth potential of those regions. The post-recession economic boom increased migration to record levels, although this was partly explained by a change in the legislation on the place of residence, i.e. by a statistical change[3]. At the same time, the population was intensively clustered in the biggest cities with new jobs in high technology sectors. A young, migrating labour force was a precondition for the emergence of the positive employment development within the new economy. This, however, was not itself the cause of migration, since the main reason for migration from rural areas to cities is still the increased productivity in primary production and industry, due to which fewer workers are needed. However, the number of new jobs in rural areas is not enough to cover the loss of jobs caused by increased productivity. In fact, migration has been ongoing since the 1950s, but in the 1980s there were many more regions with positive net migration compared to the 1990s or 2000s. Thus, for decades, migration has played a role in technological change as well as in the resulting change in Finland's economic structure.

In 2001, migration began to decrease and, in particular, the corresponding agglomerating effect on the population structure diminished. The total negative net migration of regions losing population due to migration decreased by almost half in two years (Figure 6.7). The number of such regions fell, and negative net migration decreased in other regions as well. While in the late 1990s around 10 regions had a positive net migration, the number of such regions in the 2000s exceeded 20.

Regions with negative or positive net migration in the 2000s are chiefly the same as in the 1990s. The amount of lost population depends on economic development. Every now and then, a small group of regions loses or gains population, and by Finnish standards, many of these can be regarded as middle-sized urban regions. The number of migrations has again increased to the peak level of the 2000s, but the effect on regional populations has remained almost unchanged. Thus, an increasing part of migration is of two-way nature ie. cross-hauling people between regions. For example, the total positive net migration of NUTS 4 regions with positive net migration amounts to only 10 per cent of the total migration between the same regions. This suggests that migration is increasingly about the reconciliation of individual location preferences with employers' wishes relating to the structure of the labour force.

[3] Before 1994, students were not able to register as a resident in their student city. The change in the law on the place of residence increased migration, since students are more prone than most to move around.

Figure 6.7 The mobilising effect of migration on the population, migration departures in regions (NUTS4) and total net migration.



Source: Statistics Finland.

In spite of occasional swings in migration, regional disparities in population growth are very stable in Finland, due to remarkable regional disparities in age structure. Disparities in birth and death rates explain the disparities in the broad trends of population growth. Swings in migration thus either increase or decrease regional disparities in population growth. This means that current trends in population development will continue over the next few decades.

More than globalisation, the direction of migration in the next few years will be affected by internal developments in Finland, especially by the fact that the large post-war age groups will reach the age of retirement. The number of vacancies will increase everywhere, and the direction of migration may become increasingly dependent on individual preferences relating to one's living environment and housing quality. According to a questionnaire study, there are more people who would like to live outside big cities than there are people living in such areas at the moment. On the other hand, in addition to migration based on environmental preferences, there is another migration type, migration based on employment, which is subject to changes in the labour market. However, the number of regions with positive net migration is unlikely to change drastically in the future, for as many as over 70 per cent of jobs are located in the 20 major regions. Therefore, also most vacancies will be located in these regions.

6.5 Conclusions and future prospects

Regional development in Finland has been characterised by the clustering of population and production for a long time, in spite of occasional changes in the speed, or even in the direction of the process. Post-recession regional development is closely connected to the technological development of the economy and partly also to structural change brought about by globalisation.

Between the mid-1990s and the early 2000s, the growth of production and employment was to a great extent concentrating to a few big centres and some smaller ones outside them. At the same time, migration to these centres increased remarkably. These growth centres are home to the biggest universities and other higher education institutions as well as a number of research units. The growth of these centres was particularly supported by the boost in ICT production and the general growth of production, research and development based on high-level knowledge. The growth of these centres, which can be considered major by Finnish standards, can be interpreted as a sign of the utilisation of agglomeration economies, since production grew fastest in sectors affected most by such economies.

At the beginning of the current decade, regional disparities in the growth of employment and, especially, productivity have narrowed, even to the extent that the gap between low-income and higher-income regions has narrowed. Simultaneously, internal migration has become more balanced in the sense that the number of regions with positive net migration has increased significantly, and total positive net migration has decreased remarkably, compared to the late 1990s. Furthermore, the growth of regional disparities in unemployment has ceased, at least at county level.

Does this mean that agglomeration economies are disappearing? According to the new economic geography theories this is possible when technological development has decreased the transportation costs of products, services and information to a sufficiently low level. This is too bold a conclusion. A more plausible interpretation is that balanced growth is primarily caused by balanced demand with a view to regional production structures. Growth based on domestic demand and partly on traditional export production has increased production more extensively than growth based on ICT production in the late 1990s. Furthermore, the overheated housing market in the Helsinki Metropolitan Area has increased the attractiveness of more remote areas and other centres as a place of residence.

As regards the future, it is obvious that the prevalent trend in the post-war development of regional structure will continue. The population will grow,

especially in the biggest cities and their neighbouring areas, while it will tend to decrease in rural areas, particularly in eastern and northern Finland. This prevalent trend is evident for demographic reasons alone: the population in rural regions and especially in eastern and northern Finland tends to be more aged than elsewhere, resulting in negative natural population growth.

But economic factors also support this agglomeration trend, up to a certain point. The best growth prospects in employment are in service sectors that typically operate in big centres. In particular, the growth of knowledge-intensive services, including research and development activities, could be strong. The degree of regional clustering in this sector is very high, and big centres can best supply the needed labour. Furthermore, the more diverse labour markets of the big centres are less prone to suffer from changes in the demand structure. Similarly, increasing migration from outside the country is more beneficial for big centres, in which immigrants tend to settle. The decrease of jobs in agriculture will also continue, decreasing employment in rural areas. Indeed, the moderate agglomeration tendency typical of the last few years will continue over the next few, provided no unexpected changes occur in the demand structure.

If it continues, this kind of development will enable southern and south-west Finland to become a diversely developing area with a high-quality infrastructure and ever-improving connections. Regarding other parts of the country, it is likely that a few regional clusters with a relatively diverse production structure will form around university cities. Furthermore, it can be assumed that various clusters specialising in one or a few strong sectors will form in different parts of Finland, in particular into the county centres. The success of these clusters will be partly based on local competitive factors that are either created or natural resource-based. Tourist attractions in northern Finland serve as a good example. But there can be room for even more unlikely success stories, similar to that of the village of Tuuri in the municipality of Töysä.[3] Some successful regions may thus be very small, needing just a few successful companies. It is, however, most difficult to predict the number of successful regional clusters and their locations.

Between the growing regions there will remain some geographically extensive regions with a decreasing, aged population and potentially weakening levels of know-how. On the basis of demography, it can be assumed that this will take place in eastern and northern Finland in particular. However, it should be noted

[3] A village called Tuuri (500 inhabitants) belonging to the municipality of Töysä (3,200 inhabitants) and located over 300 kilometres north of Helsinki is hosting the second biggest department store in Finland with some 6 million visitors a year and an annual turnover of over € 150 million. Thanks to the retail trade cluster, the employment self-sufficiency rate (the ratio of the number of jobs in the area to the number of employed people resident in the area) is over 120 per cent.

that this change will not mean that rural regions will be emptied of their populations. This will not happen for a long time, even in regions with the worst population dependency ratios (Nivalainen and Volk 2004).

Nevertheless, it is difficult to predict what will happen in a few decades. In many cases, even demographic developments have often turned out to be surprising. The fact that service sectors will be increasingly subject to international competition, as discussed in previous chapters, may also change regional development prospects in unexpected ways. For example, the exposure of services to competition mainly affects jobs located in major centres. Changes related to this kind of location competition may also be most rapid.[4]

The regional distribution of new vacancies due to ageing will become more even compared to the past few years. It is difficult to evaluate the effects of this, which are also complicated by the continuous development of communications technology as well as increasing prosperity. Since the 2010s will bring more employment opportunities and possibilities to work remotely, at least part-time due to improved communications, families will have more freedom to choose their place of residence according to their own preferences. On the other hand, it can be assumed that increased prosperity will increase the importance of personal preferences in the selection of one's place of residence. It is difficult to predict human preferences in advance, though.

With respect to policy, the trends mentioned above will bring two major challenges. First, it will be necessary to address the traditional question of the best way to reconcile the efficient utilisation of the resources of the economy as a whole with balanced regional development within the country. Although all realistic scenarios point to the population of Finland becoming increasingly agglomerated, the countryside will remain populated to a significant degree. This means that economic and industrial policies cannot exclusively be harnessed in order to improve the development of the regions with the best growth prospects. Since labour force can never be fully mobile, such a goal would result in the under-utilisation of resources in certain parts of the country. On the other hand, the regions with a diverse selection of jobs and a relatively large population have the best prospects of succeeding in global location competition and the growth of production. The balance between the improvement of the prospects of these regions and support for the growth prospects of the smaller, more specialised regions will remain a key issue in innovation, industrial and regional policies in the future. It is probable that

[4] A recent example of this kind of structural change is the announcement by UPM Kymmene that the group's financial administration will be centralised in Tampere and Changshu in China (Helsingin Sanomat, 13 October 2006). Jobs in other parts of Europe and Northern America will be transferred to Tampere. The change will result in the reduction of about 100 jobs in the other units in Finland, while a cluster of 180 jobs will form in Tampere.

active networking between knowledge clusters, regardless of their location or size, is required to find an effective solution.

Another major challenge concerns how to secure various welfare services in sparsely populated regions with a clearly worse population dependency ratio than average. A decreasing population base and long distances make the problem more difficult. It is evident that new ways of organising services as well as fundamental organisational reforms are required to keep unit costs reasonable and make services accessible to everyone in need. It also seems that in order to create new cost-effective methods, we need to utilise the opportunities provided by improving information technology widely and creatively.

7 FINNISH ECONOMIC STRATEGY AND THE CHALLENGES OF GLOBALISATION

7.1 Economic growth as long-term policy

Enhancing preconditions for economic growth has for long been a defining feature of economic policy in Finland, with much less attention being paid to counter-cyclical policy. However, the content and focus of growth policies have varied over time.

During the post-war decades up to the 1980s, increasing the capital stock constituted the primary method of promoting economic growth, with the particular aim of raising manufacturing capacity in such a way that industry could employ labour released from agriculture and forestry for higher-productivity jobs.

In the first place, financial market regulation and a certain type of forced saving were among the tools aimed at a high investment rate. The public sector mainly displayed a financial surplus and the resulting resources were allocated, for example, to industrial investment via state-owned companies. Interest-rate controls kept interest rates at artificially low levels and guidelines issued by authorities (mainly the central bank) directed credit allocation in the context of excess demand, typically stressing the priority of "productive investments" over consumer, public and housing spending. Capital movements were strictly regulated and capital import licences were primarily granted to industrial investment projects. Finnish non-financial sectors were also subject to regulation and restrictive trade practices on an extensive basis.

Exchange-rate policy played a vital role in the Finnish competitiveness policy. Currency devaluation helped Finland restore its price competitiveness at a time when rapid inflation had eroded it and the current account had drifted into an unsustainable deficit. The devaluation policy particularly supported export-industry investments, safeguarding their profitability. Income policy was aimed at maintaining price competitiveness created by currency devaluations.

The Finnish trade policy aimed at consistently facilitating its industry's access to western markets (in addition to political aims), EFTA membership in 1961 and the Free Trade Agreement with the EEC in 1973 representing major milestones. However, trade with the Soviet Union, based on bilateral trade agreements, played a significant role in exports and imports until the late 1980s.

From the 1960s, Finland revised its education, science and technology policies with a view to enhancing the potential for economic growth in particular (Lemola

2001). The mid-60s saw the fundamental extension of the higher education system, which also involved a major extension in its geographical scope. Later in the same decade, the current Academy of Finland was created for research planning and financing, the Finnish National Fund for Research and Development (Sitra) was established and the Ministry of Trade and Industry began to channel funding for corporate product development. The early 1970s witnessed the establishment of the comprehensive school system and the extension of the general upper secondary education and vocational education and training systems. The Technical Research Centre of Finland (VTT) was reorganised and enjoyed a substantial increase in its resources in the 1970s.

In the 1980s, technology policy strengthened its position. The year 1983 saw the establishment of the National Technology Agency Tekes[1], which assumed a major role in technology-policy planning and implementation. Funding provided by Tekes emphasized research related to information technology. The 1980s marked a period of founding technology parks and technology-transfer companies with a view to promoting technology transfer and commercialisation. Public funding for research and development increased substantially in the 1980s: its share of GDP grew from 1.2 per cent in 1981 to 1.8 per cent in 1989.

From the 1960s, Finland also aimed to promote economic growth through its social and public policy measures more broadly. Social policy measures led to the creation of systems aimed at improving people's ability and incentives to participate in the labour market. The establishment of the occupational pension system created extensive earnings-related pension cover for wage earners while that of the day-care system helped support females' labour-market participation in particular. On the whole, the creation of the so-called welfare state aimed at narrowing income inequalities, evening out risks and increasing social cohesion.

A special feature characterising the Finnish economic policy lay in its aim for a consensus throughout the society, income policy typifying one of the areas in which a consensus policy was conducted. By and large, the overall aim was to make various social strata align with the shared view on the national economic policy. The Economic Council of Finland sought a shared view on major economic policy issues among major economic policy-makers. An extensive range of politicians and representatives of interest groups and the media received training in economic policy management courses organised by Sitra.

This strategy proved successful in many respects, resulting in a very high investment rate, and a rapid annual economic growth rate of around 5 per cent on average between 1950 and 1975. Finland made marked progress in catching up with the rest of Europe's GDP per capita and clearly narrowed its income

[1] Currently the Finnish Funding Agency for Technology and Innovation.

inequalities. Due particularly to its extensive education system, Finland succeeded in increasing social mobility, which is currently high by international standards.[2]

Nevertheless, the strategy was unsuccessful in creating jobs to the extent required to meet the baby-boomers' employment needs in the late 1960s and the early 1970s. This resulted in a major emigration from rural areas to Sweden. Neither did the policy protect Finland against the mid-1970s recession caused by the oil crisis, raising unemployment to an exceptionally high level.

Over the years, the strategy began to show other shortcomings. The growth rate varied substantially because regular currency devaluations triggered an export-led recovery, which in turn ended in competitiveness and current-account problems caused by accelerating inflation. Then again, the use of capital became inefficient as a result of an artificially high investment rate and various regulatory mechanisms allocating investments on the basis of criteria other than efficiency. As a result, high saving and investment rates did not add to consumption opportunities as hoped for.

In the 1980s, Finland came to realise and acknowledge the problems caused by market regulations. While the increasing international exchange of goods and services and the advent of financial innovations weakened the possibilities of regulating financial markets in particular, Finland began to deregulate not only its financial markets but also other sectors of the economy.

This financial market liberalisation resulted in a change in monetary policy orientation. In an effort to abandon continual currency devaluations, Finland adopted the so-called stable markka doctrine. Accordingly, it became more determined to fight for the external value of the Finnish markka (within a small range of fluctuation). In the context of free capital movements, this implied that Finland could not conduct monetary policy as a counter-cyclical tool to the previous extent. In the meantime, Finnish fiscal policy continued to focus on long-term structural goals (e.g. the tax structure), with no special attention being paid to counter-cyclical measures.

[2] High social mobility is manifested, for example, in parents' income levels having no statistical effect on their children's income or education level, especially at income levels lower than median income. Social mobility in Finland, as in the other Nordic countries, is higher than e.g. in the USA, see Bratsberg et al. (2006).

7.2 Post-crisis economic policy

Finland was compelled to re-assess the basics of its economic policy lines in the early 1990s when its economy plunged into a deep economic crisis, see the special focus below. Explosive growth in unemployment naturally provoked a debate over the need for expansionary macroeconomic policies.

Special focus The economic crisis of the early 1990s

The liberalisation of financial markets in the mid-1980s unleashed a credit boom supported by strong capital inflows in 1987-1989. At its peak, in 1988, bank credit grew by almost 30 per cent. A substantial part of borrowing by the private sector was in foreign currency. Monetary policy geared towards maintaining a fixed exchange rate with respect to a currency basket could not reign in monetary expansion, while fiscal policy did not restrain domestic demand markedly, either. The result was an overheating of the economy with booming asset prices, record high investment ratios, the unemployment rate coming down to just over 3 per cent and weakening cost competitiveness.

In 1989, the first strains in the economy emerged, and asset prices started to decline. The already weakening economy was then hit by a series of shocks: rising European interest rates due to German unification in 1989, weaker economic growth in western export markets in general following the Gulf crisis and, finally, the collapse of the Soviet Union, which resulted in the sudden disappearance of a major export market in 1991. The current account deficit increased to almost 6 per cent of GDP. Devaluation speculation increased domestic rates further, and in November 1991 the currency was devalued.

GDP started to decline as early as 1990 and a vicious spiral developed with weaker incomes and higher interest rates reducing domestic demand, causing unemployment, debt service problems for highly leveraged firms and households, bankruptcies, declines of asset prices, further declines in domestic demand etc. The devaluation of 1991 did not remove devaluation expectations and interest rates remained high, finally forcing the flotation of the currency in September 1992. Further depreciation took place, burdening companies that had borrowed in foreign currency. Bank loans turned increasingly non-performing and had to be written off, resulting in losses that wiped out the capital of many banks. A significant part of the banking system was taken over by the government and the rest was very much dependent on various types of bank support to remain operative.

About 450,000 jobs or 18 per cent of all jobs disappeared, and the unemployment rate increased to almost 17 per cent, even if many people withdrew from the labour market. Public finances fell deeply into the red, with the general government deficit exceeding 10 per cent of GDP. Central government debt increased from almost zero to over 70 per cent of GDP. Automatic stabilisers were clearly working but discretionary fiscal expansion was ruled out by increasing risk premia and problems of credit availability. Instead, measures were taken to consolidate public finances through expenditure cuts and some tax increases. From early 1993, interest rates began to come down gradually.

Exports started to grow in 1991, but only upon the stabilisation of domestic demand did GDP resume growth, towards the end of 1993. Unemployment peaked in 1994.

The crisis resulted in a major structural change in the Finnish economy. Many low productivity firms which had exported to the Soviet Union and served the domestic market disappeared. The banking sector shed half of its labour force in the process of restructuring. Although all kinds of jobs were affected, in proportional terms non-skilled jobs suffered most. The substantial loss of corporate net worth during the crisis restrained fixed investment for years to come, as the firms struggled to strengthen their balance sheets.

In the realm of monetary policy, the fixed exchange rate policy, which resulted in very high interest rates that deepened the economic slump, tipped over into devaluation due to market pressures in 1991, before ending in the floatation of the Finnish markka in 1992. Following this, interest rates began to edge down, contributing to the economic recovery. In the sense of automatic stalilisation, fiscal policy turned highly expansionary during the slump years when a fall in tax revenues, an increase in income transfers of various kind and financing for bailing out banks as required by the banking crisis led to widening public deficits never experienced before.

In addition, many quarters were pushing for discretionary fiscal expansion. However, it soon became apparent that there was scant opportunity for such a policy alternative, considering that no end to widening public deficits was on the horizon and financing these deficits had begun to become more difficult due to Finland's downgraded credit rating.[3]

Consequently, enhancing economic growth in the medium and long term actually has remained the main economic policy goal during the slump years and beyond. Finland has sought to fine-tune its macroeconomic policy in support of this approach. Finnish monetary policy adopted inflation targeting in 1993 and allowed the Finnish markka to float until the markka joined the European Exchange Rate Mechanism (ERM) in 1996. Finland's return to the fixed exchange rate system was clinched by its joining the third stage of the European Economic and Monetary Union (EMU) in 1999 when national currencies were irrevocably fixed.

A key, post-slump fiscal policy goal in Finland relates to efforts to reduce public indebtedness. This required several years of spending cuts at the outset followed by very moderate growth in public spending. Within the framework of

[3] Finnish economists are not unanimous on the virtue of discretionary fiscal policy during the crisis. For instance, Kiander (2001) maintains that refraining from spending cuts and tax hikes between 1992 and 1993 would have substantially alleviated unemployment. However, a more common view is that an expansionary policy in this respect was not really an option, due to the lack of confidence in the financial market and the uncertainty about economic growth potential. Neither did a marked fall in long-term interest rates, followed by government decisions on public-expenditure retrenchment, advocate the effectiveness of measures to widen public deficits.

this goal, Finland has reduced labour taxes since the mid-1990s, with a view to supporting employment.

The challenge posed by the population's ageing has become an increasingly important economic policy consideration since the late 1990s, reflected chiefly in Finland's efforts to strengthen the sustainability of its public finances. The abovementioned programme aimed at reducing public debt serves this purpose. For the same reason, Finland has started to pay increasing attention to improving the productivity and efficiency of public services.

In an effort to strengthen the sustainability of public finances and increase the supply of labour, early 2005 saw the entry into force of a relatively extensive earnings-related pension reform aimed at postponing the average retirement age by 2–3 years. Simultaneously, increasing attention has been paid to improving the working capacity and capabilities of older employees.

Finnish income policy has continued to aim at maintaining price competitiveness, or even improving it. Agreeing on modest pay increases was not difficult in circumstances of high unemployment caused by the slump. Afterwards, wage development has, despite improved employment, remained consistent with Finland's relatively good cost competitiveness, thanks at least partially to income policy agreements: Reasonable growth in disposable income has been ensured by combining tax reductions with moderate pay increases.

Within industrial policy, the economic slump led Finland to emphasise the basics of its already-adopted policy orientation. Nokia Corporation's introduction of innovative, new-technology products onto the market and thereby embarking on the construction of a completely new base for Finnish export industry further confirmed the idea that an effective innovation system formed the key to higher productivity and competitiveness.

This approach was reflected, for instance, in the National Industrial Strategy for Finland drawn up in 1993, stressing the importance of reinforcing preconditions for long-term economic growth and rejecting the idea of temporary support or more protection against competition for companies in financial straits due to the economic slump. Technology and education, for their part, were expressly identified as the key factors in long-term growth.

The 1990s saw a new feature in the implementation of economic policy in a broad sense, i.e. EU membership in 1995 led certain policy sectors to fall under the realm of EU-level decisions, in part or in full. Accordingly, decisions on customs policy, competition policy, monetary policy and, to a large extent, agricultural policy are taken at EU level. This has understandably limited the

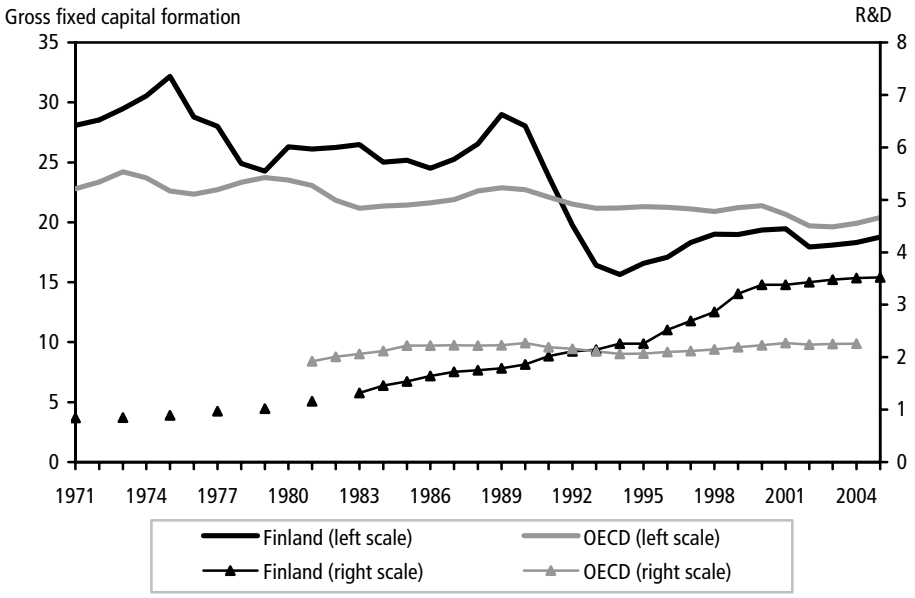
scope of national policies. However, the majority of policy decisions important to the promotion of economic growth are still made nationally.

7.3 Innovation policy at the economic strategy's core

The 1990s marked a decade of introducing a new basic approach in the Finnish economic policy: innovation policy became the crux of the strategy. Raising national R&D spending systematically became one of the key policy goals. Finland showed strong commitment to the set goals, as evidenced by decisions made during the slump to increase public R&D expenditure in particular, despite the floundering economy. However, the latter half of the 1990s recorded the most significant growth in this expenditure.

Combined with the high level of R&D spending in the private sector (mainly the ICT sector), Finnish R&D expenditure as a percentage of GDP, at 3.5 per cent, puts the country among the world's top performers. While fixed investment has steadied at a level markedly lower than before, increasing knowledge capital has come to play a much more significant role vis-à-vis physical capital. In comparison with other developed countries, Finland has switched from an economy based on fixed investment to one based on R&D investment (Figure 7.1).

Figure 7.1 Fixed investment and R&D expenditure, % of GDP.



Source: OECD.

In addition to increasing R&D spending, changes in science and technology policy and, more broadly, the logic and practices of industrial policy, have proven essential. As early as the 1980s, technology policy had risen alongside science policy, paving the way for adopting the promotion of co-operation between private and public research and networking as a key policy goal. Programme-based activities also intensified markedly during the same decade.

Experiences gained from innovation activities over the years suggested that innovation processes were extremely interactive in nature rather than proceeding in a linear fashion. This insight resulted in the adoption of a new, systemic approach in the 1990s. Dialogue between various actors came to play a pronounced role and policy measures were aimed at mending shortcomings in co-operation. Promoting networking between large and small companies became a major part of R&D project funding provided by Tekes. Finland can be regarded as one of the pioneers of this kind of development. The Science and Technology Policy Council played an important role in this re-orientation of innovation policy.

Alongside the creation of knowledge and competence, Finland also began to pay increasing attention to the diffusion and utilisation of knowledge on an extensive basis. Accordingly, the major organisations implementing this policy, Tekes and the Academy of Finland, set out to intensify co-operation (e.g. joint programmes), later joined by Sitra and Finnvera, as well as the network of regional Employment and Economic Development Centres established in 1997 as part of measures to reorganise the Finnish regional administration. Innovation policy strengthened its role in regional policy (e.g. regional innovation systems and the Centres of Expertise Programme) and employment policy (e.g. Workplace Development Programmes). In the late 1990s, the Science and Technology Policy Council sought to foster co-operation between various administrative sectors by launching inter-sector cluster programmes.

After the mid-1990s and spurred, for example, by Finland's EU membership, the concept of internationalisation became a key science and technology policy theme. Finland has been determined in its efforts to intensify Finnish research units' and companies' networking activities abroad.

As late as the early 1990s, Finland was characterised by a highly embryonic venture capital market. Sitra and, later on, Tekes played a significant role in the development of equity investment in Finland. Retail equity investors entered the market chiefly after the mid-1990s, during which equity investments experienced rapid growth not only in the ICT sector but also the biotechnology business. Finland, in a similar way to other countries, faced the 'technology bubble', whose bursting resulted in a stock market contraction. Since the mid-2000s, the equity market has rebounded markedly.

With the advent of innovation policy, the commercial and other use of research results, the creation of new innovative growth companies and entrepreneurship have more visibly become targets for policy measures. Entrepreneurship has been enthroned as one of the Government's policy inter-sectoral (horizontal) programmes. Furthermore, the 'third mission' of universities highlights their responsibility for passing on the fruits of public research to be used by business and society, as evidenced by several new financing and service programmes being designed for innovative start-ups.

The idea that knowledge and modern technology play a major role as sources of economic growth and prosperity has also been reflected in efforts to analyse various policy options explicitly from the perspective of the information society. With a view to promoting this approach, a special inter-sectoral information society programme has been in place during the current term of government.

Future challenges faced by society and public finances have increasingly emerged as topics in the innovation policy debate, innovation being gradually perceived as a key solution to these major challenges too. For instance, applying the latest technologies, developing and adopting new innovations and exploiting operating models developed by the corporate sector may prove helpful in significantly alleviating pressures caused by the population's ageing on rising healthcare costs and the shortage of labour.

7.4 The project "Finland in the Global Economy" and the implementation of its recommendations

The slump was followed in 1994–2000 by a phase of very rapid economic growth and positive employment performance. During these years, GDP grew at an average pace of nearly five per cent and employment increased by over 300,000 jobs. This growth was based first and foremost on the explosive increase of production in the ICT cluster. Finland was able to make efficient use of the sector's global market growth.

In the beginning of the current decade, the ICT sector's growth started to slacken as the technology boom drew to a close. A simultaneous consequence of increased global competition saw Finnish companies' production growth mainly occurring outside Finland and, in some cases, production carried out in Finland being offshored to lower cost countries located in Asia and eastern and central Europe. Moreover, since the level of fixed investments remained low and the value of foreign direct investments in Finland was systematically smaller than the value of Finnish investments abroad, globalisation began to be considered as more of a threat.

This perceived threat served as the background for the project, "Finland in the Global Economy," instituted by the Prime Minister in 2004. The project included six background reports, dialogues between industrial organisations on strengthening industries' competitiveness, several seminars and a final report published on 9 November 2004[4].

The final report estimated that, predominantly, globalisation has been a positive phenomenon for Finland and presents more opportunities for increasing prosperity than threats. In parallel, the report stated that globalisation also constitutes a significant challenge and, in responding to it, Finland has both weaknesses and strengths in comparison to other European countries.

The identified Finnish weaknesses were a small population (limited market potential and opportunities for big investments in risky branches of industry) and a remote location in relation to many important markets. Finland's specialisation in industries with tough global competition and in products with declining trends in comparative prices makes the country's situation more challenging than for certain others. Among other weaknesses mentioned were the fact that unemployment concentrated heavily on the section of labour subject to increasing international competition, the country's high level of taxation and its inability to attract foreign experts.

As Finnish strengths, the report identified an effective innovation system based on the high level of basic education of younger citizens in particular and impressive R&D investments by international standards. The country's safety and low levels of corruption, generally well-functioning society, equality and high level of public services were also seen as strengths.

The project's final report presented an extensive set of recommendations for actions in order to enhance Finnish competitiveness. Some of these over 120 recommendations were very general in nature, whereas others were very detailed and concrete. In the recommendations, three aspects were emphasised: strengthening competences, a clearly more open economy and society in global terms, and the capability for renewal. These recommendations were largely a continuation to, and intensification of, the existing policy, even if some distinctively new outlines were presented.

Regarding strengthening competences, the focus was set on amending the weak points in the education and innovation systems. This requires further increases in R&D investments and numerous measures taken throughout the education system. In order to realise the benefits of innovation, financing opportunities for

[4] "Finland's competence, openness and renewability" Final report of the project, "Finland in the Global Economy". Prime Minister's Office Publication Series 26/2004.

start-ups and growth companies need to be improved. Particular sector-specific attention was paid to strengthening the service sector.

In order for Finland to take better advantage of global product and input markets, the report suggested several recommendations for rendering Finland more attractive to foreign investors and experts. Similarly, several reforms promoting the transformation of Finland into an exporter of education and welfare services were recommended. Improving the transport and telecommunications infrastructure was also considered necessary.

In relation to the economy's capability for renewal, the report mentioned enhancing competitiveness in the product markets, increasing flexibility in the functioning of labour markets and improving the efficiency of public service provision as important factors.

The implementation of the recommendations from the final report of the "Finland in the Global economy" project has been started on a large scale. Many of these recommendations have been included in the interim report of Finland's National Reform Programme that forms part of the Lisbon Strategy (Ministry of Finance 2006). Important implemented recommendations include:

"Expertise"

- **Public R&D funding**: Public funding of R&D was increased in 2005 and 2006 by approximately five per cent. In the budget for 2007, expenses will grow by over five per cent, and the preliminary outlines for 2008–2011 in the spending limits decision 2006 imply increasing R&D expenses annually by approximately five per cent. This means that the increase will be significant but will not attain the recommended pace of seven per cent. Moreover, in the Finnish Government's Strategy Document 2006, the target level for total R&D expenditure by the end of the decade was set at four per cent of GDP. However, this target is not feasible with the planned increase in public expenditure. If the Government's official estimate of GDP is to be realised, the four per cent target could be attained in 2010 if the public R&D expenditures were annually increased by slightly over seven per cent. As regards recommendations on the allocation of R&D funding, some are about to be met and for some, new outlines are currently in the final phase of preparation.

- **Creation of Strategic Centres of Excellence in Science, Technology and Innovation**: On 27 June 2006, the Science and Technology Policy Council of Finland adopted the report drawn up by its appointed steering group, concerning the development of centres of excellence and national infrastructures. The report proposes that

Strategic Centres of Excellence (SCoE) be established in Finland in fields crucial to the future of the Finnish business sector and society. The operations of the SCoEs are based on strong commitments from companies, universities, research institutes and funding organisations. The working group preparing the SCoEs has worked in close co-operation with the National Committee for the Centres of Expertise programme appointed by the Ministry of the Interior and currently preparing the new Centres of Expertise programme period (2007–2013). The new operating model of the Centres of Expertise programme is based on regional clusters of expertise, each including two to five centres of expertise. On 21 August 2006, the Ministerial Working Group on Administration and Regional Development accepted the entry of 13 programme candidates to the Centres of Expertise programme, according to their national significance and suitability to the programme.

- **Attracting top researchers to Finland**: The Academy of Finland and the Finnish Funding Agency for Technology and Innovation (Tekes) have launched a new programme called the Finland Distinguished Professor Programme (FiDiPro) in order to recruit international professor-level top researchers, and Finnish researchers who have worked outside Finland for a protracted period, to Finland on a fixed term basis. The purpose of this funding programme is to strengthen scientific and technological expertise in Finland, to make the Finnish research system more international, to generate added value for the national innovation system and to support research specialisation in universities and research institutes. The first application period ended in January 2006. The Academy of Finland and Tekes have decided to fund a total of 24 research projects with EUR 17.5 million from the FiDiPro programme. This funding will enable the recruitment of 24 visiting top researchers to 12 Finnish universities or research institutes for a period of two to five years. The first of these top researchers will start work at the beginning of 2007.

- **Innovation centre pilots and co-operation models**: One innovation centre referred to in the recommendations, FinChi, started operating in Shanghai in May 2005. Based on an assignment from the Finnish National Fund for Research and Development (Sitra), a report on the tasks and operating model of an innovation centre in California was drawn up in the autumn of 2005. The report also compares the operations of innovation centres established by different countries and charts the inclination of other Nordic countries to co-operate with Finnish partners. In the summer of 2006, public actors (Tekes, the Technical Research Centre of Finland VTT and Finpro) settled into new, common facilities located in California. The new innovation centre FinNode will be opened in January 2007. The Ministry of Trade and Industry has, together with Sitra and Tekes, commissioned a preliminary

report from Finpro concerning a potential Finnish-Russian innovation centre to be located in Russia.

"Opening"

- **Mobility of foreign labour, improving flexibility of the work permit system, work-related immigration:** Noteworthy factors facilitating work-related immigration include repealing the law concerning the transition time for new EU member countries (1 May 2006)[5], centralising work permit related administration and reducing to four the number of employment offices handling work permit related matters. Improving the flexibility of the work permit system and clarifying the responsibilities of labour market organisations and employers was linked to the preparation of the Immigration Policy programme.

- **Immigration Policy programme:** On 19 October 2006, the Government adopted the Immigration Policy programme. The programme's main emphasis is to promote work-related immigration. Other themes include developing the immigrant integration system, creating a guidance system for work-related immigrants and improving ethnic relations. The programme includes a total of 34 policy outlines

- **Tax relief system for foreign experts**: Under the current legislation, the income of foreign experts meeting certain requirements is taxed using a flat tax rate of 35 per cent. This so-called key staff act will be applied to employment relationships beginning during 2007 at the latest. The Ministry of Finance is currently preparing an extension to the period during which this act will remain valid, to employment starting on 31 December 2011 at the latest.

- **Facilitation of work permits for foreign students:** This has been realised by changing the Aliens Act (34/2006) from 1 February 2006. Currently, a foreigner with a temporary residence permit based on studies is granted a new temporary residence permit for six months for the purpose of job-seeking. A person who has completed a degree in Finland can now work in Finland based on an ordinary residence permit and no longer needs to apply for a worker's residence permit.

- **Facilitation of work permits for family members**: Family members of managers and experts have mainly been exempted from the work permit obligation as of 1 May 2004. Exemption for other family

[5] After 1 May 2006, Finland did not extend the transition time applied to citizens from the new EU entrants under the scope of the Act on transition time. Upon the enlargement of the EU on 1 May 2004, Finland implemented a transition time for the mobility of labour force from eight of the new member countries. The Act on transition time remained in force for a fixed duration of two years.

members entered into force on 1 July 2006, giving an unlimited right to work to everyone with a residence permit granted on the basis of family ties.

"Renewal"

- **Development of Finland's productivity programme into concrete, sector-specific objectives**: The objective of the action plan for productivity, currently implemented within the Ministry of Finance, is the verifiable growth of productivity and the methodical use of productivity gains. Attempts to achieve this objective include functional and structural reforms in support and core services based on improving the utilisation of information and communications technology as well as private services in the provision of public services. This activity has been intensified by sector-specific productivity plans.

- **Launching a municipal and service structure project for improving municipal services:** The Government submitted a Bill to Parliament on the reform of municipal and service structures and on amending the Act on Local Authority Boundaries on 29 September 2006. According to the Bill, service structures will be reinforced by aggregating services requiring a larger population base than an individual municipality, e.g. for basic healthcare. This will be achieved by increasing co-operation between local authorities and strengthening the operating preconditions in the Helsinki area and other urban areas subject to community structure level problems. Local authorities will draw up an implementation plan for municipal and service structure reform, including an account of the extent of the service network and a plan concerning the organisation of the key functions of the local authority.

- **Employment change security for facilitating the re-education and relocation of staff facing layoffs: An operational model called "change security**" was agreed upon in the incomes policy agreement for 2005–2007. An Act, conforming to this agreement, on the operating model for finding employment and change security entered into force on 1 July 2005.

- **Reducing the taxation of work:** Labour taxation has been reduced significantly during the current term of government, in the first instance by reducing income tax in all income brackets. The tax rate for a wage earner with an average income will be lowered by approximately two percentage points from 2003 to 2007. However, the highest marginal tax rate remains at over 50 per cent. The taxation of labour has also been eased by reducing employers' social security contributions for low-wage elderly employees from the beginning of 2006.

- **Financing for companies in the start-up or growth stage:** The reform of risk capital provision for nascent businesses has been launched. The State will finance a risk capital fund specialising in early or seed stage investments and established by Finnvera Oyj. The Seed Fund Vera Ltd. (Avera) began operating on 15 August 2005. The investment operations of Avera have been allocated approximately EUR 50 million from various sources. Finnvera has invested EUR 9 million in regional venture capital companies; the Ministry of Trade and Industry has invested EUR 1.5 million in seed stage projects; and the Finnish Industry Investment Ltd. has invested EUR 50 million in its seed programme. In addition to this, the mission of Sitra's Pre Seed unit is to improve the investment readiness of early stage growth companies and organise initial investments. Investments in financing start-ups to a large extent correspond to both the objectives set in the "Finland in the Global Economy" project and the report, "Strategy for the Financing and Service System of Innovate Start-up Companies" (Paasivirta & Valtonen 2004), also published in 2004. By contrast, a similar development did not occur in the development of growth stage funding.

- **Specification of overall industrial policy outlines:** The Ministry of Trade and Industry has drawn up the Guidelines for Finnish industrial policy containing outlines for decision-making promoting business and the innovation environment. The premises of the report are based on making the markets more effective and emphasising a customer-oriented approach to innovation policy.

Many reforms are still in the preparation phase, such as the following:

- **Reform of sectoral research**: On 20 January 2006, the Prime Minister's Office appointed a working group on sectoral research to elaborate an overall plan regarding the State's sectoral research and the allocation of its resources according to the changed needs of society. The working group will complete its report by 31 December 2006.

- **Increasing the autonomy of universities**: The economic powers of universities are being developed through legislation, on the basis of the work conducted by a rapporteur ad int. The Ministry of Education will prepare an amendment to the Universities Act during the course of the current term of government. A key issue is achieving a higher adoption and exploitation rate of off-budget entities. On 2 November 2006, a proposal was presented according to which all universities would be given the possibility of their own, off-budget capital. A government proposal has already been submitted to Parliament.

Some aspects of the recommendations have not led to changes. For example, raising the tax exemption limit for donations to basic research has been examined but no preparation of a reform has been undertaken. Preparation work for the right to charge non-EU citizens for university studies and for further studies has not begun, either. Promoting innovative public procurement has not attained a practical level, nor has the risk-taking ability of the Foundation of Finnish Inventions been increased. An R&D centre of expertise or excellence for the logistics sector has not been created. Finally, increasing company-level flexibility of wages through the development of local negotiations has not progressed in a substantial manner (for more details, see section 8.2.2. below).

7.5 Re-assessment of the operating environment

Fundamentals remain unchanged

The essence of the analysis of globalisation and its effects presented in Part I, Globalisation Challenges for Europe, of this report is the same as in the analysis included in the "Finland in the Global Economy" report. The anticipated consequences for a country like Finland are therefore largely similar.

First of all, growth in the so-called developing countries is continuing intensely and the weight of these economies is increasing in terms of GDP and as players in world trade. Simultaneously, the technological and educational levels of these countries are approaching those of developed countries, making productivity and wages rise. These countries will, however, for long remain low wage countries in comparison to Europe. This entails continuing high pressure for change in the international division of labour, and therefore also in structural changes in production and employment within developed countries.

Second, the competitive edge of developed countries in production subject to international trade will continue to be based on high productivity, because their wage levels will remain higher than in developing countries. As regards technology, countries lagging behind are continuously catching up with developer countries. For production in developed countries, this necessitates constant innovation ability with respect to both products and production methods.

Third, economies of agglomeration are important in geographical allocation of economic activity at various regional levels. Coincidence or informed policy can often have a major influence on the location of emerging concentrations or clusters, and such developments can lead to self-reinforcing growth. Economies of agglomeration depend non-linearly on the transportation and communication

costs: a small decrease in costs increases economies of agglomeration, but if costs sink to a low level, these economies diminish.

Fourth, globalisation is a positive factor economically, with respect to both developing and developed countries. New elaborations of theories reinforce the concept that expanding trade is a positive phenomenon. An important empirical observation is that offshoring of jobs from developed countries to developing countries has been minor compared to the general turnover in jobs.

New features discovered

The analysis also highlights new features in globalisation. Due to communications and the related lower costs of co-ordination, competition is more clearly affecting different phases of production processes: production is being unbundled into increasingly smaller fragments that may be located in different parts of the world. As a consequence, competition from the developing countries is affecting a growing range of intermediate products and work within the production process rather than end products. This is augmenting the proportion of value added in developed countries' production that is vulnerable to international competition.

Combined with the rise in the level of education in developing countries, task level competition will affect all levels of education, not only the work of less educated workers. Furthermore, together with the direct effects of technological development (automation possibilities), this entails a finer division in developed countries' labour markets in addition to the division between skilled and non-skilled labour.

A division seems to be forming between non-routine and routine work, rendering demanding analytic reasoning tasks subject to international competition or automation. Tasks requiring human interaction, and non-routine manual tasks, are best protected from foreign competition.

Many so-called information society tasks with more analytic than interactive content will be susceptible to international competition. Setting the emphasis of education on these types of occupations in developed countries may prove risky, particularly if the education delivered is not of top quality.

The globalisation of markets may also lead to greater differences between "superstars" and those with more ordinary skills, even within a given task. The demand for "superstars" and their remuneration may grow markedly, whereas more ordinary skills may lose comparative demand.

A major characteristic of task-level global competition comprises sudden and unpredictable changes in the cost-efficiency of the location for a given task. Changes may also be large, i.e. nearly all tasks of a specific type may be transferred to another location in response to a relatively small change in the coordition costs.

The suddenness and magnitude of these changes suggest that the observation that offshoring has so far affected a relatively small proportion of jobs does not guarantee that these types of jobs will remain in developed countries in the future. Another main implication is the complication of educational planning.

The general requirements for a successful economy are largely similar to those estimated previously. Most fundamental is the economy's ability to adapt quickly to changes in circumstances. The usefulness of foresight in the sense of compiling forecasts will diminish as anticipation becomes more difficult. Nevertheless, in terms of discerning possible alternatives, which may radically differ from each other, foresight may become even more important.

Maintaining a competitive edge through constant innovation in a situation where innovation environments are also developing rapidly in developing countries requires global top competence. In part, this calls for increased specialisation. Greater ability to attract and retain top experts is also necessary.

On the other hand, prosperity increases the importance of consumer preferences, rendering the ability to produce products corresponding to preferences a major competitive advantage. This emphasises the importance of customer-driven innovation and the interaction skills it requires. By the same token, the capability to create living environments appreciated by high-skilled staff may become a critical means of attracting this type of labour into clusters of expertise both globally and nationally.

A rise in the level of education does not provide protection from international competition to the extent that may have been previously believed. More important is the ability of education to provide, at different levels of education, skills that are needed at a given time.

Environment and energy more fundamental issues in global development

One of the phenomena related to economic growth, particularly in developing countries in the future, is the increase in energy demand. No factors are in prospect that might cause a rapid decrease in the growing energy demand related to economic growth. In addition, it is evident that, at least in the short run, additional energy can mainly be produced only by using fossil fuels.

In parallel, research has been able to provide convincing evidence that human activities generating carbon dioxide, released in particular when using fossil fuels, have caused global warming. The pace and scale of climate change and, first and foremost, its consequences, are highly uncertain. In spite of the uncertainty of the estimates, the outlook is extremely disturbing.

According to recent estimates, the Earth's average temperature will rise without a radical deduction in greenhouse gas emissions, at a probability of 77–99 per cent, over two degrees centigrade, and at a probability of over 50 per cent, over five degrees centigrade by the end of the century (Stern 2006). A rise of two degrees would have extensive economic and social consequences, directly influencing e.g. food production, water supplies, displacement of population from some coastal areas and causing exceptional weather conditions. According to one estimate, no change in policy would entail a permanent decrease of 5–20 per cent in consumption per capita compared to the level without climate change. Another factor at stake is the risk, the extent of which is hard to assess, that part of the ecosystem will enter an irreversible process of change.

These perspectives mean that a policy curbing climate change cannot but become a central issue in international co-operation. Even if it is difficult to estimate the exact content of this future policy, it will most probably include both measures (taxation, emission trading) for raising fossil fuel prices as well as major investments in energy-saving technology and the development of emission-free forms of energy.

Simultaneously, a rise in the energy demand caused by economic growth entails a rise in energy prices, despite the fact that the increased energy supply will dampen any price uptrend. Additionally, the increasing scarcity of energy increases the importance of issues pertaining to security of energy supply, especially since energy supply may be used more for political purposes than previously.

The rise in fossil fuel primary energy prices will affect the Finnish economy more than those of typical EU countries. This is chiefly due to Finnish production's emphasis on products using large amounts of energy, which cannot be compensated by the high energy efficiency per product unit. The country's cold climate and long distances are in this respect an additional burden.

On the other hand, attempts to reduce dependency on fossil fuels will open up new opportunities for Finland. Most of all, Finland has the wherewithal to use biomass. This creates possibilities for the development and sale of energy technology. As an energy intensive country, Finland may also profit more from new technologies than many other countries.

Globalisation increases the importance of supranational policy but does not nullify the centrality of national solutions

It is evident that global challenges for the environment can only be solved with a policy covering all essential economies. Alone, Finland can only influence global warming marginally. Even pan-European solutions are not sufficient, since the emphasis of economic activity and particularly its growth are located outside Europe. Moreover, the measures Finland and Europe are using for restraining climate change will diminish global competitiveness in many production sectors unless the non-European competitors will take similar measures.

Furthermore, maximising the economic advantages of globalisation and minimising the social disadvantages require global responses in many respects. The best way of extending gains from trade liberalisation everywhere as widely as possible is to adopt regimes that do not discriminate against any countries or groups of countries. In this respect, WTO is a crucial forum, and the European Union cannot replace it with its bilateral arrangements. Alongside promoting the WTO process, free-trade agreements evidently provide benefits when a comprehensive multilateral agreement is not feasible.

Especially for Finland but also more widely at European level, it is worth noting that securing one's competitive position is about more than just tariffs. Of equal importance are various non-tariff barriers of trade such as trade-restricting regulations. Also trade in services, intellectual property, investments, public procurement and competition policy are of great importance.

In addition to direct economic interests, security issues in their broadest sense are tying Finland more strongly to global phenomena. Disputes related to increasingly scarce non-renewable natural resources concern, through various mechanisms, Finland too.

The significance of the European Union to Finland has grown for two reasons. First, Finland can only effectively influence the above mentioned global responses as part of the EU. It is in Finland's interests to reinforce the EU's functional capacity in dealing with global issues. This necessitates the EU being able to speak with a single voice. An efficient contribution to this could, in some cases, be the reorganisation of the EU's representation in international organs, in particular the IMF and the World Bank

Another reason for EU's growing importance is that many issues affecting European and, indirectly, Finnish economic growth necessitate good co-ordination within the EU. A key area is the energy policy with respect to Russia. Common actions for enhancing the functioning of the internal market are also called for as regards trade in services, financial markets and network industries.

Moreover, the innovation policy includes many areas requiring cross-border co-operation, such as, once again, intellectual property, standards and the implementation of large scale technological development projects.

The above statement does not mean, however, that the success of the Finnish economy in global competition would in the first instance depend on global or European level responses. The highly heterogeneous economic performance of different EU countries and their linkage to national structural policies show that ultimately, national policy is the decisive factor.

7.6 Outlook of the Finnish economy

The development of the Finnish economy described in the previous chapters strongly suggests that globalisation has predominantly been a positive phenomenon for Finland. Simultaneous to intensified economic integration with the outside world, production growth and both of its main components, namely growth in employment and productivity, have performed well. Offshoring of production has occurred in the 2000s, but it has been minor in comparison with the overall creation of new jobs. In addition, there are good reasons to assume that outsourcing has contributed to the growth of productivity in Finland.

Nevertheless, this does not imply that the economy's adaptation to globalisation and to the simultaneously advancing technological progress and population ageing has been painless. At individual, company, sector and regional level, significant difficulties have been faced in adapting to, or seizing the opportunities provided by extended markets.

There is even less reason to think that the challenges constituted by globalisation, technological development and ageing belong in the past or have been solved. It is obvious that different areas of economic activity will continue to face significant challenges in the forthcoming years.

Internationalisation and specialisation continue

The proportion of Finnish sectors open to international exchange seems to be continuously augmenting. In sectors facing the toughest competition, the success of Finnish production requires top comptetence and/or a large size in relation to the production markets in question. Both expertise and relevant size can be reinforced by specialisation. Nearly all well-performing Finnish companies have been using this method. When these companies are even slightly larger, they have usually unbundled their tasks internationally according to growth strategies and benefits obtained from the location of various tasks.

At a general level, the question is whether Finland can, to a sufficient extent, offer a good location for core operations of businesses exploiting global markets and involving major added value. A special Finnish challenge in this respect is that support provided by its small domestic markets for the creation or development of such new activities is only limited or exceptional. Finland will palpably lose some core operations as companies continue the internationalisation and networking of their increasingly fragmented activities.

Success is most probable in sectors where Finnish production is already in the vanguard of technological expertise and holds a strong market position. In this sense, the question arises of whether the Finnish sectors that are now strong at global level will meet the prerequisites for success in the future. The challenges and opportunities are multifaceted.

Which type of production can succeed in Finland?

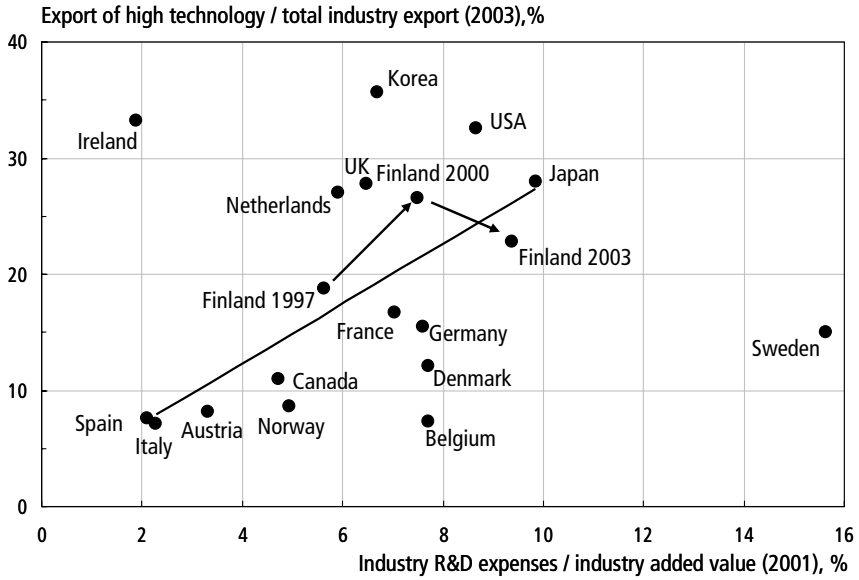
Finnish industry has succeeded considerably well in recent years, notwithstanding the fact that extensive new production capacity has been created, especially in manufacturing, in developing countries which have thus intensified competition. In part, this success in recent years can be accounted for by the rapid growth of the world market related to globalisation. In particular, the demand for investment goods, basic metal products and various components and parts in the international markets has grown swiftly and in line with specialisation areas of Finnish production this has benefited e.g. shipbuilding, engineering industry and metal processing.

Companies operating in many traditional branches of the technology industry and electronics industry in Finland have apparently succeeded in obtaining competitive advantages thanks to specialisation, product and process development and the flexible reorganisation of operations, and these measures have been sufficient to compensate for the wage level advantage in the new industrialised countries. However, the challenge has not been overcome. On the contrary, it can be assumed that the rise in competitors' level of expertise will require Finnish industry to improve its efficiency and produce new products suitable for customer needs continuously.

As a result of tough international competition and technological evolution, the price of many industrial products (e.g. mobile phones and certain grades of paper) has decreased or is on a decreasing trend. A huge increase in productivity would therefore not entail a corresponding rise in value added. This is why it is important that the companies in the sector are able to increase their high value added production in Finland.

The fact that traditional, technology-based R&D investments no longer have a direct influence on the export success of high technology products (Figure 7.2) emphasises customer-driven innovation as a success factor.[6]

Figure 7.2 R&D intensity and specialisation of trade.



Source: Etla.

How, then, can added value for the customer be developed? Exploitation of design is a way of rendering technology more "human" and finding new applications for technologies. The role of design in technical products is often emphasised when new technical features no longer provide sufficient added value to the average user. As unit prices fall, added value is sought elsewhere than technical product features: e.g. from symbolic and functional values, and experience-related and cultural aspects. The greater user-friendliness and usability of a technology-based product combined with a successful design and visual appearance and the company's brand or trademark increases the products' value to the customer. These methods are still, however, employed all too rarely by Finnish companies.

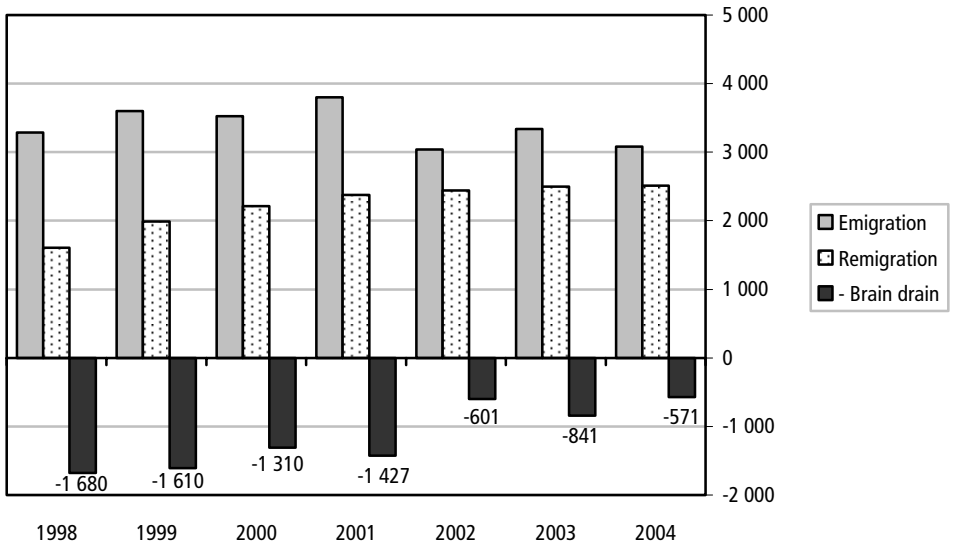
Understanding the users' needs and the related change in the concept of the customer will gain in importance as international competition intensifies. This also applies to the more traditional technology industries. The focus on product

[6] This is not necessarily or solely a question of companies' market shares and competitiveness being decreased, because as a consequence of rapid internationalisation they are carrying out a larger proportion of their production offshore. As the link between technology investments and high technology export weakens, it is worth focussing on what kind of production may be profitable in Finland in the future.

design is shifting from technology-based product concepts towards customer, user or service orientated ones. The increased importance of service businesses in many traditional industrial sectors points in the same direction.

For operations located in Finland, especially for sectors in the vanguard of technology, the key issue is the quality of the innovation environment provided by Finland. An essential factor is the extent to which Finland can offer key resources needed by companies at a competitive cost level. The level of competence in developing countries is continuously rising, causing the competition to intensify. The question for Finland, then, is whether it can educate sufficiently highly skilled experts and attract educated foreign staff to work in Finland. The education system has functioned well in many respects, but success in attracting experts to Finland has been modest. More highly educated citizens have moved from, rather than moved into, Finland, although in recent years the turnover has slightly improved. The competitiveness of the Finnish innovation environment is examined in detail under section 7.7.

Figure 7.3 Emigration and immigration of highly educated Finns during 1998–2004, number of persons.



Source: Alanen (2006).

One of the factors limiting growth in production is the availability of skilled manufacturing staff due to the ageing of the labour force and the somewhat poor reputation of industrial jobs. Seizing the opportunities represented by the new division of labour, i.e. making more extensive use of foreign staff and procuring components and some work from outside Finland, may be of help, but updating training and increasing the sector's attractiveness need to be improved as well.

Another prominent future challenge for the basic industry is the price of energy. While the energy efficiency of Finnish companies, e.g. in steel production, is world class, part of competing international production located elsewhere can profit from cheaper energy due to climate and energy policy differences. Solving this problem requires new solutions at international level.

What about services – can service expertise be developed?

It is apparent that creating new operations capable of performing in the face of global competition is clearly more challenging than further development of firmly established production. In the rapidly changing global markets, new innovations often have a high potential for major success. However, in sectors and operations that have so far been protected from international competition, for one reason or another, new competition may lead to dramatic adjustment requirements.

Aligned with trends in other developed countries, services in Finland will also form an even greater proportion of production and employment. On one hand, a higher integration of services and actual production of goods in various ways is characteristic of the development of service markets. In theory, this offers good opportunities for high value added production in a country such as Finland, while goods production or the production of parts is internationally fragmenting.

On the other hand, a greater number of services are becoming subject to international exchange and genuinely global markets are forming for some. These include scientific research, wireless communications, information systems, cultural, entertainment and content production services and services related to travelling and transport. The EU's internal market creates an integrated scope of operation for other services including construction, retail and many business services. The fact that some services require their production to be limited nationally or even regionally is a factor counterbalancing internationalisation. Many transport, nursing and social services etc. are chiefly of this type.

The Finnish service sector is facing a demanding challenge regarding the capacity to seize new opportunities and succeed in the face of intensifying competition. With the exception of certain sectors, productivity is modest in international terms. An essential contributing factor seems to be the minor application and implementation of possibilities provided by information technology, regardless of the fact that Finland is in many respects a well developed information society.

Many basic structural factors such as increases in the average life expectancy, level of education and leisure time, together with urbanisation, seem to be contributing to demand for services in the Western industrialised countries. Symbolic and meaning-based exchange is typical of post-industrial production. Images, experiences and lifestyle are now more involved in consumers' and users' decision-making. This is creating international growth opportunities for Finnish service providers. Internationalisation may promote productivity when parts of service processes can – at least for a considerable part of knowledge-intensive services – be unbundled to different countries based on the availability of production factors.

Customer-oriented operating methods can systematically be developed using marketing, design or business management measures, and any service sectors, whether public or private, can make use of consumer expertise in product development and creation. However, with a few exceptions, Finnish service companies have not been particularly successful in creating internationally competitive chains, concepts or brands. In this respect, the performance of e.g. Swedish and particularly Danish companies has been better. A partial explanation for this is that the most international Finnish companies almost always belong to producer-led processing chains (see chapter 2). The importance of promoting the export of services, in particular for business and technology-intensive services, will increase in the future.

Growing demand for health and nursing services challenging habitual practices

In the future, the demand for health and nursing services will increase, and the related quality requirements will rise as consumers set higher standards on the service environment, staff competencies and long-term service orientation. In Finland, this pressure primarily concerns publicly produced healthcare and social services, but the demand for private and customised services is also augmenting.

The Finnish healthcare system, which is to a great extent, although not entirely, based on public financing, is considered efficient in international assessments, see e.g. OECD (2005). However, it is not self-evident that the system can respond to growing demand and levels of standards. The municipal sector responsible for the provision of these services is facing the challenges of both financing the services and ensuring the supply of skilled labour as the baby boomers are retiring. Since many nursing tasks are by nature local, they are not vulnerable to foreign competition. In parallel, the possibilities to exploit foreign labour are thus more limited than in knowledge-intensive services.

In healthcare and nursing services, the application of new technology and operating concepts represent outstanding opportunities for improving productivity and enhancing the quality of services. Many projects are currently underway, from electric patient databases to advanced equipment for remote diagnostics and monitoring. Tekes, for example, is currently funding the FinnWell healthcare technology programme 2004–2009, based on the idea that technology will improve the quality and productivity of healthcare services only if new procedures are simultaneously developed in as innovative a manner as the products themselves. FinnWell is one of the most extensive technology programmes funded by Tekes. If successful, these projects may also create a basis for the export of products and service concepts.

What is the future of agriculture?

Due to demanding natural circumstances and small unit sizes compared to many other countries, the preconditions for Finnish agriculture competing in open markets are feeble. The profitability of agriculture and thus also its continuity are therefore crucially linked to support arrangements. With regard to natural circumstances, the competitive disadvantages are permanent, but with respect to unit size they are slowly improving.

Agricultural produce trade liberalisation is weakening the position of Finnish agriculture more than that of other EU countries. Liberalisation of trade along the lines of the EU's WTO offer will probably not, however, modify future agricultural development in a substantial way from that which will have to be faced at any rate: the size of farms will increase, the use of labour input will lessen and production will concentrate geographically, which will increase productivity and improve price competitiveness. However, it can be assumed that the structural change in Finnish agriculture will be considerably intensified if support is decreased for e.g. budgetary reasons more than required by the EU's WTO offer and further decoupled from production.

Nevertheless, other trends of change are reinforcing the operating conditions of Finnish agriculture. One of these trends is a growing need and interest in using bioenergy. In the short term, the greatest opportunities will be related to the use of wood-based biomass. Exploiting power generated from energy crops on a large scale requires technological advances and favourable developments in relative pricesof various bioenergy sources.

Another trend supporting agriculture is the increased importance of the health characteristics of various foodstuffs. A reliably functioning supply chain, good hygienic practices, efficient prevention of animal diseases and the minimal use of plant-protective agents provides a good basis for products considered healthy. Transforming these factors into actual competitive advantages

necessitates strong marketing expertise and, for functional food, long-term investments in research. Research investments by the State and private sector are rising to a certain extent, but it remains unclear whether they will be sufficient to allow breakthroughs.

The Finnish food industry cannot, on a large scale, be based on foreign raw materials. The abovementioned issues on the preconditions for Finnish agricultural production are therefore also vital to the food industry. As competition increases in the food markets (e.g. when new companies located in eastern Europe extend their operations), Finnish production must, like other sectors, be able to increase its added value.

7.7 Competitiveness of the innovation system

Globalisation, combined with the key role of innovations in the performance of developed economies in particular, will make the geographic location of innovative activity and its linkage to the surrounding society a key issue. Global technology leaders have traditionally located their long-term research near international, top universities. On the other hand, part of R&D located close to the markets has started to move closer to production. It can be expected that as globalisation advances, the most knowledge-intensive operations – such as R&D and innovation – will more often find their way to internationally competitive R&D and innovation environments.

This challenges innovation environments to compete with each other for the best innovative companies and top experts. The best assets are held by regions and countries capable of creating special strengths. For small countries and regions, this may mean making strategic choices, since on a global scale it is not possible to be the best in everything. In addition, fundamental strengths and weaknesses need to be identified so that policy measures and resources, that are ultimately always limited, can be allocated with maximum effect.

One of Finland's strengths is its ability to maintain a long-term, systematic R&D and innovation policy and its implementation regardless of economic and political cycles. This has necessitated good co-operation across party political and interest group boundaries. The long-term commitment of the public sector to the innovation policy direction and to the investments it requires is facilitating the planning of development measures for the private sector and promoting commitment to investments.

Another Finnish strength is the ability to co-operate and create networks between actors. Technology and research programmes have played an essential role in enhancing trust, co-operation and networking. A future challenge

includes deepening and widening the various networks and forms of co-operation as well as simultaneous fostering of co-operation and networking dynamics, i.e. the ability to build new networks rapidly. Social capital, trust and the ability to co-operate are key strengths in the transfer to more open innovation environments and partner networks.

Furthermore, in Finland the education system is highly supportive of R&D. The school system provides the students with sound basic skills. The higher education system has placed a strong emphasis on e.g. engineering sciences, important for technological development, in its organisation of subjects. In many fields, the level of post-graduate education can be considered high.

Further strengths of the Finnish innovation environment include an effective infrastructure and public administration. At the same time, the public sector presents challenging issues to which globally interesting innovation may offer solutions. For example, the comprehensive public healthcare and education systems offer significant potential for new innovations related to healthcare and education. A key issue, due to Finnish geographic conditions, is how the various welfare services can be implemented in a cost-efficient yet high-quality manner in sparsely populated areas. It can be assumed that, in this field, new technology and practices based on innovations may also be in demand in other geographically large countries with an ageing population.

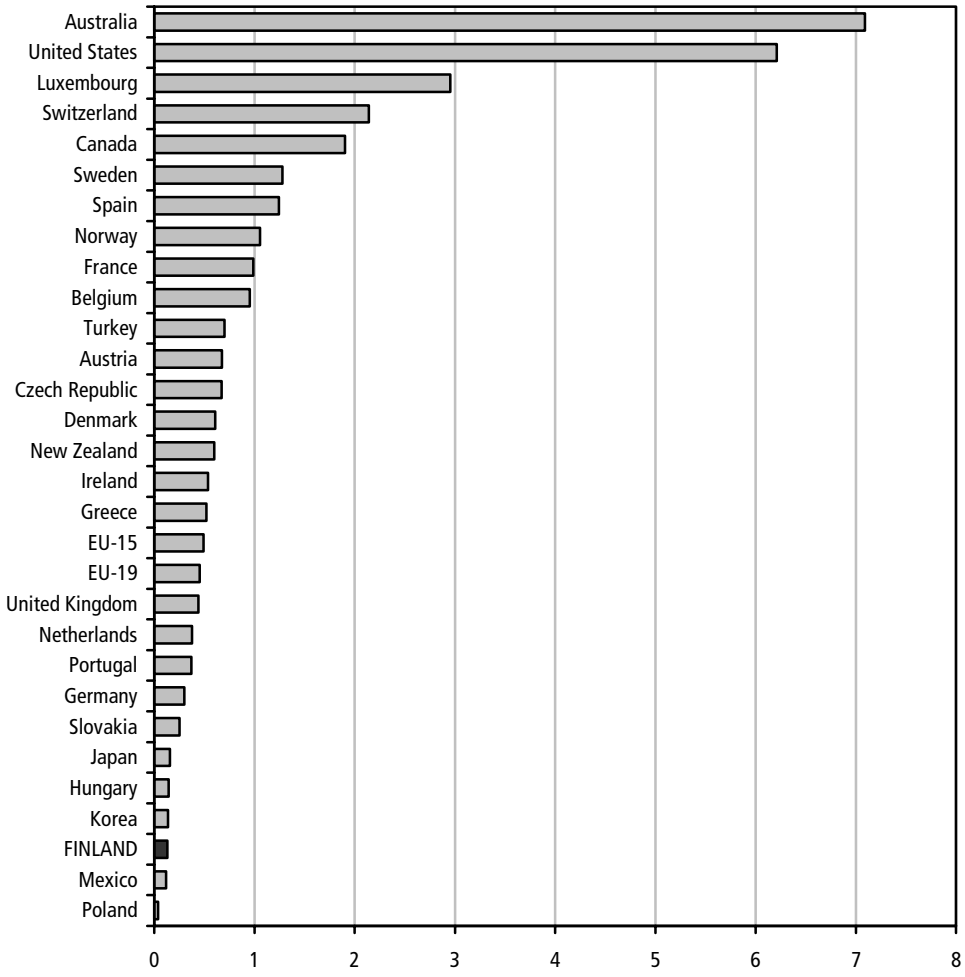
Finland's key challenge in innovation environment competition is its small size. In Finland, allocating significant resources in absolute terms is only possible for a very limited number of research and technology areas. This entails a need for specialisation which, in turn, will reduce the diversity of the innovation environment. This may be a question of significance, since many new innovations are created in various research area interfaces. In its extreme form, specialisation renders the economy highly vulnerable to focus areas that later prove to be misplaced.

The best way to avoid adverse effects caused by specialisation and to support the level of innovation is strong international networking. This enables enhancing a country's own expertise, identifying new opportunities and complementing expertise in fields where sufficient investment is not possible due to limitations in one's own resources.

Research conducted by universities, research institutes and companies has clearly become more internationalised during the last 10 years. Still, the situation cannot be considered good. A particular weak area related to internationalisation is Finland's capacity to attract and retain foreign experts. More highly educated residents have continuously moved from Finland than have moved into the country; in this sense the turnover is negative, although

the situation has somewhat improved in recent years. In Finland, the proportion of foreigners among the highly educated population is one of the lowest in the OECD area (Figure 7.4).

Figure 7.4 Proportion of foreigners among the highly educated population in different countries, %.



Source: OECD.

In addition to the small size of the innovation system, the fragmentation of research into multiple units is a problem from the point of view of Finland's international attractiveness. Good co-operation between various domestic participants helps, but it is not always sufficient. From this perspective, there is a need for even more intense networking and mergers.

The small size of the domestic markets can also be identified as a weakness in the Finnish innovation environment. It undermines the testing of innovative products and services in the markets and therefore their commercialisation. The marginal significance of innovation in public procurement is certainly not helping this situation. Commercialisation problems are being augmented by companies' lack of ambition with respect to growth and small and underdeveloped risk capital markets.

In the future, an even more important feature of the innovation system will be its capacity to react rapidly to changes occurring in the nature of innovation activity and especially in companies' operating environments. At one level, this requires paying sufficient attention to the planning, implementation, evaluation and foresight processes of policy. The ability of administrative sectors to acquire strategic information needed in decision-making is of particular importance.

8 NEEDS TO REFINE ECONOMIC STRATEGY

In the light of the globalisation analysis and the review of Finland's economic development and development prospects, the key political challenges for Finland seem to pertain to three complex issues:

- The ability to create centres of excellence fundamental to global competition, and simultaneously to ensure an extensive skills base and the education system's ability to react quickly to new needs for knowledge and competencies
- The ability of the economy and society to react rapidly to the changing preconditions of economic activity in general
- The adaptation of an energy-intensive economy on a permanent basis to higher energy prices and potential problems in supply.

This chapter focuses on the key issues of each of these three areas.

8.1 Research and education system to combine excellence with a wide competence base

Major investments in R&D and an innovation system which functions well in a variety of respects have undeniably formed the key to Finland's ability to meet the challenges and take advantage of the opportunities of increasingly global competition. Correspondingly, education has made major contributions to the economic growth and enhanced productivity of Finland, among other countries. Various estimations show that investments in education are highly productive both on the individual and social level.

There is nothing to indicate that the significance of R&D, education or the innovation system as a whole in determining economic success is declining – quite the contrary. Knowledge and competencies, and the ability to exploit them, form the strongest relative asset of developed countries as globalisation rearranges the international economic division of labour. Although no exact research data is available on the marginal returns of R&D investments and investments in education on the aggregate economy level, economies which have invested heavily in these sectors have succeeded better than average in terms of productivity and GDP growth. Similarly, extensive research proves the link between R&D expenses and success and higher productivity at the firm level. Hence, a deliberated increase in investment will most probably prove economically profitable in the future, but effective targeting of such investments is at least equally important.With respect to Finland, the analysed changes in the economic operating environment entail at least three requirements in terms of knowledge and competencies:

1 The need to invest heavily in relatively few areas of excellence, which would provide Finland with a realistic possibility to maintain its position at the forefront of global expertise, or to achieve that position, or which are otherwise crucial to the Finnish economy and society.

2 The need to attend widely to the readiness of various sectors of the economy (service operations in particular) to utilise new knowledge, the majority of which is created outside Finland.

3 The need to be able to develop new competencies rapidly for the Finnish workforce, whose expertise is becoming outdated in relation to demand.

Combining centres of excellence with an extensive knowledge base

The policy of creating **Strategic Centres of Excellence** in science, technology and innovation (SCoE), as approved by the Science and Technology Council, is a clear and thoroughly justified response to the first need on the list in terms of R&D operations. In addition, the five theme areas specified so far (energy and environment, metal products and mechanical engineering, the forest cluster, health and wellbeing and information and communication industry and services) are natural choices, because they cover the key exporting industries, highly challenging environmental and energy themes, and the production of welfare services, which entails significant needs and opportunities.

In addition to these, at least a food industry centre of excellence should be considered as a strategic focus area in the early stages, provided that operators in the sector are able to commit themselves to sufficiently high investments in R&D for their own part. Factors in favour of such a theme include both certain strengths related to the quality of Finnish raw materials and performance of the food chain, and the challenges to Finnish raw material production in the process of liberalising trade in agricultural products.

A fundamental prerequisite for the success of the Centres of Excellence is that they aim at the global cutting edge of research. From the very beginning, this requires extensive international networking and, on the other hand, an ability to link all relevant competencies available in Finland to the development of the theme areas. An equally fundamental prerequisite is that the Centres of Excellence base their development operations on an extensive concept of innovation: the idea of customer focus must be parallel to the development of 'hard' technologies.

The establishment of Centres of Excellence entails certain choices in terms of which technologies to pursue in development, and who to co-operate with. It is essential that these choices avoid the unnecessary exclusion of options at various stages of the process. Initiatives by companies must play a key role in

defining Centres of Excellence. As far as possible, it must be left up to the market to select "winning technologies" and, in particular, "winning companies".

Strategic choices require a certain long-term approach and even patience in order to achieve results. However, it would be useful to draft an exit strategy for public investment in time for each Centre of Excellence to prepare for the possibility that inputs in a certain theme area do not yield the desired results, or resources are more urgently needed for other purposes.

The creation of SCoEs calls for targeting significant intellectual and financial resources at selected areas. Because it is hardly likely that such investments can be implemented on the basis of new resources only, resources must be switched from other purposes to the focus areas.

This raises the question of whether the centralisation of resources may result in neglecting potentially important areas of development not selected. This risk could be mitigated for businesses' R&D operations by introducing a tax incentive on R&D expenditure in Finland, for instance applicable to SMEs, similar to the system already in use, one way or another, in most OECD countries. Research on the usefulness of such incentives is not unambiguous, but transferring the focus of direct public R&D funding to selected Centres of Excellence provides an additional reason for considering the introduction of tax-based support.

Another issue related to the creation of Centres of Excellence is that the Finnish higher education system, responsible for academic research and learning at its highest levels, is quite dispersed, making it difficult to create focus areas. In fact, this is hampering the participation of higher education institutions both in the aforementioned Centres of Strategic Excellence and in international co-operation. Moreover, the size of higher education institution units will diminish in terms of the number of students as generations become smaller. All of these factors will justify the structural development of the higher education system towards larger units and more efficient networking.

On the other hand, another basic requirement stated above, i.e. the need for extensive competencies and expertise, calls for extensive educational offerings in various fields and in different parts of the country. A regional presence is necessary because companies are better able to exploit research done at higher education institutions and recruit graduates when such institutions are geographically close by. This has been very distinctly reflected in Finland's regional development, levelled out by the regional expansion of the university system. There are also indications that it is more common to opt for higher education (regardless of the region of the study place) in areas hosting institutions of higher education. Provided that the skills distribution of young people of studying age does not vary accordingly, this means that a

geographically sparse network of higher education institutions would result in talent reserves left unutilised. These factors favour an extensive network of higher education institutions, both in terms of fields of research and regional distribution.

How might we integrate these seemingly contradicting requirements? One answer is provided by the specialisation and profiling of higher education institutions, and networking on that basis, i.e. based on a commonly approved strategy a higher level of specialisation will be required of universities. This would provide the opportunity to strengthen the field-specific competencies ("critical mass") and hence the ability to participate in co-operation with other universities and research institutes, both in Finland and internationally, depending on where suitable partners are located. Another basic response would be close co-operation or a merger between units operating in the same locality. This would not affect regional presence, but may enhance the interfaces between fields of research and lower administrative costs.

However, these solutions would not render the closing of units and/or lines of study unnecessary at various levels of education and in different parts of the country as age groups contract. Due to the population structure, the focus of these measures will be in eastern and northern Finland. As these closures take place, particular attention must be paid to the networking of companies in areas losing educational institutions, with higher education institutions located farther away, and to support measures guiding young people in the region to find education.

As the specialisation of universities and polytechnics increases and their structure becomes more compact, it will be crucial to ensure that the intermediary organisations within the innovation chain reach companies located in various parts of the country and the centres of expertise they form. These can be relatively small and located outside university towns. Innovation system support measures must be "open" in the sense that they do not create hindrances to the development of innovative business ventures, which seem improbable from the bureaucrates' viewpoint.

A large number of various other organisations and programmes participate in the development of expertise, a key one being the special Centre of Expertise Programme based on expertise clusters, which is currently being reorganised. The expertise clusters of the Centre of Expertise Programme and Strategic Centres of Excellence share a similar goal: to develop internationally competitive and attractive centres of expertise in Finland. However, the starting points and measures of the projects differ. The Centre of Expertise Programme develops clusters on a regional basis, focussing on the immediate utilisation of expertise. To ensure efficient use of resources, it is essential that the operations of

Strategic Centres of Excellence and the Centres of Expertise complement one another. Unnecessary overlapping must be avoided while expertise generated at the SCoEs is exploited as extensively as possible by the Centres of Expertise.

It is equally important that the organisations and programmes of economic and industrial policy and regional development work in parallel throughout, avoiding overlaps. In this respect, the situation remains unsatisfactory. In addition to Centres of Expertise, technology centres, Employment and Economic Development Centres and Tekes' regional organisation as part of them, development companies, business incubators, the Regional Centre Programme, EU Structural Fund programmes and Regional Councils responsible for regional development all form a complex tangle from the viewpoint of enterprises and other parts of society. Finland's current public system of business development services is organisation-oriented, complex and extensive, with 20 to 30 organisations providing services via some 1,200 service outlets and the number of specific service products totalling around 200. The need for clarification of duties, responsibilities and organisations is obvious in a situation where global competition can cause dramatic changes in production and employment in highly specialised regional economies.

As regards business development services, a service system reform named Enterprise Finland provides a sound basis for simplification. The Government took a decision in principle on Enterprise Finland in May 2006 (MTI 2006b). It is vital that this reform be implemented rapidly. In addition to this, re-evaluation is necessary as regards the organisation of regional economic and industrial policy and its implementation.

Focus of education and adaptation of supply

The abovementioned observations on the impact of globalisation and technological development on demand for labour and its sensitivity to change pose substantial challenges to the education system, which might extensively affect its content, quality and adaptability. Development tendencies seem to imply the following conclusions, among others:

(1) **Emphasis on the significance of basic abilities**. It is essential that the entire population possess solid basic knowledge, and attitudes which promote continuous learning. This requires heavy investments in education providing general abilities from pre-school age until the end of basic education. Finland's comprehensive school system, viewed as first-rate, provides a solid basis for this, but the transition to vocational or higher education has been identified as problematic in several contexts: too many are left without the basic vocational or professional competencies required in working life. In terms of content, the key areas in general education are the development of social interaction skills,

alongside language skills (incl. the native language), mathematical, deductive skills and the learning skills integral to these. These focus areas are not necessarily reflected in the best possible way in the current curricula.

(2) **Modularisation of education, generality and ensuring progress paths**. Since it is very difficult to know what kind of competencies will be in demand in the long term, it would only be logical to ensure an adequate degree of generality in education and to divide the provision of vocational and professional qualifications into modules instead of aiming directly at a "final" competence portfolio. In practical terms, higher education could, for instance, avoid aiming automatically at a 5 to 7-year Master's degree after the completion of a Bachelor's degree, but allow for Bachelor graduates to take up positions in working life and continue studying after a break, re-orientating if necessary. To implement this principle, the required educational standards qualifying for public sector positions should probably be revised. The principle of modularisation in vocational training and studies at polytechnics, which are basically less time-consuming, involves a choice of various progress paths after the completion of all basic courses. In spite of positive development in this area, deficiencies still exist. There is also reason to assess the degree of specificity in education provided at various levels: many curricula provided even at higher education institutions aim at quite specific professional expertise. This is a vulnerable solution. Within the higher education system, a key requirement for advanced competencies is the degree of interest in a researcher's career, and its continuance. Efficient co-operation between the research system and labour market is a prerequisite for benefiting from investments made in the education of researchers. Thorough preparations have been made with respect to this issue, providing a sound basis for action, which should be taken rapidly.

(3) **Quality more important than the formal level of education.** Since the mere level of education will not continue to ensure demand for labour as in the past and, on the other hand, successful production in Finland requires a wide variety of competences, a high percentage of higher education cannot be an end in itself. Instead, it is essential for education provided at various levels to be of high quality and to meet the needs of working life. In vocational training, this requires sufficiently modern equipment and effective interaction between teaching staff and working life. In all types of education, the development of entrepreneurship qualifications and attitudes is essential. With regard to quality, an undeniable problem lies in the high number of students per teacher due to expanding education, particularly in many fields of higher education. In this respect, more resources must be allocated to enhance quality.

(4) **A comprehensive adult education system and financing system providing efficient incentives**. It is essential that those in working life have clear and flexible opportunities for complementing their education or, if necessary, for retraining for another profession. In spite of the extensive nature of the Finnish adult education system, or possibly partly due to it, it is obvious that it does not form such a clear system. The financing of studies (training itself and subsistence during studies) in particular varies illogically between different situations. Responsibility for financing should be divided between the student, employer and Government, in a consistent and appropriately motivating manner, on the basis of the benefits/competencies provided by training, instead of on that of which party arranges the training. The development of the adult education system has been analysed recently, but the obvious risk lies in development measures excessively cleaving to existing structures. A special concern is how to educate workers who have not completed any vocational training. The so-called Noste programme created for the purpose has not reached its targets in terms of participants. Nevertheless, the programme should be intensified, not ended because of this.

(5) **Excellence requires international support**. Finnish production at the forefront of technology needs top level expertise in order to succeed in global comparisons. The talent reserves of a small nation are not necessarily adequate for this purpose, however energetically pooled. In a way, the fact that the average mathematical basic abilities of engineering students have become poorer as education has been expanded considerably, is indicative of the problem. On the other hand, as "ordinary" competencies in tasks requiring analytic deduction can be prone to outsourcing abroad in international competition, the quantitative objectives of education in, for instance, information technology and the corresponding sectors should be re-evaluated in relation to qualitative objectives. In this context, new determined measures to enhance Finland's attractiveness among talented foreign students and qualified experts must be considered. Such reorientation will hardly be successful unless educational institutions are provided with the clear opportunity to offer high-quality study modules directed at (mainly) foreign students, subject to a charge.

The efficiency of the higher education system and its ability to meet changing challenges

The abovementioned requirements to compact the structure of the higher education system and shorten its reaction times require reforms on several fronts. The first issue involves specifying the principles for the structural development of the higher education system and revising the administrative guidance and control procedures in line with needs for change.

Although the difference should be clear between education that distinctly prepares students for applied tasks, currently characteristic of polytechnics, and more theoretical education orientated more towards research, typical of universities, the creation of units of a sufficient size may require the merging of polytechnics with universities. Legislation should provide for this, because there is no reason to cling to a so-called dual model if it prevents adopting sensible measures.

The specialisation and profiling of higher education institutions must be based on existing strengths, and is most successfully implemented via spontaneous choices by units themselves. However, specific requirements in terms of the size of an institution or unit must be set for this process, using the results gained from the qualitative evaluation of education and research as primary criteria for allocating fields of teaching to various higher education institutions, instead e.g. of the size of the institutions.

The ability of higher education institutions to react to the workforce needs of labour markets alongside needs for research important to economic development, and the ability to recruit the best possible researchers and teachers, require the reform of the administration and financing of higher education institutions. Universities need a higher degree of autonomy to be able to decide, in an expedient manner, on how best to target research and teaching resources within the specified educational fields, on the recruitment and salaries of teachers and researchers, on the dimensioning of further and other education subject to a charge, on exploiting the rights to research results etc.

In turn, the efficient use of autonomy requires professional management, for which a natural solution would be a distinct board comprising more outside expertise (e.g. from working life) than at present, and a rector subordinate to the board, acting with sufficient authority as a managing director.

Basic funding provided by the Government must continue to form the financial basis, the extent of which will be determined with reference to the success of the higher education institution in achieving its goals. On the other hand, research financing subject to competition is a key tool for maintaining scientific excellence and steering the focus areas of research. However, with regard to financing subject to competition, the need for a more long-term approach is obvious. Moreover, higher education institutions must be able to use private sources of financing for purposes other than project financing only, i.e. donations and income from education subject to a charge. To facilitate this, the maximum sum of a tax-free donation should be eliminated without delay for corporate bodies. In terms of financial autonomy, the facilitation of fund holding and fund-based financing for all higher education institutions, currently under

preparation, is essential, but without new sources of income this will remain insignificant in practical terms.

The minimum objective for expanding education subject to a charge could be to endow universities with the possibility to sell graduate education to students outside the European Economic Area. The next step to be considered would be to render advanced, postgraduate and further education subject to a charge, and to compensate this to students, to the chosen extent, for instance through a voucher system. A voucher system could help intensify competition among educational institutions. When sensibly implemented, a financing system based on charges but providing adequate government subsidies may be the best way to ensure sufficient public support for investment in education, while simultaneously leaving it more than at present up to the individuals to decide on the amount and contents of "educational consumption". Such a system would provide a natural solution to the problem of covering the costs of education offered to foreign graduate students (at least from outside EEA). Charging for education, even if complemented by a voucher system, requires naturally a careful reflection from different points of view.

Required resources

Based on existing knowledge on the marginal benefits of such investments, it is impossible to give any exact, optimal value for the share of R&D expenditure of GDP. Regardless of that, from the viewpoint of the abovementioned creation of focus areas for R&D measures and the parallel securing of an extensive basis of competence, a 4 per cent share of GDP, set as a target by the Government, can be considered justified. In order to achieve this target by the beginning of the next decade, an annual increase of approximately 7 per cent in public R&D expenditures is required, assuming that the private sector's share of total input will remain at the current, internationally high 70 per cent level.

In terms of educational expenditure, the views presented on the development needs of education involve a substantial increase in costs unless the solutions chosen are ones that markedly increase the private sector's financial responsibility. Considering that Finland's current investments in education are on an average level only in international comparison, and the results are good, there is no realistic basis for assuming that the problem can be solved merely through improving productivity. Neither will the declining size of age groups allow cutting costs in any significant way during the current decade. This will help financing in the next decade, but will not necessarily suffice to compensate, at least fully, the need for increasing real education expenditures due to the aforementioned reasons.

8.2 The economy's capacity for change

On the level of an individual enterprise, the capacity for change refers to how well the enterprise manages to anticipate and take notice of the changes occurring in its business environment and react to them, i.e. how well it manages to create and get new products to the market when demand changes, adapt the scale of production and reorganise production.

On the level of the aggregate economy, the capacity for change refers more to the economy's ability to direct resources to new, more effective uses when old ones prove uncompetitive. The central part of this process is directing the labour resources to effective use within enterprises, between enterprises, and also out of unemployment and from outside the labour force.

The economy's capacity for change is decisively affected by the conventions and institutions of the surrounding society and by their reactions when circumstances change. One could also refer to the capacity for social innovations.

8.2.1 Transforming enterprise activities

One of the central concerns of an economy that copes with new challenges and efficiently utilises new possibilities is how enterprises manage to change their activities when circumstances change. In the light of the presented analysis, the operating environment of Finnish enterprises has changed and is still changing in three important ways: (1) an increasing part of production is taking place in the face of global competition, (2) innovation in many of Finland's top fields requires pushing the frontiers of technology further instead of learning from others, and (3) customers' needs and preferences are an increasingly important competitive factor for the production of a country like Finland. These facts are important in different ways with regard to the success factors of an enterprise, whether they concern the enterprise's own knowledge and other resources, the ability to adapt current productive inputs, or the ability to acquire new resources or incentives.

Competition and the right attitudes to risk are important starting points

Increasing competition is a good thing with regard to incentives. Research has clearly shown that effective competition is good not only for what is termed static efficiency, but mainly dynamically, forcing enterprises to innovate.[7] There is a lot of experience in Finland, especially in the telecommunications field, on the advantages of domestic and local international competition in getting enterprises ready to deal with intensifying global competition. In this light, furthering domestic and European competition in service sectors where, in part, it is much less effective than in manufacturing, would be advantageous to the global adaptive ability of the economy.

A very general question is the attitude to risk taking. Opinion polls on the aspiration among citizens to start up a business or of enterprise owners to expand the scale of business activities indicate that the Finns hold stability and safety in high regard. Since circumstances will, in future, change in an even more unexpected fashion, it would of course be an advantage if the attitude climate could develop in a direction that is more risk-tolerant. It is, however, difficult to see how and to what extent it would be possible for the policy makers to exercise an influence on an issue of such a fundamental nature.

Increasing the speed of establishing new enterprises

An important channel for stimulating commercial activity is the creation of new enterprises. Over recent years the number of enterprises in Finland has increased noticeably. This does not, however, necessarily mean that the stock of enterprises is undergoing sufficient renewal. International comparisons indicate that renewal has not been especially strong during the current decade – unlike during the years following the trough of the slump of the early 1990s (Finnish Ministry of Trade and Industry, 2006a).

Over the last few years a lot of attention has been paid to improving the general conditions of entrepreneurship, including within the framework of a policy programme. Several practical obstacles with regard to setting up a business deemed problematic have been either removed or significantly reduced. Measures to reduce such obstacles should be continued, and in the creation of new regulations special attention should be paid to its effects on incentives with regard to commercial activity. It is, however, difficult to identify any single

[7] The connection between competition and productivity is not straightforward. The latest research emphasises that competition may also be excessive with regard to innovative stimuli. In empirical studies it has, however, usually been shown that competition increases innovation. The positive effect of competition is emphasised in areas that are at the forefront of technology. See e.g. Griffith, Harrison & Simpson (2006) and Aghion (2006).

regulatory factors that make the establishment of an enterprise in Finland so difficult that changing them would lead to a major increase in the number of enterprises being set up.

In the end, starting up a business depends on the relationship between expected profits and risks. The Government can influence this process in different ways through economic policy; for example with the R&D and training policies mentioned above, or by developing the operating environment of the labour market. A direct means is the taxation of business activity. With regard to corporate taxation, Finland is relatively competitive among the developed (OECD) countries following the latest reforms, but tax competition may make additional reforms necessary very quickly. The risks for small-scale entrepreneurs have also been reduced by e.g. improving social security. However, to some extent risk reduction could be much better than it is, for example with regard to the possibilities for entrepreneurs who have gone bankrupt to start up a new enterprise. With respect to both legislation and general attitudes there are perhaps fewer such possibilities than in many other countries.

The growth of enterprises is even more important

Seen from the point of view of the dynamics of the economy, the question of whether good business ideas quickly lead to expanding production is more important than the number of enterprises and the turnover of the stock of enterprises. Various indicators reveal that the number of so-called growth enterprises is relatively low in Finland (Finnish Ministry of Trade and Industry, 2006). This may partly be due to the previously mentioned cautious general attitude towards risk taking.

One potential problem may still lie in the financing of very risky projects. This especially concerns business activities based on intangible capital, where the investments necessary for development do not involve the generation of capital which is suitable as collateral. Although the finance markets in Finland have developed, as elsewhere in Europe, the adequate availability of risk financing for such growth enterprises is still a problem in comparison to e.g. the United States (Murray & Maula).

Additional public investment for the financing of growth enterprises can still be considered to be well-founded. International experience shows that early-stage risk financing is best supported by actors that are able to combine finance and strong business acumen based on experience and knowledge of market conditions. This points to both business angels and venture capital funds. To incentivise such activity it is worth considering tax expenditure programmes that

encourage investors to invest in higher-risk enterprises. Such systems are in use in e.g. the United States, the United Kingdom and France.

The market risks related to new technology are significant, especially for enterprises that are active at or near the forefront of technology. The Government can, to some extent, reduce these risks with the help of innovative procurement policies (Bartelsman 2005, Georghiou 2006). By undertaking to procure products and services that have certain qualities, the Government can reduce the risks arising from experimental activities for the developers of such products. Innovativeness, however, has not yet become a central criterion for public procurements. This needs to be changed.

A significant number of new enterprises are, objectively viewed, one-man-enterprises. This is characteristic of the service sectors, especially for high knowledge business service enterprises. At the very beginning of business operations, hiring the first employee is probably a significant step, and this justifies considering whether it would be possible to make it easier and/or cheaper for entrepreneurs to hire their first employee.

The simplicity of operational adaptation

A significant part of the capacity for change is the ability to reduce and even discontinue operations that are not profitable under changed circumstances, as well as to change the structure of the used production factors.

On the basis of the estimates made by the European Foundation for the Improvement of Living and Working Conditions, working hours in Finland are relatively flexible in comparison to many other countries. With the help of various working hour banks, flexibility has been developed even further, at least in some branches. Developing appropriately flexible arrangements even further could, however, be assumed to be in both employers' and employees' interests.

A more important question with regard to adjustment is the reduction of the labour force if circumstances dictate it. In this regard too, Finland is unexceptional. It is, however, obvious that the ability to reduce the labour force if necessary is an important competitive factor in rapidly changing market conditions. A low dismissal or layeff threshold is often considered to be one of the key strengths of Denmark's dynamic labour market. Moderate job protection makes it easier (less risky) for enterprises to hire manpower for new tasks. It would make sense to consider reducing job protection as part of a greater whole that develops a new sharing of risks between the individual employer, the individual employee, and collective risk bearing, by broadening the operating model of "change security" introduced in 2005 (see 8.2.2).

Expanding the range of innovations

Finland is a technology-oriented economy. Therefore, the increase in the level of technological knowledge in developing countries presents a bigger challenge to Finland than for countries whose competitive advantages are more based on other factors. In addition to technology, another central competitive factor is the ability to produce products and services that correspond to (potential) customers' needs and wishes. Customer-driven innovation activity that aims to take this into account is becoming increasingly important, but at the same time it can be considered one of Finland's weaknesses.

Instilling customer-driven innovative activities in the day-to-day operations of Finnish enterprises is not something that can be done instantly. It can, however, be promoted in many ways. Paying attention to it in the teaching programmes of universities and polytechnics where those who will be playing key roles in business are educated is, in the long term, of importance. More rapid results can be obtained by linking the requirements of developmental activities concerning the customer interface to the support that the Government gives to enterprises through various channels. This is in fact what is being done in programmes run by Tekes, the Finnish Funding Agency for Technology and Innovation.

Customer-driven innovative activities offer competitive possibilities, especially to enterprises that cannot, due to the nature or size of their field of production or their available resources, base their competitiveness predominantly on the implementation of new technology. While the development of technology is concentrated in localities with universities and polytechnics, the customer-based innovative activities of a different kind could be the particular strength of enterprises based in smaller cities and the countryside (Karjula 2006).

Business services in need of special attention

In many countries, business services have become one of the fastest-growing sectors of the economy. In Finland, too, business services are growing and becoming more international. However, Finland's position in international comparisons is weak, despite some individual, successful service enterprises and the general positive development trend. In an EU-wide comparison Finland was placed among the last on the basis of the size of its business service sector (Hyypiä & Kautonen 2006).

Industrial companies and the public sector still produce many services that in other countries were long ago outsourced to the private service sector. Due to low domestic demand there are no strong units in the field that could benefit from advantages of scale and so succeed on an international level.

Above all, the public sector can support the development of business services by creating innovative demand for them. One field is the development of the public enterprise services mentioned previously. Transferring the production of these services to the private enterprise sector could partly assist in the successful development of service enterprises on the open, global market. The demand for services would probably be strengthened by tax incentives, which would be granted to the enterprise for the acquisition of knowledge input.

Ownership supporting renewal

One of the main characteristics of globalisation is the internationalisation of ownership. Finland is an especially good example of this. Research indicates that the internationalisation of ownership has increased the efficiency of enterprise activity in Finland (Ali-Yrkkö & Ylä-Aanttila 2003). This has mainly been realised in such a way that the Finland-based operations of enterprises have been focussed on their strongest knowledge areas, and the global market network of enterprises and other resources have been called in to support Finland-based production. Foreign ownership, therefore, has led to structural changes that support efficiency and long-term competitiveness.

However, there have also been cases of foreign ownership leading to the transfer abroad of production and accumulated knowledge capital. There is also reason to believe that in the absence of alternative Finnish owners, Finnish enterprises have been sold abroad under their market value (Puttonen 2004). The greatest fear is that the economy becomes a 'subsidiary economy', where the key decisions are made abroad. This might become problematic, especially if foreign owners act in a short-termist way due to market pressures. In such cases, development and innovation in Finland-based business may not have time to develop before investors lose patience.

In this regard, it would be beneficial if there would be an adequate number of Finnish-owned enterprises, where it can be assumed that the owners are committed to the long-term development of business operations in Finland. Indeed, with regard to the efficiency of the economy, it would probably be advantageous if there were varied ownership structures. Foreign owners probably promote efficiency because they tend to require a high return on capital. On the other hand, domestic ownership can be more long-term, and they are likely to have better understanding of the conditions related to production in Finland. Customer-owned enterprises, on the other hand, tend to curb prices where competition is perhaps unable to. Cases in point indicate that many kinds of ownership structures can lead to efficiency be it relatively concentrated ownership (family enterprises), decentralised share ownership, and extremely decentralised ownership by the customers. The natural conclusion is

therefore that Government policy should aim at supporting multifaceted ownership.

8.2.2 The functioning of the labour market

Ensuring labour supply

The state of Finland's labour market will essentially be determined over the next 10 to 15 years by the reduction in the working-age population due to the ageing of the population. This change will be difficult to fully compensate for in any one way. By raising the participation ratio, the reduction of the labour force can, however, be mitigated substantially. Compared to the other Nordic countries, Finland's participation ratio is 4 to 5 per cent units lower. This difference stems mainly from the under-25 and the over-55 age groups (Prime Minister's Office 2005).

The most useful measures to increase the total labour force supply are extending the careers of older workers and bringing forward young people's entrance onto the labour market. These have both been the focuses of Government policy for some years, cf. for example Finland's national reform programme. It remains an open question, however, whether the implemented policy measures will be enough to increase the labour supply, especially with respect to older workers. The question is the adequacy of incentives for remaining at work both in the early retirement schemes and in the old age pension scheme. Taking it into account that the higher employment rate in the other Nordic countries has been achieved at the expense of average working time, it will be important to pay particular attention to enabling older workers to work part-time.

The incentives and opportunities the unemployed have to take jobs on offer are also important. For a certain number of the unemployed, taxation and income transfers undeniably cause a significant incentive problem in accepting work. If the unemployment trap is defined as a situation in which at least 80 per cent of expected income earned goes on taxes and income transfer losses, then according to large-scale studies 13 to 17 per cent of unemployed persons during the last few years would have been in such a trap, notwithstanding various trap-reducing tax and benefit reforms (Parpo 2004, Honkanen et al. 2006). If leisure time is considered to be of more value and thus the trap limit is set below 80 per cent, then the number of people defined as being in the trap naturally grows. Developing taxation and social security to reduce incentive traps is therefore still justified.

As social benefits play a central role in causing incentive traps for most unemployed people, it is understandably difficult to reduce them. This manifests itself for example in the complexity of the use of the so-called adjusted allowance. For the older, long-term unemployed one alternative could be to establish the basic allowance or labour market subsidy as basic income, the payment of which would not be interrupted even if the recipient were to earn income.[8] The correct measuring of incentives might require the application of a separate tax scale to such people, but that should prove an insurmountable problem.

A considerable number of the unemployed, according to the latest estimates perhaps 140,000 to 150,000, are long-term or repeatedly unemployed, and are difficult to integrate into working life. Many of these unemployed people have such low productivity that there is no demand for their work at prevailing wage levels, notwithstanding the incentives of supply. When, additionally, a substantial number of them are dependent on social assistance it is difficult to improve material incentives. Effective participation in the labour market for these people will probably require the reduction of employment costs for employers one way or another, and more potent active labour market policy measures in order to increase productivity.

Labour needs can also be met from abroad, and in fact net immigration to Finland has increased over the last few years. Government policies have also become more supportive of employment-related immigration (e.g. the ending of the transitional provisions for the new Member States and the immigration policy programme). However, needs assesment remains the basic policy outline, which can be explained by continuing high domestic unemployment. Needs assessment, though, unavoidably slows down the recruitment of foreign labour and signals a certain reserve in relation to labour from outside the EU. It would be worth re-evaluating immigration policy relatively soon.

A problem in itself is the migration of the most highly-qualified. Finland is obviously not a particularly inviting destination for internationally mobile, highly-qualified people. Such people, however, take up key positions in knowledge-based economies, especially in fields where Finland is at the forefront of technology. To attract the highly-qualified, additional measures are undoubtedly needed. Special measures aimed at immigrants partly help, such as increasing and expanding the special treatment of foreign experts with regard to taxation. Similarly, attention should be paid to a wider provision of education in foreign

[8] About a third of those aged 55 and over are long-term unemployed. Implementing a 'basic income' for them at the level of the labour market subsidy would involve a relatively low risk of additional costs for the public sector, but would reduce the incentive problem to some extent, maybe even significantly.

languages. Attracting highly-qualified people also causes pressure to reduce taxation in general for those with higher earnings.[9]

Increasing the mobility of the labour force

With changes in the demand for labour caused by globalisation and by the reduction in the labour supply due to ageing of the workforce, the mobility of labour is a crucial adaptation mechanism for the economy. In the previous section, it was seen that the labour force is – contrary to some claims – relatively mobile in many respects. However, there are good reasons for increasing both occupational and regional mobility.

Finland aims to invest aggressively in a number of production fields that are at the forefront of technology. However, global competition and rapidly changing demand prospects are typical of these fields. This necessitates the ability to steer the workforce quickly to new tasks, which often involves a change of employer. However, due to the scattered location of production and population, it is probably less common in Finland than in the densely populated Central Europe for new jobs to come into being in the same area of employment from which jobs have disappeared.[10]

Increasing the mobility of labour does not mean the maximisation of mobility. While constituting an advantage for employers in certain respects, increasing mobility may also harm employers and undoubtedly generates costs for both individuals and the immediate community. An obvious danger for enterprises is the loss of social capital that they have accumulated, caused by the large turnover of the workforce. For individuals regional mobility causes both tangible and intangible costs. For communities, large population changes may, depending on the situation, lead to various costs related to the development or the underutilisation of infrastructure. These factors make it difficult to define socially optimal mobility. The requirement to adjust brought about by globalisation, however, justifies the reduction of obstacles to mobility.

In Finland, the **regional mobility of labour** has often been viewed as problematic with regard to balanced regional development. Nevertheless, the regional mobility of labour is not necessarily in contradiction to balanced regional development. Firstly, a major proportion of total migration is crosswise. Approximately 170,000 people move annually from one sub-region (NUTS 4) to

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9 High earned income tax rate is mentioned almost without exception as a problem in enquiries in which adverse factors with regard to working in Finland or immigrating to Finland are investigated.

10 The outsourcing of service sector jobs abroad, however, probably mostly affects areas with large working populations; cf. Chapter 2. In this regard, regional mobility is most probably not as important as it usually is in connection with structural changes in production.

another. Only about 10 per cent of this is net immigration to the sub-regions, which gain population. However, only this type of migration is important with regard to the regional distribution of population. Secondly, the growth of many peripheral areas with growth potential also requires various types of regional labour mobility; an example lies in tourism centres that need seasonal labour in Finnish Lapland. Thirdly, it benefits no one when the workforce becomes unemployed or is used ineffectively because it is not worth moving to another locality.

Of the factors that affect regional mobility within the sphere of influence of the authorities the most important is probably the adequate supply of housing in rapidly growing areas. The differences in living costs are clearly greater than differences in wage levels, especially between the metropolitan area of Helsinki and the rest of the country. Since the problem cannot be the quantity of undeveloped land, policies are required which aim at increasing the supply of plots by making town planning more effective and by supporting incentives to bring more land suitable for building onto the market, e.g. by way of real estate tax. Supporting effective competition in the construction industry is also important. The scaled elimination of the interest deduction on loans taken out for buying housing could also ease the housing market situation in the long run, because due to supply limits this deduction is reflected in prices.[11] Just increasing the quantity of dwellings in the market is not enough. As people attach increasing value to quality issues, special attention need to be paid to providing the sort of housing people demand.

An important factor affecting both regional and occupational mobility with regard to the unemployed is the conditionality of unemployment security, i.e. to what extent is the readiness to take an offered job remote from one's area of residence or a job that differs considerably from one's previous work (the right to refuse work other than your profession) a condition of unemployment security? With regard to both conditions the practice in Finland does not seem to be as severe as for example in Sweden or Denmark (Hasselflug 2005). There has also been some measure of uncertainty as to whether the conditions are interpreted in the same manner throughout the country. Mobility, therefore, in both regional and occupational dimensions, could and should be increased by tightening up the conditionality of unemployment security. The mobility subsidy introduced in the 2007 State budget gives a small additional incentive for an

[11] The support included in the interest deduction for owner-occupancy also tends to weaken mobility because the costs for owner-occupiers of changing locality are greater than for renters. The readiness to move is indeed lower for owner-occupiers than for renters, cf. e.g. Tervo (2000). This effect of owner-occupancy, however, is often exaggerated, because owner-occupiers tend to be people who for various reasons are less mobile. Neither do international comparisons support a major quantitative effect due to owner-occupancy in comparison to other factors: in the United States, undeniably a country where there is a high willingness to move, owner-occupancy is more common than for example in Finland.

unemployed person to move, but it is unlikely to have a noteworthy effect on overall mobility.

Commuting does not carry the economic costs accompanying changing one's residence; neither does it lead to a breach in social contacts as commonly occurs when moving. Commuting is therefore an easier solution than moving to the problem of regional labour mis-match especially when it is assumed to be temporary. On the other hand, commuting may also result in significant daily commuting costs, including the time spent commuting.

There seems to be potential for expanding employment areas through an increase in commuting even after the period of growth of recent years; fewer people spend a great deal of time on daily commutes to and from work in Finland than for example in Sweden or Denmark (EU 2006). Commuting can be furthered mainly by improving traffic services and refunding the costs it involves. A noticeable increase in the right of tax deductions for travel costs in the beginning of 2007 will be a significant change in this respect. With regard to traffic services, the most cost-effective measures are probably those related to the effective utilisation of traffic networks that have already been built (e.g. the adequate traffic density of mass public transport).

Telecommuting is often the most painless form of mobility for employees. In chapter 6 it was seen that telecommuting had not started to contribute to employment in peripheral areas as hoped by many. This notwithstanding, different forms of telecommuting offer a flexible addition to the regional incidence of work and labour, especially if combined with commuting and part-time residence in the locality of work.[12] The best path to further mobility in this respect is to promote the development of moderately priced broadband connections that cover the whole country. In this regard, the need for public investments is greatest in areas of sparse population.

With regard to **occupational mobility**, areas of key importance include the education system, incentives created by the terms of employment and the unemployment security mentioned above. Without the capacity of the education system to help people obtain the competences necessary for new tasks, even the best material incentives cannot achieve the necessary adjustment of the labour force. As noted above, the adult education system is in serious need of development.

[12] Various types of mobile or remote work seem to be relatively typical in Finland in international comparisons (FinnSight2015).

The incentives to change to a new, more productive task may suffer from the reaction of taxes, employers' contributions and income transfers to a higher earned income level. The marginal tax wedge on labour (the share of income taxes and the employer's and employee's social security contributions in additional income) in Finland has decreased systematically since the middle of the 1990s. For high income levels, however, it is relatively high. The marginal tax wedge of labour is also clearly higher than in Denmark, where the total tax ratio is higher than in Finland (Hetemäki & Suvanto 2005). At lower income levels, on the other hand, the reduction of social security benefits still causes high marginal tax effects (Honkanen et al. 2006). Justification therefore remains for reducing the taxation of labour from the point of view of labour mobility.

The increasing importance of wage flexibility

On a national level, the Finnish wage formation model has guaranteed significant flexibility in real wages, but has led to high real wage rigidity at individual level. This has probably partly weakened the integration into working life of the least qualified. Although the gradual elimination of the older, low-qualified labour from the labour market will probably ease the polarisation of unemployment related to educational levels in the coming years, the flexibility of wage formation at individual level will be more important in future than it used to be.

Globalisation analyses (Baldwin 2006, Andersen 2006) highlight the fact that competition among different countries for production locations will affect all kinds of jobs more than before. This will make it increasingly difficult to maintain wage structures that do not correspond reasonably well to people's productivity. This adds more weight to the previously obtained research results, according to which wage rigidity tends to cause unemployment (Pekkarinen & Vartiainen 2004).

On the other hand, the fact that the same wage has been paid for similar work, irrespective of the productivity differences among enterprises and plants, has tended to support structural changes which raise productivity.Plants and enterprises with weak productivity have disappeared due to competitive pressure, while highly productive enterprises have benefited from wages determined essentially at the aggregate or branch level.[13] This mechanism in itself will continue to function in the future too. The change in the nature of work, being increasingly based on the knowledge of individuals and groups and difficult to supervise, has increased the importance of pay-related productivity incentives (Vartiainen 2006).Therefore the increasing determination of wages

[13] This so-called Rehn-Meidner model factor has probably contributed to the Finnish ICT sector's excellent profitability and rapid expansion in the 1990s.

within enterprises, based on the productivity of individuals and groups, may in future even support the growth of productivity rather than lowering it. There is also recent empirical research in support of this claim (Heyman 2002 & Lundborg 2005).

Due to these factors, the development of wage formation that takes greater account of the productivity of individuals and teams of workers is important. In practice, this requires increasing the role of the enterprise level in wage formation. The need for this was also acknowledged in the dialogues among labour market organisations organised in the context of this project. The income policy agreement concluded at the end of 2004 included the possibility of using part of the total amount of the wage increases in ways to be agreed locally. However, only about a fourth or about 0.25 percentage points of the "union share" (0.6 % + 0.4 %) has been agreed locally. This is a fairly small part of the total quantity of increases (2.5% + 1.8%).[14]

In connection with the tax policy agreement there were also agreements on branch-level negotiations to develop the collective bargaining system (including civil servants), especially in terms of promoting plant-specific solutions. There have been wide-ranging discussions, and models concerning the organisation of the flexible use of working time have produced results. However, it was not possible to agree on the strengthening of the role of local agreements in wage formation.[15] The development of wage formation at enterprise level with local agreements is therefore still extremely topical.

Flexibility and risk sharing

The turbulence on the labour market arising from globalisation and technological development, together with the reduction in the labour force due to an ageing population, will demand considerable flexibility from the labour market in many respects: labour force mobility from one occupation to another, from one enterprise to another, from one region to another, wage flexibility and powerful incentives to participate in the labour market. Also a more flexible allocation of annual working time according to the work situation may become a more important competitive factor.

In most cases, these flexibility demands will increase the risks borne by employees. Examples include weak employment protection, unemployment security-related demands to change occupation or location of residence, flexibility of working time in line with demand, and the determination of wages based more on one's own productivity and the profitability of the enterprise etc.

[14] This estimate is based on the information from areas covered by the Confederation of Finnish Industries' agreements.

[15] Labour market organisations' press release of 27 March 2006.

However, bearing such risks would be disadvantageous to individuals, and may lead to inappropriate solutions, for example with regard to developing competences.

There is therefore an obvious need to spread the risks related to flexibility wider, either collectively to employers and employees, or to the whole of society through income transfers financed by tax revenues and through services for those affected by the structural change. This need has also been reflected in the labour organisations' high degree of reserve with respect to reforms in many countries that increase flexibility in various labour markets. In many European countries, such reserve or even hostility has substantially hindered the implementation of reforms.

For these reasons, increasing attention has been paid over recent years to reforms in which the flexibility needed by enterprises and the security needed by employees can be expediently linked (cf. e.g. OECD 2006d). The Danish 'flexicurity' model has received the most attention. In this model, weak job protection and flexible wage formation at enterprise level is combined with high unemployment benefits and wide-ranging but strictly implemented active labour market policy measures. As the results with regard to unemployment and employment have been excellent among the developed countries, this model has in many quarters become to be seen as an alternative to the 'Anglo-American' flexibility model.[16]

The "change securityprogramme" introduced in Finland on 1 July 2005 is a step in the direction of the flexible security described above. The employee, who has been given notice or is at risk of being given notice due to economic or production reasons, can in the programme use working hours to look for a new job and he or she has the right to a personal employment programme and to an increase in unemployment benefit during the time that the employment programme measures remain in force. The employee, however, also has the obligation to look for work actively, and to accept work and training. During the first 14 months of the new system, approximately 12,000 employees participated in it. The effect of the system on the employment of those becoming unemployed is still difficult to estimate. According to employees' and employers' organisations, the system has started well.

[16] Economic and labour market policy models have been classified in various ways. In recent years divisions into groups of four have become popular, with the Nordic countries forming their own group, which is able to combine high employment and productivity with a level income distribution, cf. e.g. Sapir (2005) and Korkman (2006). Whether Finland belongs to the Nordic group is to some extent unclear, due to e.g. its higher unemployment.

Change security concerns only a small part of all employment relationship terminations.[17] It would make sense to develop the Finnish labour market model in the direction of the flexible security model. One alternative could be to apply the new aggregate of rights and obligations to young employees. The central elements would then be reducing employment protection and, as a counterbalance, improved training and employment measures and an increased unemployment benefit level for the duration of the measures of the change security programmme. Such an extension could be justified by the fact that employees with little employment experience represent a greater risk for employers, and young workers remaining unemployed and the related risk of long-term unemployment is a greater problem than older workers drifting into long-term unemployment. As experiences with the model accumulate, it could be expanded to other groups.

The flexibility demanded from employees – while, from various standpoints important for enterprises in competitive conditions – may also be problematic for enterprises. For example, the interest of employees in improving their competence is not necessarily very great if they are very unsure about the continuation of the employment relationship. The high turnover of the labour force, on the other hand, unquestionably weakens employees' capacity for co-operation. These may have negative impacts on productivity, and also for these reasons it is important that as the flexibility of the labour market is increased in different ways, practices are strengthened that support employees' preconditions and incentives for committing themselves to their jobs. In this respect, good management is crucial.

8.2.3 A public sector that supports change

The influence of the public sector on the renewal capacity of the economy is related to specific regulation, to public sector investments in the general conditions for innovative activities, to the renewal of the public sector's own production, and also to the utilisation of public projects as promoters of innovative production, to the activities of the social security system as a bearer of risk, and to the level and allocation of taxes for financing essential expenditure.

With regard to the regulation of the product market, Finland is a comparatively typical OECD country. Using quantitative indicators, the rigidity of its regulation would even seem to be slightly lower than average according to OECD (2006)

[17] Of the 870,000 instances of unemployment that began in 2005, only 50,000 were given notice due to production reasons, and nearly 20,000 for other reasons. 530,000 were related to the ending of fixed-term contracts and 70,000 to own requests. 15,000 became unemployed after their trial periods had ended. 185,000 people became unemployed for other, undefined reasons.

estimates. Although regulation can be developed in many ways to support growth and the renewal of commercial activity, regulation itself is hardly the central problem.

Thanks to high R&D revenue, the public sector invests a large amount, in international comparison, in the general preconditions for innovative activity. Investment in education, however, is average. In the light of the analysis presented above, it would be warranted to increase such investments with regard to the size of the economy.

The public sector's participation in the risks borne by individuals has been shown to be important both as a condition for taking risks at individual level, and also for maintaining the cohesion of society, and thus as a factor that reduces general resistance to change. Since it is very possible that globalisation will increase the turbulence of working life (loss of jobs, possibly untypical employment relationships, variations in wages etc.), there is no reason to reduce the participation of society in bearing the related risks. If the rules of working life are developed in a way that reduces enterprises' risks for employing people, there is reason to increase at least to some extentpublic participation in risk bearing. This will naturally generate pressure on expenditure.

Such expenditure pressure does not fit well with the foreseeable increase in public expenditure due to the ageing of the population. Already, without these new pressures, the long-term sustainability of public finances is questionable; cf. the special focus below. Problems in balancing public finances are also difficult to solve by increasing taxation, since from the standpoint of a well-functioning labour market it makes more sense to lower labour taxation, and tax competition is likely to limit the taxation level of mobile production factors anyway.

Of course, this raises the question of alternative methods of reacting to the foreseeable weakening of the public finances. Finland's national reform programme emphasises keeping public finances in surplus over the next few years in order to build up buffers. In addition, the programme lays stress on enhancing public services with the help of both the Government's productivity programme and the municipal and services structures project. With regard to limiting pension expenditure, the strategy is to aim at achieving the targets of the pension reform through e.g. working life development. In addition, it is pointed out that strengthening the growth potential of the economy is obviously helpful in meeting the expenditure needs caused by the ageing of the population.

The public finance outlook described, needs for additional growth-supporting expenditure demands and the need to ensure sufficient public risk bearing make

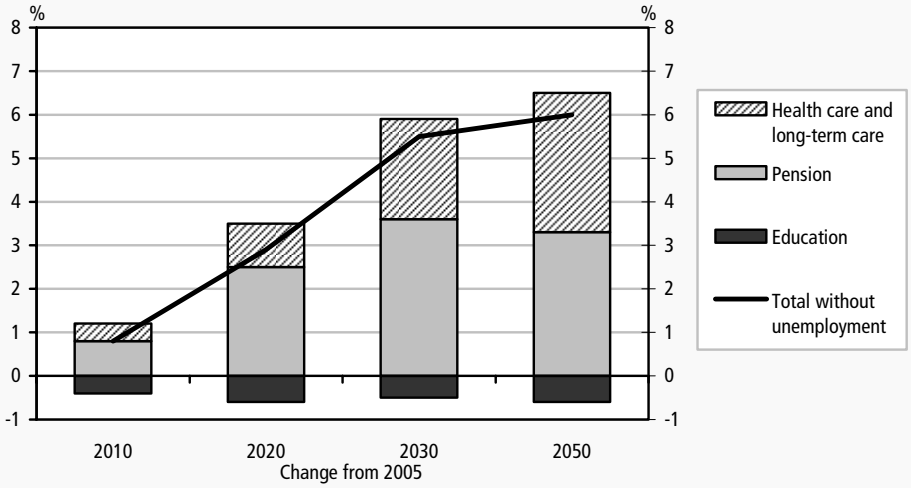
the adequacy of the chosen policy questionable. A natural question is then whether there are significant elements in public expenditure that are inessential or inefficient as public sector tasks.

Special focus The sustainability of public finances

Based on an EU-wide comparison, the balance of Finland's public finances is excellent. The public sector is clearly in surplus, and the GDP share of the public debt is one of the lowest. The main part of the surplus derives from the earnings-related pension scheme, but central government finances display a surplus too. If economic growth in general continues as expected, the public finances situation will remain reasonably strong in the near future, so long as growth in expenditure does not accelerate significantly.

In the long term, however, the pension, healthcare and long-term care costs related to the ageing of the population call the stability of public finances into question. Over the next few decades, expenditure pressures will come mainly from pensions, but in 2050 they will arise almost equally from pensions and health and long-term nursing care costs (figure).

Figure Growth of age-related expenditure, per cent of GDP.



Source: Finnish Ministry of Finance (2006).

On the basis of the calculations included in the revision of the stability programme (Finnish Ministry of Finance 2006), at the present total tax ratio, public finances would show a deficit by 2030, and the deficit would continue to increase, in turn leading to accelerating indebtness. Such a scenario cannot, of course, materialise; instead, the development path of either expenditure or revenue must change.

Calculations that extend for decades into the future are extremely uncertain and sensitive to even minor changes in assumptions. Thus, the European Commission, basing its figures on the calculations of the EU's Economic Policy Committee, estimated the stability risks of Finland's public finances to be lower than the stability programme's estimate (European Commission 2006). However, not even this calculation has a risk-free long-term outlook for public finances.

One noteworthy aspect of the calculations is that they assume the GDP share of education expenditure to diminish following the decline in the size of young people's age groups. In Finland this 'gain' is estimated to be around 0.5 per cent of GDP by 2010. Therefore, the calculations do not assume that strengthening and maintaining the competences of the labour force requires more resources for education in future than at present. The reduction in unemployment is also assumed to lower the costs resulting from unemployment, in Finland from 0.3 to 0.4 per cent of GDP. This assumption presumes that unemployment will decrease without any significant changes in active labour market policies aimed at supporting, for example, the mobility of the labour force, or without any additions to the risk burden borne by the public sector.

With regard to financing, the crucial assumption of the calculations is that the total tax ratio will remain unchanged. In the revision of the stability programme this means that by 2030 pension costs will increase by 2.1 per cent in relation to GDP, and the GDP share of other taxes will correspondingly diminish. It is not at all self-evident that it will be possible in the conditions of tax competition to maintain Finland's relatively high total tax ratio, even if so desired.

The pension system

The question of the appropriate extent of public responsibility can be most clearly linked to pension security financed by tax-like payments to the present extent. The tasks of the pension system can be divided into three: the levelling of consumption over one's life span, insurance, and reducing poverty (cf. Suoniemi, Tanninen & Tuomala 2003). Ensuring a certain basic pension security for everybody irrespective of their circumstances forms an essential part of a welfare society's risk bearing, and this can only be the Government's responsibility. There are also matters related to the self-selection of customers that speak in favour of a pension insurance system that is obligatory for everyone and based on tax-like compulsory payments.

One may instead justifiably ask whether the obligatory pension level related to the current system is optimal, whether the age limits for taking retirement and the conditions for early retirement pension systems are suitable, and what kind of time profile in accumulating pension funds should be aimed at in the pension system.

It makes sense to pose the question concerning the pension level for two reasons. On the one hand, the Finnish financial markets have developed considerably since the creation of the current pension system. Citizens now have

numerous possibilities in the financial markets to save for their pension security, and to add insurance coverage to their savings to the extent desired. In other words, citizens now have better possibilities to look after their pension security, even when the compulsory system does not do so. On the other hand, the income and wealth level of the nation's citizens has risen. To avoid pension-age poverty, it is therefore now less important than previously for the authorities to guarantee high pension security through obligatory pension savings rules.

The age limits for retirement ('full' pension at 63–68) can be questioned from the point of view of both the adequacy of labour supply and the improving health of older people. It is also not self-evident that the concept underlying various calculations (e.g. in the revision of the stability programme), which see sizes of pension funds rising at least up to the 2050s in relation to gross domestic product, would be optimal.

For these reasons, it would make sense to rethink the pension system and the financial burdens it presents. This is obviously problematic in a situation where significant reforms have just been carried out. However, due to the sluggishness typical of pension systems, postponing necessary reforms leads to a greater need for change in the future than if the reforms are carried out in time.

Publicly-funded services

Publicly-funded service production employs a significant proportion of the labour force, and therefore it is of paramount importance for the productivity of the economy as a whole that these resources are used efficiently. Efficiency is also important from the standpoint of service users due to the limited scope of public funding.

The principal parts of publicly-funded service production are health, social and educational services, which are under the responsibility of the municipalities. Therefore increasing their productivity and cost-effectiveness is of key importance for the whole public sector. The great service production cost differences among different producers, documented in many studies, indicate that significant productivity increases could be obtained by adopting the best practices.[18]

With regard to increasing the efficiency of public service production, the realisation of the municipal and service structure project is of key importance. Its central concept is to require a certain minimum scale in service production

[18] In Finland there are presumably fewer possibilities for increasing efficiency than in EU countries in general. The service production of Finland's public sector seems to be efficient in European comparisons, though such comparisons are naturally very complex (SCP 2004).

through either cooperation between municipalities or the merger of municipalities. This project must be implemented in a determined manner.

On the other hand, as scale economies fail to be decisive with regard to productivity (Loikkanen & Susiluoto 2005), it is important that sufficient attention be paid to incentives that promote productivity. Public service production is not automatically under the same competitive pressure as private production, and it is therefore essential to bring the competition element into service production as widely as possible on the basis of the purchaser-provider model. Additional demand for private service producers also tends to strengthen the ability of domestic enterprises to develop competitive service concepts, which can also be successful in open international competition.

It goes without saying that the utilisation of new technology in making public service production more effective is of crucial importance. There are already numerous larger and smaller programmes for furthering such utilisation, e.g. those funded by Tekes, the Finnish Funding Agency for Technology and Innovation, and by Sitra, the Finnish National Fund for Research and Development. However, from the viewpoint of technological and service concept-related innovation of the whole service sector, it is important that in public procurements more attention be paid to innovativeness.

Indeed, a programme should be started up quickly to promote innovative public procurements. With such procurements, the creation of new markets for new technologies and innovations can be facilitated, whilst they can also improve the productivity and quality of the previously mentioned public services. Innovative public procurements (incl. planning competitions) could be widely aimed at different welfare and infrastructure services.

However, the realisation of innovative procurements necessitates practical measures and guidelines before their wide-scale development into innovation policy instruments can be carried out. These include combination of demands across administrative sectors as well as strong coordination of procurement measures.[19]

Creating and adjusting policy focuses

When economic and social changes are rapid, political decision making has to be able to predict requirements for change, identify alternatives, form clear policies and put them speedily into action in a manner consistent with the change in circumstances. The overall impression from this report concerning the nature of

[19] Cf. e.g. Public procurement for research and innovation. Developing procurement practices favourable to R&D and innovation. Expert Group report, September 2005. European Commission Directorate-General for Research support for coherent development policies.

economic changes indicates that predicting changes will become increasingly difficult. This is a serious challenge to the broad but relatively disorderly foresight work of the public administration. Increasing this foresight work is probably not a wise reaction to this challenge. What is needed is an increase in the quality of foresight and a more systematic linkage of foresight activities to decision making; cf. the adjoining special focus.

Implementing significant policy reforms requires a solid knowledge base. In principle, there is a good basis for this. In Finland, the production of statistics is comprehensive and well organised, and the Government has significant research and survey resources directly at its disposal in what are known as sectoral research institutes. Additionally, in universities and private research institutes, many able researchers can be involved in the analysis of policy alternatives.

In the preparation of policy measures, however, these resources are not always fully utilised. It is important that the research and survey work carried out at different ministries be coordinated more effectively at Council of State level so that the resources can be allocated to the elucidation of central questions. This may require redirecting resources from existing research institutes for reallocation at Council of State level, and structural reform of the sectoral research system.[20] Databases created with public funds must also be made more flexibly available in research units active both within the Government and outside it.

During recent parliamentary terms, the Government programme has become an instrument defining the policy of the government throughout each term of office. Together with the framework procedure for central govervent spending limits, this has enhanced the predictability of policy and its long-term orientation. Emphasising the position of the Government programme may, however, make procedures more rigid, making it difficult for the Government to come to an agreement with respect to new policy openings, even though a change in circumstances might demand this. For this reason, it would be expedient when deciding on the Government programme to agree on procedures with which the programme can be modified over time.

Another important issue with respect to the Government programme is the planning and implementation of policy measures that cut across ministry boundaries. Many new policy challenges probably go beyond ministry boundaries, and such boundaries cannot simply be moved every now and again. The experiences during the current term with regard to cross-sectoral or horizontal policy programmes have been very positive, and this new mode of

[20] Questions with regard to sectoral research are at present being elucidated by a working group appointed by the Council of State, which is to finish its task by the end of 2006.

policy implementation should be made use of in future, as well. Care has to be taken, however, that not too many programmes are set up or that they do not become permanent arrangements that make administration even more complicated.

Special focus Foresight in Finland

In the beginning of the 1990s, Finland came to the realisation that there was a need for improved foresight. The collapse of the Soviet Union changed the operating environment in many ways and Finland's economy drifted into a completely unpredicted, deep slump. The importance of foresight has also been heightened by the increasing prevalence of strategy work in different organisations and rapid technological development. Foresight activity has in fact increased over the last few years. Foresight occurs mainly on an *ad hoc* basis, though some foresight processes repeat themselves in a slightly different form.

The most important recent foresight projects:

* Since 1993 a Council of State future report has been prepared for Parliament once every parliamentary termunder the direction of the Prime Minister's Office. It contains an analysis of the future development of a specific, usually rather broad theme and the Government policies that concern it. In Parliament, the report is discussed by the Committee for the Future, whose task also includes the foresight of technology. The last report on the future is from 2004 and concerned the preparatory measures for the ageing of the population. The Prime Minister's Office is at present elucidating the development possibilities for the report procedure; suggestions will be ready at the end of 2006.

* In the ministries there is a long tradition of foresight, especially of the economy, the labour force, educational needs, regional development and technology. The importance of foresight with respect to educational needs and technology has been emphasised over the last few years. The tasks of the Council of State's foresight network appointed by the Ministry of Labour include taking care of the coordination of foresight, communication between ministries, developing foresight knowledge in ministries, supporting regional foresight work and forming a common operating environment representation as the background of foresight activity that concentrates on various themes. The network's term will end in May 2007. The network published a description of the operating environment as background for ministerial surveys on the future in December 2005. Based on the aforementioned description of the operational environment, the ministries produced sector-specific surveys for the future in the summer of 2006, to help form a basis for government policies during the next parliamentary term.

* *FinnSight 2015*, a joint foresight project by the Academy of Finland and Tekes (the Finnish Funding Agency for Technology and Innovation) was made public in June 2006. Its objective was to explore the future of knowledge areas and prioritisations for science, technology, society and business. The aim of the project was also to help define strategic centres of excellence in science, technology and innovation in Finland. The foresight work was carried out by panels, where research and industry experts expressed their views on the themes involved. Ten panel reports resulted, as well as the summary report, 'The Outlook for Science, Technology and Society'.

* As a continuation of the above-mentioned project, Tekes has started up a wide-ranging collection of weak signals (Signals 2006), the results of which will be published in December 2006. Also participating are the Finnish Ministry of Trade and Industry, Finnvera, Finpro, Sitra (the Finnish National Fund for Research and Development), the Academy of Finland, T&E Centres (Employment and Economic Development Centres), and the VTT Technical Research Centre of Finland. This work, which places an emphasis on the distribution of knowledge among various parties and on international cooperation, will continue next year as strategic work.

* Sitra (the Finnish National Fund for Research and Development) started up a national foresight network in the summer of 2005. Its aims were designated as the recognition of new challenges in the future and the opportunities they represent for Finnish society, increasing cooperation between Finnish foresight organisations, and increasing the efficiency of the utilisation of foresight knowledge among Finnish decision-makers. The report, 'Towards a Competitive Welfare Society,' was published in August 2006. Sitra is continuing through developing the foresight network and foresight activities.

* Foresight is also carried out regionally with different types of cooperation models. The central actors are employment and economic development centres, regional councils, environment centres and provincial cooperation organs, and business organisations and third sector actors. The most significant regional foresight processes are 1) work related to provincial plans and regional strategy, 2) labour market, business and technology foresight in employment and economic development centres, and 3) foresight related to regional education provision.

* The Confederation of Finnish Industries has recently implemented the 'Future Survey' and 'Services 2020' projects. 'Future Survey' assembles research information and views on the present state, future and knowledge requirement of six possible success clusters with roots in industry and construction. The objective of the 'Services 2020' project was to analyse the structural change in service sectors and predict the changing knowledge and training needs of enterprises. The final reports of the projects were published in 2006. Whether the foresight work will be continued has not yet been decided.

In addition, many other organisations, such as research institutes, enterprises, central administrative boards, organisations, etc. carry out foresight in their own fields, and there are also enterprises that offer foresight services.

The Finland Futures Research Centre of the Turku School of Economics is a central actor in the foresight knowledge and research field. It offers training and development services to organisations and enterprises, and coordinates the Finland Futures Academy, formed by 17 Finnish universities, which offers basic academic training in futures research and coordinates the national postgraduate programme in futures studies. The main themes in the Centre's research activities are foresight research, training and teaching research, culture and welfare, management, and environmental research.

Evaluation

Whilst Finnish foresight activity has increased over recent years and many interesting aspects have been made the subject of public discussion, decision-makers do not feel that they are significantly benefiting from foresight research when making decisions. The foresight information produced does not adequately meet the needs of decision-makers.

Predictions are often made from the narrow point of view of one organisation, leading to the danger of dead zones. Restrictedness and sector-specificity also mean that broad, horizontal themes do not get enough attention. When predicting changes in the general operating environment the same strong trends are often repeated (globalisation, information technology, ageing etc.); new forces of change are rarely brought up. The results are also often too general to be of real use in decision-making.

Finland lacks foresight processes that involve decision-makers extensively. Evaluations of international foresight projects have shown that decision-makers get the most out of foresight projects by participating in the work themselves and by networking with other participants. If the distribution, treatment and utilisation of foresight information is relegated to the final project report, then it is easily lost in the flood of information and the decision-maker's customary haste.

Development needs

Firstly, the diversity of foresight is partly unavoidable, because foresight needs vary from one organisation to another. A certain degree of diversity is also beneficial for ensuring a varied outlook on the future. This notwithstanding, it is necessary to improve the coordination of the public sector's foresight, so that limited resources are sufficient for carrying out high-quality work and no serious dead zones remain outside foresight activity, e.g. in the terrain between the spheres of interest of administrative sectors. This presupposes assigning responsibility for the development and coordination of the public sector's foresight activities explicitly to a specific actor. The most natural alternatives are Sitra (the Finnish National Fund for Research and Development), Tekes (the Finnish Funding Agency for Technology and Innovation), or the Prime Minister's Office.

Secondly, it is also justified to lay stress on the foresight processes in which decision-makers themselves participate. In such processes, foresight information is treated from the point of view of various experts and decision-makers, which gives the participants a broader and more varied understanding of the nature and possible effects of new forces of change.

Thirdly, the international point of view is extremely important in most foresight projects. This is due both to the requirements of the subject matter, and the need to ensure sufficient 'uninvolvedness'. Domestic groups of experts and decision-makers, often closely networked and used to an atmosphere of consensus, may find it difficult to think in a sufficiently radical manner. In addition, it would be beneficial if foresight activity would be evaluated by foreign experts from time to time.

Fourthly, the diversity of the results of foresight could be increased if foresight work were not dominated only by the political, Government and research elite, but if also, for example, the representation of organised civil society and the participation of different generations could be increased.

Fifth, in so far as foresight projects are concerned that are likely to have a major extent of recurrence, the possibility would have to be explored whether part of the foresight could not be productised so that it could be easily repeated. This would also contribute to improving quality.

It is also necessary to link the foresight activities of the public sector more closely to real planning and decision-making processes. This would add motivation to the work, ensure its sufficient concreteness, and help to allocate the necessary intellectual and material resources to foresight activity.

8.3 Adjustment of the economy to new environmental and energy requirements

Global warming and climate change due to greenhouse gas emissions are more extensively recognised as a major problem requiring substantial changes in global economic operating conditions. Therefore, climate policy is becoming a key issue for global co-operation. On the other hand, regardless of advances in climate policy in the next few years, world energy consumption will continue to rise for a long time and this growth will still be based on fossil fuels in the first instance.

Measures to control global warming and climate change will, regardless of their form, raise the prices of all forms of fossil fuels. With increasing demand creating further pressure to raise prices, energy price levels will permanently settle at higher than customary levels. Simultaneously, attempts to reduce energy consumption and to develop emission-free forms of energy production will profoundly influence not only the energy sector but other production and consumption too.

In Finland, the structure of industry is energy-intensive, the climate is cold and distances are long. Therefore, Finland consumes high amounts of energy in relation to the size of its economy, and energy-related topics are more significant than in EU countries on average.

Energy price and supply and economic competitiveness

Rising energy prices are likely to raise the relative prices of products that require high amounts of energy, hence decreasing demand for such products to some extent. On the other hand, the climate and energy policies pursued by various countries or in various market areas, particularly the EU in Finland's case, will influence the competitiveness of energy-intensive production operating in Finland. The policy pursued in Europe at present and in the near future causes higher costs to European, and Finnish, energy-intensive industry than in countries where energy prices are not burdened in the same way by environmental considerations. Although high energy efficiency compensates for these factors, they will weaken Finnish industry's prerequisites for success in the near future.

The Finnish energy market is in the process of closer integration beyond national borders, with the electricity market pooled with other Nordic countries. In integrating market areas, the prices of electricity can also be expected to converge although integration of the electricity market is limited by the restrictions set by transmission networks. Therefore, in normal conditions, (tax-free) market prices for energy are likely to diverge less than before from the price level of the neighbouring areas. Hence, the expansion of domestic electricity capacity may not greatly influence the market price paid for electricity in Finland.

The impacts of this equalisation of energy prices are considerable. In such conditions, it will be increasingly more difficult to build the competitiveness of the Finnish economy on less expensive energy than in other European countries. This will effectively hamper the growth prospects of energy-intensive industry in Finland, where energy prices lower than in many competing countries have traditionally constituted a competitive edge.

The average market price of energy is not, however, the only factor influencing the situation of energy-intensive industry. Security of energy supply is also playing a major role, and in fundamental terms the situation in Finland is good in this respect, with the supply of primary energy distributed fairly evenly on various sources and almost half of the nation's energy being generated from domestic sources, which are emission-free in relation to greenhouse gases (mainly wood and nuclear power). With energy becoming an increasingly strategic factor in production, security of energy supply will increase in importance.

In terms of economic competitiveness, ensuring a diverse energy supply on a continuous basis is advantageous in addition to the fact that a diversified and decentralised energy system reduces the risks to society in general. Therefore, the future development of all non-fossil fuel based energy sources can be considered highly justified. In order to bolster security of supply and provide incentives for sensible investments in general, it is important that energy policy aim at a long term approach. It is also important for Finland's energy-intensive production that the European Union's climate policy be developed so that the competitive conditions of Finland's energy-efficient production are equal to those of global competitors.

Impacts of climate policy on the Finnish economy

Finland's climate policy is based on common EU action, and this is only natural considering the global nature of the problem. Emissions trading that sets a price on carbon dioxide emissions is the most significant climate policy steering method within the EU at present. The purpose of price incentives is not only to

control the demand for energy-intensive products and to steer energy consumption towards energy forms with low emission levels in the short term, but also to create incentives for the development and introduction of more energy-efficient production and technologies.

Within the current Kyoto Protocol period, i.e. by 2012, Finland needs to reduce emissions by 15 to 20 per cent more than normal development would indicate. GDP will decrease by 0.5–0.9 per cent in comparison with the basic scenario, if the price of emission allowances is assumed to settle at €10–20 per tonne of carbon dioxide. Higher prices are possible, however, which will raise costs. Lower consumer demand is the primary factor likely to decrease GDP, due to the direct impact of rising energy prices. Other channels of influence include the impact on incomes, with consumers spending a relatively high proportion of income on energy. Slower economic growth will also lower incomes, which will likewise be reflected in declining GDP figures.

In the long term, changes in domestic competitiveness depend on the commitments formed after the Kyoto Protocol period. EU Ministers of the Environment have proclaimed that the Community goal could be as high as a 15 per cent reduction over the level of 1990 by 2010. If this commitment still applies to Europe only, Community competitiveness will naturally suffer.

However, to prevent climate change, the aim should be to establish a system enabling as many countries as possible to join. The Kyoto Process has only defined one way of reducing emissions, but there are many contractual arrangements that could provide more positive incentives than the Kyoto Protocol, encouraging developing countries and rapidly growing new industrial countries to join the UN Climate Convention. Since participation by Europe alone will not suffice in curbing climate change, it will prove both environmentally and economically crucial to examine all of the options available.

Emissions trading and taxation

In addition to emissions trading, energy taxation is raising the price of fossil fuels, for instance in Finland. In fact, emissions trading is increasing the pressure to harmonise the taxation of sectors involved in emissions trading, at least as far as emissions are concerned. Because emissions trading as such is a method for restricting emissions that enhances cost-efficiency, it is not clear whether energy taxation should also be applied to the emissions trading sector.

If taxes are applied to energy production, they could steer the production structure in a different direction than mere emissions trading. Emissions trading as such is increasing the share of cogeneration and renewable energy sources in electricity and heat production, but the use of wood, for instance, will become

even more profitable in relative terms if sectors involved in emissions trading apply fuel taxes to fossil fuels. In such a case, however, the costs of reducing emissions may rise. Then again, if the emissions trading sector is exempted from energy taxes, tax revenues will be lost, and the method for compensating such losses may have negative consequences through the tax system. Moreover, the fact that other Nordic countries belonging to the same market area still apply energy taxes should not be forgotten.

A functioning market steers towards cost-efficient operations, which is why all control that distorts the market should also be kept to a minimum in the energy market. Therefore, problems created by emissions trading should be reduced and the detrimental side-effects of emissions trading cut down. This is an EU level issue that Finland must try to influence actively.

The role of domestic policies

Despite a common climate policy, energy policies differ considerably between European countries, which is evident in their highly divergent utilisation of energy sources. As mentioned above, Finland has systematically tried to diversify its energy supply and resort to domestic emission-free energy forms as much as possible. In addition to this, energy production has succeeded in benefiting from synergies improving energy efficiency. In Finland, the cogeneration of heat and electricity, and district heating, account for a major proportion of energy production. As a consequence, enhancing the efficiency ratio of energy production by increasing the share of district heating is only possible to a limited extent in this country, because the need for heat sets a limit on district heat production.

District heat and co-generation also differ from electricity in that their market is local and they thus allow the implementation of solutions based on local circumstances. This also means that in this kind of local use, energy prices can differ from those applicable elsewhere. There are several examples of local energy system integration in Finland, where the exploitation of local special characteristics of the industrial and energy sector has facilitated the more efficient use of energy and increasing the use of biofuels, for instance.

New energy technologies require long-term development that often takes decades before such technologies achieve commercial viability. Sufficiently long-term development work can, however, create and launch new solutions on the market, related to the cogeneration of heat and electricity, energy production for industry, decentralised energy production and efficient energy use. Therefore, active participation is necessary in the development of emission-free production methods such as nuclear power, renewable energy sources and production technologies based on emissions-free fossil fuels. Due to the

abovementioned reasons, the proposal by the Science and Technology Policy Council of Finland to establish a Strategic Centre of Excellence focusing on research into energy and environment issues is a key initiative.

In the best possible case scenario, energy technology development will provide opportunities for successful business, as demonstrated in Finland by examples in fields such as combustion technology and electric motor control systems. However, several other countries seem to have adopted a more active approach than Finland to the development of the energy and environmental technology business. With the inevitable high global demand for energy saving and new emission-free production technologies with higher cost-efficiency, Finland has good reason to provide firm support for this business.

In addition to investments in public research and development operations, public support for creating markets for new technologies may be necessary in some cases. In energy production, with its homogenous end product and the typically strong position of incumbent operators, the creation of markets for energy produced with new technologies, and therefore the technologies themselves, may be more difficult than, for instance, in the case of mobile phones (Stern 2006). That is why the significance of innovative public procurement policy and other support for the creation of markets may, at least for some energy technologies, be greater than usual.

The significance of regulation aiming at energy efficiency, and the distribution of information, should not be underestimated either, although poorly implemented regulation can result in inefficient solutions. For instance, the forthcoming requirement that liquid fuels include a certain amount of biofuel can be considered justified from the viewpoint of creating a market. Indeed, such decisions have been proven crucial to launching investments based on new technology.

The possibilities of renewable energy

The continuous pressure for higher fossil fuel prices is enhancing the profitability of all alternative energy sources. The renewable energy sources used in Finland comprise hydropower, wind power, heat recovered from the environment and solar energy, as well as renewable bioenergy which includes wood-based fuels, agricultural biomass (energy crops), biogas and the biodegradable part of REF, or recycled energy fuels. Peat is a renewable energy source too, but with a very slow pace of renewal. In terms of volume, wood-based biomass is by far the most important.

Bioenergy also provides the best opportunity for additional production among Finland's renewable energy sources. The use of bioenergy can be increased

above all in communities and industrial plants and for heating purposes. The use of bioenergy can also be increased in transportation, but based on current technologies, the profitability of the production of transportation fuels based on biomass is low without tax-based or other support.[21] Moreover, it is questionable whether so-called first generation biofuels are useful in reducing greenhouse gas emissions (Mäkinen et al. 2006).

In Finland, biofuel is primarily produced as a by-product of the forest industry, and in the form of logging waste. With respect to forest industry by-products, black lye generated in chemical pulp production is the most important, while forest processed chips are produced in both regeneration cutting and intermediate felling. According to VTT, Technical Research Centre of Finland, wood chips produced as a forest industry by-product and other side flows are, indeed, clearly the most profitable form of wood fuel. This also seems to be true of transportation fuels.

However, it is projected that technological advances will create new opportunities at a relatively rapid pace. So-called second generation biofuels will also provide more cost-efficient and better alternatives in terms of aggregate emissions, for transportation use. Simultaneously, the range of raw material available is increasing as, for instance, fuels based on reed canary grass become more profitable.

There is good reason to exploit the potential of bioenergy fully. This will require a definitive, long-term commitment to promoting bioenergy, even if future technological development remains uncertain. On the other hand, since the long-term economic and environmental benefits of various options are hard to determine, political measures should encourage rather than unnecessarily restrict trials of various technologies. In addition to the measures already determined, the development of new forms of bioenergy production may require the use of tax incentives in order to create a functioning market. However, such measures must be carefully planned in order to avoid encouraging producers and consumers to begin using expensive systems that will quickly become unprofitable due to further technological advances.

8.4 Research needs

The changes in Finland's economic operating environment and their implications for economic activity in Finland give rise to many open questions. Many of the potential changes are extremely difficult to predict, in view of which the only

[21] However, projects initiated by various parties in biofuel production are an indication of greater opportunities. Profitability is highest when the biomass can be exploited fully in one way or another, and Altia's decision to launch the production of ethanol is probably based on this.

wise precautionary approach is to improve society's capacity for self-renewal. However, in certain areas competent research can provide useful insights into the external pressures of change and the preconditions for wise policies, for the benefit of political decision-makers and the economy and society more broadly. In what follows we discuss a number of areas in which research is warranted and would be likely to serve a useful purpose.

One central issue concerns the type of skills the education system should be able to provide citizens with. The question can be approached from many angles. One is to examine how well the forecasting of educational needs has succeeded in the past. Forecasting demand for different types of skills has a long tradition in Finland. Nevertheless, relatively little is known about the accuracy of the forecasts. Data on the labour market status of individuals are plentiful in Finland and provide a good basis for analysis. There are also qualitative data available to facilitate inference about how well the education received by recent graduates matches the demands of the jobs in which they find themselves.

One research tradition is to investigate the return on investment in education for both individuals and society as a whole. Such returns have been estimated in many international studies, as reported in one of the articles forming part of this project, and such studies have been done using Finnish date as well. However, there is a clear need for additional work in this field. New work is required in particular to assess the social returns on investment in different fields and levels of education.

A fundamental question is what kinds of tasks are vulnerable to offshoring and automation in a country like Finland. The approach used in this report is only one of many alternatives. In some other studies, cited in earlier chapters, the issue has been approached by examining in detail the nature of the skills required in different tasks. Although the data requirements for such an analysis are rather demanding, the approach could most likely substantially enhance our understanding of the extent to which different types of jobs may become subject to pressures from foreign competition and technological change in Finland in the coming years.

Professor Baldwin's theoretical analysis focuses on how "co-ordination costs" affect the advantages of bundling various phases of production in one location as opposed to a more dispersed unbundled arrangement. It is very important to know to what extent these pressures to un-bundle production can be estimated empirically. This is a very hard question. Nevertheless, the data that are available in Finland are exceptionally good for such an attempt, as rich data on firms and plants can be linked to equally rich data on individual employees. This

should provide good opportunities to examine the effects of different organisational arrangements on productivity and profitability.

This theme links closely with the analysis of "creative destruction" i.e. the analysis of how changes in firm and plant structures affect productivity. Some very good research has been carried out on these questions in Finland, but the analyses do not cover the most recent and highly interesting years.

Just as it is important to investigate the returns on educational investments, one can ask about the optimal amount and allocation of public research and development expenditure. So far research has not been able to provide very good guidance as to how much and where to invest. Yet the need for such analyses is great in a country like Finland, where the R&D expenditure is among the highest in the world in relation to GDP. Based on the existing literature and, again, the availability of high quality micro-data, useful research could be done.

An important sub-theme in the field of R&D research is how widely (other enterprises, regionally etc.) the effects of a company or research institute's R&D activities tend to spread. Knowledge of such diffusion and spill-over effects is important, for example, for understanding how various types of clusters form, regionally or otherwise. Another adjacent question concerns the locations of R&D and production activities with regard to one another: to what extent do these have a tendency to cluster geographically? Such analyses would be useful for the planning of industrial and innovation policies at national as well as regional level.

The functioning of the labour market also raises many interesting questions. The "traditional" questions about the effects of taxation and social security on labour supply, the incentive effects of the pension systems, the level and determinants of the structural unemployment rate etc. are all highly relevant in light of the analysis of this report. Equally important would be to gain a better understanding of the various obstacles and costs associated with different types of labour mobility. Clearly more needs to be known about the capacity of the Finnish system of adult education to respond to the needs of occupational mobility. The effects of pay systems and the age structure of the labour force on productivity and the effects of the length of employment spells on the acquisition of new skills etc. are also very important questions.

The links between, on the one hand, economic activity and, on the other hand, the physical environment and the use of different types of energy clearly pose an array of important policy questions that warrant thorough research. From the point of view of policy, the incentive and distributional effects of various types of emission trading systems and tax systems are essential, both individually and jointly. Furthermore, work must also be done to prepare in advance for the

post-Kyoto emission targets. Although many of the questions that arise in these fields are very difficult to answer, the extensive international interest in these issues provides a good basis for Finnish research. Similarly, there is a great need for research on the economic efficiency of various types of policy measures that seek to promote energy conservation and new non-polluting technologies of energy production.

REFERENCES

Aghion, P. (2006): A primer on innovation and growth. Bruegel. Bruegel Policy Brief, Issue 2006/06.

Aghion, P., Bloom, N., Blundell, R. Griffith, R & Howitt, P. (2005): Competition and innovation: An inverted-U relationship. Quarterly Journal of Economics 120(2), 701–728.

Agra Europe (2006): SFP budget figures reveal almost 90% decoupling rate. 25.8.2006.

Aho, S. (2004): Kroonisen työttömyyden laajuus, rakenne ja syntytausta. Työpoliittinen tutkimus 261. Työministeriö.

Alesina, A. & Zeira, J. (2006): Technology and labor regulations. NBER Working Paper 12581, October 2006.

Ali-Yrkkö, J. & Palmberg, C. (2006): Locational advantages in R&D – Insights from large Finnish firms. Teoksessa: Ali-Yrkkö & Palmberg (eds.): Finland and the Globalisation of Innovation, Etla B:218, Helsinki.

Ali-Yrkkö, J. (2006, tulossa): Ulkoistus ja toimintojen siirrot Suomesta ulkomaille – Katsaus 2000-luvun alun tilanteesta. Etla, Helsinki.

Ali-Yrkkö, J. & Ylä-Anttila, P., (2003): Globalization of business in a small country – does ownership matter? In: A. Hyytinen & M. Pajarinen (eds.). Financial systems and firm performance. Theoretical and empirical perspectives, The Research Institute of the Finnish Economy ETLA, Series B 200, Taloustieto Oy, Helsinki.

Andersen (2006): Globalisation challenges for Europe – labour market perspectives. In Globalisation Challenges for Europe. Report by the Secretariat of the Economic Council - PART I. Prime Minister's Office: Publications 18/2006.

Autor, D., Levy, F. & Murnane, R. J. (2003): The skill content of recent technological change: an empirical exploration. The Quarterly Journal of Economics, MIT Press, vol. 118 (4), November, 1279–1333.

Baldwin, R. (2006): Globalisation: the great unbundling(s). In Globalisation Challenges for Europe. Report by the Secretariat of the Economic Council - PART I. Prime Minister's Office: Publications 18/2006.

Bartelsman (2005): Politiikkatoimenpiteitä teknologisen eturintaman saavuttamiseksi ja siellä pysymiseksi. Kirjassa A. Hyytinen & P. Rouvinen (toim.) Mistä talouskasvu syntyy? Elinkeinoelämän tutkimuslaitos ETLA, Sarja B 214. Taloustieto Oy.

Berghäll, E., Junka, T. & Kiander, J. (2006): T&K, tuottavuus ja taloudellinen kasvu. Tekes, Valtion taloudellinen tutkimuskeskus, VATT tutkimuksia 121.

Blinder, A. (2005): Fear of Offshoring, mimeo, Princeton University. www.princeton.edu/~ceps/workingpapers/119blinder.pdf

Blinder, A. (2006): Activities that do not require physical contact or geographical proximity are most at risk. CESifo Forum, 2/2006, CESifo, Germany.

Boschma, R. O. (2005): editorial. Role of proximity in interaction and performance: conceptual and empirical challenges.

Bouët, A., Mevel, S. & Orden, D. (2006): Two opportunities to deliver on the Doha development pledge. International food policy research institute. Research brief no. 6.

Bratsberg, B., Roed, K., Raaum, O., Naylor, R., Jäntti, M., Eriksson, T. & Österbacka, E. (2006): Non-linearities in intergenerational earnings mobility: consequences for cross-country comparisons. Tulossa Economic Journaliin.

Böckerman, P. (1998): Regional evolutions in Finland. Labour Institute for Economic Research. Discussion Papers 142.

Böckerman, P. & Maliranta, M. (forthcoming 2006): The micro-level dynamics of regional productivity growth: The source of divergence in Finland. Regional Science and Urban Economics.

Commission of the European Communities (2001): Proposal for a directive of the European Parliament and of the Council establishing a framework for greenhouse gas emissions trading within the European Community and amending Council directive 96/61/EC, Brussels, COM(2001)581, 23-10-2001.

Corrado, C., Hulten, C. & Sichel, D. (2006): Intangible capital and economic growth. NBER working paper no. 11948.

Cotis, J-P. & Elmeskov, J. (2006): Competitiveness and structural policies: where does the EU stand? In Globalisation Challenges for Europe. Report by the Secretariat of the Economic Council - PART I. Prime Minister's Office: Publications 18/2006.

Cusmano, L., Mancusi, M. L. & Morrison, A. (2006): How outsourcing is reshaping an advanced manufacturing area. Paper presented in SPRU 40th Anniversary Conference, Brighton, September 11–13,2006.

Dahlman, C. J., Routti, J. & Ylä-Anttila, P. (2006): Finland as a knowledge economy. elements of success and lessons learned. Knowledge for Development Program, World Bank Institute.

Dickens, W. T., Goette, L., Groshen, E. L., Holden, S., Messina, S., Schweitzer, M. E., Turunen, J. & Ward, M. E. (2006): How wages change. Micro evidence from the international wage flexibility project, julkaisematon käsikirjoitus.

Ellison, G. & Glaeser, E. (1997): Geographic concentration of U.S. manufacturing industries: A dartboard approach. Journal of Political Economy 105, no. 5, 889–927.

Elmeskov, J. (2006): How mobile is labour in practice in Europe, and in what ways? Esitys konferenssissa Työvoiman liikkuvuus Lissabonin strategiassa, Helsinki 4.9.2006. http://www.vnk.fi/hankkeet/talousneuvosto/tyo-kokoukset/pdf/Elmeskov_-_4_September.pdf

EU (2006): Mobility in Europe. European Foundation for the Improvement of Living and Working Conditions.

EU:n komissio (2006): EU:n biopolttoainestrategia. SEK(2006) 142.

European Commission (2006): The long-term sustainability of public finances in the European Union.

European Commission Replies to some frequently asked questions on the EC emissions trading proposal, http://europa.eu.int/comm/environment/climat/emission.htm

Falk, M. & Wolfmayr, Y. (2005): Employment effects of trade in intermediate inputs with the EU Member States and Asia', Aussenwirtschaft 60, 4, 441–461.

Forsström, J., Honkatukia, J. & Sulamaa, P. (2001): Suomen asema EU:n Komission Vihreän Kirjan hahmottelemassa unionin laajuisessa päästökaupassa. Raportteja 782, ETLA, Helsinki.

Georghiou (2006): Effective innovation policies for Europe – the missing demand-side. In Globalisation Challenges for Europe. Report by the Secretariat of the Economic Council - PART I. Prime Minister's Office: Publications 18/2006.

Gereffi, G. (2001): Shifting Governance Structures in Global Commodity Chains, With Special Reference to the Internet. American Behavioral Scientist, vol. 44, p. 1616–1637.

Gillespie, A., Richardson, R. & Conford, J. (2001): Regional development and the new economy. EIB Papers Vol.ume 6 No 1 2001.

Goulder, L. H., Parry, I.W.H., Williams, R. C. & Burtraw, D. (1999): The cost effectiveness of alternative instruments for environmental protection in a second-best setting, Journal of Public Economics, Vol.72. no3. pp. 329–360.

Griffith, R., Harrison, R. & Simpson, H. (2006): Product market reform and innovation in the EU. CEPR Discussion paper No. 5849.

Grossman, G. M. & Rossi-Hansberg, E. (2006): The Rise of Offshoring: It's Not Wine for Cloth Anymore. Mimeo, Princeton University.

Harrison, D. & Radov, D. B. (2002): Evaluation of alternative initial allocation mechanisms in a European Union greenhouse gas emissions allowance trading scheme, study for the European Commission, National economic research associates.

Hasselpflug, S. (2005): Availability criteria in 25 countries, Finansministeriet, Working paper No. 12/2005. http://www.fm.dk/db/filarkiv/10568/arbpap1205.pdf

Helynen, S., Flyktman, M., Mäkinen T., Sipilä, K. & Vesterinen, P. (2002): Bioenergian mahdollisuudet kasvihuonekaasupäästöjen vähentämisessä, VTT tiedotteita 2145, VTT Prosessit, Espoo.

Hetemäki, M. & Suvanto, A. (2005): Mitä opiksi Tanskan työmarkkinoista? Raportissa: Tuottavuus ja työllisyys, mitä opittavaa muista Pohjoismaista?, VNK raportteja 3/2005.

Honkanen, P., Jäntti, M. & Pirttilä, J. (2006): Työn tarjonnan kannustimet Suomessa 1995–2004. Julkaisematon käsikirjoitus.

Honkatukia, J., Forsström, J. & Tamminen, E. (2003): Energiaverotuksen asema EU:n laajuisen päästökaupan yhteydessä. Tutkimuksia 102, VATT, Helsinki.

Honkatukia, J. Kemppi, H. & Kerkelä, L. (2005): Arvioita ilmasto- ja energiastrategian kansantaloudellisista vaikutuksista. Tutkimuksia 116, VATT, Helsinki.

Huovari, J., Kiander, J. & Volk, R. (2006): Väestörakenteen muutos, tuottavuus ja kasvu. Pellervon taloudellisen tutkimuslaitoksen raportteja N:o 198.

Huovari, J. & Volk, R. (2004): Ikääntyminen ja maaseudun työmarkkinat. Pellervon taloudellisen tutkimuslaitoksen raportteja N:o 190.

Hyypiä, M. & Kautonen, M. (2006): Suomi liike-elämän palvelujen kansainvälistymisessä ja keskittymisessä. Innovaatiopalvelujen kansainvälistyminen ja alueellistuminen - tutkimushankkeen tilastoraportti. KTM. Rahoitetut tutkimukset 4/2006.

IEA (2004): World Energy Outlook 2004. IEA, Pariisi.

IEA (2005): World Energy Outlook 2005.

Jalava, J. & Pohjola, M. (2004): Työn tuottavuus Suomessa vuosina 1900–2003 ja sen kasvuprojektioita vuosille 2004–2030. Kansantaloudellinen aikakauskirja (100) 4, 355–370.

Jean, S., Laborde, D. & Martin, W. (2005): Consequences of alternative formulas for agricultural tariff cuts, in K. Anderson & W. Martin (eds.). Trade reform and the Doha Agenda. The World Bank, Washington DC.

Jensen, B. & Kletzer, L. (2005): Tradable services: Understanding the scope and impact of services outsourcing. Institute for International Economics, Working Paper Series Number WP 05–9. September 2005.

Johansson, Å. (2006): Wage setting in Finland: Increasing flexibility in centralised wage Agreements, OECD Economics Department Working Paper No. 503.

Jones, G. (2005): Multinationals and global capitalism – from nineteenth to twenty-first century, Oxford University Press.

Kaitila, V., Mankinen, R. & Nikula, N. (2006): Yksityisten palvelualojen kansainvälinen tuottavuusvertailu. Elinkeinoelämän Tutkimuslaitos ETLA, Keskusteluaiheita no. 1043.

Kara, M. (2004): Päästökaupan vaikutus pohjoismaiseen sähkökauppaan. Tiedotteita 2280, VTT, Helsinki.

Karjula, K. (2006): Vaurastuminen kansallisena velvollisuutena. Alueellisen yritys- ja innovaatiotoiminnan selvitysraportti. Valtioneuvoston kanslian julkaisusarja 12/2006.

Kauppa- ja teollisuusministeriö (2006): Elinkeinopolitiikan suuntaviivat. KTM Julkaisuja 35/2006.

Kauppa- ja teollisuusministeriö (2006a): Yrittäjyyskatsaus 2006. KTM Julkaisuja 28/2006.

Kauppa- ja teollisuusministeriö (2006b): Yritys-Suomi-palvelujen liiketoimintasuunnitelma. Suomalaiset työvoima- ja elinkeinopalvelut -työryhmän mietintö. KTM. Julkaisuja 30/2006.

Kerkelä, L., Lehtonen, H. & Niemi, J. (2005): The impacts of WTO export subsidy abolition on the agri-food industry in the EU: A preliminary assessment. VATT keskustelualoitteita 375.

Kerkelä, L., Lehtonen, H. & Niemi, J. (2006a): Trade and welfare implications of the export subsidy abolition. Contributed paper presented at the 16th Annual World Food & Agribusiness Symposium, June 10–13, 2006, Buenos Aires, Argentina.

Kerkelä, L., Lehtonen, H. & Niemi, J. (2006b): Effects of WTO export subsidy abolition and tariff reduction on agriculture on global and national level. Contributed paper presented at the 9th Annual Conference on Global Economic Analysis, June 15–17 2006 in Addis Abeba, Ethiopia.

Ketokivi, M. (2006, tulossa): When Does Co-Location of Manufacturing and R&D Matter? Etla, Helsinki.

Kiander, J. (2001): Laman opetukset. Suomen 1990-luvun kriisin syyt ja seuraukset. VATT-julkaisuja 27:5, VATT, Helsinki.

Kiander, J. (2005): Ruotsi ja Suomi – taloudellisen kehityksen ja talouspolitiikan vertailua. Raportissa Tuottavuus ja työllisyys, mitä opittavaa muista Pohjoismaista. VNK 3/2005.

Kilponen, J. & Santavirta, T. (2004): Competition and innovation – microeconometric evidence using Finnish data (No. 113). Government Institute for Economic Research.

Korkman, S. (2006): The assignment principle and EU economic policy. In Globalisation Challenges for Europe. Report by the Secretariat of the Economic Council - PART I. Prime Minister's Office: Publications 18/2006.

Krugman, P. R. (1991): Geography and Trade. Boston, MIT Press.

Lehtonen, H. & Pyykkönen, P. (2005): Maatalouden rakennekehitys vuoteen 2013. Pellervon taloudellinen tutkimuslaitos. Työpapereita 78.

Lemola, T. (2001): Tiedettä, teknologiaa ja innovaatioita kansakunnan parhaaksi. Katsaus Suomen tiede- ja teknologiapolitiikan lähihistoriaan. Technology Reserach Group Working Paper 57/2001. VTT, Espoo.

Lievonen, J. & Lemola, T. (2004): Alueellisen innovaatiopolitiikan haasteita - tutkimustulosten tulkintaa. Sisäasiainministeriön julkaisu 16/2004.

Lipsey, R. E. (2004): Home- and host country effects of foreign direct investments. Teoksessa: Should the IMF pursue capital account convertibility? Essays in International Finance, no. 207. Princeton: Princeton University, Department of Economics, International Finance section.

Loikkanen, H. & Susiluoto, I. (2005): Paljonko verorahoilla saa? Kuntien peruspalvelutarjonnan kustannustehokkuuden erot ja niitä selittävät tekijät vuosina 1994–2002. Kunnallisalan kehittämissäätiö, tutkimusjulkaisut nro 50, Vammalan kirjapaino Oy

Maliranta, M. (2005): R&D, International trade and creative destruction – empirical findings from Finnish manufacturing industries. Journal of Industry, Competition and Trade, 5 (1), 27–58.

Mansfield, E. & Lee, J. Y. (1996): The modern university: contributor to industrial innovation and reciepient of industrial R&D support. Research Policy. 25 (7), 1047–1058.

Marin, D. (2004): A Nation of Poets and Thinkers – Less So with Eastern Enlargement? Austria and Germany. CEPR Discussion Paper No. 4358.

Mariussen, Å. (2004): Nordic ICT Spaces. A policy-oriented overview of regional ICT.

Maula, M. & Murray, G. (2006): Risk capital for growing world-class companies: challenges for European policy. In Globalisation Challenges for Europe. Report by the Secretariat of the Economic Council - PART I. Prime Minister's Office: Publications 18/2006.

Melitz, M. J. (2003): The Impact of trade on intra-industry reallocations and aggregate industry productivity. Econometrica, 71(6), 1695–1725.

Memo 05/229 (2005): 2006 - European year of workers' mobility, the importance of the mobility of the workers to the implementation of the Lisbon strategy, Brussels, 3 June 2005.

Midelfahrt-Knarvikin, K. H., Overman, H. G., Reddig, S. J. & Venables, A. J. (2000): The location of European industry. Report prepared to the Directorate General for economic and Financial Affairs, European Commission. Economic Papers 142, ECFIN/318/00-EN.

Myrskylä, P. (2006): Muuttoliike ja työmarkkinat. Ilmestyy syksyllä 2006 Työministeriön tutkimuksia sarjassa.

Myyrä, S. & Pihamaa, P. (2006): Viljatilojen tuottavuuskehitys 1976–2003. Maatalous-tieteen päivät 2006.

Mäkinen, T., Sipilä, K. & Nylund, N-O. (2005): Liikenteen biopolttoaineiden tuotanto- ja käyttömahdollisuudet Suomessa. VTT tiedotteita 2288, VTT Prosessit, Espoo.

Mäkinen, T., Soimakallio, S., Paappanen, T., Pahkala, K. & Mikkola, H. (2006): Liikenteen biopolttoaineiden ja peltoenergian kasvihuonekaasutaseet ja uudet liiketoiminta-konseptit. VTT Tiedotteita 2357.

Nivalainen, S. (2006): Pendelöinkö vai muutanko? Työvoiman liikkuvuus kuntien välillä. Kunnallisalan kehittämissäätiön tutkimusjulkaisut, nro 54.

Nivalainen, S. & Volk, R. (2004): Alueellinen väestökehitys vuoteen 2030 ja siihen vaikuttavat tekijät. Teoksessa: Alueellinen väestökehitys ja politiikan uudistamistarpeet. Tulevaisuusselonteon liiteraportti 2. Valtioneuvoston kanslian julkaisusarja 30/2004.

OECD (2004): OECD economic reviews Finland. Volume 2004/14 – December 2004.

OECD (2005): Micro-policies for growth and productivity: Final report OECD.

OECD (2006a): Agricultural market impacts of future growth in the production of biofuels. AGR/CA/APM(2005)24/FINAL.

OECD (2006b): Economic policy reforms: Going for growth, Paris: OECD.

OECD (2006c): Employment outlook, Paris: OECD.

OECD (2006d): OECD Economic surveys Finland, Paris: OECD.

Oksanen, O. (2006): Are foreign investments replacing domestic investments? – Evidence from Finnish manufacturing. The Research Institute of the Finnish Economy ETLA, Discussion Papers No. 1001.

Ottaviano, G. I. P. & Pinelli, D. (2004): The challenge of globalisation for Finland and its regions: The new economic geography perspective. Prime Minister's Office: Publications 24/2004.

Paasivirta, A. & Valtonen, P. (2004): Aloittavien innovaatioyritysten siemenrahoituksen ja palvelujärjestelmän uudistamisstrategia (AISP-strategia). KTM. Julkaisuja 28/2004.

Pajarinen, M., Rouvinen, P. & Ylä-Anttila, P. (2006): T&K:n verokannustimien mahdollisia vaikutuksia suomalaisten yrityskyselyjen valossa. ETLA, Keskusteluaiheita no. 1045.

Pajarinen, M. & Ylä-Anttila, P. (2006): Omistajuus ja yritysten menestyminen: analyysia suomalaisella aineistolla. Elinkeinoelämän tutkimuslaitos ETLA, Keskusteluaiheita no. 1007.

Parpo, A. (2004): Kannustavuutta tulonsiirtojärjestelmään. Tulonsiirtojärjestelmän muutokset, kannustinloukut ja tulonjako. Tutkimuksia 140, STAKES.

Pekkala, S. & Kangasharju, A. (2002): Adjustment to regional labour market shocks. Valtion taloudellinen tutkimuskeskus, Keskustelualoitteita 274.

Pekkarinen, J. & Taimio, H. (2004): Suomen työmarkkinoiden toimivuus: vertaileva yleisarvio. Teoksessa Vertaileva näkökulma Suomen työmarkkinoihin. VNK 21/2004.

Pekkarinen, J. & Vartiainen, J. (1993): Suomen talouspolitiikan pitkä linja. WSOY, Helsinki.

Piekkola, H. (2006): Knowledge and innovation subsidies as engines for growth. The competitiveness of Finnish regions. ETLA B 216.

Pilat, D. & Wölfl, A. (2005): Measuring the interaction between manufacturing and services. STI Working Paper 2005/5. OECD Directorate for Science, Technology and Industry.

Pohjola, M. (2005): Tieto- ja viestintäteknologia tuottavuuden ja talouskasvun lähteenä.

Polaski, S. (2006): Winners and loosers. Impact of the Doha Round on Developing Countries. Carnegie Endowment for International Peace.

Puttonen, V. (2004): Onko omistamisella väliä? Eva-raportti.

Rosenthal, S. S. & Strange, W. C. (2004): Evidence on the nature and sources of agglomeration econimies. Handbook of urban and regional economics, Volume 4. Ed. by V. Henderson & J. F. Thisse.

Rouvinen, P. (2002): Hyvinvointiyhteiskunta kilpailukyvyn perustana? Pohjoismaat kärjessä yli sadan maan vertailussa. Economic trends 2004(4), 54–57.

Rouvinen, P. & Vartia, P. (2002): Suomi maailman kilpailukykyisin? Suhdanne, 2002(1), 93–100.

Sapir, A. (2005): Globalisation and the reform of European social models. Bruegel policy brief. Issue 2005/01 November 2005.

SCP (2004): Public sector performance. Social and cultural planning office. The Hague.

Spitz, A. (2004): Are skill requirements in the working place rising? Stylized facts and evidence on skill-based technological change. ZEW DP No. 04-03.

Stern, N. (2006): The Stern review report on the economics of climate change. http://www.hm-treaury.gov.uk/independent_reviews/stern_review_economics_climate_change/stern_review_report.cfm

Suomen maatalous ja maaseutuelinkeinot (2006): Toim. J. Niemi ja J. Ahlstedt. MTT Taloustutkimus. julk. 106.

Suomen Pankki (2005): Suorat sijoitukset Suomen maksutaseessa. www.bof.fi.

Suoniemi, I., Tanninen, H. & Tuomala, M. (2003): Hyvinvointipalveluiden rahoitusperiaatteet. Sosiaali- ja terveysministeriön julkaisuja 2003:5.

Tervo (2000): Migration and labour market adjustment: empirical evidence from Finland 1985-90. International Review of Applied Economics 14.3.

The Lisbon review (2004): An assessment of policies and reforms in Europe. World Economic Forum.

Tohmo, T. (2005): Suomen teollisuuden keskittyminen ja seutukuntien erikoistuminen 1975–2001. Jyväskylän yliopiston taloustieteiden tiedekunta, julkaisuja N:o 149/2005.

Työministeriö (2004): E-työ Suomessa 2003. ETR:n selvitys ja toimenpidesuositukset e-työn kehittämismahdollisuuksista. Toimittanut Tiina Hanhike.

Valtioneuvoston kanslia (2005a): Palvelualojen kehitys, tuottavuus ja kilpailu. Valtioneuvoston kanslian julkaisusarja 11/2005.

Valtioneuvoston kanslia (2005b): Tuottavuus ja työllisyys – mitä opittavaa muista Pohjoismaista? Valtioneuvoston kanslian raportteja 3/2005.

Valtioneuvoston kanslia (2006): Työmarkkinoiden kysyntä, tarjonta ja kohtaanto, Talousneuvostolle laadittava selvitys työmarkkinoiden toiminnasta, työvoiman kysynnän ja tarjonnan yhteensopivuudesta ja siihen liittyvistä ongelmista, väliraportti 8.6.2006.

Valtiovarainministeriö (2006a): Lissabonin strategia kasvun ja työllisyyden parantamiseksi – Suomen kansallisen toimenpideohjelman 2005–2008 väliarvio. Valtiovarainministeriö, Taloudelliset ja talouspoliittiset katsaukset 3a/2006.

Valtiovarainministeriö (2006b): Talouspolitiikan strategia -raportti 2006. Valtiovarainministeriön julkaisuja 2/2006.

Virjo, I. Aho, S. & Koponen, H. (2006): Ammatillinen liikkuvuus-tutkimusprojekti, Käsikirjoitustekstiä 25.9.2006

Ward, T., Harrison, T. & Rabemiafara, N. (2005): The implications of demographic trends for employment and jobs, Alphametrics, November 2005.

van Welsum, D. & Reif, X. (2006): The share of employment potentially affected by offshoring – an empirical investigation, Working Party on the Information Economy, DSTI/ICCP/IE(2005)8/FINAL, OECD.

Westergaard-Nielsen, N. (2006): Decentralized wage setting in Denmark after 1993? Mimeo.

Widgrén, M. (2006): Challenges created by the New EU Member States and third countries. In Globalisation Challenges for Europe. Report by the Secretariat of the Economic Council - PART I. Prime Minister's Office: Publications 18/2006.

Wölfl, A. (2005): The service economy in OECD countries. STI Working Paper 2005/3. OECD Directorate for Science, Technology and Industry.

Yliherva, J. (2006): Tuottavuus, innovaatiokyky ja innovatiiviset hankinnat. Sitran raportteja 64.

Ylä-Anttila, P. & Hernesniemi, H. (2006): Helsingin seudun ja Uudenmaan aluetalous - selittävätkö klusterit ja erikoistuminen nopeaa kasvua? Helsingin kaupungin tietokeskus, Kvartti 2/2006.

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