

2002

Annual
Competitiveness
Report 2002



2002

Annual Competitiveness Report 2002

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November 2002



National
Competitiveness
Council





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Foreword by An Taoiseach



Ireland's international competitiveness, allied to a well educated workforce and a favourable regulatory environment for enterprise, has been the hallmark of our extraordinary economic success. Now, as the economy faces into a difficult and uncertain time, competitiveness will assume even greater importance in the coming years. New challenges have to be faced and while recent economic success is no guarantee of future success, many lessons can be gleaned from our own experiences since the 1980's. In the absence of monetary and exchange rate policy, and in light of weakened global demand, we must maintain competitiveness if we are to safeguard the economic gains made over the past decade. With this in mind, competitiveness is a key priority for Government policy.

The Government is determined that the conditions for enterprises operating in Ireland should be as favourable as possible. This encompasses the costs that businesses face, the skills level of the population, the physical infrastructure, the regulatory environment, the efficiency and effectiveness of public administration and other factors.

The National Competitiveness Council was established in 1997 as part of the Programme for Prosperity and Fairness to report to the Taoiseach on key competitiveness issues for the Irish economy. The Council makes recommendations to Government and provides a significant contribution to the development of policy in all of the areas mentioned above. The Council takes a broad view of competitiveness, defining it as the ability to achieve success in markets leading to better standards of living for all. The Annual Competitiveness Report, together with the Competitiveness Challenge provides a valuable insight into the current state of Irish competitiveness, together with a comprehensive list of policy actions, designed to protect and indeed enhance Ireland's competitive position relevant to other countries.

I am very pleased therefore to introduce both the *Annual Competitiveness Report 2002* and *Competitiveness Challenge 2002*. The Government will give careful consideration to the Council's recommendations in the formulation of policy.

Mr. Bertie Ahern, T.D. ,
Taoiseach

November 2002



Preface



This year the National Competitiveness Council is publishing its fifth *Annual Competitiveness Report* and *Competitiveness Challenge*. The Council would like to acknowledge the dedication and hard work of former Chairman Brian Patterson over the past five years.

Using a wide range of key indicators, sourced from bodies such as the OECD and Eurostat, the *Annual Competitiveness Report 2002* (ACR) analyses Ireland's competitiveness and compares it to that of our trading partners and main competitors. This year's report differs from last years in several ways. First it contains a more refined and focussed set of indicators. Using an input-output approach, these indicators are sub-divided into a number of separate headings, each representing a key driver of competitiveness. Second, this year's report is more accessible and user friendly, with improvements in the layout of the statistics, graphs and tables.

This year's ACR confirms many of our strengths. However it also points out many areas of deterioration and leaves no room for complacency. Future policy must focus on improving the underlying structures of our economy. Escalating wage costs, prices and infrastructural deficits must be urgently tackled. As these key issues are addressed policies must be put in place to develop our human capital to facilitate the development of a knowledge economy. Using the analysis contained in the ACR as a starting point the Council's main policy document, the *Competitiveness Challenge 2002*, identifies a wide range of competitiveness issues and makes a number of recommendations for the direction of future public policy. In addition to addressing the primary concerns of prices and costs, wage growth moderation and the continued provision of infrastructure, the Council has focussed attention on issues such as Regulation and Competition Policy, Science, Technology and Innovation, and Education and Skills.

Both the domestic and global economies face difficult times ahead. The extent or exact timing of any upturn in economic growth cannot be predicted with a strong degree of confidence. As a result policy makers must contend with a number of potential domestic and international threats to the economy: rising costs, increasing wages, higher than acceptable inflation, lower investment than is desirable and weaker than expected global demand. Any decrease in international competitiveness would have adverse effects on employment, income levels and would inevitably impact on the Government's ambitious public spending plans, all of which would put at risk the benefits of the last ten years of unparalleled growth. Remaining at the forefront of world competitiveness is the key to overcoming these current difficulties and will put Ireland in a favourable position to take advantage of any world economic recovery, as well as making the most of the current environment.

In order to do this, the over-arching short to medium-term emphasis must be on the restoration of the 'virtuous circle' which Ireland enjoyed in the late 1990's. This virtuous circle of sustainable moderate wage growth, low inflation, productivity gains, social partnership and a competitive business environment was the bedrock on which our remarkable recent economic performance has been built. Although the economy has progressed in recent years, we cannot afford to ignore the fundamentals of our success and urgent policy action is required to restore our much lauded international competitiveness.

Looking to the future, strategies to enhance productivity must become the guiding light for policy makers. By addressing the drivers of productivity: skill levels, investment and innovation- and moving towards the creation of a knowledge economy, policy makers can put in place a framework which will maximise the growth potential of the economy ensuring continued prosperity and increasing living standards for all. Now more than ever, in the face of international economic unpredictability, competitiveness is our only security and the only way to ensure long term prosperity and social equality.

William Burgess
Chairman
National Competitiveness Council

November 2002



Key Findings

Previous strong economic performance was driven by gains in competitiveness alongside other economic factors, and as a result employment and incomes grew rapidly. However, more recent economic evidence outlined in this Report shows deterioration in some areas of competitiveness.

- Firstly the rise in wage costs evident in this Report has seen Irish wage levels now rise above major competitors, with the risk of further divergence over the coming years. EU data now estimates average Irish nominal wages per full-time employee was 3.6% above the EMU-12 average in 2001, with average wage levels forecast to rise to 13% above the EMU average by 2003. In the past, gains in labour productivity justified significant growth in incomes and wages. However, recent falling productivity trends suggest that wage inflation will have to ease if low unemployment and competitiveness are to be sustained. Account must be taken of different sectoral performances.
- Secondly, an easing of wage growth must be accompanied equally, and in parallel, by reductions in consumer price inflation, thus allowing real wage gains to match productivity gains. This will limit the risks of embedded cost inflation and the development of a competitiveness damaging price-wage spiral. Recent price and cost developments highlighted in this report, confirm a number of worrying trends with consumer price inflation running at more than twice the EU average. There is a key role for policy in enhancing competition where possible, particularly in restoring competitiveness across the non-traded sector of the economy.
- Finally infrastructure bottlenecks are still severe and adding to business costs. Problems are particularly acute in the transport sector and the progressive implementation of the National Development Plan (NDP) should remain a priority notwithstanding the tighter budgetary position. Growing congestion that is driving up costs and curtailing economic prospects must also be addressed by regional policy. The forthcoming National Spatial Strategy has a central role to play in achieving balanced regional development.

Conclusions

Overall findings show that there appears to be a wide spectrum of competitive performance across the economy. The report though also highlights other areas where competitiveness is deteriorating.

The benchmark findings from this report should be used to develop future policy which can stabilise and improve the Irish competitive position. If we are successful in delivering this policy action then the economic outlook is solid. However, failure to address these challenges within the new economic environment will result in a sharp increase in risks across the economy, in turn threatening a reversal of many of the economic gains made over the last decade.



Economic Summary

Overview

Maintaining and strengthening our overall competitive position is the key to ensuring that economic potential is maximised. It is therefore vital that Government policy responds rapidly and effectively to unfolding macroeconomic events and competitiveness threats. A stable macro-economic environment is the necessary foundation on which enterprise can build competitiveness, assisted where feasible by other competitiveness-enhancing public interventions. Ensuring a strong economic foundation and business environment will allow the benefits from other competitiveness policies to be fully reaped.

Recent Developments

Over the last decade the Irish economy has enjoyed significant advances, allowing convergence across key areas with many of our competitors. A virtuous circle of low inflation, moderate wage increases, lower taxes and higher productivity was maintained. As a result the Irish economy has been extremely competitive in recent years. This can be observed when assessing the level of GDP or GNP per capita in Ireland compared with other countries. OECD data shows that Ireland now has the second highest level of GDP per capita at US\$31,400. While GDP measures overstate Irish income, the data indicate that Ireland is now amongst the richest countries in the world.

However, this economic transformation has presented policymakers with a new set of challenges. Firstly, the economy has come up against supply-side constraints including labour market tightness, and also inadequate infrastructure in the areas of transport, housing, education, telecommunications, health and energy. Secondly, the risk of a price-wage spiral has escalated as consumer prices, wage growth and other costs accelerate rapidly in response to surging demand and restricted capacity.

Adding to this new set of economic circumstances was the bursting of the ICT bubble in mid-2000, and later the global economic shock triggered by the events of September 11th 2001. As a result global growth conditions, which were already on a tentative footing, deteriorated rapidly from the second half of 2001 led by a rapid deceleration in US growth. The Asian and European economies also remained weak in this period and into early 2002, dampening global economic conditions further. The Irish economy was not immune to these deteriorating global trends. With domestic economic conditions remaining shaky as a result of continued high wage and price inflation and the foot and mouth crisis, downside risks to the overall economy reached their highest levels for over a decade. The changing economic environment is summarised in the following table:

	1999	2000	2000	2000	2000	2001	2001	2001	2001	2002	2002
	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2
Real GDP (%ch)	14.3	10.2	13.4	10.1	12.1	12.3	9.0	2.8	0.1	2.9	
Employment (%ch)	6.6	6.1	5.0	4.1	3.8	3.6	2.7	2.8	2.5	2.1	1.9
Productivity* (%ch)	7.2	3.8	8.0	5.7	7.9	8.4	6.1	0.0	-2.4	0.8	
Consumer Prices (%ch)	3.8	4.3	5.2	6.2	6.6	5.3	5.5	4.7	4.1	4.8	4.6
Unemployment (%)	5.1	4.7	4.3	4.3	3.9	3.7	3.7	4.3	4.0	4.4	4.2

%ch = annual change
* Forfás labour productivity estimate
Source: Central Statistics Office

- Rapid deceleration in GDP growth in the second half of 2001 as investment stalled and export growth slumped.
- Slowing employment growth from Q4 1999.
- Cyclical fall in labour productivity from the second half of 2001.
- Persistent high levels of price inflation, wage growth and rises in enterprise level costs.

In addition, other evidence indicates:

- Weakening income growth, consumer purchasing power and confidence.
- Emergence of the first signs of public finance weakness.
- Strengthening of the euro against the dollar, and to a lesser extent sterling, resulting in a deterioration of the Irish Central Bank's Trade Weighted Competitiveness Indicator. The previous 10% price advantages gained from the weak effective exchange rate have been eroded somewhat, further exposing already high prices and costs.
- Deterioration in the IMF's relative unit labour cost indicator of competitiveness.

Short-term Outlook and Risks

Growth conditions over the remainder of 2002/3 are expected to stabilise in line with a shallow recovery in global economic conditions and the subsequent knock-on effects into Irish export growth and the domestic economy. However the extent of the global economic recovery is uncertain at this stage and economic risks remain high for an economy as open to trade as Ireland. As a result the domestic outlook is more uncertain than in recent years. In a baseline scenario, strengthening US and Asian economic activity, alongside still robust UK economic conditions, should support Irish exports and allow real GDP growth to average 3.5-4% in 2002. Next year GDP growth is expected to strengthen towards 4.5%, just below trend estimates, although there are several downside risks to this forecast.

The key exogenous risks facing the Irish economy in the immediate future are:

- Weaker than expected global demand.
- Volatile stock markets.
- Global inflationary shocks (e.g. a sharp rise in oil prices).
- Further strengthening of the effective exchange rate.
- Rising international political risks.

Short-term domestic risks to consumption growth include rising unemployment, slower income gains, high consumer debt levels, the deterioration in the public finances, and most importantly continuing high consumer price and wage inflation. Investment is threatened by lower profitability, declining stock prices and high international risks, including rising political instability and the rising threat of conflict.

Longer Term Macroeconomic Outlook and Risks

The key to the long-term performance of the economy continues to depend on solid policy action directed towards maximising the growth potential of the economy by maintaining Irish competitiveness. Although the longer term outlook for the economy appears healthy, this scenario is underpinned by the key assumption that Ireland is able to successfully respond to the recent deterioration in competitiveness. Failure to deal with key competitiveness issues would severely threaten the economic outlook over the coming years.

The longer-term growth potential of the economy is estimated to be around 5%, and although this is well below the double-digit gains recorded over recent years, it is still expected to strongly outpace EU average growth. In another economic scenario though, growth could be much lower, particularly if there was a continued weakening of competitiveness, or if productivity failed to become a stronger driver of growth. Specific longer term risks to the economy are therefore:

- An unsettled macroeconomic environment with embedded high price inflation, unsustainable wage growth and growing costs in other areas. Any return to sustained budget deficits alongside a rising government burden would also present problems for the longer term performance of the economy.
- The failure to address the infrastructural short-fall which continues to threaten the longer-term growth potential of the economy.
- Failure to build on and adapt our successful competitiveness formula to new challenges, particularly targeting policy towards niche industries, improving skills and fostering innovation.
- A euro strengthening against sterling (most likely if the UK makes efforts to join EMU). This will raise the effective exchange rate further.
- Increased global competition.

Irish Competitive Summary

The National Competitiveness Council defines competitiveness as “The ability to achieve success in markets leading to better standards of living for all”. This report presents and assesses a range of input indicators which underpin competitiveness under a variety of headings:

- Labour Costs;
- Prices and Costs;
- Economic Policy, Government, and Regulation;
- Education and Skills;
- Information Society;
- Transport Infrastructure;
- Environment and Energy;
- Investment and Capital;
- R&D and Innovation; and,
- Productivity.

In this summary we review Ireland’s recent competitiveness performance on the international stage, and highlight some of the key issues arising from this Report.

Labour Costs

Given Ireland's previous productivity performance it was possible to sustain high wage growth and rapidly rising wage levels while sustaining the economy's competitiveness. However, recent trends including those highlighted in this Report suggest that wage inflation needs to be quickly moderated in line with weakening growth and productivity if competitiveness, high growth and low unemployment are to be maintained. Projections from the OECD show that Ireland has higher wage levels and inflation than most of its competitors. Unit labour cost measures paint a similar weak picture, with Ireland having the third highest growth of the countries considered. Wage costs, even when adjusted for productivity, are therefore rising by more than Ireland's competitors. Managing wage growth in a way that it relates to the ability of enterprise to absorb the costs without damaging the competitiveness position of the economy is a key challenge for policy-makers. This is only likely to happen if accompanied in parallel by slower rises in consumer price inflation and also by reductions in other cost pressures across the economy.

Prices and Costs

Other enterprise costs (excluding wages) are also important when assessing competitiveness. Recent trends point to a sharp rise in a wide range of costs facing firms across the economy. These cost pressures include rapid rises in insurance, property, telecommunications and energy costs. The competitive position of exporting firms is also being undermined by the recent strengthening of the effective exchange rate which had previously given an artificial and temporary boost to competitiveness. Unfavourable exchange rate movements, accompanied in parallel by rising wages and other cost increases, are therefore threatening to place sharp upward pressure on export prices. Telecommunications costs are a key cost for certain types of business and were assessed as part of this study. On the basis of the cost of a basket of calls, both national and international, Ireland is ranked the 9th most expensive out of 16 countries considered. Electricity is also crucial for competitiveness and one measure reported reveals Irish firms face the second highest level of electricity costs of eight countries surveyed. Unfortunately data for international insurance costs is not yet available although data would be expected to confirm the high and rising insurance cost burden facing Irish firms.

Economic Policy, Government and Regulation

The tax burden faced by employees and businesses is considered to be a key determinant of competitiveness and was analysed in this study. Total tax revenue as a percentage of GDP is equal to 29.2% which ranks Ireland as 3rd lowest out of 16 countries. This compares to an average of 41.6% across the EU as a whole, and to 37.4% for all OECD countries.

Corporate and personal taxation burdens are also low in Ireland. Ireland has the lowest rate of tax on corporate income. Japan currently has the highest rate at 42%, out of the sixteen countries considered. From a competitiveness perspective Ireland is ranked highly on this measure.

Education and Skills

Investment in education is an important determinant of competitiveness and various measures of human capital development were examined. One measure of the impact of investment on education is the percentage of the population aged 25–34 that has attained at least third level education. On the basis of this indicator Ireland is ranked in 8th place out of 13 countries, with 29% of the 25-34 year old cohort having attained this level of education. Japan is ranked first at 45%. This data dates to 1999 and given on-going increases in third-level participation this percentage is set to increase over the coming years. Further investment though is still needed if this driver of competitiveness is to be maximised over the longer term.

Information Society

Investment in Information Society is also seen as important for future economic growth. A range of competitiveness indicators have been accessed and analysed in relation to the Information Society. These include indicators on broadband access, Internet usage, mobile telephone and the extent of DSL. Ireland is ranked around mid-table based on a number of measures. While progress has been rapid with significant investment in new technology, further work is required if Ireland is to be amongst the leaders in these developments.

Transport Infrastructure

Higher than expected economic and population growth in recent years has placed considerable strain on Ireland's transport infrastructure. This infrastructure deficit is leading to increased congestion and to concerns that future economic and social development will be impaired unless the deficit is met. In assessing this and other issues in relation to transport, a range of competitiveness indicators have been accessed and analysed which suggest that the quality of Ireland's infrastructure is weak and requires significant upgrading. That said, significant progress has been made, and is continuing to be made, particularly in the Roads and Public Transport projects around the Greater Dublin Area.

One indicator of the quality of our transport infrastructure measures the average speed of business deliveries for a specified journey in capital cities expressed in minutes. While information on this is weak, available data would suggest that Ireland is ranked last of eight countries, with the longest speed of business delivery on average. Further detailed research on this may be warranted.

Investment and Capital

Gross fixed capital formation measures total investment undertaken by the private and public sector. Using this measure Ireland is ranked the 4th highest of the 16 countries considered. Foreign Direct Investment (FDI) is an important element of this investment. In terms of FDI flows as a percentage of GDP however, Ireland is ranked first out of the chosen set of 16 countries. These indicators show the favourable competitiveness position of the economy, however the recent decline in FDI indicates how quickly competitiveness can change for a small open economy.

R&D and Innovation

Ireland has benefited greatly over the past decade or so from the performance of high-tech sectors. Spill-over effects from high-tech foreign enterprises have stimulated a range of new technology-based firms in areas like software to add to traditional indigenous strengths in the food-processing sector. The challenge now is to consolidate these advances at a time of increasing uncertainty in world markets and to lay the groundwork for moving to a new stage of industrial development. Ireland must intensify its commitment to Science, Technology and Innovation by increasing its investment in Research & Development (R&D), and by addressing the bottlenecks which limit our innovation capabilities.

While Ireland performs reasonably well in certain areas, for instance, in terms of the number of science graduates at third level etc. it is evident that many concerns remain. Overall research intensities are below international norms. Ireland is ranked just 11th out of 16 countries in terms of Gross Expenditure on R&D (percentage of GDP). An additional worry is that almost two thirds of business sector R&D in Ireland is performed in foreign owned industry.

Productivity

Available data shows that Ireland has experienced rapid labour productivity growth in recent years which has far outpaced other major OECD countries. This rapid productivity growth has allowed the level of output per employee to rise rapidly and be amongst the highest in the OECD area. Measures of labour productivity levels place Ireland 4th out of 16 countries reviewed. Data on productivity as measured in terms of US\$ per hour worked rank Ireland 5th of the 16 countries considered. More recent trends though show a rapid deceleration in productivity growth as economic activity slowed following recent global economic shocks. Over the longer term, economic stability and equilibrium must be supported by real wage growth staying in line with productivity gains. Another key area which policy must address is the narrowing of the current wide productivity gap between the indigenous traditional sectors and largely high tech foreign owned sectors.

Balanced Regional Development

Balanced regional development is a crucial element of economic and industrial policy. Though there has been significant economic and social progress, the distribution of this progress is now a key issue with the emergence of significant regional disparities. In particular there are concerns about increased urbanisation and the excessive growth and development of the mid-east region. Urban sprawl, traffic congestion, and infrastructure problems are affecting the economic competitiveness of the mid-east region in particular. A key competitiveness challenge is to achieve more balanced regional development, and this is one of the issues to be addressed in the forthcoming National Spatial Strategy document. The difficulties in altering established economic concentrations will require determined and innovative policies.

Sectoral Performance

The impressive performance of the macro economy masks significant differences in sectoral performance. Ireland's traded manufacturing sector comprises a low productivity traditional sector, which is generally Irish owned and which serves the domestic and UK markets. It also includes a modern or high technology sector, which is predominately foreign-owned and which serves the wider European market. These leading sectors tend to have high productivity as measured by output per person.

Trends in employment provide a useful indicator of the relative performance of these sectors and the different competitiveness challenges that they face. Traditional manufacturing employment remained unchanged over the period 1995-2000, while the food-processing sector showed modest growth. In contrast, employment in high technology sectors expanded rapidly. These significant differences in performance present a challenge particularly for pay policy.



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Competitiveness Framework

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1. Competitiveness Framework

1.1 Definition of Competitiveness

The literature on competitiveness supplies a wide variety of definitions of the term. One of the most straightforward definitions, supplied by the World Economic Forum, is that competitiveness is the ability of a country to achieve sustained high rates of growth in GDP per capita. A similar but more detailed definition, supplied by the OECD, is that competitiveness is the degree to which a nation can, under free trade and fair market conditions, produce goods and services which meet the test of international markets, while simultaneously maintaining and expanding the real incomes of its people over the long-term.

The definition favoured by the National Competitiveness Council is that competitiveness is the ability to achieve success in markets leading to better standards of living for all. The approach taken in this report to measuring competitiveness is based on this definition.

Competitiveness is something that is important at a range of levels, from the level of the individual firm to the level of an industry and from the level of a small local region to the level of an association of nation states. The National Competitiveness Council is concerned with the country as a whole, with promoting the success in national and international markets of the enterprise sector overall and with the ultimate objective of promoting improved standards of living for all people in the country. However, for the first time this Report also includes a number of regional aspects of competitiveness.

1.2 Approach Taken to Measuring Competitiveness: Input-Output Approach

The approach taken in this year's Annual Competitiveness Report consists of an input-output framework to assessing competitiveness. This report presents and assesses a range of input indicators, under a variety of headings, namely:

- Labour Costs;
- Costs and Prices;
- Economic Policy, Government, and Regulation;
- Education and Skills;
- Information Society;
- Transport Infrastructure;
- Environment and Energy;
- Social Capital;
- Investment and Capital;
- R&D and Innovation; and,
- Productivity.

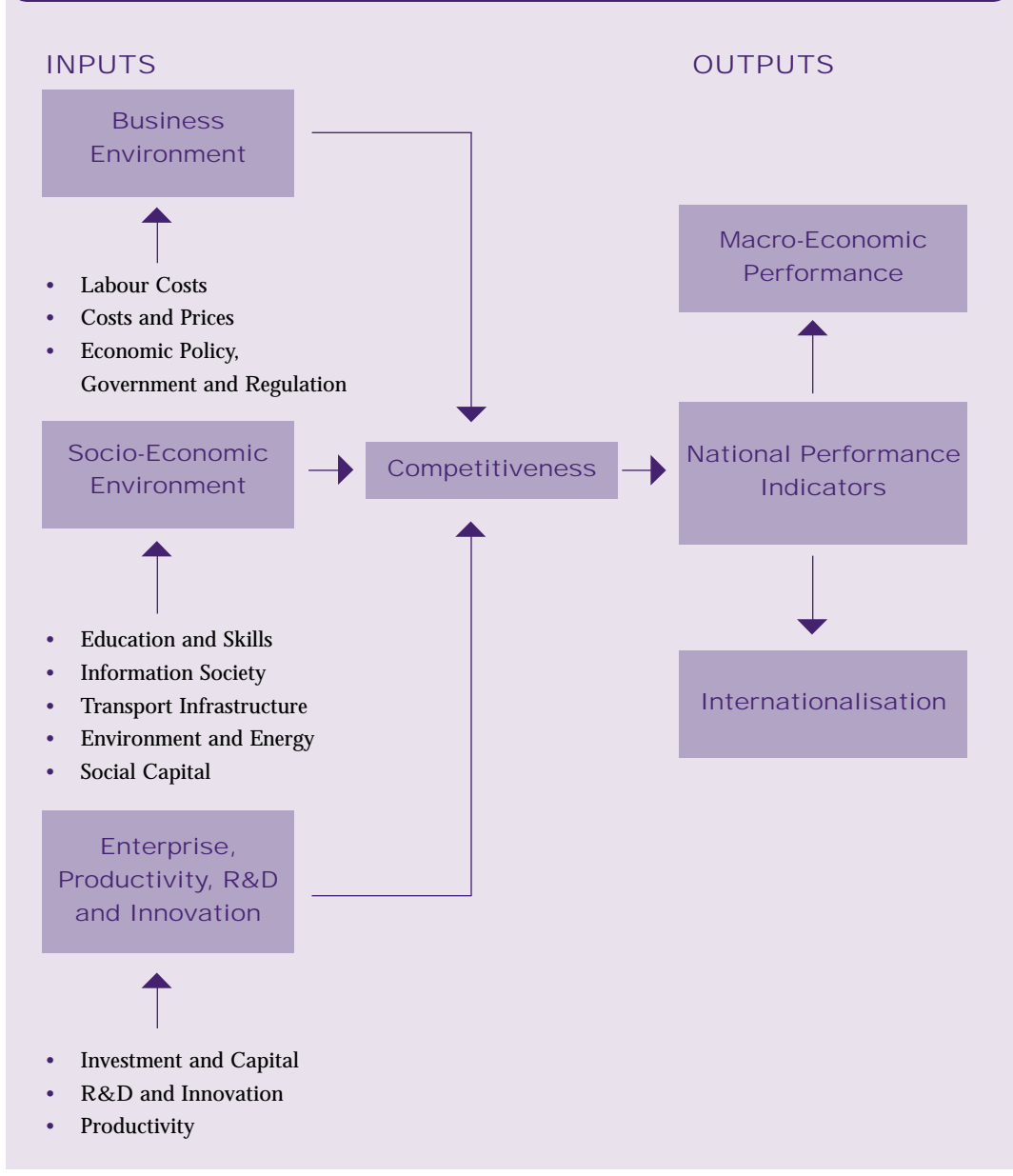
These sets of input indicators provide an indication of the level of competitiveness in the economy. A range of national performance indicators are then considered as resultant output indicators of competitiveness, under the broad headings:

- Macroeconomic Performance; and,
- Internationalisation.

This overall approach is represented in Figure 1.1.

In interpreting the ranking associated with the indicators presented in this report, a score of “1” is given to the country that is most competitive, based on the value of a given indicator, while a score of “16” is given to the least competitive country (assuming values for that given indicator are available for all countries). Hence, in general, a low ranking implies a healthy competitiveness position, while a high ranking implies an uncompetitive position.

Figure 1.1 Competitiveness Framework ACR 2002



1.3 Headline Indicators

A total of 144 indicators relating to competitiveness are considered in this report. In order to present a concise and accurate reflection of Ireland's relative competitiveness, a number of key or headline indicators have been selected for more detailed analysis in the main body of the report. The remaining indicators are discussed briefly at section ends and presented in the annexes.

These headline indicators which are chosen for more detailed analysis are presented in Table 1.1 to Table 1.3 below. Table 1.1 presents the headline indicators for Business Environment.

Table 1.1 Headline Indicators - Business Environment

Labour costs (including drivers of labour costs)	
1	Nominal compensation per employee (€000 per annum)
2	Nominal compensation per employee (% chya)
3	Unit labour costs in the total economy (% annual change)
Costs and prices	
4	Composite business basket cost of calls (national and international)
5	Industrial electricity prices – 10 GWh
6	Office rents: total occupation costs
7	Effective exchange rates
Economic policy, government and regulation	
8	Total tax revenue (% GDP)
9	Taxes on corporate income (standard/top rate)
10	Gross fixed capital formation (% GDP)

Table 1.2 presents the headline indicators for Socio-Economic Environment and includes indicators on Education and Skills, Information Society, Transport Infrastructure and Environment/Energy.

Table 1.2 Headline Indicators – Socio-Economic Environment

Education and Skills	
11	Public and private expenditure on educational institutions (% of GDP)
12	Total enrolment in tertiary education growth (1995=100)
13	% of population aged 25-34 that has at least third level education
14	Number of science graduates at university level (per 000 in Labour force 16-25)
Information Society	
15	Broadband penetration (per 100 population)
16	Internet users per 1,000 inhabitants
17	Mobile subscribers per 1,000 inhabitants
18	Technology Achievement Index
19	DSL as proportion of total lines
Transport Infrastructure	
20	Average speed of business deliveries in capital cities (minutes)
21	Road haulage costs – vehicle excise duties
22	Rail infrastructure indicator
23	Percentage of goods transported by road – percentage of tonne kilometres
Environment and Energy	
24	CO ₂ emissions per unit of GDP
25	Waste recycling – paper and cardboard (as % of consumption)
26	Pollution abatement and control (total expenditure % GDP).

Table 1.3 presents the headline indicators for Enterprise, R&D and Innovation.

Table 1.3 Headline Indicators – Enterprise, R&D and Innovation

Investment and Capital	
27	FDI inflow - % GDP
28	FDI outflow flow - % GDP
29	Cumulative venture capital raised as a % of GDP
30	High tech investment as a percentage of total investment
R&D and Innovation	
31	Inventiveness Coefficient
32	Gross domestic expenditure on R&D (% GDP)
33	Share of government budget allocated to R&D
34	Business R&D expenditure (% GDP)
35	Total new science and technology PhDs per 000 population (25-34)
Productivity	
36	Productivity per employee per annum (US\$000)
37	Productivity (US\$ per employee per hour worked)
38	Labour productivity – percentage change - 1996 to 2001
39	Productivity (% chya) 2001

In total there are 39 headline indicators that are analysed and reviewed in detail. These were selected following a review of existing indicators and are different to previous years. Some previous indicators were deleted while there were additions in some areas.

1.4 Comparator Countries

For the Annual Competitiveness Report 2002, a standard set of 15 comparator countries has been chosen for consideration across all indicators. These countries are set out in Table 1.4, and include 9 EU countries, 2 accession countries (Hungary and the Czech Republic), 2 Asian economies (Japan and Korea), as well as New Zealand and the US. These are a representative sample of countries which pose different competitive challenges to Ireland.

Table 1.4 Selected Comparator countries

1	Denmark
2	Finland
3	France
4	Germany
5	Hungary
6	Italy
7	Japan
8	Korea
9	Netherlands
10	New Zealand
11	Poland
12	Spain
13	Sweden
14	UK
15	US

1.5 Limitations of Competitiveness Benchmarking

Benchmarking exercises are a useful tool for policy matters. However, it is important to draw attention to the limitations of competitiveness benchmarking.

Lack of Availability of Data

Much of the data that we would wish to use to measure competitiveness, for example data relating to efficiency and effectiveness of Government expenditure in areas like health, education, and public infrastructure, are not available. The lack of availability of data applies across the range of issues that are covered in this report. Moreover, when we wish to use internationally comparable data, availability becomes even more severely limited. Apart from not having internationally comparable data for matters which are essentially measurable, there is also the problem that certain matters we wish to cover – Quality of Life being a prime example – are difficult to measure by conventional methods and so have to be approached through proxy measures.

Lack of Availability of Recent Data

Where we do have internationally comparable data they sometimes tend to lag behind the most current national data.

General Problems

There is also a range of what might be termed general problems. Two of these are listed here. Firstly, cross-country comparisons are always difficult because there are so many different factors at play: cultural, institutional, historical, demographic, geographic etc. Secondly, particular indicators are often specified in ways that do not precisely suit the exercise at hand. For example, they may be too crudely specified or too detailed, or they may include elements that are irrelevant for our purposes.

Business Environment

2

2 Business Environment

This section considers indicators relating to the competitiveness of the business environment. This is a natural starting point in our input-output approach to assessing competitiveness, since the competitiveness of a firm is affected by both labour and non-labour costs. Economic policy, government and regulation will also directly impact on the competitiveness of the business environment and these are also considered in this section.

Despite a slowing economy the business environment in Ireland remains positive. There are however, concerns about rising costs which if not addressed have the capacity to undermine future economic performance. These concerns particularly relate to labour costs where increases have been exceeding those of our main trading partners. There have also been significant increases in the costs of certain services. This reflects increases in the costs of labour but also a lack of competition in some sectors that needs to be addressed. Finally, overall government tax and regulation policy supports competitiveness. The tax burden is currently low and very supportive for competitiveness. However, there are regulatory and competition issues in some sectors.

Hence, the indicators under this heading cover three main areas, namely:

- Labour Costs (including drivers of labour costs);
- Costs and Prices; and,
- Economic Policy, Government and Regulation.

2.1 Labour Costs

Labour costs as an indicator can be viewed in two ways. Firstly, and from the point of view of competitiveness, lower labour costs are seen as having a positive impact. On the other hand, labour costs reflect what employees earn, in turn reflecting the overall standard of living. The overall objective of policy is to improve living standards. Accordingly, higher sustainable wage levels and improved quality of life are the objective of policies to improve competitiveness.

In assessing Ireland's relative competitiveness position, we present three headline indicators:

- Nominal compensation per employee (€000 per annum);
- Nominal compensation per employee (% change 2001 to 2002); and,
- Unit labour costs in the total economy (% annual change).

Furthermore, a number of additional indicators are assessed:

- Unit labour costs in the total economy – projected % annual change 2001 to 2002;
- Unit labour costs in the total economy – projected % annual change 2002 to 2003;
- Hourly compensation costs for production workers (manufacturing);
- Nominal compensation per employee (% change 2002 to 2003)
- Working days lost per 1,000 inhabitants per year due to industrial disputes;
- Cost of living index;
- Cost of housing index;
- Average annual percentage change in nationwide house prices from 1980 to 2002;
- Urban house prices as a multiple of personal disposable income per head.

Thus, the focus is on a range of labour and non-labour cost indicators.

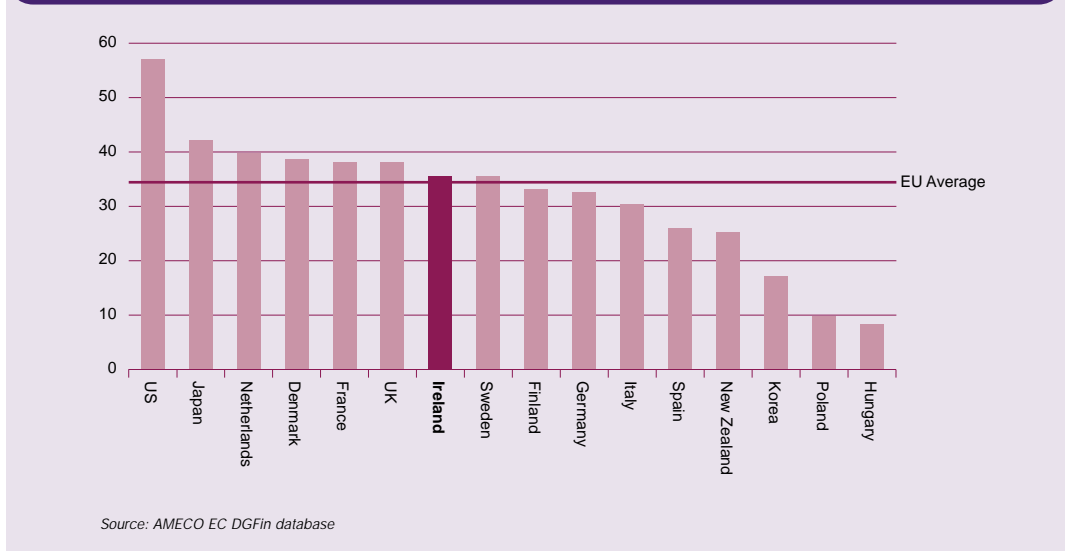
Nominal compensation per employee (€000 per annum)

Figure 2.1 presents the latest available data on nominal compensation per employee. The data is presented in thousands of euro per annum and is taken from the AMECO EC DGFin database, and relates to estimated 2002 figures. This relates to the level of wages in contrast to the next indicator which examines annual changes.

Nominal compensation costs per employee are estimated by the European commission at €35,590 in 2002, ranking Ireland as 7th highest out of the sixteen countries considered. Average nominal compensation per employee in the EU is equal to €33,810. Thus, Irish employees are now amongst the better paid in the EU and earn more than the EU average.

By 2003, nominal compensation levels per employee in Ireland are forecast by the Commission to be 13% higher than the EMU12 average. This could have adverse pressures on competitiveness unless supported by higher productivity per person employed.

Figure 2.1 Nominal compensation per employee in 2002 (€000 per annum)

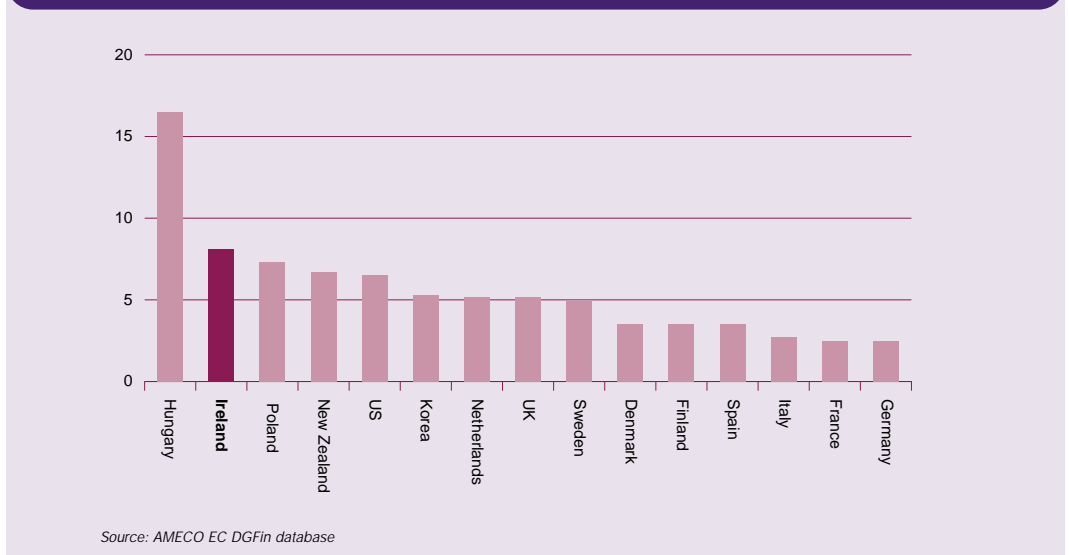


Nominal compensation per employee (% change)

Figure 2.2 presents the estimated percentage change in nominal compensation per employee in 2002 for sixteen countries. Ireland is ranked 15th out of sixteen on the basis of this indicator, given that it has the second highest estimated percentage change in nominal compensation per employee at 8.1%. Only Hungary at 16.5% is higher. The average across the EU is equal to 3.5%.

Data presented in the annexes also shows that Ireland is forecast to have the third highest percentage increase in nominal compensation per employee in 2003 at 6.9%, although that projection may overstate the outturn in 2003 due to the on-going slowdown in the economy. This compares to an average proportionate increase across all EU countries of 3.1%. This reflects the recent exceptionally buoyant demand for labour which has seen an increase in labour costs.

Figure 2.2 Nominal compensation per employee (% change from 2001 to 2002) ¹



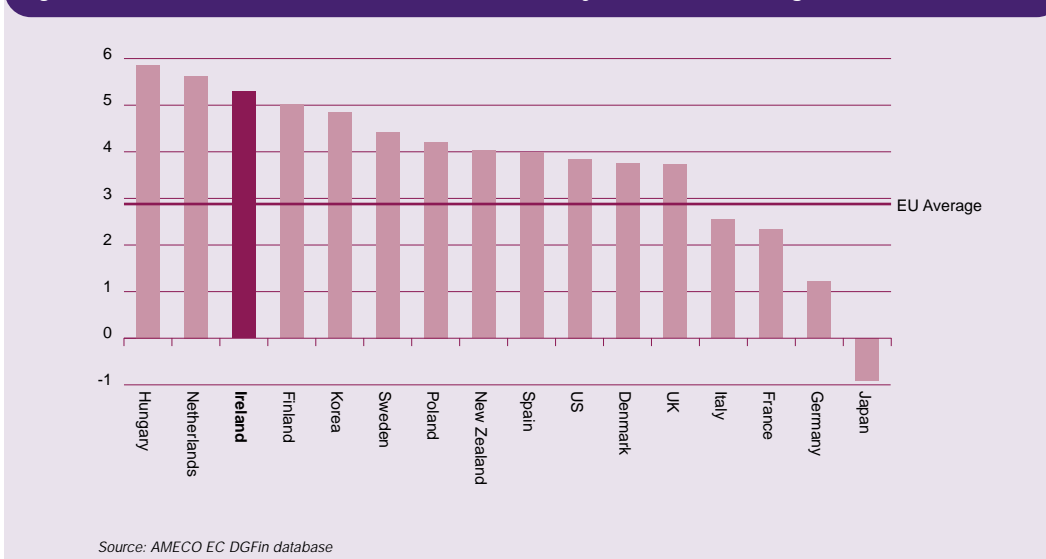
¹ Japan is not included in Figure 2.2 to give a better indication of the relative scale among the other 15 countries.

Unit labour costs in the total economy (% annual change)

Figure 2.3 presents the percentage change in unit labour costs in the total economy in 2001 for Ireland and the fifteen chosen comparator countries. The data is taken from the AMECO EC DGFin in database. Increases in unit labour cost were relatively high in Ireland at 5.3% in 2001, the third highest of the countries considered. This ranks Ireland 14th out of 16, and compares with an average across the EU of 2%.

Data is also available on the projected increase in 2002. Ireland is ranked 15th of sixteen in terms of the percentage annual change in unit labour costs in the total economy for 2002, with an increase of 5%. Only Hungary has a higher percentage increase. These are projected changes for 2002 and may differ from the actual outturn due to on-going labour market developments. Nonetheless, these indicators show that wage costs when adjusted for productivity are rising by more than our competitors. This reflects the very strong demand for labour relative to supply, which has been a recent feature of the labour market. In order to sustain competitiveness, changes in unit labour costs will eventually converge to the increases experienced in other EU countries. It is clear that on this important indicator, Ireland's relative position has deteriorated last year, and our ranking has slipped.

Figure 2.3 Unit labour costs in the total economy - % annual change - 2000 - 2001



Other labour cost indicators

A number of additional indicators relating to labour costs (including drivers of labour costs) were considered. Details of these are included in the annexes.

According to data from the US Bureau of Labour Statistics, Ireland has one of the lowest hourly compensation costs for production workers in manufacturing, at US\$13.28 (2001), an increase of 6.2% from the previous year. Only New Zealand, Korea and Spain of the countries considered had lower hourly rates. This is in contrast to a previous indicator which showed that wage costs in Ireland were the seventh highest amongst the comparator group, and may in part reflect differences in hours worked across countries.

A number of additional indicators relating to labour costs are noteworthy. For example, Ireland is ranked 12th of sixteen in terms of working days lost due to industrial disputes per 1,000 inhabitants per year, at 25.61 days. Only Spain, the US, Finland and Korea lost more days on average per 1,000 inhabitants per annum in 2000. Of course, these data relate to just one year. Over a longer timeframe Ireland's record on this indicator is good.

A cost of living index ranks Ireland as the 12th most expensive out of our set of sixteen countries in 2001, while a cost of housing index ranks Ireland as 12th most expensive in 2000 (this index considers the cost of a three-room apartment). The Economist House-Price Index implies that house prices in Ireland grew by 9.5% per annum on average over the period from 1980 to 2002, the second highest of ten countries considered. Only Spain was ranked worse on the basis of this indicator. In fact, as of 1999, urban house prices as a multiple of personal disposable income per capita had reached a multiple of 18.2 in Ireland. This ranks Ireland as 3rd worst of 11 countries for which comparable data is available on the affordability of urban housing.

It would also be interesting to include data on the actual level of house prices. Unfortunately, comparative data on housing costs across countries are not available, but it is apparent that housing costs in Ireland, most notably in Dublin, are amongst the highest in the OECD area. This mainly reflects improvements in living standards, but issues about affordability for some groups and high debt-to-income levels are of increasing concern.

Overall, the indicators of labour costs show cause for concern.

2.2 Costs and Prices

As well as labour costs, the competitiveness of individual firms is also a function of non-labour enterprise costs and prices. For example, a number of costs and prices are important for competitiveness including:

- Telecommunications costs;
- Energy costs; and,
- Property costs.

This section considers a number of non-labour enterprise costs and prices, including the following headline indicators:

- Composite business basket cost of calls (national and international);
- Industrial electricity prices – 10 GWh;
- Office rents: total occupation costs;
- Effective exchange rates.

An additional set of cost and price indicators are also analysed:

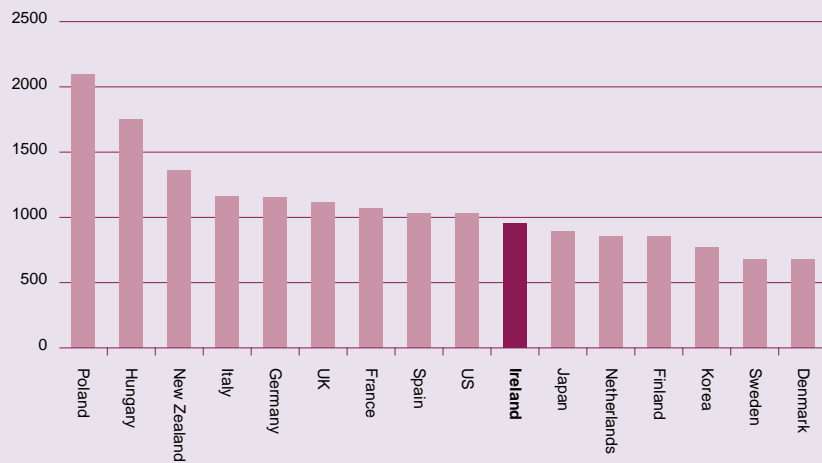
- National leased line prices – 2mb/s, 2 km circuits;
- Fixed-to-fixed interconnection cost (national) cents per minute;
- Fixed-to-fixed interconnection charges for call termination on fixed network – local level;
- Cost of internet use (30 mins peak rate);
- OECD business basket cost of calls;
- International fixed telephone costs;
- Automotive diesel oil prices for commercial use (US\$/toe);
- Gas prices – Industrial Rate (exc VAT 4186 GJ/200 days);
- Absolute interest rate spread - % points.

Regrettably data for insurance costs is not yet available on an international basis, although they would be expected to confirm the high and rising insurance cost burden facing Irish firms compared to major competitors.

Composite business basket cost of calls (national and international)

Figure 2.4 presents the cost of a basket of calls (both national and international), as estimated by Teligen. Overall Ireland is ranked 7th cheapest out of 16 countries considered, at a cost of US\$955 in PPP terms. The cheapest country is Denmark at US\$682, while the most expensive is Poland at US\$2094. This data is the latest available and relates to May 2002.

Figure 2.4 Composite business basket cost of calls (national and international) – US\$ PPP – May 2002



Source: Teligen

Industrial electricity prices – 10 GWh

Figure 2.5 presents electricity prices for EU industry as of January 1st, 2002. The prices are presented in Euro, excluding VAT, and rank Ireland 7th out of the eight countries for which the data is available. Italy is the most expensive country at €9.53, followed by Ireland at €7.42. Sweden has the cheapest industrial electricity prices at €2.83.

An important issue here is the level of cross-subsidisation of domestic electricity users by industry. Unfortunately there is insufficient data available to properly analyse the situation and so further study is merited to clarify this issue.

Figure 2.5 Industrial electricity prices – 10 GWh – Euro, VAT excl - 2002

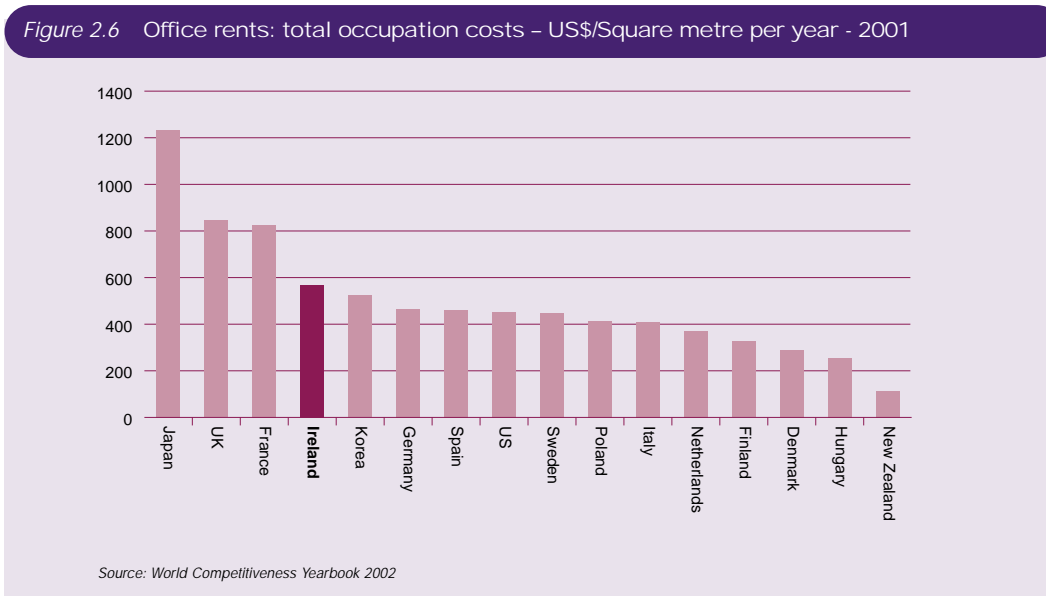


Source: Eurostat: Statistics in Focus – Environment and Energy

Office rents - total occupation costs

Differentials in office rents across countries will also affect the competitiveness of business. Figure 2.6 presents data in relation to total occupation costs, taken from the World Competitiveness Yearbook. The data relate to 2001.

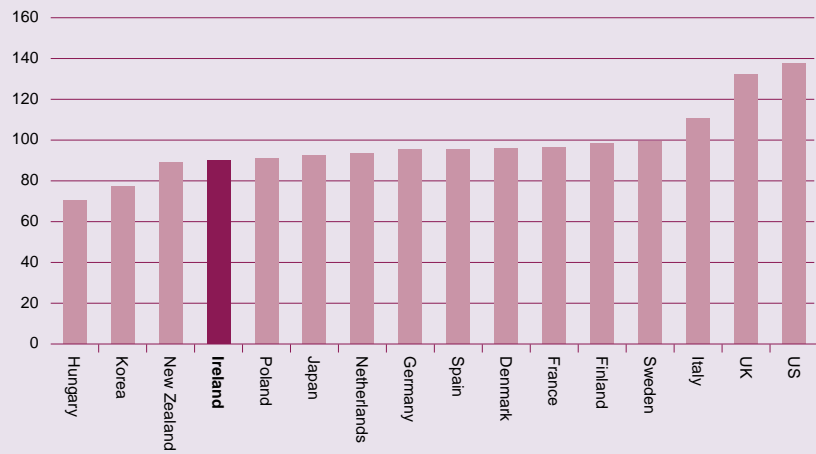
The data indicates that Ireland is 13th most expensive out of the sixteen countries considered, with only Japan, the UK and France more expensive.



Effective exchange rates

Figure 2.7 presents data in relation to changes in effective exchange rates for 2002. Effective exchange rates are a trade-weighted measure of the exchange rate. Changes in effective exchange rates over time can affect both the costs of imported raw materials and inputs from abroad, as well as the price of exports. With the index set to 100 in 1995, Ireland is ranked in 4th place out of sixteen. Ireland's effective exchange rate is 10% lower than 1995. The data indicates that the effective exchange rate in the US has increased by 37.6% since 1995, as the dollar appreciated. Ireland's exchange rate has been falling along with the other countries of the Euro area. This would have increased imported Eurozone inflation but would have provided a competitiveness boost for some exporters. Given Ireland's greater trade exposure to non-Eurozone countries, the effective exchange rate in Ireland fell by more than other Eurozone countries. This provided a competitive boost to the economy but highlights the risks of a reversal of these trends. Indeed, the recent strengthening of the Euro has led to an appreciation of Ireland's real exchange rate with adverse consequences for competitiveness. The evolution of the Euro-Sterling exchange rate is a key factor in determining future competitiveness. Early entry of Sterling into the Euro area, which could lead to a fall in Sterling, would have implications for Ireland's competitiveness. This would have consequences for, *inter alia*, pay policy.

Figure 2.7 Index of effective exchange rates in 2002 (Indices 1995 = 100)



Source: World Competitiveness Yearbook 2002

Other cost and price indicators

A range of additional indicators in relation to non-labour costs and prices are presented in the annexes of this report. For example, Ireland is ranked 4th cheapest of 11 countries in relation to national leased line prices as of August 2001 (2mb/s, 2 km circuits), and 3rd of 10 as of August 2001 in relation to fixed-to-fixed interconnection charges for call termination on the local level fixed network. These data are taken from the EU 7th Report on the Implementation of the Telecommunications Regulatory Package. Furthermore, Ireland is ranked 2nd of 10 countries in relation to fixed-to-fixed interconnection (national) prices in the year 2000, and 6th of 15 in relation to international fixed telephone calls in 2002.

A Teligen indicator examining the cost of internet use (for 30 minutes at peak rate) places Ireland as 4th cheapest of the sixteen countries under consideration in this report. Ireland is ranked by Teligen as 10th most expensive for the cost of a business mobile basket of calls.

An indicator of automotive diesel oil prices for commercial use places Ireland as 7th most expensive out of fifteen countries in 2001, while Eurostat data for 2002 places Ireland as 2nd cheapest of 9 for gas prices.

In terms of assessing non-labour cost indicators, the evidence on the competitiveness position of the economy is conflicting. On some indicators Ireland fares well, while on other indicators the position is less satisfactory. This reflects a range of factors. Non-traded costs in Ireland have been increasing significantly and have led to price increases in some sectors. The extent of pass through from cost increases to final price increases reflects a number of factors but, primarily, the level of competition and liberalisation. From a policy perspective, improvements in the performance of non-traded costs depend on the rigorous application of competition policy.

Overall, Ireland's ranking in terms of non-labour costs has deteriorated.

2.3 Economic Policy, Government and Regulation

This section considers indicators in relation to economic policy, government and regulation. This represents an important set of indicators as government policy and regulation can have important implications for business competitiveness and economic development. Furthermore, government investment policy can impact on future competitiveness.

In undertaking this analysis, we focus on the following headline indicators:

- Total tax revenue (%GDP);
- Taxes on corporate income (standard/top rate);
- Gross fixed capital formation as a percentage of GDP.

We also consider a number of additional indicators, namely:

- Employees and employers social security contributions and personal income tax less transfer payments – married (% gross labour costs);
- Employees and employers social security contributions and personal income tax less transfer payments – single (% gross labour costs);
- Employers social security contributions (% gross labour costs);
- Government spending (%GDP);
- Government financial balance (% GDP);
- Overall employment protection against dismissal;
- Cost of forming a private limited company (euro);
- Rating of Competition Authorities across countries.

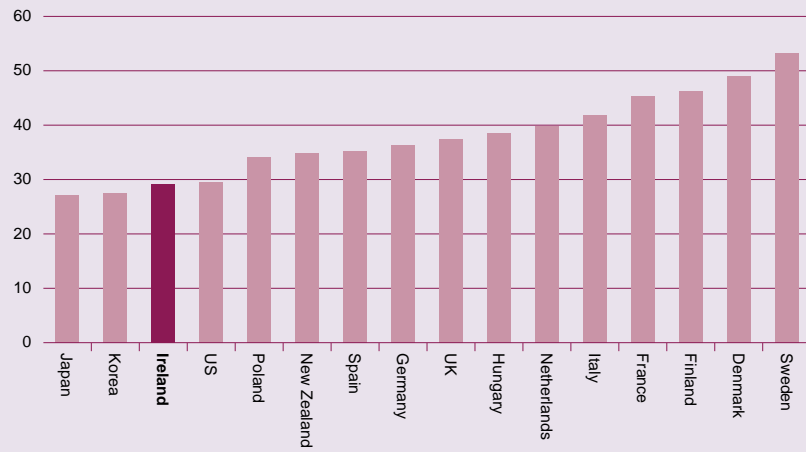
Total tax revenue (% GDP)

Figure 2.8 presents data on total tax revenue as a percentage of GDP for 16 countries. The data is taken from the OECD Revenue Statistics publication and relates to 2001.

Overall the data ranks Ireland as 3rd lowest out of 16 countries, with total tax revenue as a percentage of GDP equal to 29.2%. This compares to an average of 41.6% across the EU as a whole, and to 37.4% for all OECD countries in 2000. Only Japan and Korea have lower proportionate tax takes. Sweden has the highest tax revenue as a percentage of GDP, at 53.2%.

The data show that Ireland has one of the lowest tax burdens of the countries reviewed and our relative position is improving. It should be noted however that using GDP instead of GNP decreases the measure of the tax burden for Ireland more so than for other countries.

Figure 2.8 Total tax revenue as a percentage of GDP - 2001



Source: OECD Revenue Statistics 2002

Taxes on corporate income (standard/top rate)

Figure 2.9 presents data on taxes on corporate income. The data is taken from KPMG's Corporate Tax Rates Survey, from January 2002, and places Ireland in first place out of 16 countries, having the lowest rate of tax on corporate income. Japan currently has the highest rate at 42%, out of the sixteen countries considered.

From a competitiveness perspective Ireland is ranked highly on this measure. Moreover, it is likely that Ireland's position will improve further as future reductions in corporation tax are reflected in the data.

Figure 2.9 Taxes on corporate income in 2002 - standard/top rate - %

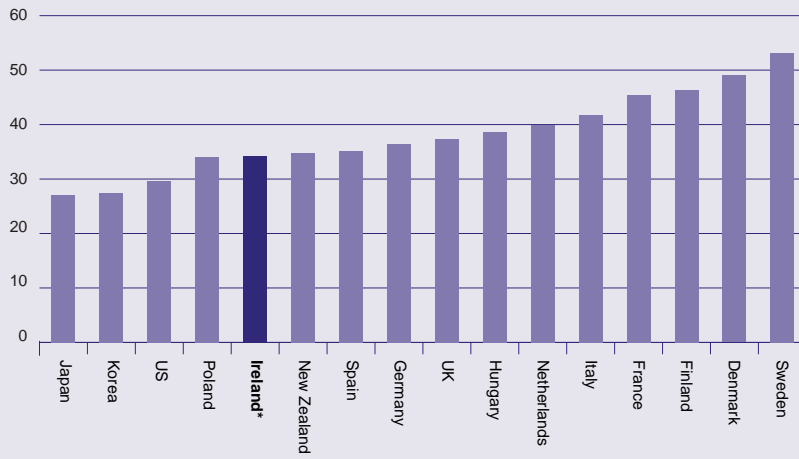


Source: KPMG Corporate Tax Rate Survey

Addendum

For reasons of improved comparability, two additional tables have been included here which take account of Ireland's unique economic structure. Due to the high numbers of multinational corporations operating here, and the resultant high levels of profit repatriation, Gross Domestic Product (GDP) overstates Irish living standards. Thus, it may be appropriate to look at Gross National Product (GNP) as a more accurate reflection of Irish national income. In the two graphs provided below we examine the *Total Tax Revenue* and *Gross Fixed Capital Formation* as percentages of GNP for Ireland. This has the effect of increasing both tax revenue and gross fixed capital formation as a proportion of economic activity in Ireland.

Total tax revenue as a percentage of GDP – 2001 *GNP for Ireland



Source: OECD Revenue Statistics 2002

Gross fixed capital formation as % of GDP – 2002 *GNP for Ireland, 2001



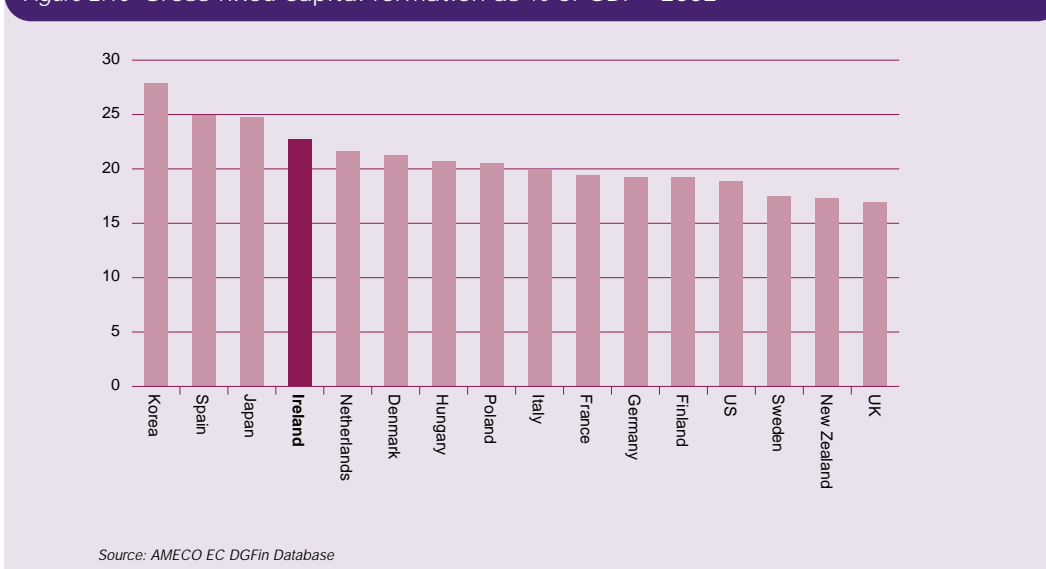
Source: AMECO EC DGFin Database

Gross fixed capital formation as % of GDP

Figure 2.10 presents data in relation to gross fixed capital formation as a percentage of GDP, and relates to 2002. This is a proxy for capital expenditure (both public and private) as a percentage of GDP, and is taken from the AMECO EC DGFin database. Overall this data ranks Ireland as 4th highest of the 16 countries considered, in terms of capital investment. This amounts to 22.7% of GDP and only Korea, Spain, and Japan have higher capital expenditure shares of GDP based on the latest available data.

In terms of investment performance, Ireland is ranked above average of the countries reviewed.

Figure 2.10 Gross fixed capital formation as % of GDP - 2002



Other economic policy, government and regulation indicators

A range of other relevant indicators in relation to economic policy, Government and regulation were considered. According to the OECD Taxing Wages 2001 publication, Ireland has the lowest employees and employers social security contributions and personal income tax as a percentage of gross labour costs for married persons, while the publication ranks Ireland 4th of 16 for the same indicator relating to single persons. This data relates to 2001. Furthermore, a ranking of employer's social security contributions as a percentage of labour costs places Ireland as 7th lowest of 16 in 2000 according to the same publication. This reflects the significant reductions in personal taxation implemented in recent budgets, and despite the increase in employers PRSI, the tax environment facing business is extremely favourable.

In terms of government spending as a percentage of GDP, Ireland is second lowest, at 32.7% in 2001. In terms of annual government borrowing as a percentage of GDP Ireland is one of the best performers in 2001 and is ranked 4th. The fiscal position has deteriorated since 2001 reflecting slower economic growth.

The OECD Employment Outlook 1999 places Ireland as 3rd of 15 countries in an indicator of overall employment protection against dismissal, while Ireland is ranked as the cheapest country (of ten considered) in the cost of forming a private limited company.

Finally, Ireland's Competition Authority is ranked joint 6th out of 13 countries as of 2002 according to the Global Competition Review. Only the US, the UK, France, Germany, and Italy receive higher scores. This indicator is based on survey responses from competition specialists including economists, lawyers, and others.

Overall, our assessment is that in terms of Government policy and regulation, Ireland performs well. The tax burden is low and helps the competitiveness of businesses. In terms of regulation and competition policy, there is scope for improvement in some areas.

Socio-Economic Environment

3

3 Socio-Economic Environment

In terms of the socio-economic environment there are major challenges for policy-makers. Despite significant investment, Ireland's infrastructure is severely congested as a result of the growing demand for travel. Ireland's relative performance is declining. In relation to the information society Ireland has made progress but lags behind our competitors on some of the key indicators. Overall performance looks unchanged. Investment in education and skills has been one of the key reasons for the rapid expansion in living standards. Improvements in most key areas are observed but further work is required. There are major challenges in each of the main environmental areas where Ireland's record is relatively poor.

The indicators under this heading cover five main areas, namely:

- Education and Skills;
- Information Society;
- Transport Infrastructure;
- Environment and Energy; and,
- Social Capital.

Each of these areas is considered important from a competitiveness perspective and indicators on each one are presented in subsequent sections.

3.1 Education and Skills

The stock of human capital is one of the most important determinants of competitiveness. Research from the ESRI on Ireland as well as international reviews by the OECD indicate the critical importance of investment in human capital as a factor influencing economic growth. Ireland's convergence in living standards towards the EU average reflects significant investment in education. With a high proportion of the population having attained a third-level qualification, Ireland has the skills to compete in the global market. Of course, while much progress has been made on foot of previous policy, continued progress is required.

In relation to education and skills, the following represent the headline indicators:

- Public and private expenditure on educational institutions (% of GDP);
- Total enrolment in tertiary education growth (1995=100);
- % of population aged 25-34 that has at least third level education;
- Number of science graduates at university level (per 000 in Labour force 25-34).

A number of additional indicators in relation to education and skills are also examined:

- Annual expenditure per student (US\$ PPP) – all;
- Ratio of students to teaching staff – all;
- Educational participation – age 16 (%);
- % of 25-64 year olds participating in continuing education and training;
- % of population aged 25-64 that has at least upper secondary level education;
- Percentage of students scoring at literacy level 3 or higher;
- Student performance on the mathematical literacy scale;
- Student performance on the scientific literacy scale;
- Average number of foreign languages per pupil; and,
- Measure of ageing population.

Public and private expenditure on educational institutions (% of GDP)

Figure 3.1 presents data in relation to public and private expenditure on educational institutions as a percentage of GDP. The data is from the OECD Education at a Glance 2001 publication and relates to 1998. This data ranks Ireland in 8th place of 14 countries for which the data is available, with expenditure on educational institutions amounting to 5.4% of GDP.

There is some evidence of a decline in this proportion for Ireland in recent years. Preliminary data for 1999 puts the percentage at 4.6% and at 4% in 2000.

Figure 3.1 Public and private expenditure on educational institutions in 1998 (% of GDP)



Source: OECD Education at a Glance 2001

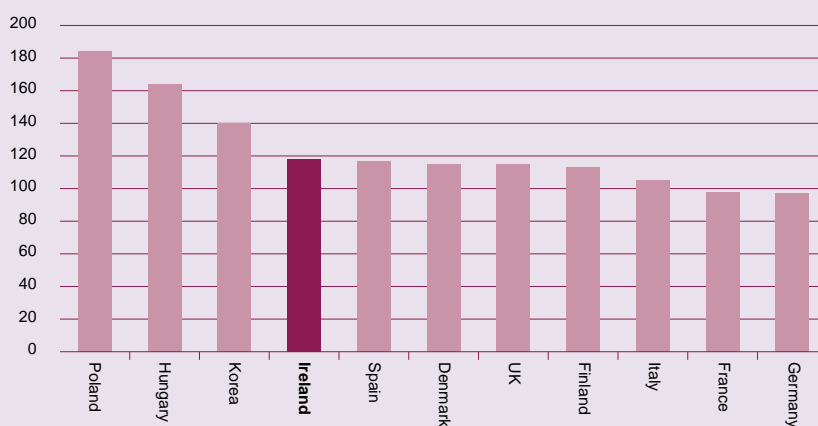
Total enrolment in tertiary education growth (1995=100)

Data on total enrolments in tertiary education in 1999 is presented in Figure 3.2. The index is set to 100 for investment in 1995 and the value of the index in 1999, as presented in Figure 3.2, gives an indication of the growth since 1995. For example, there has been an increase of 18% in tertiary enrolments between 1995 and 1999 in Ireland, ranking Ireland in 4th place on this basis. Of the countries under consideration, growth in tertiary education enrolments was highest in Poland and Hungary, at 84% and 64% respectively. A caveat in relation to this indicator however is the low base for some countries in 1995, and hence the subsequent high growth rates. Preliminary data for Ireland suggests an increase in the index to 125 in 2000.

It is also noteworthy that in Ireland, 22% of 25 to 64 year olds participate in continuing education and training, while 51% of the same cohort has at least upper secondary education. This ranks Ireland below average reflecting previous under-investment in education. Countries with high levels of life-long learning are likely to experience significant competitiveness-related benefits.

Overall, Ireland is ranked highly on this measure.

Figure 3.2 Index of total enrolment in tertiary education in 1999 (1995=100)



Source: OECD Education at a Glance 2001

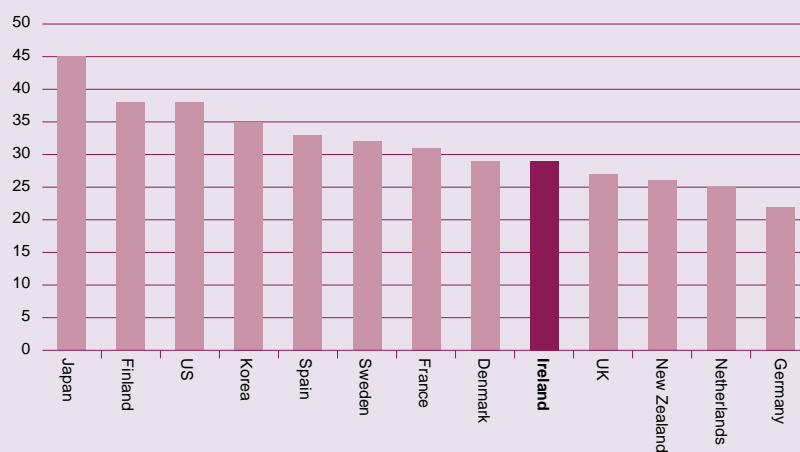
Percentage of population aged 25-34 that has at least third level education

Figure 3.3 presents data in relation to the percentage of the population aged 25 – 34 that has attained at least third level education. On the basis of this indicator Ireland is ranked in 8th place out of 13 countries, with 29% of the 25-34 year old cohort having attained this level of education. Japan is ranked first at 45%.

This data dates to 1999. Given the on-going increases in third-level participation this percentage is set to increase rapidly over the next decade.

Ireland's ranking on this indicator is showing further improvements.

Figure 3.3 Percentage of population aged 25-34 that has at least third level education in 1999

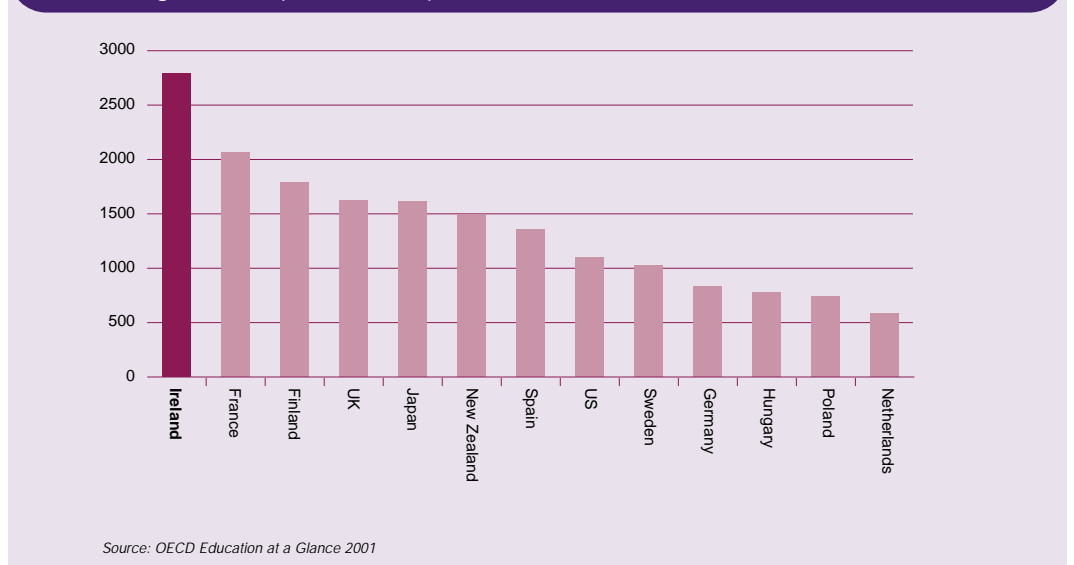


Source: OECD Education at a Glance 2001

Number of science graduates at university level (per 100,000 in Labour force 25-34)

Figure 3.4 presents data on the number of science graduates at university level per 100,000 persons in the labour force aged between 25 and 34 in 1999. Ireland is ranked in first place on the basis of this indicator with an average of 2,789 science graduates per 100,000. This indicator has important implications for future sectoral growth and competitiveness, and Ireland's favourable position needs to be maintained. Recent indications of falling trends in the number of students enrolling on science courses in Ireland represent a potential threat to our competitiveness, and need to be addressed.

Figure 3.4 Number of science graduates at university level in 1999 (graduates per 100,000 persons in Labour force 25-34)



Other education and skills indicators

A range of additional education and skills indicators was considered. Ireland is ranked 8th of 15 countries in relation to average expenditure per student in 1998, and also placed 8th in relation to the ratio of students to teaching staff in 1999.

Overall, 92% of Irish 16 year olds as of 1999 participated in education, ranking Ireland 10th of 16 countries.

The OECD Programme for International Student Assessment (PISA) publishes interesting data in relation to average attainment levels in reading and mathematics, and in science. Ireland is ranked 4th of 15 countries in relation to student's reading abilities in 1999 according to the PISA study, and ranked 9th of 15 countries in relation to mathematical ability. In terms of student's performance on the scientific literacy scale, Ireland is placed 6th of 15 countries for the same year.

Ireland had an average of 0.99 foreign languages per pupil in 1996-97, ranking it in last place of 11 countries.

Finally, data from the Human Development Report 2002 (HDR) shows that Ireland has the second lowest proportion of persons aged 65 and over in the population, at 11.3%. The HDR report predicts this proportion to increase to 13.1% by 2015.

The overall assessment is favourable and Ireland's ranking is improving in some areas, but further work is required.

3.2 Information Society

A range of competitiveness indicators have been assessed and analysed in relation to the information society. Investment in information society is seen as crucial for future economic growth. The following represent the key headline indicators:

- Broadband penetration (per 100 population);
- Internet users per 1,000 inhabitants;
- Mobile telephone subscribers per 1,000 inhabitants;
- Technology Achievement Index;
- DSL as proportion of total lines.

A range of additional indicators are also considered, namely:

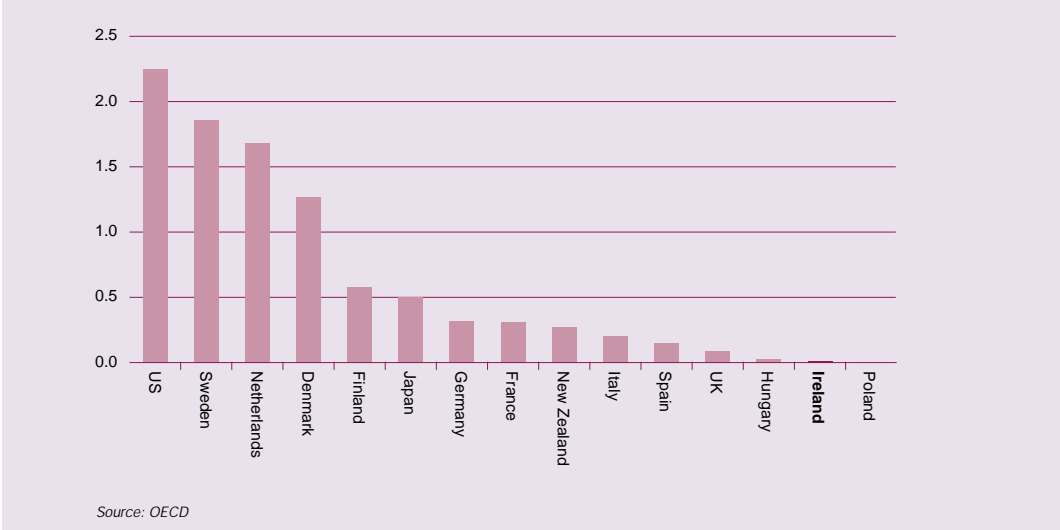
- Telecommunications investment – percentage change 1998 to 1999;
- Telecommunications investment – percentage change 1995 to 1999;
- Number of secure web servers for electronic commerce (per million population);
- Value of on-line business-to-consumer transactions (US\$bn per thousand population);
- Value of on-line business-to-business transactions (US\$bn per thousand population);
- % SMEs connected to internet for business purposes;
- Total ICT expenditure (% GDP);
- ICT employment (% total business employment);
- Main telephone lines – compound annual growth rate (CAGR) 1995 to 2001;
- Main telephone lines per 100 inhabitants;
- Cellular mobile subscribers – CAGR;
- Cellular mobile subscribers as a percentage of total telephone subscribers;
- Internet hosts per 10,000 inhabitants;
- PCs per 100 inhabitants;
- Percentage change in ISDN subscribers.

Broadband penetration (per 100 population)

Figure 3.5 presents data in relation to broadband penetration, and in particular, the number of broadband lines per 100 persons. The data relates to 2000 and is from the OECD.

Overall Ireland is ranked 15th out of the 16 countries considered in terms of broadband access, with only 0.01 out of every 100 persons having access to broadband or one broadband access for every 10,000 persons. Korea is ranked first with 9.2% of the population having access. Only Poland has a lower rate of broadband penetration than Ireland. This is a major cause for concern.

Figure 3.5 Broadband penetration as of 2001 (per 100 population)²

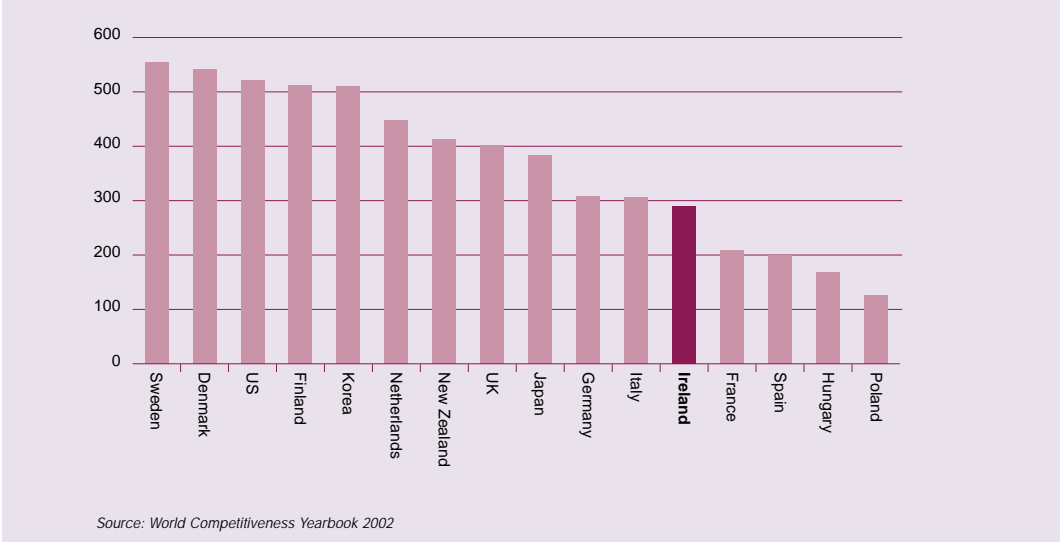


Internet users per 1,000 inhabitants

Figure 3.6 presents data as of 2001 on the number of Internet users per 1,000 inhabitants. On the basis of this indicator, Ireland is placed 12th of 16 countries, with 29% of the population using the Internet in 2001. Sweden has the highest proportion of Internet users at 55%, while Poland has the lowest at 13%.

Recent data for Ireland from the ODTR shows an increase in this percentage.

Figure 3.6 Internet users per 1,000 inhabitants - 2001

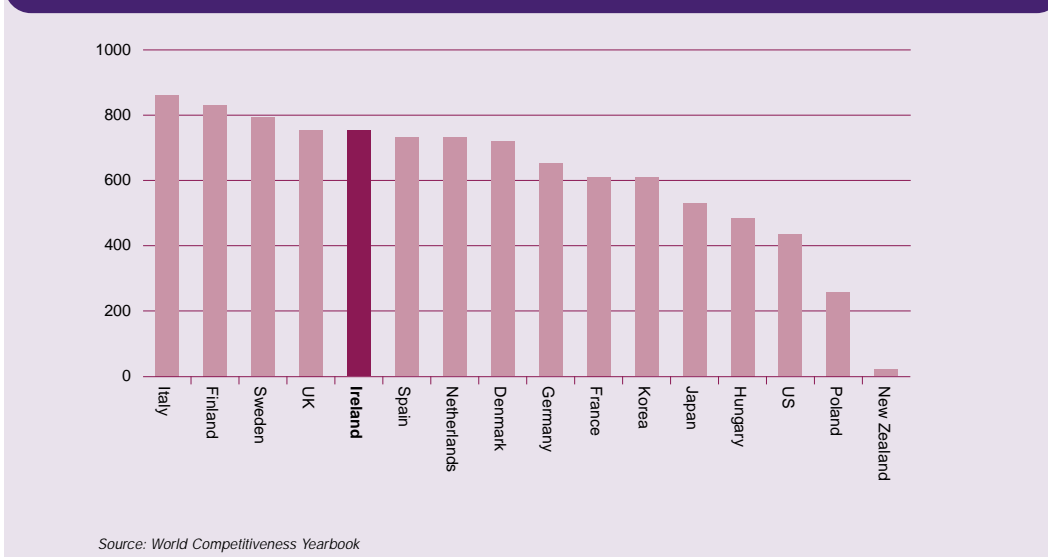


² Korea is not included in Figure 3.5 to give a better indication of the relative scale among the other countries.

Cellular mobile subscribers per 1,000 inhabitants

Next we consider the number of cellular mobile subscribers per 1,000 inhabitants. Figure 3.7 presents this data from the World Competitiveness Yearbook. Ireland is ranked 5th on the basis of this criteria, with 75% of the population having a mobile phone in 2001. Italy has the highest proportion of mobile subscribers, while New Zealand has the lowest of the countries considered here.

Figure 3.7 Cellular mobile subscribers per 1,000 inhabitants in 2001



Technology Achievement Index

Figure 3.8 presents the Technology Achievement Index from the Human Development Report 2001. This index provides a snapshot of each country's achievements in creating and diffusing technology and in building human skills to master new innovations.

According to this indicator, Ireland is ranked 9th of 15 countries in terms of technology achievement. Finland, the US and Sweden score highest on the basis of this criterion, while Italy, Hungary, and Poland are ranked lowest.

Figure 3.8 Technology Achievement Index 2001



DSL as proportion of total lines

Figure 3.9 presents the number of digital subscriber lines as a percentage of total subscriber lines in 2002. This gives an indication of technological developments in the telecommunications sector for end-users. Ireland is ranked last of 10 countries on the basis of this indicator, for which the data is available. Sweden, Denmark, and Germany all have much greater penetration rates of DSL based on this information.

Figure 3.9 Digital subscriber lines as proportion of total lines in 2002



Other information society indicators

A range of additional indicators were also examined for the purposes of examining the extent of the information society in Ireland. For example, percentage changes in telecommunications investment were assessed and are presented in the annexes of this report. Ireland had the second largest percentage increase in telecommunications investment between 1998 and 1999 according to the latest International Telecommunications Union data, and the largest percentage increase over the period from 1995 to 1999.

In terms of the number of secure web servers per million inhabitants, Ireland is ranked 5th highest of 15 countries in 2001. Only the US, New Zealand, Sweden and the UK have more servers per person.

Indicators in relation to the value of on-line transactions were also assessed. Ireland is ranked joint 3rd highest of 9 countries in terms of the value of on-line business-to-consumer transactions (in terms of US\$ per thousand population), and is ranked second last of nine countries in relation to business-to-business transactions. This data relates to 2000. Furthermore, Ireland has the third highest proportion of SMEs connected to the Internet in 1999 of the countries considered.

Ireland is ranked 11th of 16 countries in relation to total ICT expenditure as a percentage of GDP in 1997, with only New Zealand, Poland, Italy, and Hungary spending proportionately less. On the other hand, Ireland is ranked 6th of 14 countries in terms of ICT employment as a percentage of total business employment for the same year.

According to the latest International Telecommunications Union (ITU) data, Ireland has experienced the 3rd highest compound annual growth rate (CAGR) over the period from 1995 to 2001 in the number of main telephone lines. Despite this, Ireland is ranked only 10th of 16 in the number of main lines per 100 inhabitants in 2001.

For cellular mobile subscriptions, Ireland had the 6th highest CAGR between 1995 and 2001, resulting in Ireland being the 3rd highest in terms of cellular phones as a proportion of total telephone subscribers.

Ireland is ranked 9th of 16 countries in terms of ITU data on Internet hosts per 10,000 inhabitants, and has the 6th highest proportion of PCs per 100 inhabitants, in 2001. Finally, Ireland has had the highest percentage increase in ISDN subscribers between 1998 and 1999 for 8 countries for which the latest ITU data was available.

On these indicators there have been improvements, but Ireland still lags behind in a number of important respects.

3.3 Transport Infrastructure

Higher than expected economic and population growth in recent years has placed considerable strain on Ireland's transport infrastructure. This infrastructure deficit is leading to increased congestion and to concerns that future economic and social development will be impaired unless the infrastructure deficit is met. In assessing this and other issues in relation to transport, a range of competitiveness indicators have been assessed and analysed.

The following represent the key headline indicators with respect to transport infrastructure that are presented in this report:

- Average speed of business deliveries in capital cities (minutes);
- Road haulage costs – vehicle excise duties – 40te gvw (2+3) articulated vehicles
- Rail infrastructure indicator;
- Percentage of goods transported by road – percentage of tonne kilometres.

A range of additional indicators are also considered, namely:

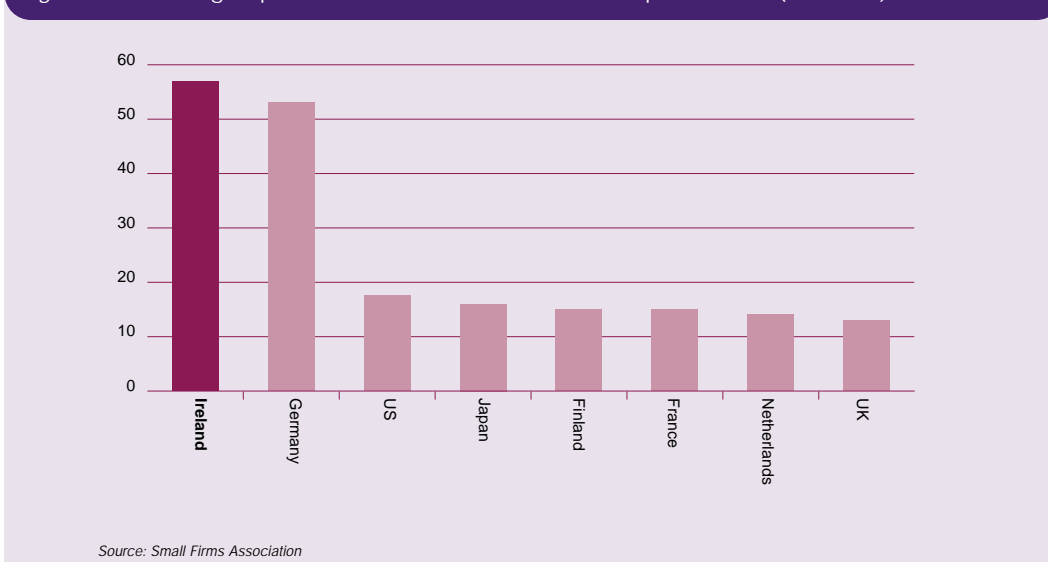
- Length of road network per 1,000 km;
- Length of motorway per 1,000 km;
- Investment in transport infrastructure per head;
- Average commute time to and from work (EU time use survey);
- Passenger kilometres on buses and coaches per person per year;
- Percentage of railway line electrified;
- Number of passenger cars per 100 inhabitants;
- Percentage of tax added to the price of a small passenger car;
- Percentage of goods transported by rail – percentage of tonne kilometres;
- Passenger cars – passenger km per person per year;
- Road accidents per 1,000 population.

Average speed of business deliveries in capital/principal cities (minutes)

Figure 3.10 presents data on the average speed of business deliveries for a specified journey in capital cities expressed in minutes, from data published by the Small Firms Association. The data relates to 2000 for all countries except Ireland, where the average speed is for the year 2001. As the chart shows, Ireland is ranked last of eight countries for which the data was available, with the longest speed of business delivery on average.

According to the data, the average speed of business delivery in Dublin is 57 minutes, compared to 53 minutes in Berlin, and 18 minutes in Washington. Average speed of business delivery is lowest in London at 13 minutes and in Amsterdam at 14 minutes.

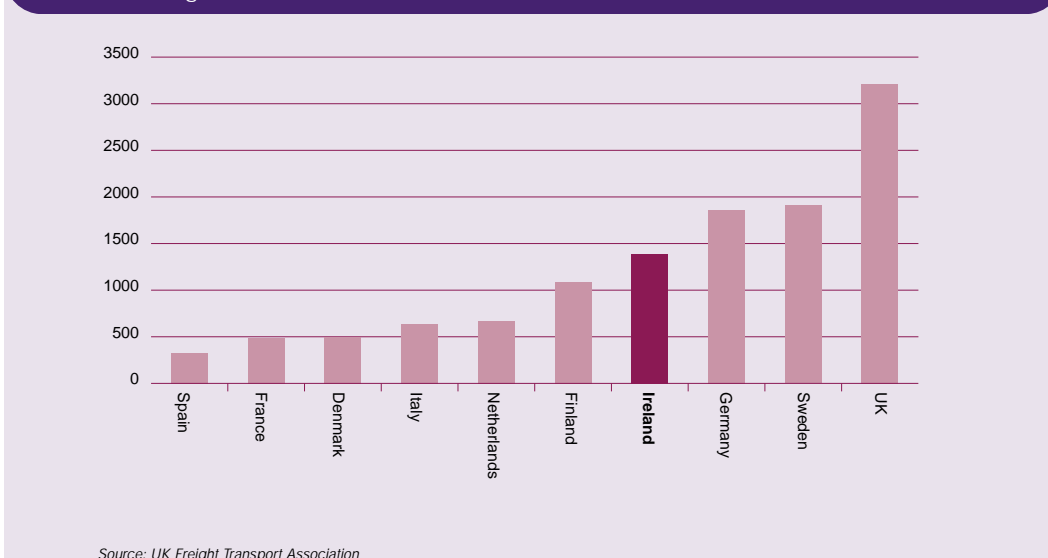
Figure 3.10 Average speed of business deliveries in capital cities (minutes) - 2000



Road haulage costs – vehicle excise duty

Figure 3.11 presents an indicator relating to road haulage costs, and in particular in relation to vehicle excise duty on 40 tonne gross vehicle weight (gvw) articulated lorries. The amounts presented are in euros, relate to December 1998, and represent one cost associated with road haulage. On the basis of this indicator, Ireland is ranked 7th of 10 countries, implying higher vehicle excise duty costs on average.

Figure 3.11 Road haulage costs – vehicle excise duty for 40 tonne gross vehicle weight articulated lorries – Euros – December 1998



Rail infrastructure indicator

Figure 3.12 presents a composite indicator of rail infrastructure for 1998 (developed using data on the length of the rail network relative to both geographical area and population density). Ireland is ranked 8th of 10 countries in relation to this rail infrastructure indicator, with only the Netherlands and Spain faring worse. The data is taken from the EU Transport in Figures Statistical Pocket Book.

Figure 3.12 Rail infrastructure indicator - 1998



Percentage of goods transported by road – percentage of tonne kilometres

The EU Energy and Transport in Figures publication also presents data in relation to the modes of transport for goods. Figure 3.13 presents data in this regard and in particular on the percentage of goods transported by road across EU countries in terms of the percentage of tonne kilometres (tkms) in 1999. Ireland is ranked first of the 10 countries for which data is available, having the highest proportion of goods transported by road. Of course this reflects the low share carried by rail and Ireland is ranked 9th out of 10 countries in terms of the proportion of goods transported by rail. Ireland's geographic limits and separation from mainland Europe mean that the domestic rail market does not benefit as much from economies of scale and therefore has a higher dependence on transport by road.

Figure 3.13 Percentage of goods transported by road – percentage of tonne kilometres - 1999



Source: EU Energy and Transport in Figures 2001

Other transport infrastructure indicators

A range of additional transport infrastructure indicators is also presented in the annexes. When analysing transport data though, careful consideration must be given to the geographic scale and periphery nature of the Irish island.

Of the sixteen countries considered, Ireland is ranked 8th in terms of length of road network per 1,000 km², and placed 13th of 16 in terms of length of motorway per 1,000 km². Both indicators relate to 1997. Ireland is ranked 6th of 10 countries in terms of investment in transport infrastructure as a percentage of GDP in 1996. This data, while representing the latest available comparable data, is dated. Significant recent investments in roads and public transport have been undertaken in Ireland. However this has been matched by increased road usage and demand for public transport services, leading to increased congestion.

The most recent available data in relation to average commute time to work (EU time use survey 1996) places Ireland 5th of 10 countries, with an average commute time of 40 minutes per day. It is likely that given the exceptional recent growth in economic activity and population in the Dublin area, that these average commute times would have increased in Dublin.

Ireland had the 2nd highest passenger kilometres on buses and coaches per person per year as of 1999, though is ranked last in terms of the proportion of railway lines that are electrified.

Ireland has the second lowest number of passenger cars per 1,000 inhabitants, and the second lowest level of passenger-kms per person per year by car in 1999.

According to data on the percentage of tax added to the price of a small passenger car, Ireland is ranked 9th of ten countries for which this data is available, with 74% tax added. Germany has the lowest percentage of tax added to the price of a small passenger car at 16%. This data relates to 1998 and is the latest available from the EU Energy and Transport in Figures publication

3.4 Environment and Energy

It is also important to consider competitiveness indicators pertaining to environment and energy given the importance of sustainable development. Environmental and energy resources are in general scarce, and pollution and environmental degradation can have long-lasting and far-reaching costs.

A high quality environment is important both as an indicator of the quality of life as well as a key requirement for economic performance. For example, the tourism industry and the food industry in Ireland depend in many ways on a high quality environment. Efficient energy use is also important in this regard.

In assessing Ireland's relative competitiveness position in relation to the environment and energy, we present three headline indicators:

- CO₂ emissions per unit of GDP;
- Waste recycling – paper and cardboard (as % of consumption);
- Pollution abatement and control (total expenditure % GDP).

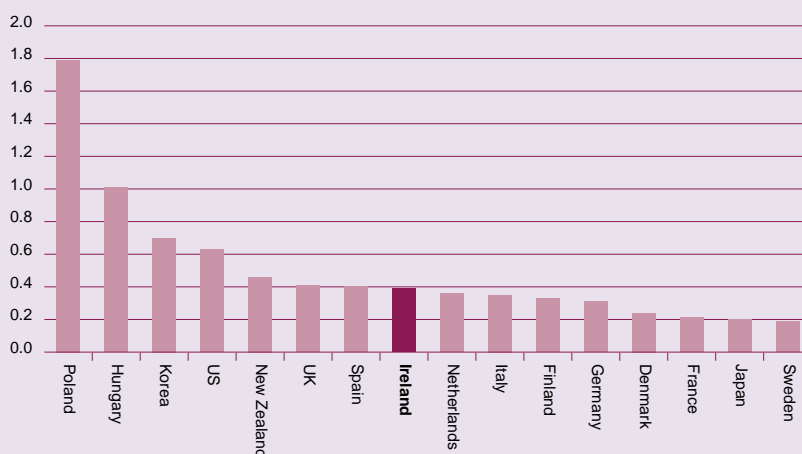
Furthermore, a number of additional indicators are assessed, namely:

- Major protected areas (% total area);
- Nitrogenous fertilisers used (tonnes per square km of arable land);
- Public waste water plants (% population connected);
- Water quality of selected rivers;
- Total final consumption of energy (per unit of GDP) %GVA;
- Total final consumption of energy (per unit of GDP);
- Commercial energy use per capita (KG of oil);
- Municipal waste generated (kg per capita);
- Industrial waste.

CO₂ emissions per unit of GDP

Figure 3.14 presents data on CO₂ emissions per unit of GDP in 2000. Ireland is ranked 9th of the sixteen countries under review in terms of CO₂ emissions. Sweden has the lowest rate of CO₂ emissions based on the criterion, while Poland has the highest.

Given Ireland's commitments under the Kyoto Protocol, decoupling CO₂ emissions (and emissions of the other five Greenhouse gases), and economic growth is a major challenge.

Figure 3.14 CO₂ emissions per unit of GDP - 2000

Source: OECD in Figures 2002

Waste recycling – paper and cardboard (as % of consumption)

The OECD Environmental Compendium 1999 presents data for 1997 in relation to waste recycling and these are re-produced in Figure 3.15. In particular, the recycling of paper and cardboard as a percentage of consumption is presented. Of the sixteen countries considered, Ireland is ranked last in this regard. Germany, New Zealand, and the Netherlands are ranked highest in relation to waste recycling.

Although this international database has yet to be updated, new data in relation to recycling and energy conservation in Ireland is available from the CSO. According to the latest available estimates, only 36.9% of households reported that they recycle glass, 17.5% recycle aluminium, 10.9% recycle tin cans, 6.4% recycle plastic, 6.2% recycle paper, and 6.1% of households recycle cardboard.

Ireland is ranked poorly on the basis of waste recycling, and further investment and awareness is required if Ireland is to improve its relative position in relation to recycling. Some progress though has been made by a small number of Irish companies over recent years.

Figure 3.15 Waste recycling in 1997 – paper and cardboard (as % of consumption)



Source: OECD Environmental Compendium 1999

Pollution abatement and control (total expenditure % GDP)

Figure 3.16 presents data on pollution abatement and control expenditure as a percentage of GDP, and represents the latest available data. Again, Ireland is ranked last (of fifteen) in this regard with total expenditure of 0.6% of GDP. The Netherlands and Korea score highest on the basis of this indicator at 1.8% and 1.7% respectively.

Low levels of expenditure on pollution abatement and control are likely to lead to damage to scarce environmental resources, which will entail significant future costs. However it should be noted that the less-pollutant make up of Irish industry in relation to other competitor nations may explain some of this apparent spending shortfall.

Figure 3.16 Pollution abatement and control (total expenditure as a percentage of GDP)



Other environment and energy indicators

The United Nations Human Development Report 2000 presents data on the percentage of total land protected as key areas in 1999. Ireland is ranked last out of 16 countries considered on the basis of the HDR indicator, with only 0.9% of total land classified as a key protected area. Furthermore, Ireland uses more tonnes of nitrogenous fertilisers per square km of arable land than the other fifteen countries. This data is taken from the OECD in Figures 2002 publication.

Ireland has the 4th lowest percentage of the population connected to public wastewater plants, at 61%, with only Poland, Spain and Hungary scoring worse on the basis of this indicator. On the other hand, Ireland is ranked 2nd in terms of water quality of selected rivers, though the data is somewhat dated.

Ireland is ranked in first place of 12 countries considered in relation to the percentage change in the total final consumption of energy per unit of GDP, with a reduction of 36.1% over the period from 1980 to 1997, while Ireland has the fifth lowest commercial energy use per capita in 1997.

Ireland generated 560 kg of municipal waste per capita in 1995, ranking it joint 12th of 15 countries in this regard. Only the US fared worse on the basis of this indicator. Ireland is ranked 10th of 15 countries in terms of industrial waste according to OECD data. These findings are worrying given the reduced space available from landfill sites and the lack of treatment facilities for more difficult waste, all of which point to future additional costs for Irish industry as they export more waste for treatment abroad.

Finally, the Environmental Protection Agency (EPA) in its “Environment in Focus 2002” report concluded that “while Ireland’s environment is still generally of a high standard, many pressures on it are increasing at significantly faster rates than in most other European countries. These pressures have resulted from the rapid economic growth experienced by Ireland in recent years and in particular from growth in the transport and energy sectors.” The report makes clear that “significant challenges lie ahead for Ireland if it is to progress towards improved eco-efficiency and a more sustainable approach to development.”

3.5 Social Capital

Indicators in relation to social capital are also presented in the annexes to this report, and in particular indicators in relation to:

- Income inequality (share of highest 20% to poorest 20% after transfers);
- Responsiveness of health systems; and,
- Interpersonal trust.

Income inequality, measured as the ratio of the share of the richest 20% to the share of the poorest 20% ranks Ireland as 13th of 15 countries. According to this measure, only the UK and the US have more unequal income/consumption distributions. This measure of income inequality is taken from the Human Development Report 2002, and is consistent with other data sources.

The World Health Organisation in their annual Report of 2000 presented an indicator in relation to the responsiveness of health systems across countries. This indicator ranked Ireland as 11th out of 16 in this regard in 1999.

Finally, an indicator relating to interpersonal trust is also presented for 2000. This indicator presents survey evidence by country in relation to the proportion of the population who indicate that people can generally be trusted in their country. For Ireland this proportion is equal to 35.2%, the sixth highest of 12 countries for which the data is available. Denmark, Sweden, and the Netherlands score highest on the basis of this indicator.

Overall on the basis of these social capital indicators, Ireland's performance is mixed, with poor scores in relation to income inequality and health systems, and an average score in relation to interpersonal trust.

Enterprise, R&D and Innovation

4

4 Enterprise, R&D and Innovation

This chapter considers competitiveness indicators in relation to enterprise, R&D and innovation. Investment in the capital stock is crucial for future economic development. Furthermore, scientific and technological advance based on research and development (R&D) and innovation, is an important determinant of economic growth.

Ireland's investment record has been impressive during the boom years and ranks amongst the highest of the OECD countries. There are however pressures in sustaining FDI flows - a key source of investment - given the global slowdown and Ireland's declining relative competitiveness. This is a major challenge for policy. Improving R&D investment and venture capital performance are also desirable.

The indicators considered here cover three main areas, namely:

- Investment and Capital;
- R&D and Innovation; and,
- Productivity.

4.1 Investment and Capital

In assessing Ireland's relative competitiveness position in relation to investment and capital, we present four headline indicators:

- FDI inflow - % GDP;
- FDI outflow flow - % GDP;
- Cumulative venture capital raised (% GDP);
- High tech investment as a percentage of total investment.

Furthermore, a number of additional indicators are assessed:

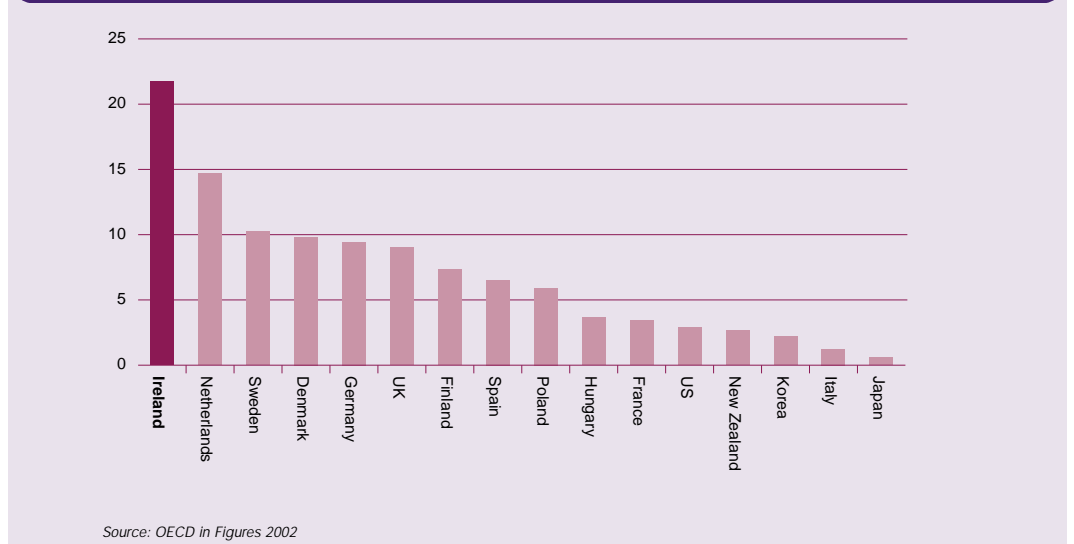
- Real total gross fixed capital formation growth %;
- FDI inflow - % market share in OECD;
- Share of foreign affiliates in manufacturing R&D;
- Venture capital – share of total venture capital technology investment in the OECD, by country;
- Rate of return on capital (business sector);
- Average return on US investment abroad;
- Proportion of technology investments classified as venture capital.

FDI inflow - % GDP

Figure 4.1 presents data on FDI inflows as a percentage of GDP. Ireland is ranked first out of the chosen set of 16 countries. OECD in Figures data relating to 2000 show that FDI inflow represented 21% of GDP in Ireland. This is a good measure of the extent to which Ireland is attracting FDI.

FDI inflows as a percentage of total OECD FDI inflows are also presented in the annexes. Overall Ireland is ranked 9th of 16 in this regard, with 1.9% of all FDI into the OECD going to Ireland. The US, Germany, and the UK account for the highest share with 26.2%, 16.4%, and 12.0% of OECD FDI respectively.

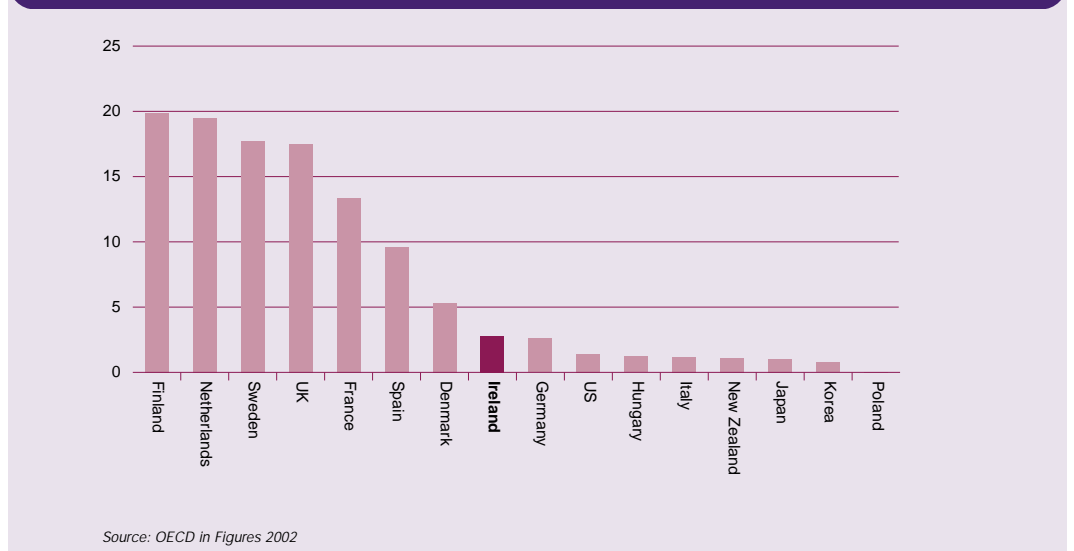
Figure 4.1 FDI inflow as a percentage of GDP - 2000



FDI outflow - % GDP

Figure 4.2 presents data on FDI outflows as a percentage of GDP for 2000. Overall Ireland is ranked 8th of 16 in this regard. FDI outflows from Ireland abroad represent only 2.8% of GDP. This compares to 19.9% in Finland, 19.5% in the Netherlands, and 17.8% and 17.6% in Sweden and the UK respectively.

Figure 4.2 FDI outflow as a percentage of GDP - 2000



Cumulative venture capital raised as a percentage of GDP (GNP for Ireland)

Figure 4.3 presents Ireland's relative position in relation to cumulative venture capital raised as a percentage of GDP. Ireland is ranked 4th on the basis of this indicator out of 10 selected countries. The data relates to 1999, and is taken from the European Venture Capital Association Yearbook.

Figure 4.3 Cumulative venture capital raised as a percentage of GDP – 1999

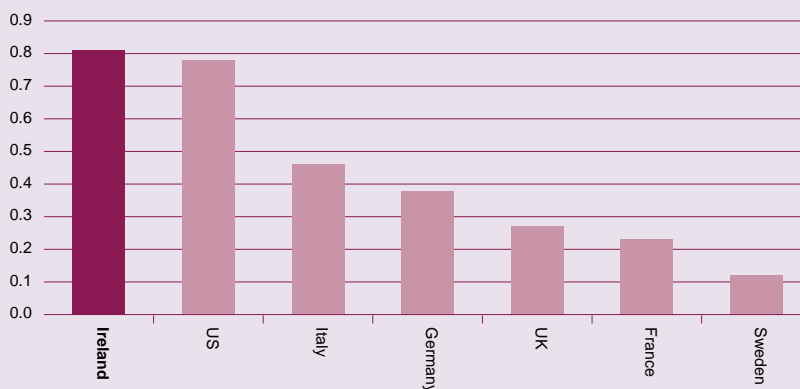


Source: European Venture Capital Association Yearbook 2000

High tech investment as a percentage of total investment

Figure 4.4 presents data on high tech investment as a percentage of total investment. Ireland is placed first out of seven countries for which the relevant data is available. This data relates to 2001.

Figure 4.4 High tech investment as a proportion of total investment - 2001



Source: PwC Technology Investment Report 2001

Other investment and capital indicators

A number of additional indicators are worthy of consideration in relation to investment and capital and these are included in the Annex. Ireland is ranked 7th of 16 countries in relation to growth in real total gross fixed capital formation in 2001.

Ireland is ranked 11th of 12 countries with respect to the share of foreign affiliates in manufacturing R&D in 1997.

Data on the share of total venture capital technology investment in Europe, by country suggests Ireland is placed 10th out of twelve countries on the basis of this criterion. Ireland received 1.2% of OECD venture capital investment in 2001, compared to 26.3% in the UK, the highest ranked country on the basis of this indicator

The rate of return on capital in the business sector was 4th highest in Ireland out of 12 countries in 1998, while the average return on US investment abroad was second highest in Ireland between 1995 and 1998.

Finally, Ireland is ranked last in terms of the proportion of technology investments classified as venture capital technology investments, at 56% in 2001.

These trends indicate a mixed picture. Clearly the economy benefited from a significant expansion in investment. However, in some indicators such as investment from venture capital, Ireland ranks less well. It is difficult to fully explain these trends but they may well reflect the dominance of FDI as a source of investment and a still maturing venture capital market.

4.2 R&D and Innovation

In considering indicators in relation to R&D and innovation, a number of key headline indicators were chosen for analysis. These are:

- Inventiveness Coefficient;
- Gross domestic expenditure on R&D (% GDP);
- Share of government budget allocated to R&D;
- Business R&D expenditure (%GDP); and,
- Total new science and technology PhDs per 1,000 population (25-34).

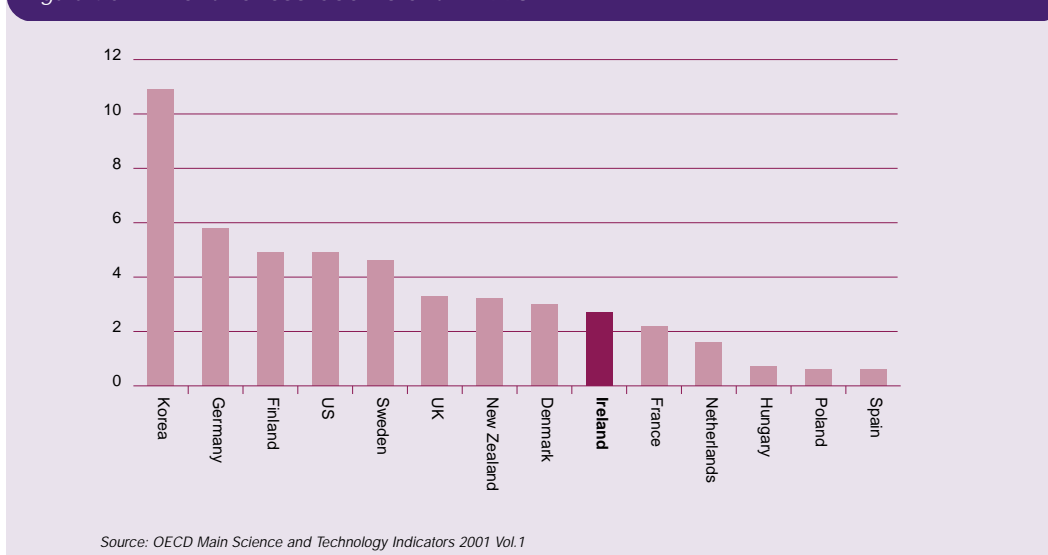
Furthermore, a number of additional indicators are worth considering. These include:

- Patent applications to the EPO per million inhabitants;
- Gross domestic expenditure on R&D (% real annual change);
- Government R&D expenditure (% GDP);
- Researchers per 1,000 population;
- Science and engineering degrees (as % of total degrees).

Inventiveness Coefficient

Figure 4.5 presents data from the OECD Main Science and Technology Indicators 2001 in relation to resident patent applications per 10,000 applications. This is taken as a proxy for an Inventiveness Coefficient and the data relates to 1998. Overall Ireland receives a score of 2.7 placing it 10th place out of 15 countries in relation to inventiveness. Japan had 28.3 resident patent applications per 10,000 population in 1998, giving it a rank of 1st.

Figure 4.5 Inventiveness Coefficient³ - 1998

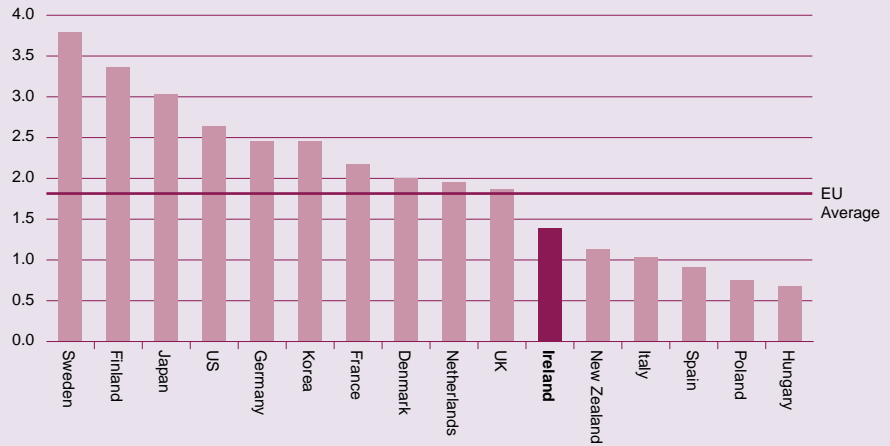


3 Japan is not included in Figure 4.5 to give a better indication of the relative scale among the other 15 countries.

Gross domestic expenditure on R&D (% GDP)

Figure 4.6 presents the latest available data in relation to gross domestic expenditure on R&D as a percentage of GDP. Overall Ireland is ranked 11th of 16 countries in relation to its spending on R&D as a share of GDP. Only New Zealand, Italy, Spain, Poland, and Hungary, of the countries considered, spend less in proportionate terms.

Figure 4.6 Gross domestic expenditure on R&D (% GDP)

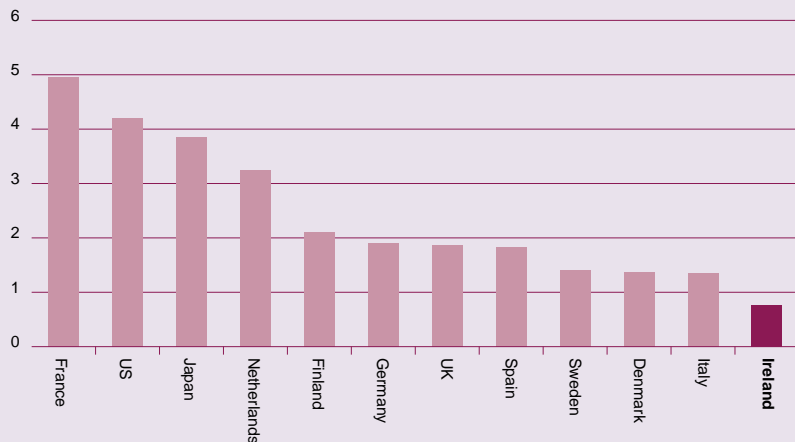


Source: OECD Main Science and Technology Indicators 2001 Vol.1

Share of Government budget allocated to R&D

Figure 4.7 presents data in relation to the share of Government budget allocated to R&D in 1999/2000. Ireland ranks last out of the 12 countries for which the data is available, with only 0.77% of the Government budget allocated to R&D. This compares to 4.95% in France, which ranks first on the basis of this criterion. It should be noted though that recent progress made toward R&D from the government budget via the National Development Plan, will have resulted in a probable improvement in this ranking over 2001 and 2002.

Figure 4.7 Share of Government budget allocated to R&D - 1999/2000



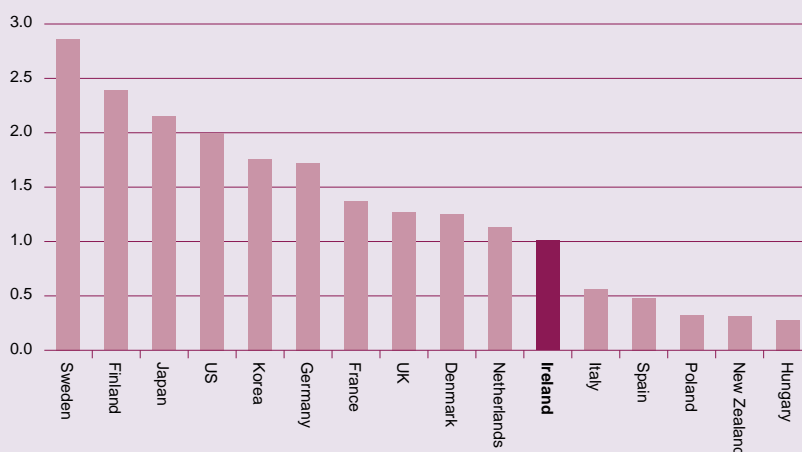
Source: Benchmarking of National Research Policies

Business R&D expenditure (%GDP)

Figure 4.8 shows Ireland's position relative to 15 other countries in relation to expenditure by business on R&D in 1999 (the proportion for Ireland relates to 1997). Specifically, this expenditure is presented as a percentage of GDP.

According to the OECD data Ireland is ranked 11th of 16 countries, with expenditure of 1.01% of GDP per annum by business on R&D.

Figure 4.8 Business R&D expenditure (%GDP) - 1999

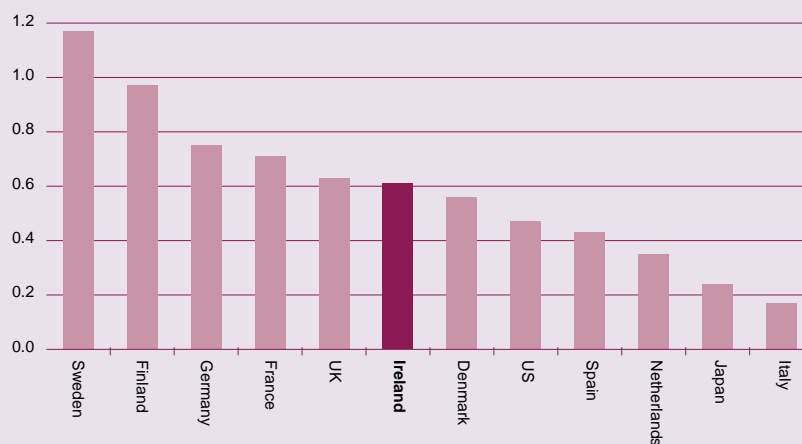


Source: OECD Main Science and Technology Indicators 2001 Vol.1

Total new science and technology PhDs per '000 population (25-34 yrs)

Figure 4.9 presents data in relation to total new science and technology PhDs per thousand population aged between 25 and 34 years, in 1998/1999. Ireland is ranked 6th of twelve countries for which relevant data is available.

Figure 4.9 Total new science and technology PhD's per '000 population in 1999 (persons aged 25-34)



Source: Benchmarking of National Research Policies

Other R&D and innovation indicators

In addition to the headline indicators considered above, a range of additional indicators are presented in the annexes to this report. These include indicators in relation to:

- Patents granted;
- Gross domestic expenditure on R&D (GERD % real chya);
- Government R&D expenditure (% GDP);
- Researchers per 1,000 population;
- Science and engineering degrees (as % of total degrees).

Eurostat publishes data in relation to patent applications to the EPO per million inhabitants, as of 2000, and this data ranks Ireland 9th out of 11 countries for which relevant data are available.

Data is also presented in relation to the percentage change in gross domestic expenditure on R&D (GERD). In this instance Ireland places first of 14 countries. However, for government spending on R&D (GovERD) as a percentage of GDP, Ireland is last of 16 countries.

In relation to researchers per thousand population, Ireland is ranked 9th of 16 selected countries, and on the basis of science and engineering degrees as a percentage of total degrees awarded, Ireland is placed 5th of 15, in 1998.

4.3 Productivity

Improvements in relative productivity are crucial in sustaining competitiveness.

In considering indicators in relation to productivity, a number of key headline indicators were chosen for analysis. These are:

- Productivity per employee per annum (US\$000);
- Productivity (US\$ per worker per hour worked);
- Labour productivity – percentage change - 1996 to 2001;
- Productivity (% change) 2001.

A number of additional indicators are worthy of consideration. These include:

- Sectoral productivity – Services; and,
- Sectoral productivity – Industry.

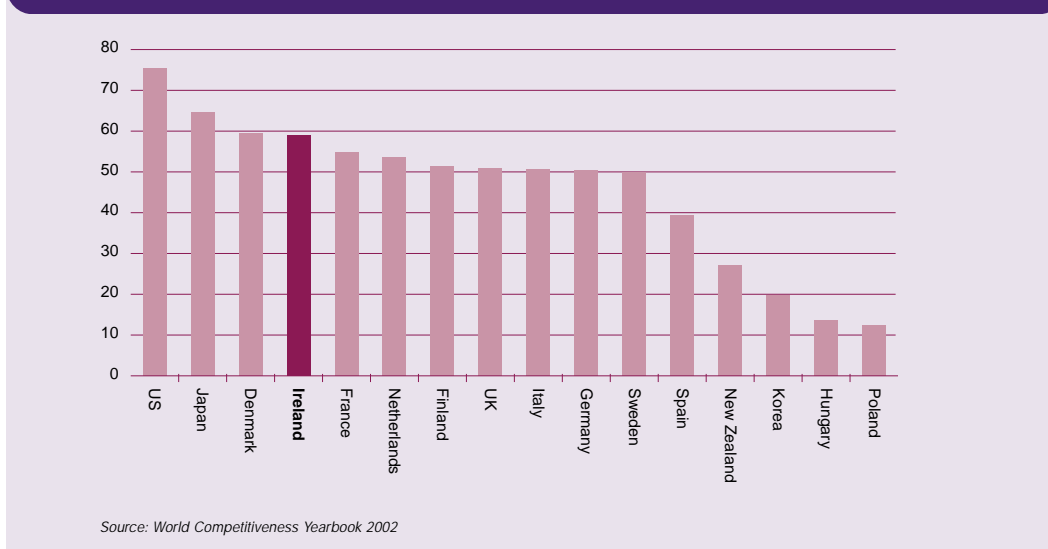
Indirectly, labour productivity was considered in earlier sections when we examined unit labour costs.

Productivity per employee per annum (US\$000)

Figure 4.10 presents data in relation to productivity per employee per annum (US\$000). The data places Ireland 4th of 16 countries in relation to productivity per employee at US\$58,900 per annum in 2001. Overall, employee productivity is higher in the US, Japan, and Denmark according to the data, but lower in all other countries under consideration.

This high ranking for productivity per employee is consistent with the data on labour costs which show that wages in Ireland are amongst the highest of the countries reviewed.

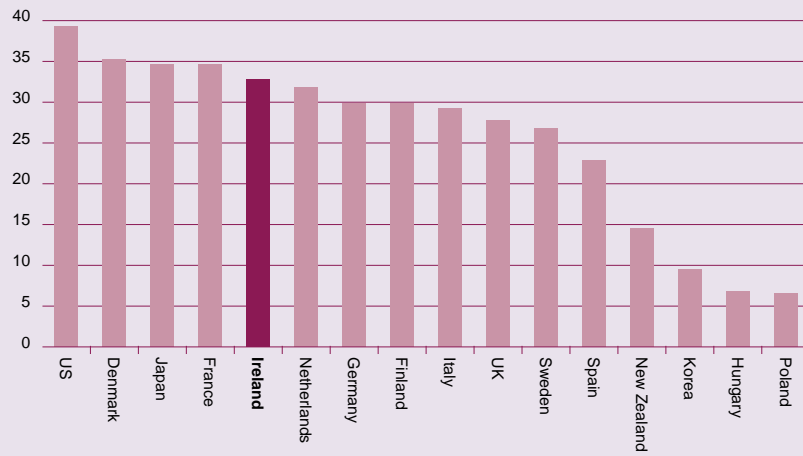
Figure 4.10 Productivity per employee per annum (US\$000) - 2001



Productivity (US\$ per worker per hour worked)

Figure 4.11 presents data in relation to productivity in terms of US\$ per person employed per hour worked. Again the data relates to 2001, and indicates that Ireland has an average productivity of US\$32.80 per hour worked, ranking it 5th of the 16 countries considered. Only the US, Denmark, Japan, and France outperform Ireland on the basis of this indicator.

Figure 4.11 Productivity (GDP per person employed per hour, US\$)



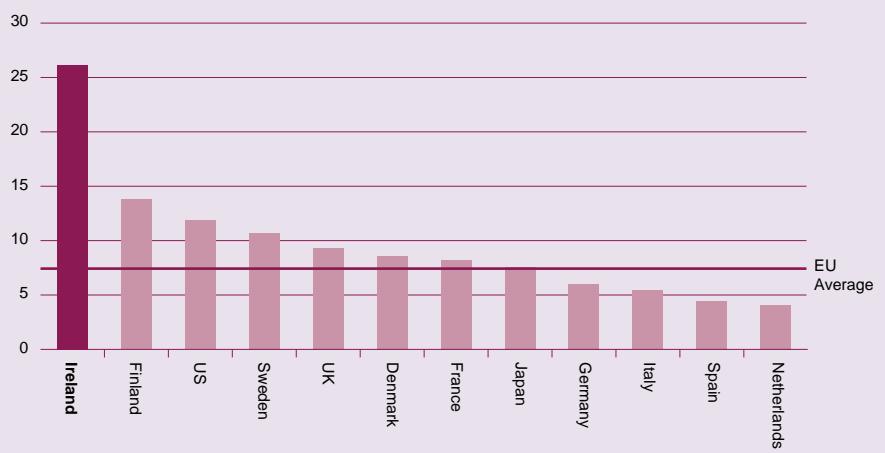
Source: World Competitiveness Yearbook 2002

Labour productivity (% change) 1996-2001

Figure 4.12 presents data in relation to the percentage change in labour productivity between 1996 and 2001. This data shows that Ireland had the highest overall percentage change in labour productivity over the period from 1996 to 2001 at 26.2%. This compares to the second highest proportionate increase in Finland of 13.8%.

It should be noted however that this data masks significant differences in productivity across sectors. This issue is considered in detail in section 8.

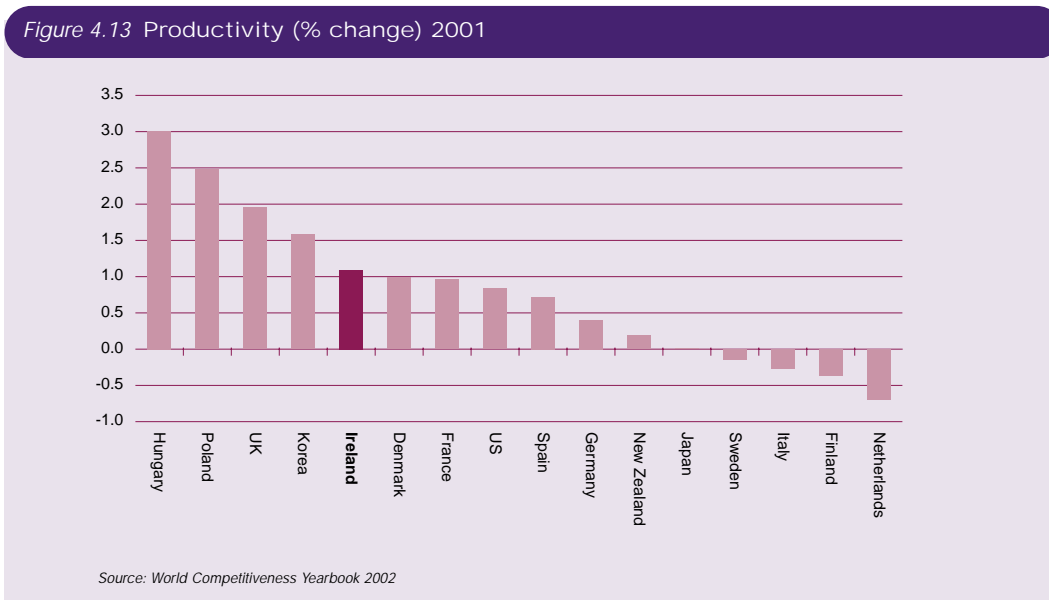
Figure 4.12 Labour productivity (% change) 1996-2001



Source: EC Economic Data Pocket Book 2002

Productivity (% change) 2001

Figure 4.13 presents data in relation to the percentage change in productivity in 2001 and places Ireland in 5th place out of 16 countries. This data indicates that Ireland had a 1.1% increase in productivity between 2000 and 2001. Hungary is ranked highest on the basis of this indicator, with an increase in productivity of 3%, though account must be taken of its relatively low base.



Other productivity indicators

A number of other productivity indicators were also considered. These include, *inter alia*:

- Sectoral productivity in services; and,
- Sectoral productivity in industry.

For productivity in the services sector, Ireland is ranked in 5th place in 2001, while for productivity in the industrial sector, Ireland is placed 3rd for the same year.

Further details of sectoral productivity are presented in section 8.

Outputs **5**

5 Outputs

Next we consider the output indicators from the Competitiveness Framework as described in section 1. These indicators represent the results and outputs from Ireland's relative competitiveness and include indicators in relation to:

- Macroeconomic Performance;
- Internationalisation.

On the key macro indicators Ireland's performance is very impressive and has ranked highly for the last number of years. Although the economy is slowing, this is reflected in most countries as the global slowdown continues leaving our relative position unchanged.

5.1 Macroeconomic performance

In considering Ireland's relative macroeconomic performance we will consider a number of indicators, namely:

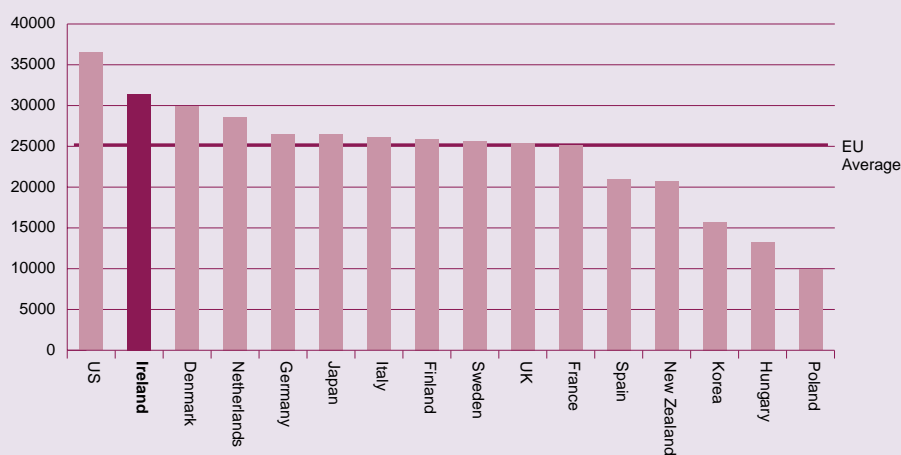
- GDP per capita (current prices PPP US\$);
- Real GDP growth;
- Real GDP growth (past 5 years);
- Export performance of total goods (%chya);
- Export performance of commercial services (%chya);
- Current account balance (% GDP);
- Consumer prices (%chya);
- Employment growth (%chya);
- Five year change in total employment;
- Male participation rate (% pop 15-64);
- Female participation rate (% pop 15-64);
- Part-time employment (% total employment); and,
- Standardised unemployment rate.

GDP per capita (current prices PPP US\$)

Figure 5.1 presents data in relation to the GDP per capita (current prices PPP US\$) across sixteen countries for 2001. On the basis of this data taken from the OECD in Figures 2002 publication, Ireland is ranked as having the second highest level of GDP per capita (in current US\$ in PPP), at US\$31,400. Only the US has a higher level, at US\$36,500.

This high ranking reflects high output per person employed, and a high employment rate as measured by employment as a share of the total population.

Figure 5.1 GDP per capita (current prices PPP US\$) - 2001



Source: OECD in Figures 2002

Real GDP growth (past 5 years)

Figure 5.2 presents data in relation to real GDP growth over the past five years. Ireland is ranked in first place out of 10 comparator countries, with an overall increase of 44.8% since 1997. This rate of increase is far in excess of all other countries presented in Figure 5.2 below, with Finland having the second largest increase in real GDP at 17.9% over the period. This reflects the rapid convergence in Irish living standards in recent years towards the levels pertaining amongst OECD countries.

Furthermore, growth in real GDP in 2001 in Ireland was higher than all fifteen comparator countries at 6.6%, according to OECD data. These numbers confirm Ireland's impressive economic performance over the later half of the 1990s and into 2001.

For the first quarter of 2002, GDP (at constant 1995 prices) increased by 2.9% over the corresponding period in 2001, while GNP in the first quarter of 2002 was up 1.6% from the first quarter of 2001. It should be noted however that GNP on a quarterly basis is affected by the timing of net factor income flows from abroad.

Figure 5.2 Real GDP growth - 1997 to 2002



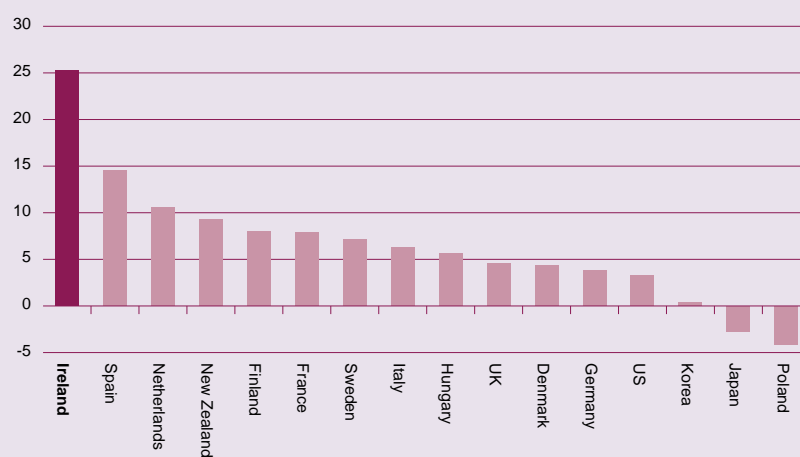
Five year change in total employment

Figure 5.3 presents data in relation to the five-year change in total employment between 1997 and 2002. Again Ireland is ranked in first place on the basis of this indicator, with a five-year proportionate increase in employment levels of 25.3%. This compares with the next highest percentage increase of 14.5% in Spain. Ireland also had the biggest proportionate year-on-year increase in employment in 2001 of all 16 selected comparator countries.

The most recent Quarterly National Household Survey (QNHS)⁴ shows an increase of 33,400 (1.9%) in the level of employment from the second quarter of 2001 to the second quarter of 2002, while there was an increase of 4,400 (0.3%) from the first quarter of 2002 to the second quarter.

⁴ QNHS, second quarter 2002.

Figure 5.3 Five year percentage change in total employment – 1997 to 2002



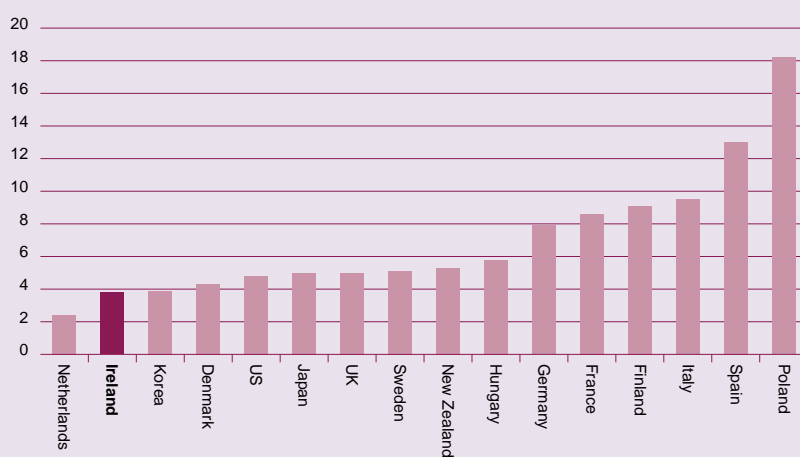
Source: AMECO EC DGFin Database

Standardised unemployment rate

Figure 5.4 presents data in relation to the standardised unemployment rate. As of 2001, Ireland had one of the lowest standardised unemployment rates of all sixteen selected comparator countries at 3.8%. Only the Netherlands, at 2.4%, had a lower rate.

According to the latest CSO QNHS data, the unemployment rate was 4.2% in the second quarter of 2002. This compares with 4.4% in the first quarter of 2002, and to 3.7% in the second quarter of 2001. The unemployment rate was 4.6% for males, and 3.7% for females.

Figure 5.4 Standardised unemployment rate - 2001



Source: OECD Employment Outlook 2002

Other employment related variables

Ireland is ranked 10th of 16 countries in terms of male participation rates in 2001. The percentage of the male population aged between 15 and 64 years, and in the labour force, was 79% in Ireland in 2001. The corresponding proportion of women aged between 15 and 64 in Ireland as of 2001 was 56% ranking Ireland 12th of 16 selected countries. The data on participation rates show that Ireland's rate has increased significantly but still lags behind other countries. This reflects the fact that older women are less likely to work in the labour force than their counterparts in some countries. The lower ranking may also reflect barriers to employment faced by young women.

Part-time employment accounted for 18.4% of total persons employed in Ireland in 2000, the 4th highest proportion of 14 countries considered.

Other macroeconomic variables

Ireland had the 5th highest percentage increase in exports of total merchandise goods in 2000, and the 7th highest percentage increase in exports of commercial services.

Inflation, as measured by the percentage change in consumer prices, was equal to 4% in 2001, giving Ireland a ranking of 12 out of 16. This high inflation rate is due in part to the greater exposure of the Irish economy to movements in the Euro due to our strong trade links with the UK and the US. This pushed up traded inflation. In parallel, there was higher services inflation as increases in wages were reflected in higher non-traded prices.

Recent trends - Irish disposable income and GDP

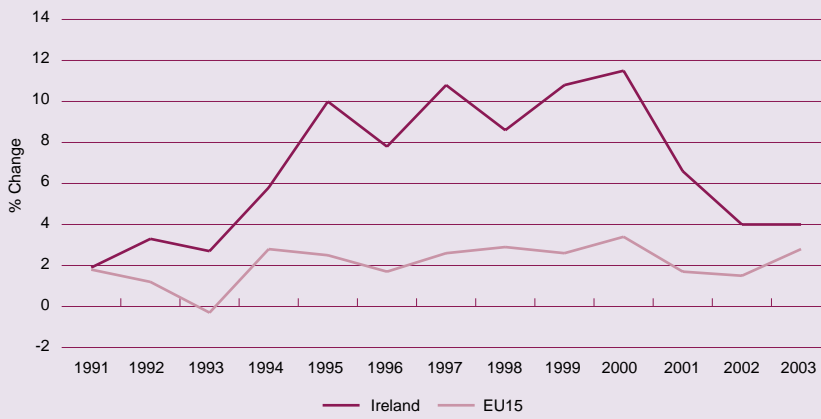
Disposable income has been rising fast in Ireland over the last ten years. Figure 5.5 shows real gross national disposable income (GNDI) in Ireland over the period from 1990 to 2000. As of 1990, real GNDI was equal to IR£31.77 billion, increasing by 76% to £56 billion in 2000.

Figure 5.5 Real gross national disposable income – Ireland 1990 to 2000 – millions of Irish pounds



Irish gross domestic product (GDP) per capita now compares very favourably with EU and OECD averages. As of 2000 Irish GDP per capita was 21% higher than the EU average, and 6% higher than the OECD average although using the more meaningful GNP measure reduces the gap. Figure 5.6 below compares the growth rate in GDP for Ireland and for all 15 EU countries. In each of the years between 1990 and 2000, Irish growth exceeded the EU average and in the latter half of the decade Irish growth rates were between 5% and 8% higher than average EU growth rates.

Figure 5.6 Growth rates in real GDP - Ireland and EU15 - 1991 to 2003



Source: OECD Economic Outlook and Central Bank of Ireland

5.2 Internationalisation

In considering Ireland's relative macroeconomic performance we also consider a number of indicators, namely:

- Trade openness (X+M of goods and services)/(2 x GDP)
- Real exports of goods and services (%chya)
- Real imports of goods and services (%chya)

Trade openness (X+M of goods and services)/(2 x GDP)

Figure 5.7 presents data in relation to trade openness as of 2000. On the basis of this indicator Ireland is ranked first in terms of openness with a trade to GDP ratio of 93.8%. The Netherlands is ranked second with a trade to GDP ratio of 69.5%.

Figure 5.7 Trade openness (X+M of goods and services)/(2 x GDP)



In terms of real exports of goods and services, Ireland showed the third highest percentage increase in 2001 out of the 16 comparator countries, and showed the second highest percentage increase in real imports of goods and services in 2001.

Spatial Aspects of Competitiveness

6

6 Spatial Aspects of Competitiveness

Balanced regional development is a key element of economic and industrial policy. As highlighted in Chapter 6, Ireland has achieved rapid economic growth in recent years. GNP has averaged over 8% per annum since 1993, employment has expanded by over 50% and unemployment is now below 5% compared to over 16% in 1993. While most parts of the country have participated in this expansion some regions have grown faster than others.

Though there has been significant economic and social progress, the distribution of this progress is now a key issue with the emergence of significant regional disparities. In particular there are concerns about increased urbanisation and the excessive growth and development of the mid-east region. Urban sprawl, traffic congestion, and infrastructure problems are affecting the economic competitiveness of the mid-east region in particular.

A number of indicators can be used to highlight these regional differences and are presented in this chapter. These include indicators in relation to:

- Population;
- Labour market;
- Income levels
- Gross Value Added; and,
- House prices.

Policy in relation to spatial competitiveness is also discussed in this chapter.

Population

Ireland is currently divided into two NUTS2 regions - the Border, Midlands and West (BMW) region, and the South and East (SE) region. Under certain Central Statistics Office assumptions, the population of the BMW region is projected to increase by 7.8% between 1996 and 2031, reaching a total of 1,040,500. The population of the SE region is projected to grow by almost one-third over the same period, to over 3.5 million by 2031. As Table 6.1 shows, the Greater Dublin Area (GDA) region will provide most of the growth, with its population projected to increase by 54.4% over the period. The remainder of the SE region will grow by 8%, almost identical to the rate projected for the BMW region.

Table 6.1 Actual and Projected Population of NUTS2 Regions (M1F2 Scenario) – 1996 and 2031

	Pop 1996	Natural increase	Internal migration	External migration	Pop 2031	% change
BMW	965.2	86.8	-79.3	68.2	1,040.5	7.8
SE	2,660.9	529.3	79.3	256.8	3,526.0	32.5
GDA	1,405.7	396.6	140.5	228.1	2,170.8	54.4
SE rem	1,25.2	132.7	-61.2	28.7	1,355.2	8.0
Total	3,626.1	616.2	0.0	325.0	4,566.6	25.9

Source: Central Statistics Office

It is also worth considering these population projections at a more disaggregated level. Table 6.2 presents actual and projected populations for each of the eight Regional Authority areas (Border, Dublin, Mid-East, Midlands, Mid-West, South-East, South-West, and West), as well as for the State as a whole. Specifically, the actual population in 1996 is presented along with a Central Statistics Office (CSO) estimate for the population in 2031. This projected

population is a function of estimated natural increases in each region (due to births and deaths), as well as estimated internal and external migration.

Overall, Table 6.2 predicts very different population changes across regions. For example, Dublin's population is estimated to increase by almost 600,000 persons, or by 56% over the period. Furthermore, the population of the Mid-East region is predicted to increase significantly over the period, by 49.7%. On the other hand, the population of the Midlands is forecasted to decrease by 9.9%.

The increase in the population of the West is predicted to be slightly less than for the State as a whole. For example, while the West's population is predicted to increase by 21.7%, the population of the state is predicted to increase by 25.9%.

Table 6.2 Actual and Projected Population of Regional Authority Areas (CSO M1F2 Scenario) - 1996 and 2031

Region	Population 1996	Natural Increase	Internal Migration	External Migration	Population 2031	% Change
Border	407.3	34.7	-34.4	19.2	426.6	4.7
Dublin	1,058.3	315.4	71.9	205.2	1,650.8	56.0
Mid-East	347.4	81.2	68.6	22.9	520.0	49.7
Midland	205.5	14.8	-35.9	1.1	185.2	-9.9
Mid-West	317.1	53.1	-8.9	14.1	375.1	18.3
South-East	391.5	20.7	-24.3	6.5	394.3	0.7
South-West	546.6	58.9	-28.0	8.2	585.7	7.2
West	352.4	37.4	-8.9	47.9	428.7	21.7
State	3,626.1	616.2	0.0	325.0	4,566.6	25.9

Source: Central Statistics Office, Regional Populations Projections, 2001 - 2031

Figure 6.1 and Figure 6.2 overleaf present the share of actual and projected population in 1996 and 2031 respectively for each regional authority.

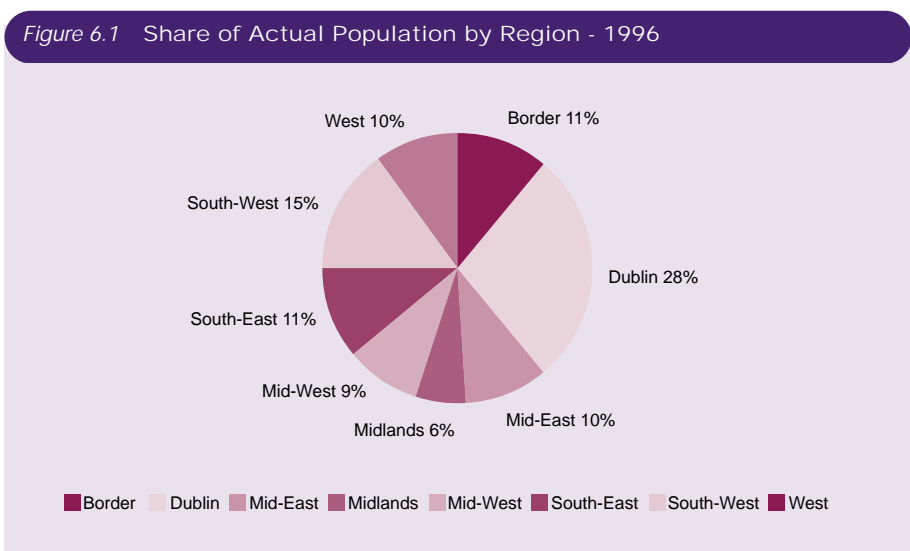
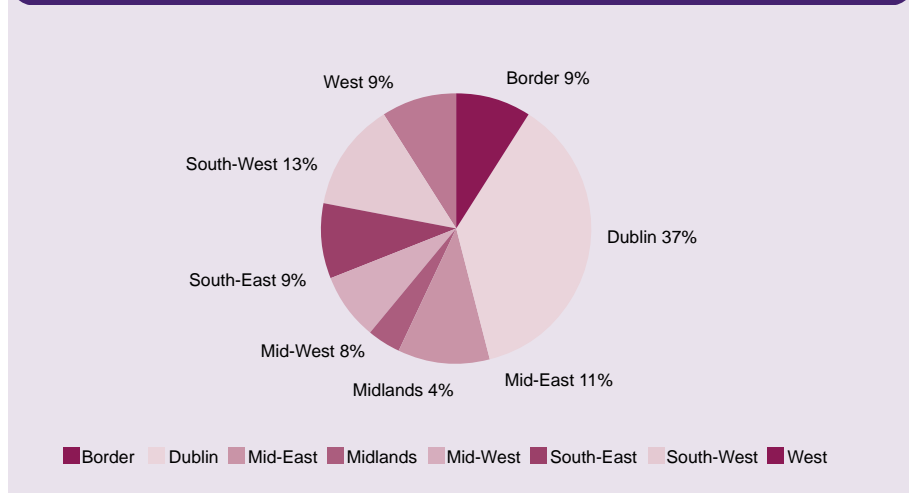


Figure 6.2 Share of Projected Population by Region - 2031



Census 2002 Data

According to the preliminary estimates from the 2002 census, the total for the population enumerated on census night was 3,917,336 persons, an increase of 8 per cent from the previous Census in 1996. The rate of population growth was the highest experienced since the 1970s, and implies an average annual rate of population increase between 1996 and 2002 of 1.3%.

The preliminary Census data suggests that the population of all four provinces increased between 1996 and 2002, and that the increase was most marked in Leinster at 9.4%. Leinster's share of the overall population of the State has increased in every census since 1926. The population of the South east region increased by 8.2% between 1996 and 2002, however within that region the population of the Greater Dublin Area increased by a strong 9.2%. The Greater Dublin area population share has therefore increased from 38.8% of the national total in 1996, to 39.2% in 2002.

Ulster (part of) experienced the lowest proportionate increase at 5.3%.

Table 6.3 Population in each province, 1996 and 2002

	1996		2002	
	Population	% of State	Population	% of State
Leinster	1,924,702	53.1%	2,105,449	53.7%
Munster	1,033,903	28.5%	1,101,266	28.1%
Connaught	433,231	11.9%	464,050	11.8%
Ulster (part of)	234,251	6.5%	246,571	6.3%
State	3,626,087	100.0%	3,917,336	100.0%

Source: Central Statistics Office, Census 2002, Preliminary Report

Labour Market

It is also informative to consider regional variations in labour market indicators. Table 6.4 presents the estimated size of the labour force, by region, for 1993 and 2001. As can be seen, both the West and the Mid-East have experienced extremely rapid labour force growth between 1993 and 2001. The labour force rose by over 50% in both regions compared with an increase of 27% for the country as a whole. Both the Border and South-East regions showed much slower growth, while the Midlands region showed a decrease.

Table 6.4 Estimated Size of Labour Force by Region, 1993 and 2001

	1993	2001	% Change
Border	149.7	173.1	15.6
Midlands	93	90.2	-3
West	110	171.5	55.9
Dublin	438.5	552.8	26.1
Mid-East	122.5	184.5	50.6
Mid-West	116.1	151	30.1
South-East	145.4	175.4	20.6
South-West	200.6	247.1	23.2
State	1,375.8	1,745.6	26.9

Source: Central Statistics Office

Table 6.5 presents estimated unemployment rates by region for 1993 and 2001. Unemployment rates have fallen across all regions, with the largest decrease in the Dublin region, which as of 2001 had the lowest unemployment rate at 3.4%.

Table 6.5 Estimated Unemployment Rates by Region, 1993 and 2001

	1993	2001
Border	17.6%	6.6%
Midlands	16%	5.5%
West	16%	5%
Dublin	17.5%	3.4%
Mid-East	17.2%	3.7%
Mid-West	15.8%	4%
South-East	17%	4.9%
South-West	15%	3.8%
State	16.7%	4.3%

Source: Central Statistics Office

Table 6.6 presents some additional labour market indicators across regions, including numbers employed and unemployed, as well as unemployment and participation rates. This data relates to 2001. Participation rates are highest in the Dublin and Mid-East regions.

Table 6.6 Persons Aged 15 Years and Over Classified by NUTS3 Regions and ILO Economic Status - 2001

	In employment '000	Unemployed '000	In labour force '000	Unemployment rate %	Participation rate %
Border	166.8	12.4	179.2	6.9	55.0
Midlands	88.9	3.8	92.7	4.1	56.1
West	179.4	9.5	188.9	5.0	59.2
Dublin	552.7	20.5	573.3	3.6	63.0
Mid-East	189.9	6.7	196.6	3.4	62.8
Mid-West	148.3	6.8	155.1	4.4	58.2
South-East	177.7	8.8	186.5	4.7	57.5
South-West	241.9	11.4	253.2	4.5	56.7
State	1,745.5	80.0	1,825.4	4.4	59.4

Source: Central Statistics Office

Household incomes by region

Table 6.7 presents data in relation to disposable income per person by region in each year from 1995 to 1999 in euro. Average disposable income levels per head are highest in Dublin at €15,525, and lowest in the Midlands at €10,921. Over the period from 1995 to 1999, average disposable income per person increased by 45.5% in the State. The highest proportionate increase was in the Dublin area at 49.4%, while the lowest was in the Midlands region at 35.4%.

Table 6.7 Estimates of Disposable Income per Person by Region, 1995 to 1999, Euro

	1995	1996	1997	1998	1999
Border	8,280	8,865	9,800	10,562	11,695
Midland	8,067	8,620	9,606	10,178	10,921
West	8,248	8,917	9,877	10,874	11,973
Dublin	10,391	11,166	12,294	13,671	15,525
Mid-East	8,786	9,547	10,632	11,507	13,157
Mid-West	8,806	9,476	10,393	11,759	12,971
South-East	8,250	8,805	9,544	10,550	11,560
South-West	8,698	9,319	10,348	11,265	12,378
State	9,032	9,709	10,716	11,785	13,146

Source: Central Statistics Office

Figure 6.3 presents disposable income per person by region in 1999.

Figure 6.3 Disposable income per person by region 1999



Table 6.8 presents indices of disposable income by region where the average disposable income per capita in the state forms the base income of 100. This table shows the regions where disposable incomes are highest and lowest.

Table 6.8 Indices of Disposable Income per Person by Region and County, 1995 to 1999, State = 100

	1995	1996	1997	1998	1999
Border	91.7	91.3	91.5	89.6	89.0
Midland	89.3	88.8	89.6	86.4	83.1
West	91.3	91.8	92.2	92.3	91.1
Dublin	115.0	115.0	114.7	116.0	118.1
Mid-East	97.3	98.3	99.2	97.6	100.1
Mid-West	97.5	97.6	97.0	99.8	98.7
South-East	91.3	90.7	89.1	89.5	87.9
South-West	96.3	96.0	96.6	95.6	94.2
State	100	100	100	100	100

Source: Central Statistics Office

Gross value added (GVA) by region

Measures of gross value added (GVA) per person at basic prices are presented in Table 6.9. GVA per person is highest in the Dublin area at €28,151 in 1999, and lowest in the Midlands at €14,569. This data shows significant regional variation, though it should be noted that estimates of GVA at a regional level are subject to measurement difficulties. One particular difficulty relates to the problems caused by persons living in one region and commuting to another.

Table 6.9 GVA per person at Basic Prices, 1995 – 1999, Euro

	1995	1996	1997	1998	1999
Border	10,226	11,412	12,930	14,519	15,958
Midland	9,590	10,739	11,630	12,458	14,569
West	9,826	11,050	11,849	13,645	15,298
Dublin	17,154	18,935	21,565	24,772	28,151
Mid-East	11,873	12,427	14,340	14,161	18,876
Mid-West	12,361	13,730	14,781	16,956	19,086
South-East	14,291	12,685	13,474	14,879	16,823
South-West	13,778	14,669	18,168	21,575	23,535
State	13,156	14,463	16,424	18,591	21,171

Source: Central Statistics Office

Figure 6.4 presents GVA per person in 1999.

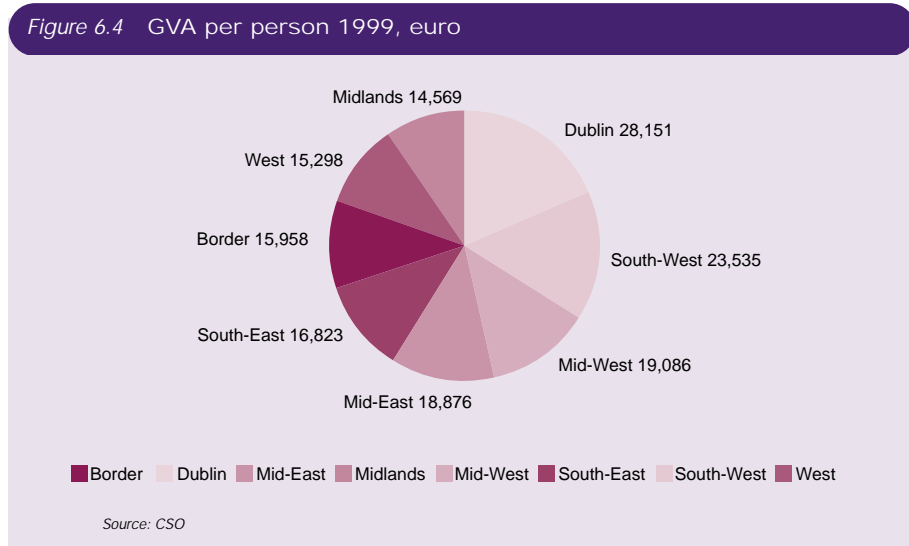


Table 6.10 presents indices of GVA per persons at basic prices, which clearly illustrates the regional variation in this variable, and how regions relative position varies through time.

Table 6.10 Indices of GVA per person at Basic Prices, 1995 – 1999, (State = 100)

	1995	1996	1997	1998	1999
Border	77.7	78.9	78.7	78.1	75.4
Midland	72.9	74.3	70.8	67.0	68.8
West	74.7	76.4	72.1	73.4	72.3
Dublin	130.4	130.9	131.3	133.2	133.0
Mid-East	90.2	85.9	87.3	76.2	89.2
Mid-West	94.0	94.9	90.0	91.2	90.2
South-East	85.5	87.7	82.0	80.0	79.5
South-West	104.7	101.4	110.6	116.0	111.2
State	100.0	100.0	100.0	100.0	100.0

Source: Central Statistics Office

Finally, Table 6.11 presents GVA per person employed by region.

Table 6.11 GVA per Person Employed by Region (euro) - 1999

	1999
Border	42,045
Midland	37,691
West	36,627
Dublin	60,419
Mid-East	42,000
Mid-West	45,728
South-East	42,690
South-West	58,156
State	49,830

Source: Central Statistics Office

House Prices

The pressure from rapid and uneven economic and population growth can be seen in housing market developments. The demand for housing has increased dramatically, particularly in the Dublin region. Data on house price inflation areas are set out in the Table 6.12 below. There are considerable differences between house prices in the Dublin area compared to other areas. House prices in Dublin were €55,000 higher on average than houses in Cork, the next most expensive area, as of 2000.

At year-end 2000, average house prices in Northern Ireland were equal to €116,228, 31.3% lower than average house prices in the South.

Table 6.12 Average Prices of New Houses for Which Loans Were Approved (€) – 1996 to 2000

	1996	1997	1998	1999	2000
Cork	85,351	96,046	112,133	141,007	166,557
Dublin	97,058	122,036	160,699	193,526	221,724
Galway	93,050	109,905	118,738	138,928	163,824
Limerick	83,281	91,077	104,248	121,880	145,834
Waterford	79,784	91,608	107,954	132,050	145,713
Other Regions	82,091	94,664	116,589	136,970	154,050
Republic of Ireland	87,202	102,222	125,302	148,521	169,191
Northern Ireland ⁵	-	-	-	-	116,228

Source: Department of the Environment, and Halifax Bank of Scotland

Policy

In recognition of this uneven economic development pattern and the negative consequences of congestion in parts of the country, the Government has taken a number of policy initiatives. The principal objective of this regional policy stance is as follows:

- To achieve a more balanced regional development of the economy;
- To reduce the growing regional income disparities that exist and in particular to favour the development of the BMW Region; and,
- To alleviate the growing congestion problems in the Dublin area and the Mid-East region more generally.

There are a number of specific policy initiatives that seek to deliver on these policy objectives.

These regional considerations also now inform the work of the industrial promotional agencies. The level of grant assistance provided to potential projects in the Dublin area is lower than in other areas. There is also a conscious decision to favour investment projects that are located in the Regions.

⁵ Figure for Northern Ireland relates to the fourth quarter of 2000.

This shift in policy has been included in policy statements publicised by FORFÁS. The 1999 policy statement stated, “Geographic dispersal has been unsatisfactory, with a disproportionate share of jobs generated by overseas investment going to major cities and especially greater Dublin”. This concentration of development has led the IDA to re-focus its activity and priorities and to deliver a much higher level of new investment into the regions.

The National Development Plan is also based on this new regional approach. For the first time the plan contained a regionalised approach. The country was divided into the Border, Midlands and West and the Rest. This so-called BMW was considered to be suffering from under-development in comparison to the rest of the country. In order to address some of these issues, the Plan contained a larger amount of expenditure per capita in this Region than in the rest of the country.

7 Sectoral Aspects of Competitiveness

The analysis in this report thus far has focused on the overall performance of the economy. Despite a slowdown in economic growth and a recent increase in unemployment, overall economic performance has been exceptional.

Moreover, the structural indicators suggest that productivity and living standards in Ireland are amongst the highest in the world. Ireland is now one of the most prosperous and productive economies in the OECD area and has converged in terms of living standards with the rich countries of the OECD.

This impressive performance at an economy-wide level masks significant differences in sectoral performance. In assessing competitiveness it is useful to consider a more disaggregated approach. Ideally, this would focus on the performance of actual business units or sectors that are responsible for overall economic performance.

The starting point for such an analysis is to consider the dual structure of Irish manufacturing. Ireland's traded manufacturing sector comprises a traditional sector, which is generally Irish owned and which serves the domestic and UK markets. It is characterised by relatively low productivity. The manufacturing base also includes a modern or high technology sector, which is predominately foreign-owned and which serves the wider European market. These leading sectors tend to have high productivity as measured by output per person. Table 7.1 shows the differences in gross and net output per person employed for Irish and foreign-owned sectors in 1999, which broadly match the traditional and high-technology classification.

Table 7.1 Productivity per person engaged unit per sector – 1999 - Euros

	Number of Persons Engaged	Gross Output per person ('000)	Net output per person ('000)
Irish	126,840	141.7	53.8
Foreign	122,131	464.2	293.2
Total	248,971	299.8	171.2

Source: Census of Industrial Production

Table 7.2 provides an additional useful measure of the extent to which the sectors differ, from 1995 to 2000. Wages costs are important determinant of competitiveness at a macro level but their importance varies by sector. For example, wages are equal to 4.7% of gross output for the high-technology sectors but account for a much higher 14.2% for the traditional sectors. Thus, wage pressures arising from strong labour demand will put more pressure on the viability and competitiveness of the traditional sector given their higher wage share. This is important in considering the sectoral impact of recent wages trends.

Table 7.2 Labour's Share of Gross Output 1995 to 2000

	1995	1996	1997	1998	1999	2000
Traditional Manufacturing	17.0%	16.6%	16.1%	15.6%	15.1%	14.2%
Food Processing	6.2%	6.3%	6.2%	5.8%	5.7%	5.5%
High Technology	8.1%	7.5%	6.8%	5.7%	5.1%	4.7%

Source: ESRI

Given these different structures the competitiveness challenges facing the sectors are fundamentally different and need to be highlighted separately.

These different competitiveness challenges are revealed by relative sectoral performance during the years of rapid economic expansion. Table 7.3 shows trends in output between 1995 and 2000 for four sectors: traditional, high-technology, food processing and building.

Table 7.3 Industrial Sector Gross Output 1995 to 2000, Euro million

	1995	1996	1997	1998	1999	2000
Traditional Manufacturing	8,285	8,486	8,974	9,154	9,521	9,902
Food Processing	10,800	10,892	11,013	11,786	12,375	12,870
High Technology	24,215	27,178	33,477	41,154	47,327	52,652
Building	5,119	6,064	7,131	7,836	8,655	9,385

Source: ESRI

The data are also presented in index form as shown in Table 8.4. These show that gross output in traditional manufacturing increased by 20% between 1996 while the food-processing sector showed a comparable increase. In contrast the high technology sectors grew by 117% over the period. This is exceptional growth reflecting buoyant market conditions for their products and continuing inflows of Foreign Direct Investment. The Building sector also showed strong growth of over 83% reflecting the demand for both housing and office space.

Table 7.4 Industrial Sector Gross Output 1995 to 2000

	1995	1996	1997	1998	1999	2000
Traditional Manufacturing	100	102	108	110	115	120
Food Processing	100	101	102	109	115	119
High Technology	100	112	138	170	195	217
Building	100	118	139	153	169	183

Source: ESRI

Examining each sector's share of total output also reveals the dominance of high technology sector. In 2000 it accounted for almost 70% of manufacturing output.

Table 7.5 Sectoral Output Share 1995 to 2000

	1995	1996	1997	1998	1999	2000
Traditional Manufacturing	19.1%	18.2%	16.8%	14.7%	13.8%	13.1%
Food Processing	24.9%	23.4%	20.6%	19.0%	17.9%	17.1%
High Technology	55.9%	58.4%	62.6%	66.3%	68.4%	69.8%

Source: ESRI

Trends in employment also provide a useful indicator of the relative performance of the sectors, and are presented in Table 7.6. Traditional manufacturing employment remained unchanged over the period under review. However, this masks differences in sub-sectors where declines in some areas have been offset by modest growth in others. The data reveal modest growth in the food-processing sector. In contrast, employment in high technology sectors has expanded by almost 30,000 over the period. The building sector also showed strong growth.

Table 7.6 Employment levels 1995-2000

	1995	1996	1997	1998	1999	2000
Traditional Manufacturing	81	81	83	82	83	81
Food Processing	40	41	41	41	42	42
High Technology	105	110	122	126	129	133
Building	83	87	97	124	140	164

Source: ESRI

For convenience these data are also show in index form. Table 7.7 shows that that employment in high-technology sectors grew by 27% while the building sector showed growth of 98%. By comparison the other two sectors under-performed. This analysis clearly shows the relative performance of the different sectors, which in turn reflects relative competitiveness

Table 7.7 Employment levels 1995-2000

	1995	1996	1997	1998	1999	2000
Traditional Manufacturing	100	100	102	101	102	100
Food Processing	100	103	103	103	105	105
High Technology	100	105	116	120	123	127
Building	100	105	117	149	169	198

Source: ESRI

Table 7.8 summarises percentage changes in some of key aggregates over the period from 1995 to 2000.

Table 7.8 Annual Percentage Changes 1995-2000

	1995	1996	1997	1998	1999	2000
Traditional						
Gross output	7.6	2.4	5.8	2.0	4.0	4.0
Employment	1.3	0.3	2.1	-1.2	1.0	-2.5
Productivity	6.3	2.1	3.5	3.3	3.0	6.7
Food Processing						
Gross output	10.8	0.9	1.1	7.0	5.0	4.0
Employment	4.3	2.0	0.2	0.0	2.2	0.0
Productivity	6.3	-1.1	0.9	7.0	2.7	4.0
High Technology						
Gross output	26.4	12.2	23.2	22.9	15.0	11.3
Employment	13.3	5.0	11.0	3.1	2.9	2.6
Productivity	11.6	6.9	11.0	19.2	11.8	8.4

Source: ESRI

In comparing inter-industry performance it is useful to examine these sectors in more detail. The above analysis focuses on combining individual sectors. It is also useful to examine specific sectors. Data from the CSO's Census of Industrial production enables us to undertake this exercise.

Productivity measurements are a useful way of comparing the relative performance of sectors. The CIP provides data on the number of units per sector and gross output and net output per sector. Table 7.9 shows the number of units for each sector and average gross and net output per unit, in 1999. This provides an indication of the relative productivity performance of individual units per sector.

The data show significant differences across sectors. Generally, the more traditional sectors have lower output per unit. This is also shown by the breakdown by nationality.

Table 7.9 Productivity per unit per sector – 1999 – Euros

	Number of Units	Gross Output per Unit ('000)	Net output per Unit ('000)
Manufacture of food products; beverages and tobacco	806	17,663	8,181
Manufacture of textiles and textile products	314	2,640	1,330
Manufacture of leather and leather products	26	2,555	1,039
Manufacture of wood and wood products	250	2,752	1,107
Manufacture of pulp, paper and paper products; publishing and printing	589	14,272	11,886
Manufacture of chemicals, chemical products and man-made fibres	242	76,788	62,231
Manufacture of rubber and plastic products	282	3,990	1,839
Manufacture of other non-metallic mineral products	304	4,371	2,442
Manufacture of basic metals and fabricated metal products	587	2,953	1,283
Manufacture of machinery and equipment n.e.c.	371	4,,199	2,096
Manufacture of electrical and optical equipment	467	50,470	20,156
Manufacture of transport equipment	127	7,889	3,485
Manufacturing n.e.c. and Manufacture of coke, refined petroleum products and nuclear fuel	429	3,595	1,427
Irish	4,105	4,379	1,662
Foreign	689	82,286	51,975
Total	4,794	15,575	8,894

Source: Census of Industrial Production

Data are also available on the number of persons employed in each sector, in 1999. Combing this information with the output measures it is possible to construct various measures of labour productivity such as output per person. Table 7.10 shows the significant differences in sectoral labour productivity that exist.

Table 7.10 Productivity per person engaged unit per sector – 1999 – Euros

	Number of Persons Engaged	Gross Output per person (‘000)	Net output per person (‘000)
Manufacture of food products; beverages and tobacco	47,513	299.6	138.8
Manufacture of textiles and textile products	11,629	71.2	35.9
Manufacture of leather and leather products	895	74.2	30.2
Manufacture of wood and wood products	5,642	121.9	49.0
Manufacture of pulp, paper and paper products; publishing and printing	24,143	348.2	289.9
Manufacture of chemicals, chemical products and man-made fibres	22,969	809.0	655.7
Manufacture of rubber and plastic products	10,567	106.4	49.1
Manufacture of other non-metallic mineral products	10,461	127.0	71.0
Manufacture of basic metals and fabricated metal products	15,632	110.9	48.1
Manufacture of machinery and equipment n.e.c.	14,494	107.4	53.6
Manufacture of electrical and optical equipment	64,462	365.6	146.1
Manufacture of transport equipment	9,584	104.5	46.2
Manufacturing n.e.c. and Manufacture of coke, refined petroleum products and nuclear fuel	10,980	140.5	55.8
Irish	126,840	141.7	53.8
Foreign	122,131	464.2	293.2
Total	248,971	299.8	171.2

Source: Census of Industrial Production

It is clear that the traditional sectors of Irish Manufacturing face a major competitiveness challenge. Due to their low productivity they are under increasing competitive pressure. Indeed, more recent quarterly employment data show that these sectors are losing employment. Unless these sectors can improve their productivity performance they are likely to face significant difficulties in the future as the economy continues to move up the value-added chain.

Labour Costs		1	2	3	4	5	6	7	8
Indicator	Nominal compensation per employee, total economy (€'000 per annum)	Nominal compensation per employee - percentage change	Nominal compensation per employee - percentage change	Nominal compensation per employee - percentage change	Unit labour costs in the total economy - percentage annual change	Unit labour costs in the total economy - projected percentage annual change	Unit labour costs in the total economy - projected percentage annual change	Hourly compensation costs for production workers in manufacturing (US\$)	Working days lost per 1,000 inhabitants per year
Year	2002e	2001-2002	2002-2003	2000-2001	2001-2002e	2002-2003e	2001	2000	
Source	AMECO Database, DG ECFin	AMECO Database, DG ECFin	AMECO Database, DG ECFin	AMECO Database, DG ECFin	AMECO Database, DG ECFin	AMECO Database, DG ECFin	US Department of Labor, Bureau of Labor Statistics, September 2001	World Competitiveness Yearbook 2002	
Country	16 Rank	16 Rank	16 Rank	16 Rank	16 Rank	16 Rank	14 Rank	16 Rank	16 Rank
Denmark	38.72	4	3.5	3.76	6	1.99	21.98	23.37	11
Finland	33.17	9	3.5	5.01	13	1.75	19.94	49.00	14
France	38.20	5	2.5	2.33	3	1.34	15.88	11.93	8
Germany	32.69	10	2.5	1.22	2	1.24	23.84	0.13	2
Hungary	8.37	16	16.5	5.86	16	6.87	-	14.92	9
Ireland	35.59	7	8.1	5.29	14	5.54	13.28	25.61	12
Italy	30.43	11	2.7	2.55	4	2.10	13.76	15.31	10
Japan	42.29	2	-7.5	-0.92	1	-2.61	19.59	0.28	3
Korea	17.23	14	5.3	4.84	12	2.63	8.09	40.28	13
Netherlands	39.77	3	5.2	5.63	15	4.30	19.29	0.59	4
New Zealand	25.34	13	6.7	4.03	9	2.18	7.74	3.00	6
Poland	9.76	15	7.3	4.21	10	3.85	-	1.92	5
Spain	26.06	12	3.5	3.99	8	2.54	10.88	91.64	16
Sweden	35.57	8	4.9	4.42	11	1.79	18.35	0.03	1
UK	38.13	6	5.2	3.73	5	2.50	16.14	8.38	7
US	57.02	1	6.5	3.85	7	0.36	20.32	72.09	15
EU	33.81		3.5	2.81		1.99			
OECD						1.37			

2001 = a

2000 = b

1999 = c

1998 = d

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Labour Costs continued

Indicator	9	10	11	12
	2001	2000	2002	1999
Cost of living index	World Competitiveness Yearbook 2002	World Competitiveness Yearbook 2002	The Economist House-Price Index	Dresdner Kleinwort Benson
Source	16	16	10	11
Country	Rank	Rank	Rank	Rank
Denmark	95.88 14	770 4	-	11.5 2
Finland	87.17 10	660 2	-	-
France	82.17 9	980 10	5.5 6	12.0 3
Germany	80.34 8	820 8	1.5 1	19.0 10
Hungary	54.73 1	800 6	-	-
Ireland	89.03 12	870 9	9.5 9	18.2 9
Italy	79.82 5	810 7	7.5 7	14.5 6
Japan	131.17 16	2160 15	2.0 2	26.1 11
Korea	80.21 7	1580 13	-	-
Netherlands	80.15 6	1130 12	4.5 3	16.5 8
New Zealand	66.14 3	770 4	-	-
Poland	61.63 2	1060 11	-	-
Spain	68.93 4	670 3	10.5 10	15.0 7
Sweden	88.81 11	600 1	5.0 5	13.0 4
UK	95.12 13	2450 16	9.0 8	13.2 5
US	100.00 15	1675 14	4.8 4	8.3 1
EU				
OECD				

2001 = a
2000 = b
1999 = c
1998 = d
1997 = e
1996 = f
1995 = g
1994 = h

		1	2	3	4	5	6	7	8
Indicator		National leased line prices - 2mb/s, 2 km circuits, Euro per year	Fixed-to-fixed interconnection cost (national) - cents per minute	Fixed-to fixed interconnection charges for call termination on fixed network - local level - cents per minute	Cost of internet use - 30 mins peak rate - US\$	Composite business basket cost of calls (national and international) - US\$ PPP	OECD business mobile basket - US\$ PPP including VAT	International fixed telephone costs - US\$ per 3 minutes in peak hours to USA	Automotive diesel oil prices for commercial use (US\$/toe)
Year		Aug.01	2000	Aug.01	Nov.00	May.02	May.02	2002	2001
Source		EU Seventh Report on the Implementation of the Telecommunications Regulatory Package	DG XIII Tariff Data 2000	EU Seventh Report on the Implementation of the Telecommunications Regulatory Package	Teligen	Teligen	Teligen	World Competitiveness Yearbook	OECD Energy Prices and Taxes 2001
Country		11 Rank	10 Rank	10 Rank	16 Rank	16 Rank	16 Rank	15 Rank	15 Rank
Denmark		1956 1	1.35 1	0.67 4	0.77 13	681.5 7	1018 4	0.61 7	791.2 11
Finland		-	2.63 10	1.12 10	0.30 1	852.4 4	1159 7	0.94 12	712.4 8
France		7500 7	2.01 7	0.58 1	0.89 14	1071.6 2	991 3	0.24 2	695.8 6
Germany		4080 2	2.28 9	0.83 8	0.33 2	1154.7 12	1203 9	0.24 3	753.2 9
Hungary		-	-	-	0.71 12	1749.9 15	2023 16	0.85 10	902.3 14
Ireland		4571 4	1.54 2	0.64 3	0.41 4	955.3 7	1,246 10	0.54 6	708.1 7
Italy		7772 8	1.80 5	0.72 6	0.44 6	1162.1 13	1669 13	0.71 9	799.1 12
Japan		47222 11	-	-	0.90 15	891.7 6	1069 5	1.38 13	684.6 5
Korea		-	-	-	0.38 3	770.8 3	1104 6	1.68 14	541.8 2
Netherlands		13363 10	1.71 4	0.79 7	0.57 9	854.5 5	783 2	0.20 1	754.2 10
New Zealand		-	-	-	0.55 7	1363.8 14	1814 14	0.70 8	328.9 1
Poland		-	-	-	0.64 11	2093.5 16	1950 15	2.65 15	600.7 3
Spain		10625 9	2.16 8	0.90 9	0.61 10	1034.1 9	1368 12	0.50 5	637.1 4
Sweden		4326 3	1.70 3	0.67 4	0.57 8	681.6 4	1317 11	0.27 4	836.0 13
UK		4786 5	1.80 5	0.63 2	1.41 16	1116.7 11	1185 8	0.86 11	1174.3 15
US		7162 6	-	-	0.43 5	1029.0 8	6.37 1	-	-
EU		6841		0.85					
OECD									789.5

2001 = a
2000 = b
1999 = c
1998 = d
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1996 = f
1995 = g
1994 = h

Costs and Prices continued

Indicator	9	10	11	12	13
Year	2002	2002	2001	2001	2002e
Source	Statistics in Focus - Environment and Energy; Eurostat, 04/2002	Statistics in Focus - Environment and Energy; Eurostat, 04/2002	World Competitiveness Yearbook 2002	World Competitiveness Yearbook 2002	OECD Economic Outlook June 2002
Country	8 Rank	9 Rank	16 Rank	16 Rank	16 Rank
Denmark	-	7.66 5	291 3	4.90 14	96.1 10
Finland	4.42 2	8.38 8	326 4	3.85 9	98.3 12
France	5.62 5	6.70 4	824 14	3.98 10	96.5 11
Germany	6.69 6	8.23 7	467 11	6.45 16	95.2 8
Hungary	-	-	254 2	3.70 8	70.6 1
Ireland	7.42 7	5.67 2	568 13	4.74 13	90.0 4
Italy	9.53 8	7.89 6	410 6	4.57 12	110.8 14
Japan	-	-	1233 16	1.91 3	92.4 6
Korea	-	-	523 12	1.90 2	77.1 2
Netherlands	-	-	372 5	1.92 4	93.4 7
New Zealand	-	-	113 1	4.53 11	89.1 3
Poland	-	-	413 7	6.36 15	91.2 5
Spain	5.14 3	4.68 1	461 10	2.08 5	95.4 9
Sweden	2.83 1	9.75 9	448 8	3.67 7	99.4 13
UK	5.59 4	6.23 3	845 15	0.33 1	132.0 15
US	-	-	452 9	3.23 6	137.6 16
EU					
OECD					92.0

2001 = a
2000 = b
1999 = c
1998 = d
1997 = e
1996 = f
1995 = g
1994 = h

Economic Policy, Government and Regulation

Indicator	1	2	3	4	5	6	7	8
Year	2001	2001	2001	2000	Jan.02	2001	2002e	2001
Source	OECD Revenue Statistics 2002	OECD Taxing Wages 2000/01	OECD Taxing Wages 2000/01	OECD Taxing Wages 2000/01	KPMG's Corporate Tax Rates Survey - January 2002	EC Economic Data Pocket Book August 2002	AMECO DG ECFin Database	EC Economic Data Pocket Book August 2002
Country	16 Rank	16 Rank	16 Rank	16 Rank	16 Rank	12 Rank	16 Rank	12 Rank
Denmark	49.0 15	31.3 8	44.2 10	0 1	30.0 7	53.7 11	21.3 6	3.0 3
Finland	46.3 14	38.8 13	45.9 11	21 11	29.0 5	49.4 9	19.2 12	4.9 1
France	45.4 13	39.4 15	48.3 13	29 15	34.3 10	52.7 10	19.5 10	-1.4 9
Germany	36.4 8	32.6 10	50.7 15	17 9	36.4 13	48.5 8	19.3 11	-2.7 11
Hungary	38.6 10	38.9 14	52.6 16	29 15	18.0 2	- 2	20.7 7	- 7
Ireland	29.2 3	12.8 1	25.8 4	11 7	16.0 4	32.7 2	22.7 4	1.7 4
Italy	41.8 12	35.6 11	46.2 12	25 13	40.3 15	47.8 7	20.0 9	-1.6 10
Japan	27.1 1	20.4 6	24.2 3	9 5	42.0 16	40.2 5	24.8 3	-6.9 12
Korea	27.5 2	16.0 2	16.6 1	8 4	29.7 6	- 6	27.9 1	- 7
Netherlands	39.9 11	32.4 9	42.3 8	14 8	34.5 11	45.6 6	21.7 5	0.2 5
New Zealand	34.8 6	16.8 3	19.6 2	0 1	33.0 9	- 9	17.4 15	- 8
Poland	34.1 5	38.0 12	42.9 9	17 9	28.0 3	- 3	20.5 8	- 8
Spain	35.2 7	31.0 7	37.9 7	23 12	35.0 12	39.6 3	25.0 2	0.0 2
Sweden	53.2 16	41.4 16	48.6 14	25 13	28.0 3	57.4 12	17.5 14	4.8 2
UK	37.4 9	17.8 4	29.7 5	9 5	30.0 7	40.1 4	17.0 16	0.9 5
US	29.6 4	19.4 5	30.0 6	7 3	40.0 14	32.6 1	18.9 13	0.5 6
EU	41.6					47.0	19.9	-0.7
OECD	37.4							

2001 = a
2000 = b
1999 = c
1998 = d
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1996 = f
1995 = g
1994 = h

Economic Policy, Government and Regulation continued

Indicator	9	10	11
	Overall employment protection against dismissal	Cost of forming a private limited company (euro)	Rating of Competition Authorities across countries
Year	Late 90s	1996	2002
Source	OECD Employment Outlook June 1999	OECD 'Fostering Entrepreneurship - A Thematic Review', 1998	Global Competition Review - July 2002
Country	15 Rank	10 Rank	13 Rank
Denmark	1.6 3	-	3.5 6
Finland	2.1 6	-	3.5 6
France	2.3 9	3400 9	4.5 2
Germany	2.8 12	1400 7	4.5 2
Hungary	2.1 6	-	-
Ireland	1.6 3	200 1	3.5 6
Italy	2.8 12	2100 8	4.0 5
Japan	2.7 11	4000 10	3.5 6
Korea	-	-	-
Netherlands	3.1 15	1000 5	3.5 6
New Zealand	1.7 5	-	3.5 6
Poland	2.2 8	-	-
Spain	2.6 10	300 2	3.0 13
Sweden	2.8 12	1100 6	3.5 6
UK	0.8 2	400 3	4.5 2
US	0.2 1	500 4	5.0 1
EU	3.5		4
OECD			

2001 = a

2000 = b

1999 = c

1998 = d

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1995 = g

1994 = h

Education and Skills

Indicator	1	2	3	4	5	6	7	8
Year	1998	1988	1999	1999	1999	Various years	1999	1999
Source	OECD Education at a Glance 2001	OECD Education at a Glance 2001	OECD Education at a Glance 2001	OECD Education at a Glance 2001	OECD Education at a Glance 2001	OECD Education at a Glance 2001	OECD Education at a Glance 2001	OECD Education at a Glance 2001
Country	14	15	15	16	11	11	16	13
Denmark	7.2	9562	12.4	93	115	56	80	29
Finland	5.7	7327	13.5	94	113	58	72	38
France	6.2	7226	12.8	95	98	-	62	31
Germany	5.6	9481	15.2	97	97	-	81	22
Hungary	5.0	5073	10.6	93	164	-	67	-
Ireland	5.4	8522	14.6	92	118	18	51	29
Italy	5.0	6295	10.3	79	105	22	42	-
Japan	4.7	9871	15.4	95	-	-	81	45
Korea	7.0	6356	22.2	98	140	-	66	35
Netherlands	4.6	10757	17.7	107	-	36	64	25
New Zealand	-	-	16.1	89	-	46	74	26
Poland	-	4262	-	90	184	14	54	-
Spain	5.3	5038	12.9	85	117	-	35	33
Sweden	6.8	13224	14.5	97	-	54	77	32
UK	4.9	9699	14.7	84	115	45	62	27
US	6.4	19602	15.6	88	-	42	87	38
EU	-	-	-	-	-	-	-	-
OECD	5.8	11720	-	-	-	-	-	-

2001 = a

2000 = b

1999 = c

1998 = d

1997 = e

1996 = f

1995 = g

1994 = h

Education and Skills continued

Indicator	9	10	11	12	13	14	15
Year	1999	1999	1999	1996-97	1999	2000	2015
Source	OECD Programme for International Student Assessment (PISA) 2000	OECD Programme for International Student Assessment (PISA) 2000	OECD Programme for International Student Assessment (PISA) 2000	Key Data on Education in Europe, 2000	OECD Education at a Glance 2001	Human Development Report 2002	Human Development Report 2002
Country	15 Rank	15 Rank	15 Rank	11 Rank	13 Rank	16 Rank	16 Rank
Denmark	59.6 10	514 7	481 14	1.98 2	-	15.0 9	19.5 10
Finland	78.8 1	536 4	538 3	2.46 1	1785 3	14.9 8	20.7 12
France	62.8 8	517 6	500 8	1.61 5	2063 2	16.0 11	18.6 8
Germany	55.0 13	490 11	487 12	1.23 7	835 10	16.4 12	21.0 13
Hungary	52.4 15	488 12	496 10	1.12 10	775 11	14.6 7	17.4 6
Ireland	71.0 4	503 9	513 6	0.99 11	2789 1	11.3 2	13.1 2
Italy	55.4 12	457 15	478 15	1.15 9	-	18.1 16	22.4 15
Japan	72.0 3	557 1	550 2	-	1614 5	17.2 14	25.8 16
Korea	75.6 2	547 2	552 1	-	-	7.1 1	11.6 1
Netherlands	-	-	-	1.49 6	551 13	13.6 6	17.8 7
New Zealand	69.1 5	537 3	528 5	-	1494 6	11.7 3	14.5 4
Poland	52.7 14	470 14	483 13	1.69 4	743 12	12.1 4	14.8 5
Spain	58.1 11	476 13	491 11	1.19 8	1359 7	17.0 13	19.8 11
Sweden	67.2 7	510 8	512 7	1.72 3	1029 9	17.4 15	22.3 14
UK	67.5 6	529 5	532 4	-	1620 4	15.8 10	18.9 9
US	61.1 9	493 10	499 9	-	1098 8	12.3 5	14.4 3
EU							
OECD	60.5	500	500	1.37			

2001 = a

2000 = b

1999 = c

1998 = d

1997 = e

1996 = f

1995 = g

1994 = h

Information Society		1	2	3	4	5	6	7	8
Indicator	Broadband penetration (per 100 population)	Number of internet users per 1,000 people	Telecommunications investment - percentage change	Telecommunications investment - percentage change	Mobile telephone subscribers per 1,000 inhabitants	Number of secure servers per million inhabitants	Value of on-line business-to-consumer transactions - US\$bn per thousand population	Value of on-line business-to-business transactions - US\$bn per thousand population	
Year	2000	2001	1998 - 1999	1995 - 1999	2001	2001	2000	2000	
Source	OECD Directorate for Sciences, Technology and Industry	World Competitiveness Yearbook 2002	International Telecommunications Union	International Telecommunications Union	World Competitiveness Yearbook 2002	World Competitiveness Yearbook 2002	Netprofit Statistics	Netprofit Statistics	
Country	16	16	9	10	16	15	9	9	9
	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank
Denmark	1.27	541.2	-13.20	71.6	719.5	54.1	30	250	9
Finland	0.58	512.5	0.34	5.5	831.3	-	-	-	-
France	0.31	208.6	-2.98	7.5	610.0	22.0	10	1000	4
Germany	0.32	308.8	23.40	0.4	651.7	45.9	20	1380	2
Hungary	0.03	168.8	-	-	484.5	9.0	-	-	-
Ireland	0.01	289.5	21.63	101.5	753.5	64.6	20	360	8
Italy	0.20	307.0	-21.43	-8.8	862.4	13.8	10	1000	4
Japan	0.50	384.0	-	-	528.4	22.9	-	-	-
Korea	9.20	510.0	-	-	608.9	5.2	-	-	-
Netherlands	1.68	448.5	19.75	57.2	730.8	34.1	20	830	7
New Zealand	0.27	413.0	-	-	190.6	125.9	-	-	-
Poland	0.00	125.5	-	-	288.6	4.9	-	-	-
Spain	0.15	193.3	17.64	-25.1	731.4	19.2	0	1000	4
Sweden	1.86	554.2	-	15.5	792.0	91.4	30	1400	1
UK	0.09	401.8	-29.33	68.3	754.8	74.0	20	1290	3
US	2.25	522.1	-	-	435.0	231.5	-	-	-
EU	0.39						20		
OECD	1.27								

2001 = a

2000 = b

1999 = c

1998 = d

1997 = e

1996 = f

1995 = g

1994 = h

Information Society continued

Indicator	9	10	11	12	13	14	15	16
Year	1999	2001	1997	1997	Jun.02	1995 - 2001	2001	1995 - 2001
Source	European Network for SME Research 2001	Human Development Report 2001	OECD, Science Technology and Innovation Outlook 2000	OECD Measuring the ICT Sector	European Competitive Telecommunications Association	International Telecommunications Union	International Telecommunications Union	International Telecommunications Union
Country	10 Rank	15 Rank	16 Rank	14 Rank	10 Rank	16 Rank	16 Rank	16 Rank
Denmark	57	4	6.5	5.1	5.44	3.3	72.3	29.9
Finland	60	0.74	6.0	5.6	3.13	0.2	54.8	25.4
France	39	0.54	6.4	4.0	2.04	0.8	57.4	73.8
Germany	55	0.58	5.6	3.1	5.26	3.7	63.5	57.2
Hungary	-	0.46	4.4	5.7	-	9.6	37.4	63.0
Ireland	58	0.57	5.7	4.6	0.06	6.0	48.5	61.5
Italy	36	0.47	4.3	3.5	2.11	1.6	47.1	52.2
Japan	-	0.70	7.4	3.4	-	3.4	59.7	36.2
Korea	-	0.67	6.1	2.5	-	3.4	47.6	61.4
Netherlands	44	0.63	7.0	3.8	2.30	3.5	62.1	67.5
New Zealand	-	0.55	8.6	2.1	-	1.1	47.1	37.0
Poland	-	0.41	2.7	-	-	12.2	29.5	126.2
Spain	35	0.48	4.1	-	2.85	2.4	43.1	74.3
Sweden	70	0.70	8.3	6.3	5.76	1.5	73.9	23.3
UK	38	0.61	7.6	4.8	1.02	3.1	58.8	42.0
US	-	0.73	7.8	3.9	-	2.9	66.5	24.7
EU			5.9	3.9				
OECD			6.9	3.6				

2001 = a
 2000 = b
 1999 = c
 1998 = d
 1997 = e
 1996 = f
 1995 = g
 1994 = h

Information Society continued

	17	18	19	20
Indicator	Cellular mobile subscribers as a percentage of total telephone subscribers	Internet hosts per 10,000 inhabitants	Estimated PCs per 100 inhabitants	ISDN subscribers - percentage change
Year	2001	2001	2001	1998 - 1999
Source	International Telecommunications Union	International Telecommunications Union	International Telecommunications Union	International Telecommunications Union
Country	16 Rank	16 Rank	16 Rank	8 Rank
Denmark	50.5 13	1045.4 5	43.2 3	111.1 3
Finland	58.7 4	1707.3 2	42.4 5	57.4 5
France	51.4 12	132.9 13	33.7 10	- -
Germany	51.8 10	294.6 10	33.6 11	37.4 7
Hungary	57.1 5	166.0 11	10.0 15	- -
Ireland	60.1 3	333.7 9	39.1 6	196.6 1
Italy	64.1 1	117.3 15	19.5 13	143.9 2
Japan	49.6 14	569.0 7	34.9 9	- -
Korea	56.1 8	92.1 16	25.1 12	- -
Netherlands	54.3 9	1634.8 3	42.9 4	21.1 8
New Zealand	56.9 7	1049.6 4	38.6 7	- -
Poland	46.9 15	126.8 14	8.5 16	- -
Spain	60.3 2	133.2 12	16.8 14	100.0 4
Sweden	51.7 11	825.1 6	56.1 2	- -
UK	57.1 5	371.4 8	36.6 8	53.8 6
US	40.1 16	3714.0 1	62.3 1	- -
EU				
OECD				

2001 = a

2000 = b

1999 = c

1998 = d

1997 = e

1996 = f

1995 = g

1994 = h

Transport Infrastructure

Indicator	1	2	3	4	5	6	7	8
Average speed of business deliveries in capital/principal city (minutes)		Road haulage costs - Vehicle excise duty for 40 te gvw articulated lorry - Euro	Rail Infrastructure Indicator	Modal split by country - goods transport - percentage of tonne kilometres (tkms) by road	Modal split by country - goods transport - percentage of tonne kilometres (tkms) by rail	Length of road network per 1,000 km2	Length of motorway per 1,000 km2	Investment in transport infrastructure as a percentage of GDP
Year	2001	Dec.98	1998	1999	1999	1997	1997	1996
Source	Small Firms Association - Speed of Business Survey	UK Freight Transport Association	EU Transport in Figures Statistical Pocket Book August 2000	EU Energy and Transport in Figures 2001	EU Energy and Transport in Figures 2001	OECD Environmental Compendium 1999	OECD Environmental Compendium 1999	EU Energy and Transport in Figures 2001
Country	8 Rank	10 Rank	10 Rank	10 Rank	10 Rank	16 Rank	16 Rank	10 Rank
Denmark	-	792 3	22228 4	70.0 7	8.3 7	1647 5	21.55 4	0.5 9
Finland	15 3	1724 6	20069 5	73.2 6	26.0 2	231 16	1.31 14	0.5 9
France	15 3	773 2	31925 2	76.2 5	15.6 3	1626 7	18.03 6	1.1 4
Germany	53 7	2951 8	50029 1	69.6 8	14.5 4	1838 4	31.68 2	1.1 4
Hungary	-	-	-	-	-	2269 3	4.71 11	-
Ireland	57 8	2201 7	14517 8	92.4 1	7.6 9	1366 8	1.34 13	0.9 6
Italy	-	1008 4	14933 7	86.7 2	8.0 8	1022 10	21.59 3	1.5 1
Japan	16 5	-	-	-	-	3052 1	16.19 8	-
Korea	-	-	-	-	-	957 11	19.02 5	-
Netherlands	14 2	1065 5	12427 9	48.8 10	3.5 10	3036 2	53.61 1	0.7 8
New Zealand	-	-	-	-	-	341 13	0.53 16	-
Poland	-	-	-	-	-	1206 9	0.84 15	-
Spain	-	522 1	7661 10	85.6 3	8.9 6	322 14	17.91 7	1.2 2
Sweden	-	3035 9	31536 3	63.4 9	36.6 1	309 15	2.94 12	1.2 2
UK	13 1	5104 10	19918 6	83.5 4	10.0 5	1629 6	13.72 9	0.8 7
US	18 6	-	-	-	-	674 12	9.50 10	-
EU				74.7	13.4			1.1
OECD								

2001 = a
2000 = b
1999 = c
1998 = d
1997 = e
1996 = f
1995 = g
1994 = h

Transport Infrastructure continued

Indicator	9		10		11		12		13		14		15	
	Year	1996	1999	1999	1999	1999	1999	1999	1998	1999	1999	1999	1999	1999
Source	EU Transport in Figures Statistical Pocket Book August 2000	EU Energy and Transport in Figures 2001	EU Energy and Transport in Figures 2001	EU Energy and Transport in Figures 2001	EU Energy and Transport in Figures 2001	EU Energy and Transport in Figures 2001	EU Energy and Transport in Figures 2001	EU Energy and Transport in Figures 2001	EU Energy and Transport in Figures 2001	EU Energy and Transport in Figures 2001	EU Energy and Transport in Figures 2001	EU Energy and Transport in Figures 2001	EU Energy and Transport in Figures 2001	EU Energy and Transport in Figures 2001
Country	10	Rank	10	Rank	10	Rank	10	Rank	10	Rank	10	Rank	10	Rank
Denmark	38	4	2105	1	26	9	341	10	173.0	10	12496	1	1.4	2
Finland	41	7	1471	4	38	7	407	7	22.0	5	10628	5	1.3	1
France	36	3	689	10	45	6	465	3	20.6	4	11838	2	2.1	5
Germany	45	9	828	8	48	5	515	2	16.0	1	9129	8	4.8	10
Hungary	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Ireland	40	5	1571	2	2	10	346	9	74.0	9	8254	9	2.1	4
Italy	23	1	1563	3	66	3	544	1	20.0	3	11467	3	3.6	8
Japan	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Korea	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Netherlands	44	8	955	7	73	2	398	8	59.5	8	9613	6	2.7	7
New Zealand	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Poland	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Spain	33	2	1268	5	56	4	424	5	39.0	6	8250	10	2.5	6
Sweden	40	5	1197	6	75	1	440	4	52.4	7	9506	7	1.8	3
UK	46	10	757	9	30	8	414	6	17.5	2	10647	4	4.1	9
US	-	-	-	-	-	-	-	-	-	-	-	-	-	-
EU	38	-	1073	-	49	-	460	-	-	-	10066	-	-	3.5
OECD	-	-	-	-	-	-	-	-	-	-	-	-	-	-

2001 = a

2000 = b

1999 = c

1998 = d

1997 = e

1996 = f

1995 = g

1994 = h

Environment and Energy

Indicator	1	2	3	4	5	6	7	8
Year	1999			1994-97	1980 to 1997	1997	1997	2000
Source	Human Development Report, 2000	OECD in Figures 2002	OECD in Figures 2002	OECD Environmental Data Compendium 1999	OECD Environmental Data Compendium 1999	OECD Environmental Data Compendium 1999	World Development Report 2001	OECD in Figures 2002
Country	16 Rank	16 Rank	16 Rank	14 Rank	12 Rank	16 Rank	16 Rank	16 Rank
Denmark	32.0 1	10.6 8	89 5	10.0 8	-28.8 3	3.0 10	3994 8	0.24 4
Finland	5.5 15	7.2 6	80 6	11.6 1	-15.5 7	4.7 15	6435 15	0.33 6
France	13.5 5	13.7 10	77 8	10.0 8	-16.5 6	2.8 8	4224 10	0.21 3
Germany	26.9 2	16.7 11	91 4	9.9 10	-	3.0 10	4231 11	0.31 5
Hungary	7.0 11	5.6 1	26 16	9.8 11	-	1.7 1	2492 1	1.01 15
Ireland	0.9 16	47.0 16	61 13	11.0 2	-36.1 1	2.5 5	3412 5	0.39 9
Italy	7.3 10	7.9 7	63 11	10.9 4	-11.1 9	2.2 4	2839 4	0.35 7
Japan	6.8 13	11.2 9	62 12	11.0 2	-13.7 8	2.7 6	4084 9	0.20 2
Korea	6.9 12	23.4 13	68 10	9.2 13	5.5 11	2.8 8	3834 6	0.70 14
Netherlands	5.7 14	34.9 14	98 1	9.6 12	-22.7 4	3.7 13	4800 13	0.36 8
New Zealand	23.4 3	38.0 15	80 6	-	15.8 12	3.4 12	4435 12	0.46 12
Poland	9.1 7	5.9 2	52 14	10.6 5	-	1.8 2	2721 2	1.79 16
Spain	8.4 8	6.2 3	48 15	6.5 14	-0.8 10	1.9 3	2729 3	0.40 10
Sweden	8.1 9	6.8 5	93 2	-	-21.0 5	4.0 14	5869 14	0.19 1
UK	20.4 4	20.3 12	92 3	10.2 7	-	2.7 6	3863 7	0.41 11
US	13.1 6	6.3 4	71 9	10.6 5	-30.5 2	5.4 16	8076 16	0.63 13
EU	11.2	11.7	76					0.32
OECD	6.4	6.6	63					0.45

2001 = a
2000 = b
1999 = c
1998 = d
1997 = e
1996 = f
1995 = g
1994 = h

Environment and Energy continued											
Indicator	9	10	11	12							
Year	1994-1997	1997	Latest available year	Latest available year							
Source	OECD Environmental Data Compendium 1999	OECD Environmental Data Compendium 1999	OECD in Figures 2002	OECD in Figures 2002							
Country	15 Rank	16 Rank	15 Rank	15 Rank							
Denmark	560 12	50 8	0.9 11	20 1							
Finland	410 6	57 5	1.1 8	150 14							
France	480 9	41 11	1.4 5	80 12							
Germany	460 7	70 1	1.5 4	40 6							
Hungary	500 11	49 9	0.7 14	20 1							
Ireland	560 12	12 16	0.6 15	60 10							
Italy	460 7	31 14	0.9 11	20 1							
Japan	400 4	54 7	1.4 5	40 6							
Korea	400 4	57 5	1.7 2	60 10							
Netherlands	560 12	62 3	1.8 1	30 4							
New Zealand	-	66 2	-	30 4							
Poland	320 1	13 15	1.1 8	170 15							
Spain	390 3	42 10	0.8 13	40 6							
Sweden	360 2	62 3	1.2 7	110 13							
UK	480 9	40 13	1.0 10	40 6							
US	720 15	41 11	1.6 3	-							
EU	450			50							
OECD	500			70							

2001 = a

2000 = b

1999 = c

1998 = d

1997 = e

1996 = f

1995 = g

1994 = h

Social Capital

Indicator	1	2	3
	Income inequality (ratio of share of richest 20% to share of poorest 20%)	Responsiveness of health systems - Level WHO Index	Interpersonal trust - proportion of population indicating that people can generally be trusted
Year	Latest available year	1999	2000
Source	Human Development Report 2002	World Health Organisation Annual Report 2000	Halman, Tilburg University
Country	15 Rank	16 Rank	12 Rank
Denmark	3.6 3	7.1 2	66.5 1
Finland	3.6 3	6.8 8	58.0 4
France	5.6 12	6.8 7	22.2 10
Germany	4.7 7	7.1 3	34.8 7
Hungary	3.5 2	5.5 16	21.8 11
Ireland	6.4 13	6.5 11	35.2 6
Italy	4.2 6	6.7 9	32.6 8
Japan	3.4 1	7.0 4	-
Korea	5.3 9	6.1 14	-
Netherlands	5.5 11	6.9 5	59.7 3
New Zealand	-	6.7 9	-
Poland	5.1 8	5.7 15	18.9 12
Spain	5.4 10	6.2 13	38.5 5
Sweden	3.6 3	6.9 6	66.3 2
UK	7.1 14	6.5 12	29.8 9
US	9.0 15	8.1 1	-
EU			
OECD			

2001 = a

2000 = b

1999 = c

1998 = d

1997 = e

1996 = f

1995 = g

1994 = h

Investment and Capital

	1	2	3	4	5	6	7	8
Indicator	Real total gross fixed capital formation - % growth	FDI inflow (% market share in OECD)	FDI inflow (% GDP)	FDI outflow (% GDP)	Share of foreign affiliates in manufacturing R&D	Cumulative venture capital raised as a percentage of GDP (GNP for Ireland)	Rate of return on capital (business sector) - %	Average return on US investment abroad
Year	2001	2000	2000	2000	1997	1999	1998	1995-1999
Source	OECD Economic Outlook June 2002	OECD in Figures 2002	OECD in Figures 2002	OECD in Figures 2002	OECD, Science Technology and Innovation Outlook 2000, Forfás R&D Study 1999	European Venture Capital Association Yearbook 2000	OECD Economic Outlook December 1998	US Department of Commerce
Country	16	16	16	16	12	10	12	15
	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank
Denmark	0.0	1.5	9.8	5.3	-	0.4	8.9	11.2
Finland	2.1	0.8	7.3	19.9	10.7	1.3	12.9	18.2
France	2.8	4.1	3.4	13.3	16.1	1.5	16.4	6.7
Germany	-4.8	16.4	9.4	2.6	13.6	0.7	15.3	9.5
Hungary	3.1	0.2	3.7	1.2	77.1	-	-	20.6
Ireland	1.1	1.9	21.7	2.8	58.5	1.5	17.0	19.8
Italy	2.4	1.2	1.3	1.2	20.2	0.7	14.6	11.0
Japan	-1.7	2.7	0.6	1.0	0.9	-	11.7	9.1
Korea	-1.7	0.9	2.2	0.8	-	-	-	10.9
Netherlands	-1.1	5.1	14.7	19.5	40.6	1.7	18.9	15.3
New Zealand	-0.6	0.1	2.7	1.1	-	-	19.1	8.8
Poland	-10.0	0.9	5.9	0.0	-	-	-	10.8
Spain	2.5	3.4	6.5	9.6	32.7	0.6	18.2	10.8
Sweden	1.5	2.2	10.2	17.7	20.1	2.2	11.8	11.3
UK	0.1	12.0	9.0	17.5	39.6	4.6	11.1	8.3
US	-0.7	26.2	2.9	1.4	11.8	-	-	-
EU	0.1							
OECD	-1.3							

2001 = a

2000 = b

1999 = c

1998 = d

1997 = e

1996 = f

1995 = g

1994 = h

Investment and Capital continued

Indicator	9	10	11
	Venture capital - share of total venture capital technology investment in Europe by country	Proportion of technology investments classified as venture capital technology investments	High tech investment as a percentage of total investment
Year	2001	2001	2001
Source	PwC Technology Investment Report 2001	PwC Technology Investment Report 2001	PwC Technology Investment Report 2001
Country	12 Rank	12 Rank	7 Rank
Denmark	3.2 7	98 2	-
Finland	1.8 9	88 6	-
France	12.8 4	80 9	23 6
Germany	15.9 2	61 11	38 4
Hungary	1.0 11	100 1	-
Ireland	1.2 10	56 12	81 1
Italy	13.6 3	87 7	46 3
Japan	-	-	-
Korea	-	-	-
Netherlands	5.4 6	94 4	-
New Zealand	-	-	-
Poland	0.3 12	65 10	-
Spain	2.2 8	95 3	-
Sweden	7.7 5	89 5	12 7
UK	26.3 1	83 8	27 5
US	-	-	78 2
EU			
OECD			28

2001 = a

2000 = b

1999 = c

1998 = d

1997 = e

1996 = f

1995 = g

1994 = h

R&D and Innovation

Indicator	1	2	3	4	5	6	7	8
Year	1998	2000	1997-2000	1997-2000	1997-2000	1999-2000	1997-2000	1997-1999
Source	Main Science and Technology Indicators 2001 Vol 1	Eurostat Statistics in Focus - Science and Technology 2002	Main Science and Technology Indicators 2001 Vol 1	Main Science and Technology Indicators 2001 Vol 1	Main Science and Technology Indicators 2001 Vol 1	Benchmarking of National Research Policies (Annex), 2001	Main Science and Technology Indicators 2001 Vol 1	Main Science and Technology Indicators 2001 Vol 1
Country	15 Rank	12 Rank	16 Rank	14 Rank	16 Rank	12 Rank	16 Rank	16 Rank
Denmark	3.0 9	169.5 5	2.00 8	9.47 5	0.31 7	1.37 10	1.25 9	6.1 5
Finland	4.9 4	320.3 2	3.36 2	12.26 4	0.37 3	2.11 5	2.39 2	9.9 1
France	2.2 11	139.7 8	2.17 7	2.75 12	0.39 2	4.95 1	1.37 7	6.1 5
Germany	5.8 3	296.8 3	2.46 5	3.72 11	0.34 6	1.90 6	1.72 6	6.0 7
Hungary	0.7 13	-	0.68 16	13.94 3	0.22 10	-	0.28 16	3.1 16
Ireland	2.7 10	87.6 10	1.39 11	14.91 1	0.07 16	0.77 12	1.01 11	5.1 9
Italy	-	72.3 11	1.04 13	5.55 9	0.22 10	1.36 11	0.56 12	3.3 14
Japan	28.3 1	148.5 7	3.04 3	-0.90 14	0.30 8	3.86 3	2.15 3	9.7 2
Korea	10.9 2	-	2.46 5	5.16 10	0.36 4	-	1.76 5	4.6 11
Netherlands	1.6 12	217.7 4	1.95 9	0.89 13	0.35 5	3.25 4	1.13 10	5.0 10
New Zealand	3.2 8	-	1.13 12	-	0.40 1	-	0.32 14	4.4 12
Poland	0.6 14	-	0.75 15	14.63 2	0.23 9	-	0.31 15	3.3 14
Spain	0.6 14	22.1 12	0.91 14	9.30 6	0.15 14	1.83 8	0.48 13	3.7 13
Sweden	4.6 6	346.4 1	3.80 1	-	0.13 15	1.40 9	2.86 1	9.1 3
UK	3.3 7	124.0 9	1.87 10	6.94 8	0.20 12	1.87 7	1.27 8	5.5 8
US	4.9 4	158.2 6	2.64 4	7.45 7	0.19 4	4.20 2	2.00 4	8.1 4
EU	2.6	152.7	1.85		0.26	1.99	1.20	5.2
OECD	6.0		2.21		0.23		1.54	6.1

2001 = a

2000 = b

1999 = c

1998 = d

1997 = e

1996 = f

1995 = g

1994 = h

1993 = i

R&D and Innovation continued

Indicator	9	10
	Science and engineering degrees awarded as a percentage of the total number of degrees awarded	Total new science and technology PhDs per 000 population (25-34 yrs)
Year	1998	1998-1999
Source	OECD Education at a Glance, 2000	Benchmarking of National Research Policies (Annex), 2001
Country	15	12
Denmark	-	Rank 7
Finland	32.2	0.97
France	28.8	0.71
Germany	34.9	0.75
Hungary	18.0	-
Ireland	26.9	0.61
Italy	26.3	0.17
Japan	26.0	0.24
Korea	39.2	-
Netherlands	18.4	0.35
New Zealand	20.1	-
Poland	17.3	-
Spain	20.6	0.43
Sweden	25.2	1.17
UK	26.9	0.63
US	16.2	0.47
EU		0.55
OECD		

2001 = a

2000 = b

1999 = c

1998 = d

1997 = e

1996 = f

1995 = g

1994 = h

1993 = i

Productivity										
Indicator	1	2	3	4	5	6				
	Productivity per employee per annum (US\$ '000s)	Productivity (GDP per person employed per hour, US\$ per hour worked)	Labour Productivity - percentage change	Productivity - percentage change	Productivity in services - related GDP per person employed in services, US\$ '000s	Productivity in industry - related GDP per person employed in industry, US\$ '000s				
Year	2001	2001	1996 - 2001	2001	2001	2001				
Source	World Competitiveness Yearbook 2002	World Competitiveness Yearbook 2002	EC Economic Data Pocket Book 2002	World Competitiveness Yearbook 2002	World Competitiveness Yearbook 2002	World Competitiveness Yearbook 2002				
Country	16 Rank	16 Rank	12 Rank	16 Rank	16 Rank	16 Rank				
Denmark	59.4 3	35.2 2	8.6 6	1.0 6	59.9 3	62.7 5				
Finland	51.4 7	29.8 8	13.8 2	-0.4 15	52.2 8	52.8 7				
France	54.9 5	34.6 4	8.3 7	1.0 7	56.7 4	51.5 8				
Germany	50.4 10	29.9 7	6.0 9	0.4 10	55.7 6	42.7 11				
Hungary	13.6 15	6.8 15	-	3.0 1	14.3 16	13.3 15				
Ireland	58.9 4	32.8 5	26.2 1	1.1 5	55.7 5	70.5 3				
Italy	50.6 9	29.2 9	5.4 10	-0.3 14	54.4 7	47.7 10				
Japan	64.6 2	34.7 3	7.6 8	0.0 12	68.1 2	64.1 4				
Korea	19.8 14	9.5 14	-	1.6 4	17.3 14	29.8 13				
Netherlands	53.6 6	31.8 6	4.1 12	-0.7 16	50.5 9	77.0 2				
New Zealand	27.1 13	14.5 13	-	0.2 11	26.9 13	29.8 13				
Poland	12.3 16	6.6 16	-	2.5 2	15.9 15	12.8 16				
Spain	39.4 12	22.9 12	4.5 11	0.7 9	43.3 12	35.5 12				
Sweden	49.9 11	26.8 11	10.7 4	-0.2 13	47.2 10	59.1 6				
UK	51.0 8	27.8 10	9.3 5	2.0 3	47.2 10	51.0 9				
US	75.4 1	39.3 1	11.8 3	0.8 8	71.7 1	89.7 1				
EU			7.4							
OECD										

2001 = a
 2000 = b
 1999 = c
 1998 = d
 1997 = e
 1996 = f
 1995 = g
 1994 = h

Macroeconomic Performance

Indicator	1	2	3	4	5	6	7	8
GDP per capita using current prices and PPP US\$	2001	Real GDP growth (%)	Real GDP growth over past 5 years - %	Export performance for total goods (merchandise) - % change	Export performance of commercial services - % change	Current account balance as a percentage of GDP	Consumer prices (percentage change)	Employment growth (percentage change)
Year	2001	2001	1997-2002	2000	2000	2001	2001	2001
Source	OECD in Figures 2002	OECD Economic Outlook June 2002	AMECO Database, DG ECFin	World Trade Organisation: International Trade Statistics 2001	World Trade Organisation: International Trade Statistics 2001	OECD Economic Outlook June 2002	OECD Economic Outlook June 2002	World Competitiveness Yearbook 2002
Country	16	Rank	10	Rank	16	Rank	16	Rank
Denmark	29900	3	12.1	7	22.3	1	2.5	4
Finland	25900	8	17.9	2	-7.4	16	2.7	9
France	25100	11	11.9	8	-0.2	11	1.8	2
Germany	26500	5	9.1	10	0.8	9	2.4	5
Hungary	13200	15	-	12.3	10.6	5	9.2	16
Ireland	31400	2	44.8	1	8.3	7	4.0	12
Italy	26100	7	9.9	9	-6.5	15	2.3	4
Japan	26500	5	-	14.3	13.2	3	-0.7	1
Korea	15700	14	-	19.9	19.9	2	4.1	13
Netherlands	28600	4	14.8	4	-1.2	13	5.1	14
New Zealand	20700	13	-	6.5	-0.3	12	2.6	7
Poland	9900	16	-	15.5	12.6	4	5.5	15
Spain	21000	12	16.6	3	-0.1	10	3.2	11
Sweden	25600	9	13.3	6	1.6	8	2.6	7
UK	25400	10	13.5	5	-3.2	14	2.1	3
US	36500	1	-	11.3	10.4	11	2.8	10
EU	25200	1.7	12.1	2.5	-0.4	0.1	2.5	
OECD	24600	1.0	8.4	8.4	4.5	-1.1		

2001 = a
2000 = b
1999 = c
1998 = d
1997 = e
1996 = f
1995 = g
1994 = h

Macroeconomic Performance continued

Indicator	9	10	11	12	13
	Five year change in total employment - percent	Male participation rate (% population aged 15-64 years)	Female participation rate (% population aged 15-64 years)	Incidence of part-time employment as a percentage of total employment	Standardised unemployment rate as a percentage of total labour force
Year	1997-2002	2001	2001	2000	2001
Source	AMECO Database, DG ECFin	OECD Employment Outlook 2002	OECD Employment Outlook 2002	OECD Employment Outlook 2002	OECD Employment Outlook 2002
Country	16 Rank	16 Rank	16 Rank	14 Rank	16 Rank
Denmark	4.4 11	83.3 5	75.0 2	14.5 6	4.3 4
Finland	8.0 5	76.7 12	72.5 3	10.5 11	9.1 13
France	7.9 6	74.3 13	61.8 9	13.8 7	8.6 12
Germany	3.8 12	79.3 9	63.8 8	-	7.9 11
Hungary	5.7 9	67.8 16	52.4 14	2.8 14	5.8 10
Ireland	25.3 1	79.0 10	56.0 12	18.4 4	3.8 2
Italy	6.3 8	74.2 14	47.3 16	12.2 9	9.5 14
Japan	-2.7 15	85.0 1	60.1 10	24.9 2	5.0 6
Korea	0.4 14	76.8 11	52.6 13	7.5 13	3.9 3
Netherlands	10.5 3	84.2 2	66.9 7	33.0 1	2.4 1
New Zealand	9.3 4	83.4 3	68.5 5	22.7 3	5.3 9
Poland	-4.2 16	71.5 15	59.9 11	11.6 10	18.2 16
Spain	14.5 2	79.8 8	51.6 15	7.9 12	13.0 15
Sweden	7.2 7	81.4 7	77.1 1	17.8 5	5.1 8
UK	4.5 10	82.2 6	67.6 6	-	5.0 6
US	3.3 13	83.4 3	70.5 4	13.0 8	4.8 5
EU	6.65	78.3	60.1	13.8	7.6
OECD		80.5	59.3	14.9	6.5

2001 = a

2000 = b

1999 = c

1998 = d

1997 = e

1996 = f

1995 = g

1994 = h

Internationalisation

Indicator	1	2	3
Trade to GDP ratio - (Exports + Imports) / (2 x GDP)			
Year	2000	2001	2001
Source	World Competitiveness Yearbook 2002	OECD Economic Outlook June 2002	OECD Economic Outlook June 2002
Country	16 Rank	16 Rank	16 Rank
Denmark	42.4 6	3.1 6	3.8 3
Finland	38.8 7	-0.7 13	-1.0 13
France	28.8 12	1.1 8	-0.2 11
Germany	33.9 9	4.7 4	0.1 9
Hungary	69.3 3	9.1 2	6.3 1
Ireland	93.8 1	7.4 3	5.2 2
Italy	27.3 14	0.8 12	0.2 8
Japan	10.9 16	-6.6 16	-0.5 12
Korea	42.8 5	1.0 10	-2.8 15
Netherlands	69.5 2	1.1 8	1.1 7
New Zealand	35.8 8	2.1 7	1.7 6
Poland	30.9 11	10.6 1	-0.1 10
Spain	31.3 10	3.4 5	3.7 4
Sweden	44.3 4	-1.4 14	-3.9 16
UK	28.0 13	1.0 10	2.8 5
US	12.7 15	-4.5 15	-2.7 14
EU			
OECD		-1.5	-1.4

2001 = a

2000 = b

1999 = c

1998 = d

1997 = e

1996 = f

1995 = g

1994 = h



NCC Publications

Annual Competitiveness Report, 1998	March 1998
The Competitiveness Challenge Summary Statement	March 1998
Statement on Telecommunications: A Key Factor in Electronic Commerce and Competitiveness	November 1998
Statement on Skills	December 1998
Annual Competitiveness Report, 1999	May 1999
Report on Costs	June 1999
Statement on Social Partnership	September 1999
Proposals on Transport Infrastructure, the Planning Process and Public Transport	March 2000
The Competitiveness Challenge	May 2000
Annual Competitiveness Report, 2000	May 2000
Statement on Telecommunications, e-Business and the Information Society	July 2000
Statement on Regulatory Reform	July 2000
Statement on Labour Supply and Skills	September 2000
The Competitiveness Challenge, 2001	December 2001
Annual Competitiveness Report, 2001	December 2001
The Competitiveness Challenge, 2002	November 2002
Annual Competitiveness Report, 2002	November 2002

