

2004

Annual Competitiveness Report 2004



National
Competitiveness
Council



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Council Members

The members of the National Competitiveness Council are as follows:

Mr William Burgess	Chairman
Mr Rory Ardagh	Director, Leap Broadband
Mr Donal Byrne	Chairman, Cadbury Ireland Limited
Mr Martin Cronin	Chief Executive Officer, Forfás
Dr. John Fingleton	Chairperson, Competition Authority
Mr Brendan Butler	Director of Enterprise, IBEC
Ms Annette Hughes	Economist, DKM Economic Consultants
Mr Peter McLoone	General Secretary, IMPACT
Ms Ainé Maria Mizzoni	Managing Director, Grafton Recruitment (Ireland) Ltd
Mr Seamus O' Morain	Assistant Secretary, Department of Enterprise, Trade and Employment
Mr Neil Ormonde	Director, Plato Ireland Limited
Mr William Slattery	Chief Executive Officer, State Street International (Ireland)
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Foreword by An Taoiseach



Ireland's recent international competitiveness has played a critical role in our successful economic performance. This economic success has brought many benefits to our society. It is for these reasons that competitiveness remains a key priority of Government policy as we seek to continually improve the living standards of everyone in Ireland.

The economic environment facing Ireland has changed in recent years. Irish firms are facing growing competition both in Europe and globally. We know that we cannot compete on the same basis as in the past. We need to protect our current strengths and develop new bases for competitive advantage. As knowledge and innovation become the basis for competition and economic development, important policy issues in the medium term are developing our innovation potential, the human capital of our country and our economic and technological infrastructure.

As a small open economy we are continually affected by global economic and political developments. Ireland's performance to date has proved robust to these challenges. We have seen inflation fall significantly, although challenges clearly remain. We have maintained huge levels of investment in infrastructure and public services while ensuring that the public finances remain on a sustainable path. We have successfully concluded the Mid Term Review of Sustaining Progress, ensuring that social partnership remains a cornerstone of our success.

The Government's policies are paying off, with employment continuing to increase and a number of very significant new industrial investments announced during 2004. We will continue to pursue policies that create the conditions for our future economic and social development. That is how we will generate the resources to invest for the future, to improve services and to build a better society for all.

The National Competitiveness Council was set up to report to the Government on key issues for Irish competitiveness. I am grateful to the Council for its work. The Government gives careful consideration to all of its recommendations.

I am therefore pleased to introduce both the Annual Competitiveness Report 2004 and the Competitiveness Challenge 2004.

Mr Bertie Ahern, TD,
Taoiseach
October 2004



Chairman's Preface



This year, the National Competitiveness Council is publishing its seventh *Annual Competitiveness Report and Competitiveness Challenge*. The Annual Competitiveness Report 2004 (ACR) analyses Ireland's competitiveness using a wide range of key 'input' and 'output' indicators, drawing on data from bodies such as the OECD and Eurostat; this analysis uses a benchmarking process which compares Ireland's competitiveness to that of our trading partners and main competitors. The *Competitiveness Challenge 2004* draws on the ACR's statistical analysis, highlights weaknesses which threaten Ireland's current and future economic performance and recommends policy responses to meet these challenges.

The economic context for this year's competitiveness reports is, by most measures, highly reassuring. Economic growth is accelerating in tandem with that of our key trading partners. Foreign direct investment is picking up, unemployment remains low and the public finances are in a strong position.

In this economic environment, it may seem untimely to raise concerns about our future economic well-being. Yet it is the role of the NCC to look beyond the immediate and to focus on what is required to sustain our growth into the medium-term. From the analysis in this year's ACR, two key concerns stand out.

First, the analysis within this year's ACR, as well as in the NCC *Statement on Prices and Costs* published in September, confirms the widely-held belief that costs in Ireland are out of line with other developed countries. Together with the risk of a further sharp decline in the value of the dollar against the euro, this presents a growing threat to jobs in Ireland. The fall in the cost of insurance has demonstrated the potential of determined Government actions in improving cost competitiveness for businesses. This determination now needs to be applied across a range of sectors and policy areas that affect costs in Ireland, including fiscal policy, incomes policy, public sector efficiency, infrastructure, competition and regulation. The *Competitiveness Challenge 2004* presents recommendations on how this can be done.

Second, the ACR analysis shows that there remains an inconsistency between our image as a 'high-technology' economy and our underlying 'knowledge base'. Large sections of our economy remain beset by low levels of research and innovation, low productivity, and limited sales and marketing capabilities. As a result, large pockets of our economy remain characterised by low levels of productivity relative to other advanced economies.

As knowledge and innovation become the basis for competitiveness and productivity growth, raising productivity through innovation will be the key to improving our nation's living standards. In this regard, Government measures to increase public and private investment in scientific research are very welcome. Much more, however, needs to be done. We need to build the infrastructure that facilitates the development and flow of information and people, ensure that all of our citizens have the skills to be able participate in the knowledge economy, remove the financial and regulatory barriers affecting entrepreneurs, and ensure that our publicly-funded investments in research are well-targeted and support the needs of Irish industry. Recommendations on all these issues are presented in this year's *Competitiveness Challenge*.

Promoting competitiveness is not an agenda that divides business from wider society. Economic growth and social progress are two sides of the same coin. The NCC believes that implementation of the recommendations on all these issues will help to safeguard Irish competitiveness in the coming years. Sustaining Ireland's future competitiveness is crucial to boosting living standards in our society.

William Burgess

Chairman, National Competitiveness Council

October 2004



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Introduction and Overview **1**

1.1 About the National Competitiveness Council

The National Competitiveness Council (NCC) was established in May 1997 under the Partnership 2000 agreement to report to the Taoiseach and other government ministers on key competitiveness issues for the Irish economy and to make recommendations on actions required to enhance Ireland's growth potential.

This is done through the preparation of the *Annual Competitiveness Report (ACR)* and *Competitiveness Challenge*, as well as through the preparation of other policy statements by the NCC from time to time. Drawing from a wide range of economic indicators, the ACR benchmarks Ireland's competitiveness performance against other countries. On the basis of this benchmarking, the *Competitiveness Challenge* report, which is published alongside the ACR, makes recommendations on the public policy actions that can help improve the competitiveness and performance of Irish-based firms. This year, the NCC is publishing its seventh pair of ACR and *Competitiveness Challenge* reports.

In line with its terms of reference, the NCC seeks to develop a consensus in the preparation of all of its reports and statements. Where this is not possible, the NCC resolves disagreements by a simple majority of votes of the members present. In this sense, not all of the views expressed in this document have been supported by all of the NCC's members.

1.2 Understanding Competitiveness: the NCC Framework

1.2.1 What is National Competitiveness?

The term competitiveness is a notoriously slippery concept. At its narrowest, competitiveness can refer to the impact of developments in costs, prices and wages on the ability of firms in a particular country to compete in international markets. According to Lane, price and wage competitiveness is a state in which medium-term full employment is achieved and the return on capital matches the global risk-adjusted cost of capital.¹ By this definition, an economy is over-competitive if prices and wages are so low that the economy is overheating and employment growth is only achievable via significant levels of net immigration; an economy is under-competitive, if the levels of prices and wages are sufficiently high to generate an increase in the current or future unemployment rate and/or capital disinvestment. Clearly, the more productive is the labour force and the capital stock, the higher is the level of wages (and prices) that is consistent with a state of 'price and wage' competitiveness.

While this narrow concept of competitiveness is not contentious, problems arise when one attempts to broaden the concept of competitiveness to incorporate economic development. The concept of 'national competitiveness' – the idea that countries, like firms, can be in competition with one another – has been a source of friction between economists on the one hand and government planners and politicians on the other ever since the term emerged into the domain of public policy from management literature almost two decades ago.² Most economists are uncomfortable with the idea that nations, like corporations, compete with each other – a concept dismissed by US economist Paul Krugman as crude 'pop internationalism'.³ For economists, industrial development within countries and international trade between countries is a mutually beneficial activity, and rarely, if ever, involves 'win-lose' outcomes. Unlike firms within the same industry, countries trade extensively with each other, and therefore benefit from each other's innovations and cost improvements. The concept of national competitiveness is, to many economists, a distraction used by policy-makers to justify hard choices that have nothing to do with international

¹ Assessing Ireland's Price and Wage Competitiveness", P. R. Lane, Institute for International Integration Studies (IIIS) and Economics Department, Trinity College Dublin and CEPR, July 2004.

² The Competitive Advantage of Nations", M Porter, Macmillan Press Ltd., 1990.

³ What Do Undergrads Need to Know About Trade?", P. Krugman, The American Economic Review, Papers and Proceedings, May 1993.

competition, but that are necessary to support domestic economic reform and productivity growth.

In the view of industrial planners, however, the economists' critique of the notion of competition between nations may ignore the particular situation of small countries such as Ireland, that are highly exposed to international trade and dependent on foreign investment. For them, the reality of international competition in industrial development has been evident from the competing efforts of development agencies in several European countries, including Ireland, to develop European 'hubs' or clusters in areas such as biotechnology, ICT, wireless communications and digital media. At this 'micro' level, Ireland has clearly 'competed' with other countries for mobile investment projects, which have in turn affected the development of entire industries. For industrial planners, Intel's investment in Leixlip is a case in point; Ireland's success in winning Intel's semiconductor fabrication project in the late 1980s by beating off competition from Wales and Scotland was one of the key factors behind the success of the entire Irish electronics industry in the 1990s. In such situations, success for one country can be at the cost of another.

For this reason, the concept of national competitiveness can be linked to a policy of industrial targeting of high quality activities.⁴ According to this perspective, only when industries are characterised by high profits as a result of economies of scale and positive agglomeration effects can there be a meaningful understanding of the concept of national competitiveness. For it follows from the scale economies and 'lock-in' effects that such industries will ultimately converge to only a small number of locations globally. Translating this into non-technical language, many high-technology industries, such as biotechnology, software and aerospace, over time converge in a small number of locations that provide access to the right skills, services and business environment. The essence of national competitiveness is the competing efforts by nations to capture the economic benefits available from these industries by ensuring that such industries locate and develop within their jurisdictions. According to this perspective, countries compete to develop a winning formula to attract companies in targeted high-growth sectors, and then to lock in a first-mover advantage that will subsequently yield high returns.

1.2.2 The NCC Definition of Competitiveness

The NCC has chosen a definition of national competitiveness that attempts to offer simplicity and steer clear of these debates. According to the NCC:

"Competitiveness is the ability to achieve success in markets leading to better standards of living for all. It stems from a number of factors, notably firm level competitiveness and a supportive business environment that encourages innovation and investment, which combined lead to strong productivity growth, real income gains and sustainable development".

This definition brings together a number of issues that are important to the NCC. First, the definition draws attention to the NCC's view that in the long-run, competitiveness is essentially about growth in productivity. Productivity (often defined as the value of output per hour worked), is a measure of the efficiency with which goods and services are produced and is the key long-term determinant of every nation's living standards. As an advanced economy, firms in Ireland cannot, and should not, be trying to compete on the basis of wage costs, but rather on the basis of their ingenuity and efficiency. Improvements in productivity, through more innovation in product and process design at the firm level, as well as greater efficiency across our public services, will be vital to future growth in incomes and living standards. Public policy has an important role in stimulating such improvements.

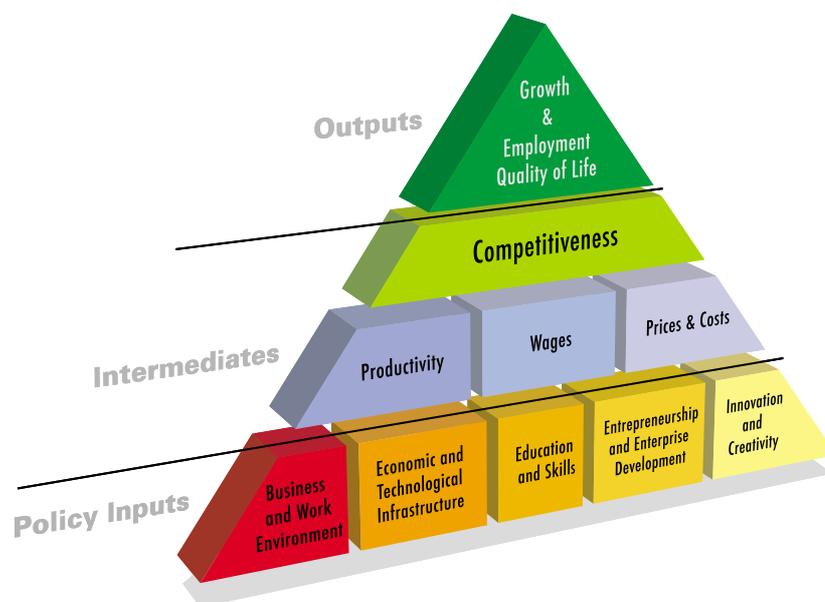
⁴ Competitiveness and its Predecessors: a 500-Year Cross-National Perspective", E. Reinert, Paper prepared for the Business History Conference, Williamsburg, Virginia, March 1994.

Second, while acknowledging that productivity is the key long-term determinant of competitiveness, the definition also draws attention to the importance of costs and the ability of firms to compete in international markets. In the short-run, national developments in prices, wages and exchange rates can have significant impacts on the competitive performance of a nation's firms – even those firms with high rates of productivity growth. This is particularly true of small countries, like Ireland, that are highly open to international trade.

Finally, the definition emphasises that promoting competitiveness should not be an agenda that divides business and wider society. Economic dynamism and social progress must go hand-in-hand. An innovative and competitive enterprise base offers the best opportunity to construct a fair and inclusive society in which all can contribute and benefit from rising prosperity. Policies that aim to promote national competitiveness must be sustainable both socially and environmentally.

1.2.3 The NCC Competitiveness Framework

Figure 1: National Competitiveness Framework Model



The 'competitiveness pyramid' above illustrates the framework that the NCC uses to understand national competitiveness, and forms the structure of the ACR. The framework distinguishes between the 'inputs' into competitiveness and the 'outputs' from competitiveness.

'Policy Inputs' into Competitiveness

The five 'Policy Inputs' (along the bottom row of the pyramid) represent the primary drivers of cost competitiveness and productivity growth. It is through policy measures under these headings that government can have the greatest impact on competitiveness, both in the short- and long-runs. The policy areas covered under these five headings and discussed in detail in Section 2 of the report are:

1. Business and Work Environment

- Competition and Regulation
- Labour Market
- Taxation and Macroeconomic Policy
- Openness to Trade and FDI

2. Economic and Technological Infrastructure

- General Infrastructure
- Transport
- Information and Communication Technology (ICT)
- Energy
- Housing

3. Educations and Skills

- Investment in Education and Skills
- Participation & Attainment in Education and Skills

4. Entrepreneurship and Enterprise Development

- Entrepreneurship and Business Formation
- Firm Level Management Skills
- Clusters and Networks

5. Innovation and Creativity

- Investment in Knowledge
- Application of Knowledge

Competitiveness Outputs

'Outputs' from competitiveness refer to the results of the policy inputs, and are assessed and discussed in Section 3 of the report. This is divided into two sub-sections.

First, the report examines 'Intermediates', or secondary policy objectives. These comprise:

- Productivity
- Wages
- Prices and Costs

High and rising levels of productivity, a competitive cost base and sustainable wage growth are not ends in themselves, but represent important milestones in measuring progress towards the primary policy objectives.

The ultimate reason for policy makers to pursue competitiveness is to improve the living standards and quality of life available to people in Ireland. The final section of the ACR benchmarks and discusses Ireland's performance regarding desired 'outputs' of national competitiveness. These are covered under two headings:

- Living Standards and Employment
- Quality of Life and Environmental Sustainability

1.2.4 International Benchmarking

To assess Ireland's performance under each of these headings, the report uses a total of 143 statistical indicators that are internationally comparable. These statistics are drawn from a range of international sources, including the International Monetary Fund (IMF), the OECD, Eurostat, the World Economic Forum (WEF) World Competitiveness Yearbook, the IMD and various agencies of the United Nations.

Ireland's performance in each of these indicators is ranked against a list of 15 other countries. The list of comparator countries has been amended since 2003 to better reflect Ireland's trading partners and competitors for mobile investment flows. The list is made up of seven eurozone countries, two European Union countries which are outside of the eurozone, two new EU members, one non-EU European country and four non-European countries chosen for either their global importance (e.g. the USA) or for their similarity to Ireland in terms of size and/or stage of economic development (e.g. New Zealand).

Table 2: Selected Comparator Countries

Eurozone

1. France
2. Finland
3. Germany
4. Ireland
5. Italy
6. Netherlands
7. Spain

Non-Eurozone

8. Denmark
9. United Kingdom

EU Accession

10. Hungary
11. Poland

Other

12. New Zealand
13. Singapore
14. South Korea
15. Switzerland
16. United States

Under each of these indicators, a rank of '1' is given to the country that is deemed most competitive, while a rank of '16' is given to the least competitive country (assuming data for that particular indicator are available for all 16 countries). Hence, in general, a low ranking implies a healthy competitiveness position, while a high ranking implies a weak position. In some situations, however, the direction of the ranking hierarchy is contentious. With regard to the minimum wage, for example, it is not always clear whether a high minimum wage is a sign of excessive government interference in the labour market (which may damage competitiveness and therefore lead to a high ranking) or whether a high minimum wage is reflective of high levels of productivity (which would deserve a low ranking). Where such difficulties in interpretation occur, they are highlighted in the text and in the footnotes to the indicator.

While the NCC believes that competitiveness benchmarking is a useful exercise, it is important to draw attention to its limitations. Much of the data that help to measure economic performance and competitiveness are not available or internationally comparable. Apart from not having data for matters which are essentially measurable, there is also the problem that certain matters – quality of life being a prime example – are difficult to measure by statistical methods and so have to be approached through proxy measures. Data timeliness is another challenge; internationally comparable data often tends to lag the most current national data.

Gross National Product vs. Gross Domestic Product

Many indicators in this report, such as investment in education and levels of taxation, are expressed in relation to the size of the respective economies so as to facilitate like-for-like comparisons. Where appropriate, the Irish performance under such indicators is provided using two methods of estimating the size of the Irish economy. First, the conventional **Gross Domestic Product (GDP)** measurement of output is used. This is the most commonly used international method of estimating the size of an economy, and is defined as the sum of the gross value added through the production of goods and services within the economy. It represents the total expenditure on the output of goods and services produced in the country accruing to both permanent residents and non-residents.

In addition, the **Gross National Product (GNP)** measurement of income is also used for some indicators. This is defined as total income accruing to the permanent residents of the country, and is calculated by adding the 'net factor income' from abroad to the estimate of GDP. Net factor income from abroad includes the incomes from economic activity of Irish residents abroad – profits or rents from property – but excludes incomes arising in the Irish state to non-residents, including the profits of foreign owned multinational corporations.

Using the GNP measurement facilitates, in some instances, better international comparisons. This is because it is arguably a better estimate of the resources available to Irish residents and of Irish living standards, as it avoids the distortions to Irish GDP caused by large financial flows through the economy as a result of the large presence of multinational firms in Ireland. Most recent estimates show that the Irish GNP is 25 per cent lower than the Irish GDP. This large gap between GDP and GNP is almost unique among developed countries. In the rest of the EU, GNP is usually within plus or minus two per cent of GDP.⁵

⁵ 'Irish Public Spending in Perspective', C. McCarthy and J. Lawlor, *Irish Banking Review*, Autumn 2003.

1.3 Overview and Executive Summary

We move in reverse order by first examining the ‘outputs’ section of the report (Section 3.2). The economic context for this year’s competitiveness reports is, by most measures, reassuring. According to Central Bank forecasts, Gross National Product (GNP) should grow by about 4.25 per cent this year compared with 2.8 per cent last year. This largely reflects the recovery in export demand as a result of the strong global economic recovery, driven mainly by the USA, as well as the improving fortunes of the information and communications technology industry, which is of particular importance to Ireland. Total employment grew by 2.9 per cent in the 12 months to the first quarter of the year. The unemployment rate has fallen to below 4.5 per cent in 2004, down from over five per cent in 2003. Foreign direct investment, business confidence and industrial output have all recovered strongly in 2004, and the public finances are in a healthy state.

Ireland’s rapid economic growth in recent years has lifted measured output per capita to among the highest in the world. In 2002, GDP per capita measured \$32,600, second only to the US among the 16 countries benchmarked in the ACR. GNP per capita in 2002 was lower, at \$26,600, putting Ireland in ninth place among the 16 countries. Nonetheless, living standards in Ireland are still somewhat behind those of the USA, reflecting the lower employment rate and average working hours in Ireland, as well as the lower productivity per hour worked. Moreover, unlike many other advanced economies, such as Germany, France and the USA, Ireland has not yet had the opportunity to accumulate a significant amount of material ‘wealth’.

Fast economic growth has brought the Irish economy to effective full employment. Employment in Ireland grew by 0.9 per cent in 2003, the 4th highest growth rate of the 15 countries measured on this benchmark. Supported by high levels of immigration, rising labour force participation (particularly among women), natural growth in the native working-age population and falling unemployment, total Irish employment grew by 23.9 per cent in the period between February 1998 and February 2003. Strong employment growth in recent years meant that Ireland’s unemployment rate was down to just 4.5 per cent in 2004, 4th lowest of the benchmarked countries.

Measures assessing broader concepts of quality of life and environmental sustainability show a mixed performance by Ireland. Ireland scores very well under the UN’s Human Development Index, reflecting our strong performance in terms of life expectancy and income per capita. Measures of environmental sustainability in Ireland are, however, much weaker.

Ireland’s current robust performance in terms of exports, output and employment is, in some respects, surprising. Indicators in the *Intermediates* section of the report (Section 2.1), covering productivity, wages, costs and prices, suggest that, in many ways, Ireland’s competitiveness has deteriorated in recent years. Since 2000, the average cost of Irish goods and services (when measured in a common currency) increased by over a fifth relative to our major trading partners. The rise in the external value of the euro over this period, particularly against the US dollar, has been the biggest cause of the deterioration in Ireland’s cost competitiveness, although fast growth in domestic prices and wages has also played a significant role. By 2003 Ireland was virtually on a par with Finland as the most expensive country in the eurozone for consumer goods and services. According to analysis carried out for the NCC, by the end of 2003 Ireland’s price level relative to our trading partners (when measured in a common currency) was eight per cent above its long-run sustainable level – the level that keeps the Irish economy competitive enough to sustain full employment.

As with prices, Irish wages have been rising faster than in other EU countries for a number of years. In the period 1998-2003, nominal compensation per employee (before tax) in Ireland grew by 37.1 per cent – faster than in any other eurozone country. This compared with growth in nominal compensation per employee of just 8.7 per cent in Germany over the same period. By 2004, gross annual average compensation in Ireland (before tax) was estimated at €38,140 (Figure 8). This was higher than that of the EU15 average (€34,630), the UK (€35,750) and compares with just €10,920 in Hungary and €8,340 in Poland.

The impact of rising pay costs on business competitiveness has been offset by rising worker productivity only in a small number of sectors. A small number of capital-intensive industries dominated by multinational companies (MNCs), such as chemicals, pharmaceuticals and electronics, have accounted for the bulk of industrial productivity growth. While these sectors account for the bulk of the value added in production, they represent a disproportionately smaller share of total manufacturing employment. Moreover, productivity growth in these sectors may have been over-stated as a result of transfer pricing activities by MNCs. In contrast, the more labour intensive sectors (transport equipment, leather, and textiles) have generally suffered a significant rise in unit labour costs between 1995 and 2003. As wage costs matter a lot more for labour intensive firms than for capital intensive firm, this deterioration in unit labour costs for labour intensive sectors presents a clear threat to employment levels in these sectors.

A number of explanations are possible for the apparent mismatch between our current strong growth performance and the indicators of declining international competitiveness. First, recent output and employment performance has to be interpreted in the context of the artificial state of ‘super competitiveness’ enjoyed by Ireland during the period 1999-2000, as a result of the sharp depreciation in the external value of the euro. Hence, the loss of competitiveness since 2000 may simply be returning Ireland to a more normal equilibrium. Second, the rapid growth in prices and wages in recent years in part represents a catching-up phase in the wake of prolonged wage suppression during the 1990s as part of the social partnership process. Third, most of the data that is available (both in Ireland and internationally) only assess the competitiveness of the manufacturing sector. As services become a more important driver of our economy, this is a major handicap; it may well be that productivity and cost developments in Irish services activities present a more benign picture of developments in Ireland’s overall competitiveness.

Finally, and more worryingly, the muted reaction of output and employment so far may in part be the result of firms willing to absorb a temporary decline in profit margins. If the decline in competitiveness persists, a lagged response in terms of loss of living standards and employment may still occur. Indeed, it may well be that Ireland is at an inflection point in terms of its growth profile: going forward the pressures on our competitive position are considerable. These include the continued growth in domestic prices and wages, the growth threat from accession countries and emerging Asia in terms of attracting FDI flows and the substantial possibility that the euro will appreciate further, at least against the dollar.

What does the benchmarking of Ireland’s Policy Inputs (Section 2) tell us about what needs to be done to sustain our competitiveness and growth in the coming years? Looking first at the *Business and Work Environment* (Section 2.1), it seems that Irish government policies in areas such as business and labour market regulation, competition, international trade and investment, taxation and macroeconomic management have, on the whole, had a very positive impact on business flexibility, cost competitiveness and innovation. Areas that require some attention are the need to increase domestic competition and to maintain Ireland’s good reputation as a investment-friendly location in terms of business regulation.

Ireland's performance with regard to *Economic and Technological Infrastructure* (Section 2.2) is of greater concern. Notwithstanding the large investments currently being made in Ireland's infrastructure, survey evidence continues to give Ireland a very poor ranking for the efficiency and effectiveness of infrastructure in transport, energy and ICT, and for overall infrastructure quality. This survey evidence is, for the first time, backed up with harder quantitative data based on the level of public capital stock in different countries using historical data on gross government investment. Past under-investment in infrastructure is likely to be now suppressing productivity and increasing costs across the enterprise sector.

Looking next at *Education and Skills* (Section 2.3), Ireland ranks close to the middle of the 16 countries benchmarked in both performance and investment. Public and private investment in education in Ireland in 2001 was around 5.3 per cent of GNP (4.5 per cent of GDP), placing us joint 9th out of 15 countries. In terms of average spending per student, Ireland has relatively low levels of investment at all stages in the education system, from pre-primary all the way up to university education. In terms of performance, Irish 15 year-olds perform strongly in terms of reading skills, although less well in terms of scientific and mathematical literacy. Completion rates in secondary level education remain low (at under 80 per cent). Our third level performance is good in terms of participation, but as regards quality there is no quantitative evidence available. Participation in life long learning in Ireland has increased significantly in recent years, although there is still a significant gap between us and the global leaders on this measure.

Ireland's comparative performance with regard to *Entrepreneurship and Enterprise Development* is mixed (Section 2.4). On entrepreneurship, Ireland generally performs positively. Ireland leads Europe in the rate of business start-ups and ranks 4th out of the 16 countries benchmarked. While the rate of business start-ups is high by European standards, Ireland lags behind the leading entrepreneurial nations, particularly the USA, South Korea, New Zealand and Australia. This may reflect the growing administrative burden faced by entrepreneurs in Ireland, and continued difficulties faced by Irish entrepreneurs in accessing risk finance. Measures of enterprise development for Ireland are less encouraging. Too few indigenous Irish firms have grown into world-beating players in their sectors. Large sections of Irish enterprise remain beset by low levels of R&D and innovation, low productivity, limited sales and marketing capabilities and over-concentration in traditional sectors and on the domestic and UK markets.

Finally, we look at *Innovation and Creativity*, which measures the degree to which scientific knowledge and business process innovation have been applied by Irish industry to improve their competitiveness (Section 2.5). With regard to investment in knowledge, notwithstanding recent policy measures, both public and business investment in R&D were still well below the levels pertaining in other advanced economies, as well as the Lisbon Strategy targets for EU countries. Given Ireland's limited historical investment in knowledge creation, it is not surprising we also perform poorly regarding the application of knowledge for commercial innovation. There is also considerable evidence that Ireland ranks poorly for the application of ICT to support 'business process innovation'.

Summary of findings of ACR 2004

Business Environment

Ireland generally scores poorly for competition while the scores for regulatory burden suggest a decline in performance since last year. Ireland remains competitive in terms of taxation policy and openness to international trade and investment.

Rankings: Intensity of local competition 13/16; Burden of regulation 5/16; Effective marginal standard corporate tax rate 1/9; Exports of goods and commercial services 2/16

Economic and Technological Infrastructure

Overall, performance has been very weak, particularly for transport and broadband infrastructure, despite continued high levels of investment.

Rankings: Infrastructural stock 11/12; Efficiency of distribution infrastructure 15/16; Broadband access 14/15

Education and Skills

Ireland continues to enjoy relatively strong attainment levels despite low levels of investment.

Rankings: Public and private investment in education 15/15; Percentage of population aged 25-34 that has at least third level education 6/15; Science and engineering graduates (aged 20-29) 1/13

Entrepreneurship and Enterprise Development

Ireland continues to have high levels of entrepreneurship vis-à-vis the EU but lags US performance. There are however a number of weaknesses particularly in relation to finance for start-ups. Performance in terms of cluster development has improved.

Rankings: Total entrepreneurship activity 4/16; Cumulative venture capital 9/12; Cluster development 5/16

Innovation and Creativity

Low levels of investment in R&D have resulted in poor innovation performance undermining Ireland's ambitions of becoming a knowledge driven economy.

Rankings: Gross expenditure on R&D 11/15; Total new science and engineering PhDs per 1,000 population (aged 25-34) 6/12

Intermediate Policy Objectives

Strong aggregate productivity performance masks large differentials between indigenous and foreign owned firms. Rising wages and costs also undermine the international competitiveness of Irish based firms.

Rankings: Hourly productivity 8/13; Nominal compensation per employee 10/14; Consumer price inflation 6/15

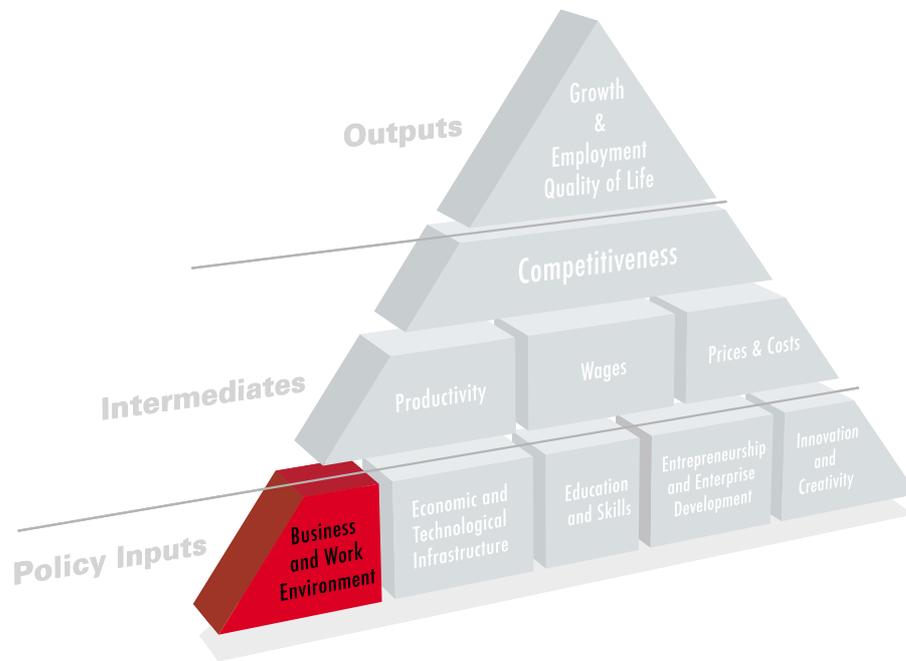
Outputs

Despite a number of weaknesses in the input sections, Ireland remains a strong macroeconomic performer. In terms of quality of life and sustainable development, however, Ireland scores poorly.

Rankings: GDP growth (1998-2003) 1/15; Employment growth 4/15; Sustainable development 8/16

Inputs to Competitiveness **2**

2.1 Business and Work Environment



Business and Work Environment - Labour Market

Indicator	8	9	10	11	12	13
Labour force participation rate (% pop 15-64)	2003	2003	2004	2003	2000	Average 2000-2002
Source	OECD Economic Outlook 2004	OECD Employment Outlook 2004	Eurostat Statistics in Focus 10/2004	IMD World Competitiveness Yearbook 2004	OECD Trends in International Migration 2002	IMD World Competitiveness Yearbook 2004
Year	2003	2003	2004	2003	2000	Average 2000-2002
Country	15	15	8	16	13	16
Rank	Rank	Rank	Rank	Rank	Rank	Rank
Finland	74.4	72.1	3	5.32	1.5	10
France	70.2	62.5	9	2.58	6	4
Germany	75.9	64.5	8	1.88	8.8	3
Hungary	58.5	53.9	13	6.00	0.9	12
Ireland	69.9	57.6	11	5.23	3.7	6
Italy	61.7	48.3	15	4.11	3.6	7
Korea	66.9	52.8	14	3.17	0.6	13
Netherlands	67.2	68.4	7	3.95	3.4	8
New Zealand	76.1	69.3	5	3.56	11	2.73
Poland	62.9	56.4	10	2.64	14	8.67
Singapore	-	-	-	7.76	2	0.68
Spain	69.0	55.7	12	4.23	1.2	0.00
Switzerland	87.6	73.9	2	7.67	18.3	86.90
UK	76.2	69.2	6	4.74	4.4	2.13
US	75.3	69.7	4	6.37	12.4	13.16
EU	70.0	61.3	-	-	-	26.84
OECD	69.5	59.6	-	-	-	-

*Note: The NCC has ranked those countries with a high minimum wage as the least competitive. It should be recognised, however, that a high minimum wage can also be reflective of high levels of productivity.

**Note: 1 = Labour regulations hinder business activities

***Note: Figures for Netherlands and UK are as a percentage of total employment; figures for Finland and Spain refer to 1999 while Netherlands refers to 1998

Business and Work Environment - Taxation and Macroeconomic Policy

Indicator	14	15	16	17	18	19	20	21	22
	General government balance (% GDP)	Cyclically adjusted general government balances	General government total tax and non-tax receipts (% GDP)	Change in tax to GDP ratio (%)	Standard corporate tax rate (%)	Effective marginal standard corporate tax rate (%)	Income tax plus employer & contributions less cash benefits, married with 2 children (% gross labour costs)*	Change in tax wedge, married with 2 children (% gross labour costs)**	Taxes on property (% GDP)
Year Source	2003 OECD Economic Outlook 2004	2003 OECD Economic Outlook 2004	2003 OECD Economic Outlook 2004	1995-2001 OECD Revenue Statistics 1965-200	2004 KPMG Corporate Tax Rates Survey	2001 Baker & McKenzie Effective Tax Burden of Companies in Member States of EU	2003 OECD Taxing Wages 2002-2003	1996-2003 OECD Taxing Wages 2002-2003	2001 OECD Revenue Statistics 1965-2002
Country	15 Rank	11 Rank	14 Rank	15 Rank	16 Rank	9 Rank	15 Rank	15 Rank	15 Rank
Denmark	1.2 4	2.2 3	57.3 14	0.4 7	30.00 8	18.81 8	37.5 5	-1.0 9	1.7 10
Finland	2.1 3	3.0 10	52.7 13	1.0 9	29.00 6	18.09 3	38.4 11	-4.2 6	1.1 13
France	-4.1 12	-3.3 10	50.4 12	1.0 9	34.33 11	30.11 9	40.1 9	-0.7 11	3.1 2
Germany	-3.9 11	-2.3 8	45 9	-1.4 6	38.29 15	25.20 8	43.9 15	-1.5 8	0.8 14
Hungary	-5.9 15	-	44.2 8	-3.4 2	16.00 2	2 2	34.8 8	-9.9 2	0.7 15
Ireland	0.2 6	-0.4 5	35.4 3	-2.9 4	12.50 1	9.43 1	15.7 2	-18.2 1	1.7 10
Italy	-2.5 8	-1.6 6	46.4 11	0.8 8	37.25 14	13.74 2	40.9 13	-8.3 3	2.0 7
Korea	4.7 1	-	29 1	6.7 15	29.70 7	13.4 1	13.4 1	8.3 15	3.1 2
Netherlands	-3.2 9	-1.7 7	45.6 10	-2.4 5	34.50 12	20.67 6	37.3 9	0.2 12	2.0 7
New Zealand	3.1 2	2.7 2	41.6 6	-3.2 3	33.00 10	19.9 3	19.9 3	1.6 13	1.8 9
Poland	-4.2 13	-	42 7	-6.0 1	19.00 3	42.4 14	42.4 14	1.8 14	1.3 12
Singapore	-	-	-	-	22.00 4	-	-	-	-
Spain	0.3 5	0.5 4	39.9 5	2.4 13	35.00 13	18.30 4	34.1 4	-2.6 7	2.2 6
Switzerland	-1.2 7	-	-	2.1 12	24.10 5	20.83 7	23.3 5	-0.9 10	2.8 5
UK	-3.2 9	-2.9 9	39.3 4	2.5 14	30.00 8	20.83 7	23.9 6	-7.0 5	4.3 1
US	-4.8 14	-4.2 11	30.9 2	1.3 11	40.00 16	23.2 4	23.2 4	-8.3 3	3.1 2
Ireland - GNP	0.2	-0.5	42.7						2.1
EU	-2.7	-1.7	46.2						
OECD	-3.8	-3.4	37						

*Note: With one person earning 100% and the second earning 67% of the average wage

**Note: With one person earning 100% of the average wage.

Business and Work Environment - Openness to Trade and FDI

Indicator	23		24		25		26		27		28	
	Year	2002	Imports of goods and commercial services (% GDP)	2002	Extra EU exports + imports (% GDP)	2003	Foreign direct investment inward stock (% GDP)	2002	Foreign Direct Investment outward stock (% GDP)	2002	Index of economic freedom*	2004
Source	World Trade Organisation Statistics 2003	World Trade Organisation Statistics 2003	Eurostat Structural Indicators	UNCTAD FDI Database	UNCTAD FDI Database	Index of Economic Freedom 2004	Rank	Rank	Rank	Rank	Rank	Rank
Country	16	16	8	14	14	14	14	14	14	16	16	16
Denmark	46.78	42.28	-	42	42	42	42	42	42	43	43	43
Finland	38.65	31.8	23	27	27	27	27	27	27	53	53	53
France	27.94	27.7	14	28	28	28	28	28	28	46	46	46
Germany	36.12	32.32	23	23	23	23	23	23	23	29	29	29
Hungary	64.67	68.73	3	38	38	38	38	38	38	7	7	7
Ireland	82.58	75.71	2	129	34	1	1	1	1	30	8	1.74
Italy	24.74	25.63	14	11	16	5	11	11	11	16	16	16
Korea	37.03	9.21	16	75	34	1	75	75	75	85	85	85
Netherlands	70.25	65.75	4	50	7	3	50	50	50	13	13	13
New Zealand	34.55	34.73	7	24	8	11	24	24	24	1	1	1
Poland	27.06	33.87	8	-	1	1	-	-	-	1	1	1
Singapore	188.33	155.19	1	33	8	8	33	33	33	33	33	33
Spain	27.56	29.31	11	44	6	4	44	44	44	111	111	111
Switzerland	42.95	36.93	6	41	5	6	41	41	41	66	66	66
UK	24.89	28.57	12	13	15	13	13	13	13	14	14	14
US	9.25	13.43	15	158	158	158	158	158	158	37	37	37
Ireland - GNP	101.17	92.51										
EU												
OECD												

*Note: The Index of World Economic Freedom is a composite indicator measuring 50 independent variable divided into 10 factors of economic freedom: trade policy, fiscal burden of government, government intervention, monetary policy, FDI, banking, wages & prices, property rights, regulation and informal market activity.

2.1 Business and Work Environment

The Business and Work Environment is the first policy input area in the NCC competitiveness framework. It refers to the impact of government policies in areas such as business and labour market regulation, competition, international trade and investment, taxation and macroeconomic management on business flexibility, cost competitiveness and innovation. The indicators examined under this heading cover four main areas:

- Competition and Regulation
- Labour Market
- Taxation and Macroeconomic Policy
- Openness to Trade and FDI

2.1.1 Competition and Regulation

The first heading examined under the Business and Work Environment is Competition and Regulation. Research by the OECD (amongst others) has indicated that market entry by new firms and a high degree of rivalry between existing firms improves industry-level productivity and competitiveness.⁶ Intense domestic competition can also reduce aggregate price levels for consumers.⁷ For this reason, it is important for a country's international competitiveness that its legislative and regulatory frameworks ensure vigorous competition. Regulations that inhibit entry of new players reduce competition, with negative impacts on consumer choice, costs, technological diffusion and firm level innovation. When well-designed, business regulation can improve the functioning of markets and achieve environmental and social goals without imposing a significant compliance burden on firms.

For the purposes of this chapter, competition policy refers to all regulations and policies that impact on the intensity of domestic competition. Regulatory policy refers to the administrative burden that falls on existing firms as a result of the need to comply with legislation and regulations (often cumulatively described as 'red tape').

Intensity of Local Competition

International surveys of leading industrialists administered by the *World Economic Forum* (WEF) and the *Institute for Management Development* (IMD) are the primary sources of information regarding the intensity of local competition across different countries.

The WEF survey benchmarks the degree of price competition and the frequency of changes in market leadership across the economy (Figure 2). Ireland's score on this indicator (5.2 out of a maximum seven) equates to a rank of 13th out of the 16 countries benchmarked in the ACR. Another WEF indicator measuring the extent of locally based competitors places Ireland 13th out of the 16 countries covered in the ACR (Indicator 2).

This poor performance regarding the intensity of local competition may be the result of a combination of factors. First, the limited size of the Irish market may restrict the level of domestic competition, particularly in the utility markets and other regulated network industries characterised by economies of scale. Second, the development of a pro-active competition agenda in Ireland has been a relatively recent occurrence when compared with many of our principle competitors. This is supported by an IMD survey indicator that places Ireland 10th out of 16 for the efficiency of competition legislation (Indicator 3). Finally, the intensity of competition in Ireland may have been negatively influenced by government regulations and practices that inhibit competition across a number of important sectors of the economy, including retailing, transport and professional services.

⁶ 'The Sources of Economic Growth in OECD Countries: A Review Article', M. Baily, Fall 2003.

⁷ 'Assessing Ireland's Price and Wage Competitiveness', Pp R. Lane, Institute for International Integration Studies (IIIS) and Economics Department, Trinity College Dublin and CEPR, July 2004.

Figure 2 Intensity of Local Competition (7 = intense) (Indicator1)

The degree of competition for public procurement contracts is another, albeit imperfect, indicator of the support for competition among policy-makers. While public procurement activity in Ireland, as in other EU countries, is determined by EU competition rules, it is noteworthy that there remain significant differences between EU countries with regard to the proportion of total public procurement contracts (as a percentage of GDP) which are openly advertised. In 2002, the value of advertised public procurement as a percentage of GDP was 2.4 per cent in Ireland, ranking us 5th out of the nine countries benchmarked on this measure (Indicator 4). It is worth noting that only larger procurement contracts must be openly advertised. While higher aggregation of public procurement contracts may attract greater interest from overseas suppliers and generate short-term savings, this process is also likely to exclude domestic SMEs from tendering.

Another oft-cited measure of government policy towards competition is the level of subsidies for industry. Subsidies can inhibit competition by propping up loss-making firms and industries. On the other hand, well targeted state interventions can also be used to catalyse the development of new industries in particular countries and regions. Ireland does not subsidise industry as much as other EU countries. Measures of the level of sectoral and ad hoc state aid (as a percentage of GDP) show that Ireland is ranked 6th out of 11 countries (a rank of one for the country providing the lowest level of subsidy) (Indicator 5).

Impact of Regulation

Most regulations – whether through legislation or administrative procedures – are implemented for valid public policy reasons, such as protecting the environment, consumers and employees. Regulation is necessary in many areas in which business operates to ensure that there is no abuse of a dominant position and that laws are adhered to by all businesses. Effective regulation is often also required for the effective functioning of markets e.g. financial markets could not function without regulations governing the rights of debtors and creditors. The role of the state is to ensure that regulation is effective, light and that it rapidly reflects changes in technology and socio-economic developments. For this reason, processes to achieve better regulation are increasingly being used across the developed world as a means of developing a competitive edge in the race for investment and jobs.

International surveys of industrialists administered by the WEF and the IMD are the primary sources of information regarding the burden of regulation across different countries. According to the WEF survey, the administrative burden on Irish enterprises is low relative to many of the other countries benchmarked. While a score of 3.4 is a slight improvement on last year, Ireland's corresponding ranking in the ACR has declined from 2nd to 5th, suggesting that other countries are making greater strides in minimising the regulatory burden on firms (Figure 3).

This decline confirms anecdotal evidence from the business community that Irish firms are experiencing a significant rise in the regulatory burden as a result of both EU and domestic legislation.

Figure 3 Burden of Regulation (7=low) (Indicator 6)



Source: World Economic Forum

That said, the relatively low regulatory compliance burden in Ireland remains an advantage for firms operating here. According to an IMD survey, the levels of bureaucracy in Ireland do not unduly hinder business activity. Under this indicator Ireland is ranked 6th out of the 16 countries benchmarked (Indicator 7).

2.1.2 Labour Market

The Labour Market is the second of the headings examined in this chapter. By fostering employment opportunities, well-functioning labour markets are essential for achieving high economic growth and for insuring that the subsequent benefits of growth are shared among the entire population. In a period of rapid technological change, labour markets are faced with the dual challenge of minimising the potential hardship that these changes create, while ensuring an effective re-allocation of resources from declining sectors to emerging ones. Labour costs form a major element of a firm's cost structure (wages are examined in detail in section 3.1.2) and in order to maintain cost competitiveness, labour market institutions need to deliver real wage gains that are intimately linked with improvements in labour productivity.

The indicators in this section can be divided into five main categories covering labour force participation, the minimum wage, labour market regulation, immigration and the state of industrial relations.

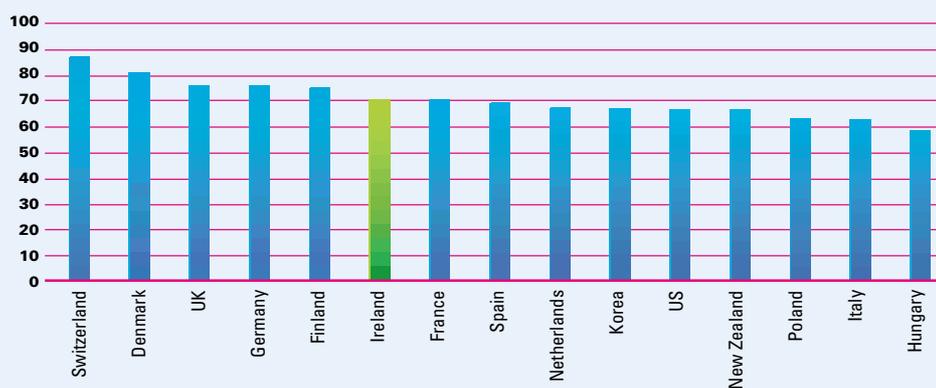
Labour Force Participation

The increase in the numbers employed in Ireland over the past decade exceeded the fall in unemployment and was only made possible by a significant increase in the labour force participation rate (the proportion of the population aged 15 to 64 year olds either in employment or actively looking for employment). The labour force participation rate in Ireland increased from 60 per cent in 1990 to 69.9 per cent in 2003, ranking Ireland 9th out of the 15 countries benchmarked (the higher the participation rate, the better the ranking). Participation rates in Ireland remain a long way behind Switzerland (86.6 per cent), Denmark (80.7 per cent) and other leading countries (Figure 4).

If Irish participation rates are to continue to converge towards the level of other northern European countries, then the female participation rate will need to substantially increase. According to the OECD, Ireland is currently ranked 11th out of 15 under this heading, with a rate of 57.6 per cent. By comparison, the female participation rate in Denmark is 74.8 per cent (Indicator 9).

Labour force participation rates are influenced by a range of factors, including wage levels, the interaction between tax and social welfare systems, health and education standards, the availability of childcare facilities, social norms, incentives for early retirement and broader economic conditions (which affects the demand for labour). While there is not necessarily an optimum rate, certain economic benefits can accrue to those economies with a higher participation rate. For example, a higher participation rate broadens the tax base. This spreads the cost of providing public goods and services over more of the population. A high participation rate also provides a higher potential return to public education as workers utilise their skills paid for by the exchequer through the education system. It should be noted, however, that raising the participation rate may imply social costs.

Figure 4 Labour Force Participation Rate
(% Population Aged 15-64) (Indicator 8)



Source: OECD Economic Outlook

The Minimum Wage

One of the factors that can affect labour force participation is the wage level. While market forces in general determine wages, the use of a minimum wage is a direct attempt by policymakers to ensure an adequate living standard for workers in low-paid sectors. There is no conclusive evidence regarding the implications of the introduction of a minimum wage on employment and competitiveness.

Of the 25 EU member states, 18 have a legal minimum wage. It is interesting that the Scandinavian countries (generally considered to be amongst the most egalitarian in Europe) have not introduced a minimum wage. Ireland's minimum wage level is amongst the highest in Europe (6th highest out of 18).⁸ When the standard set of countries used in the ACR is benchmarked, Ireland is ranked 5th out of the eight countries for which data are available (Indicator 10). For the purpose of this report, the NCC has ranked those countries with a high minimum wage as the least competitive. It should be recognised however, that a high minimum wage can also be reflective of high levels of productivity. Indeed, research by the ESRI suggests that the introduction of a relatively high minimum wage (currently €7 per hour) in Ireland has had little or no impact on Ireland's competitiveness to date. This is because market forces have, in most regions of the country, raised the average hourly wage above the legal minimum.

Labour Market Regulation

Labour market regulation refers to the set of rules governing the hiring of new workers and the conditions of employment guaranteed thereafter by legislation. Labour market regulations have been found to affect employment, innovation and growth, but the impact appears to depend on the other institutional aspects of the labour market and the industry in question.⁹ For example, changes in the skills demanded by employers in industries characterised by rapid innovation and sudden technological change often requires rapid turnover in employees, which is easier with less statutory job protection. On the other hand, strict employment legislation does not appear to be a constraint in other industries characterised by cumulative innovation processes. In these industries, upgrading the skills of existing employees may be less costly than hiring and training new employees.

As with regulation generally, the primary sources of information regarding the impact of labour market regulation across different countries is drawn from international surveys of industrialists administered by the WEF and the IMD. According to the IMD survey, labour market regulations in Ireland did not have a significant impact on business activities, although our overall score and ranking declined between 2002 and 2003. Ireland is now ranked 7th out of 16 countries, substantially behind Denmark, Singapore and Switzerland (Figure 5). Ireland's traditional strong performance in this area is reflected in the general ease with which the Irish industrial base has restructured over the past decade from traditional low-productivity industries to more high-tech knowledge based industries without significant adjustment difficulties.

⁸ On a purchasing power parity (PPP) basis.

⁹ 'The Sources of Economic Growth in OECD Countries: A Review Article', M. Baily, Fall 2003.

Figure 5 Labour Market Regulations (Indicator 11)

Immigration

One way for a country to increase the skill levels of its labour force is to encourage targeted immigration. Action to encourage immigration of workers with required skills sets can ease labour market constraints and boost levels of human capital. There are no figures available to monitor skilled immigration and so this report relies on overall immigration figures instead. The net flow of foreign workers into Ireland increased rapidly throughout the 1990s (from 3,800 in 1991 to approximately 10,700 in 2000). Between 1996 and 2002, average annual net migration into Ireland accelerated to 25,511, up from just 1,660 in the previous 6-year period.¹⁰ Given that immigration into Ireland is a recent phenomenon, the overall stock of foreign workers remains low by the standards of most other advanced economies, at 3.7 per cent of the total labour force. By comparison, foreign workers account for 18.3 per cent of the total Swiss labour force, 8.8 per cent of the German labour force and 6.0 percent of the French labour force. The stock of foreign workers is greater in Ireland than in the Mediterranean and Scandinavian countries benchmarked, and Ireland ranks 5th out of 13 on this measure (Indicator 12).

Industrial Relations

Labour market institutions that deliver industrial relations stability can support competitiveness and growth in the economy generally. The number of working days lost (per 1,000 inhabitants) in industrial disputes can be used to assess a country's performance on this issue. Based on the 2000-2002 period (latest internationally comparable data available), Ireland does not appear to have performed very well (ranked 10th out of 16 by the IMD with over 20 days lost per annum over this period) (Indicator 13). The data for Ireland were inflated, however, by a relatively small number of public sector disputes in 2000 and 2001. This situation has since improved. According to CSO data, the days lost per annum per 1,000 inhabitants was just 5.4 in 2002, although this rose slightly to 9.4 in 2003.

2.1.3 Taxation and Macroeconomic Policy¹¹

Taxation and Macroeconomic policy is the third element of the Business and Work Environment examined in this chapter. This section examines the links between competitiveness and growth and macroeconomic stability, the overall level of taxation and the structure of the tax system, and benchmarks Ireland's performance in each of these areas.

Macroeconomic Stability

Macroeconomic stability is a key ingredient for sustainable long-term growth. Economic volatility and the uncertainty generated by high price inflation discourage private sector investment and promote safe short-term, but ultimately less productive, investments.

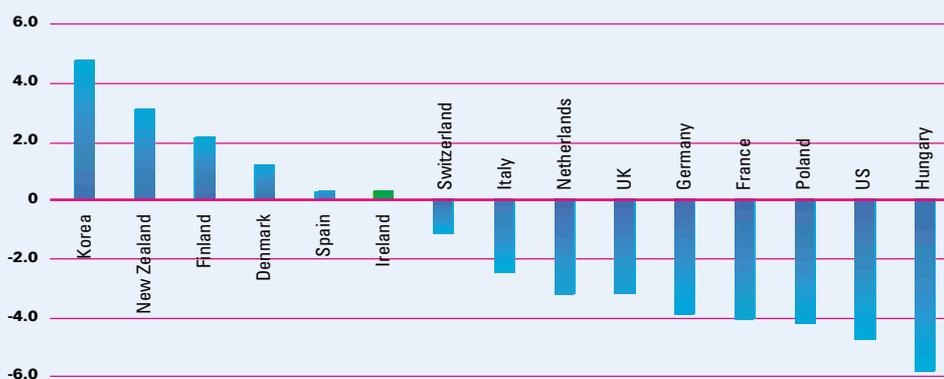
Between December 1999 and December 2003, consumer price inflation in Ireland measured 17.5 per cent, compared with just 8.4 per cent for the EU-15 as a whole. Average annual inflation in Ireland measured 4.7 per cent over this period. While there is no evidence that inflation of this order has generated sufficient price uncertainty to discourage investment, it has weakened Irish cost competitiveness relative to other trading partners and made Irish businesses more vulnerable to exchange rate fluctuations.

It may be that greater macroeconomic instability will, at least in the short-term, be a feature of Ireland's membership of European Economic and Monetary Union (EMU). With the adoption of the euro as our national currency, Irish policy makers can no longer adjust local interest rates or the external exchange rate in order to manage spending growth in line with prevailing economic conditions. Moreover, because the UK and the USA are Ireland's largest trading partners, large fluctuations in the value of the euro against sterling and the dollar may, by affecting the cost of imports into Ireland and the competitiveness of Ireland's exporting firms, lead to greater instability in inflation and growth than was the case before EMU.

Countries or regions without independent monetary and exchange rate policy can, to varying degrees, use government fiscal policy to promote economic stability.¹² Assessing the degree to which government fiscal policy has been used to promote economic stability is, however, a complex matter. Over the long-term, government budgets which are close to balance promote stability by ensuring fiscal sustainability. In 2003, the Irish Government recorded a general government surplus of 0.2 per cent of GDP, giving Ireland a ranking of 6th out of 15 countries (Figure 6). For the purposes of this report, the lower the government deficit (or the higher the surplus), the better the ranking in terms of competitiveness. By the end of this year, general government debt is expected to fall to 31.5 percent of GDP – lower than all other EU15 countries except Luxembourg.

¹¹ A minority within the Council oppose the broad thrust of this section of the report.

¹² Fiscal policy refers to changes in overall government and spending levels and the impact that such changes have on economic activity.

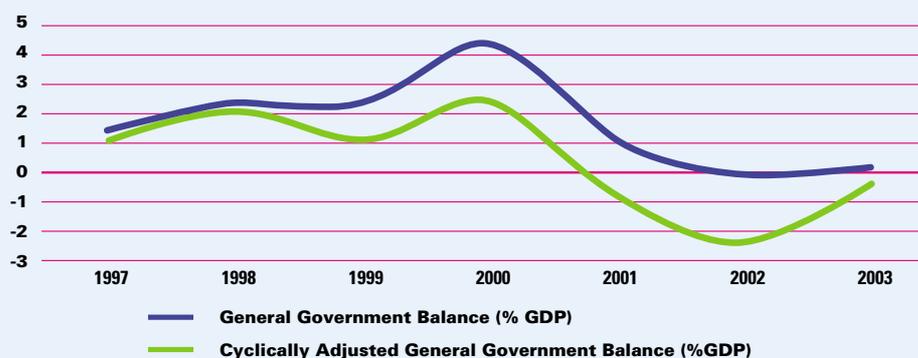
Figure 6 General Government Balance (% GDP) (Indicator 14)

Source: OECD Economic Outlook 2004

Clearly however, the appropriate size of the fiscal balance in any one year depends on a wide variety of factors, including the stage of the economic cycle. When business investment, exports and consumer spending are weak, governments often promote economic stability by running fiscal deficits, through expansionary fiscal policy (spending increases or tax cuts). In contrast, when demand pressures from business investment, exports or consumers are already strong, governments may need to dampen inflationary pressures by tightening fiscal policy (increasing taxes or cutting public spending). To some extent, this process happens automatically. When economic growth accelerates, automatic 'fiscal stabilisers', such as reduced payments for unemployment benefit and higher tax receipts, have a dampening effect on the economy. This process goes into reverse during periods of slowing economic growth.

The extent to which governments proactively attempt to promote economic stability through 'discretionary' fiscal measures – such as changes in tax rates or the expansion or contraction of government programmes – is assessed by the OECD using a measure called the cyclically-adjusted general government balance. This measure decomposes a country's budget balance into a cyclical and a non-cyclical component. The decomposition is aimed at separating cyclical influences on the budget balance (automatic stabilisers) from those which are non-cyclical. Changes in the latter can be seen as a cause rather than an effect of output fluctuations and may be interpreted as indicative of discretionary policy adjustments.

When the economic growth and inflationary pressures were at their peak during the 1999-2000 period, fiscal policy was tightened marginally i.e. discretionary government tax increases and spending cuts helped to dampen inflationary pressures (Figure 7). As the Irish economy slowed in line with the rest of the world in the 2000-02 period, fiscal policy became expansionary (tax cuts and/or spending increases), helping to cushion domestic employment and growth from the downturn in business investment and exports. This would suggest that fiscal policy in Ireland has, to some degree, been used to promote economic stability. Cyclically adjusted deficit estimates should, however, be interpreted with caution as it is difficult to accurately estimate the effect of the business cycle, particularly in small open economies such as Ireland.

Figure 7 Fiscal Policy in Ireland (Indicator 15)

Source: OECD Economic Outlook 2004

Overall Level of Government Spending and Taxation

In the previous section, we examined how the difference between government taxation and spending impacts on economic stability and growth. But what is the relationship between overall level of government taxation and spending on the one hand and competitiveness and growth on the other? All other things being equal, businesses and employees prefer lower taxes. OECD research suggests that growth in the level of overall government spending and taxation above certain levels can, by creating disincentives to work and by crowding out private sector activity, have adverse effects on a country's productivity and economic growth.¹³ For the purposes of this report, therefore, those countries with lower levels of taxation (i.e. the lowest ratio of tax and non-tax revenue to national income) are deemed to be more competitive.

At the same time, there are clearly limits to the extent to which a low-tax low-spend strategy is good for the overall welfare of citizens, and even for competitiveness of the business sector. Striking the right balance between low taxes and the adequate provision of public goods important for enterprise, such as infrastructure, education and research, is a central task in sustaining long-run competitiveness. Moreover, every society makes a different choice about the most appropriate size of government and the public sector, for social as well as economic reasons. There are also examples of countries with large government sectors enjoying high rates of growth e.g. Scandinavian countries.

General government total tax and non-tax receipts in Ireland were 42.7 percent of GNP in 2003. This placed Ireland in a mid-table position, at 7th out of the 14 countries benchmarked on this measure (Figure 8). Lower Irish public spending as a proportion of national income compared with some other EU countries reflects a number of factors, such as lower debt servicing costs, lower demographic dependency ratios and different pension funding arrangements. Based on 2003 estimates, Ireland's public expenditure on health as a percentage of GNP is the highest in the EU and in per capita terms it is the third highest, behind Denmark and Luxembourg.¹⁴ Public expenditure on education as a percentage of GNP (and per capita) is also above the EU average. When GDP is used as the measure of the size of the economy, Ireland was ranked 3rd out of 14 countries, with the ratio of tax and non-tax receipts falling to 35.4 percent of GDP, lower than the OECD average, and only marginally above that of the USA and Korea. (See section 1.2.4 for a discussion on the use of GDP and GNP).

¹³ 'The Sources of Economic Growth in OECD Countries: A Review Article', M. Baily, Fall 2003.

¹⁴ 'Browsing Onwards: Irish Public Spending in Perspective', J. Lawlor and C. McCarthy, DKM Economic Consultants, Irish Banking Review, Autumn 2003.

A note-worthy development over recent years has been the gradual decline in the aggregate tax level as a proportion of Irish economic activity. While certain sectors may have experienced adverse changes in the level of taxation, in total the ratio of tax to GDP has declined by almost three per cent between 1995 and 2001 (Indicator 17). This decline in government revenues as a proportion of national output occurred at a time of rapid economic growth that resulted in significant real increases in actual revenue. Only Poland, Hungary and New Zealand have enjoyed greater reductions in tax over the same period. The greatest reductions in overall tax ratios have occurred in EU accession countries.

Figure 8 General government total tax and non-tax receipts
(% GDP) (Indicator 16)



Source OECD Economic Outlook 2004

Structure of Taxation

In addition to the overall level of government taxation and spending, the structure of a country's taxation system can have an influence on international competitiveness. There is no one single indicator that captures the degree to which a country's taxation system supports competitiveness and growth. Below we examine the extent to which taxes on corporate profits, income, employment and property may be affecting Ireland's competitiveness.

For any given level of taxation, OECD research suggests that higher direct taxes (income tax, corporation profits tax, capital gains tax) as opposed to indirect taxes (consumption, wealth, property etc.) weaken economic growth and competitiveness.¹⁵ High direct taxes on profits and labour undermine incentives for investment and work. In an era of globalisation, individuals and capital are increasingly free to re-locate to low income tax jurisdictions. Some research suggests that the high degree of international capital mobility means that for small countries in particular, low corporate tax rates can, under certain conditions, benefit both workers and companies.¹⁶ At the same time, there has been no conclusive research regarding the implications of Ireland's low rate of corporation tax for the welfare of Irish workers.

¹⁵ 'The Sources of Economic Growth in OECD Countries', OECD 2003. The Council recognises that considerations other than economic efficiency are also important in designing a tax system.

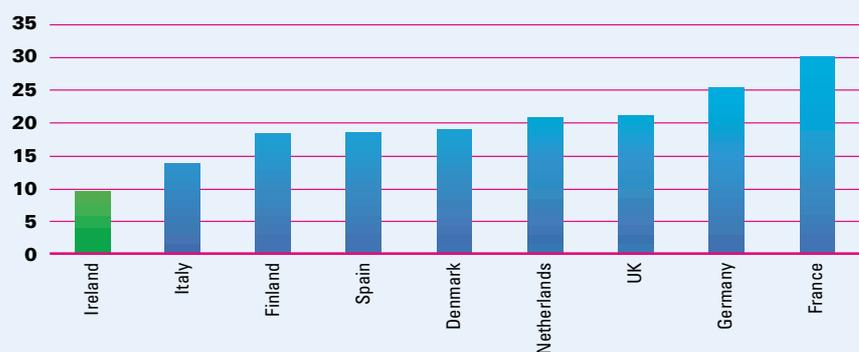
¹⁶ 'Sensible Tax Policies in Open Economies', J.R. Hines Jr., Department of Economics, University of Michigan, 2003.

At 12.5 per cent, Ireland's standard rate of corporate tax is the lowest out of the 16 countries benchmarked. Ireland's low rate of corporation tax is frequently cited as the most important reason for foreign investors to locate in Ireland (Indicator 18).¹⁷ The positive impact of introduction of the 12.5 percent standard rate of corporate tax on business investment and profitability is also reflected in the increase in corporate tax revenue, both as a proportion of national income and as a proportion of total tax revenue. For this reason, the Enterprise Strategy Group has called on Government to re-commit to Ireland's current 12.5 per cent rate of corporation tax into the medium-term.¹⁸ Other countries, notably new members of the EU, are beginning to emulate Ireland's tax strategy, as evidenced by the strong performance by Hungary (ranked 2nd) and Poland (ranked 3rd) under this indicator.

The standard corporate tax rate can overstate Ireland's relative advantage in the area of corporate taxation. Also of importance is the effective marginal rate of corporate tax, which takes into account the impact on companies' corporate tax liabilities of special exemptions and allowances. Under this measure, while Ireland maintains its top ranking (with an effective marginal tax rate of 9.4 per cent as of 2001), the favourable disparity between Ireland and the other eight countries benchmarked is reduced substantially (Figure 9). For instance, while Italy has a standard corporate tax rate of 37.25 per cent (equating to a ranking of 14th out of 16), when special allowances and exemptions are taken into account, the effective rate fell to just 13.7 per cent as of 2001, raising Italy's ranking to 2nd out of the nine countries for which data is available.

The EU is currently seeking to harmonise the way all EU countries levy corporate taxes i.e. agreeing common rules and definitions regarding the base to which different EU taxes rates are applied. There is, at yet, no agreement to extend harmonisation to the actual corporate tax rates applied by different EU countries.

Figure 9 Effective marginal standard corporate tax rate (2001)
(Indicator 19)



Source: Baker & McKenzie

¹⁷ IDA Client Survey, 2002.

¹⁸ 'Ahead of the Curve, Ireland's Place in the Global Economy', Report of the Enterprise Strategy Group, July 2004.

With regard to taxes on personal income, Ireland also performs quite well, and is ranked 2nd out of 15 countries for the amount of income tax (plus employee and employer contributions less cash benefits) deducted from a married couple with 2 children earning 1.67 times the average wage in 2003 (Indicator 20). Only Korea had a lower tax take under this measure. For a married couple, the rate of income tax has declined from 16.9 per cent in 2002 to 15.7 per cent in 2003. It should be noted, however, that married couples with children enjoy substantial tax advantages over their single counterparts; a single person in Ireland with no children, earning the average industrial wage was subject to income tax of 24.5 per cent in 2003.

One particularly striking indicator relates to the tax wedge (the difference between what employers pay out in wages and social security contributions and what employees take home after tax and social security deductions). A high tax wedge increases the cost to employers of hiring staff and decreases individuals' incentives to move into paid employment. Between 1996 and 2003, the tax wedge in Ireland fell by 18.2 per cent – a bigger fall than for any other of the 14 countries benchmarked on this indicator (Indicator 21). It seems likely that this was one of the factors behind Ireland's strong employment creation performance over this period. It is particularly important for Ireland to keep the tax wedge in line with levels prevailing in Northern Ireland and other parts of the UK, with which Ireland shares a common labour market.

There is tentative evidence, however, that the breadth of Ireland's tax base compares unfavourably with other countries. OECD evidence suggests that a broad tax base is good for competitiveness and growth because it helps to minimise the distortion to economic activity from tax rates in all parts of the economy. In this sense, a broad tax base helps to make low direct tax rates consistent with the need to fund public services and infrastructure.

One area where Ireland appears to have scope to broaden the tax base is property. Ireland currently offers one of the lowest property tax regimes amongst the 15 benchmarked countries (Indicator 22). Revenue from property taxes currently account for just 1.7 per cent of GDP (two per cent of GNP). This corresponds to a rank of 10th out of 15. All other things being equal, low taxes on property and other forms of wealth require higher taxes on income and consumption. For this reason, while overall levels of taxation in Ireland are average by the standards of other advanced countries, Ireland remains a high tax country for some parts of society.

2.1.4 Openness to Trade and Foreign Direct Investment

OECD research shows a positive correlation between a country's openness to international trade and investment and its performance regarding productivity and economic growth.¹⁹ While the order of causality is not entirely clear, increased globalisation appears to go hand-in-hand with improved economic performance. Openness to trade and investment promotes cross-border exchange of goods, services and capital for mutual gain, and provides a medium for the exchange of ideas and technology transfer, which enhances competition and promotes innovation.

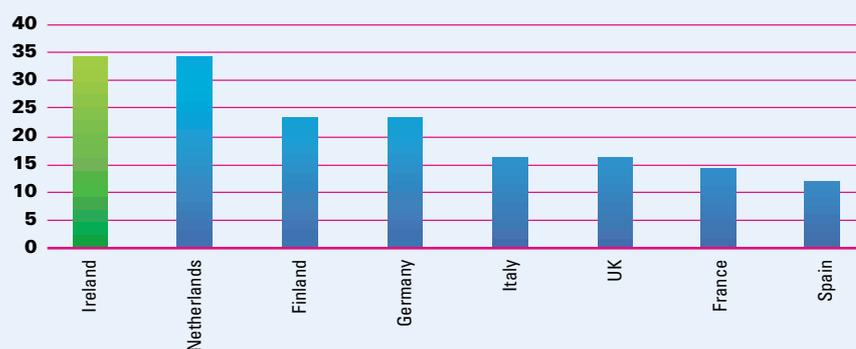
Trade

Ireland is one of the most open economies in the world when it comes to trade in goods and services. *World Trade Organisation* (WTO) statistics rank Ireland 2nd out of the 16 countries benchmarked in the ACR for imports and exports of goods and services as a proportion of GDP as of 2002, behind only Singapore (Indicators 23 & 24).²⁰ The high degree of openness partly reflects our small size. Many consumer goods and services and inputs for further production cannot be produced in Ireland for climatic or resource reasons. In other cases, the small domestic market cannot support efficient production. The national welfare of a small, regional economy relies on a large volume of exports to ensure that we can afford to import a range of goods and services that we would otherwise have to forego.

This 'natural' degree of openness has been reinforced by policy decisions. Our membership of the EU's Single European Market and the WTO has reduced tariff and non tariff barriers to trade between Ireland and the rest of the world, and particularly other EU countries. This is evidenced by our generally low import tariff rates (according to the Index of Economic Freedom, Ireland has a weighted average tariff rate of 2.6 per cent of the value of total trade). In addition, the introduction of the euro has negated the impact of currency fluctuations on Irish trade within the eurozone. While undoubtedly this high degree of openness is a major factor in Ireland's economic success, it also leaves the Irish economy vulnerable to global economic downturns.

It should be pointed out that using simple aggregate trade statistics discounts internal trade and can be misleading. Trade within countries accounts for a greater proportion of trade in larger countries such as France and Germany than in smaller economies such as Ireland, and so such data automatically displays small country bias. For example, the data would suggest that the USA is a far more closed economy than most other countries included in the benchmark. As one of the world's most open economies, this is entirely counter-intuitive and is primarily a result of the size of US GDP.

Figure 10 Extra-EU Exports + Imports 2003 (% GDP) (Indicator 25)



Source: Eurostat

Comparing extra-EU trade (as a proportion of GDP) – the level of trade each EU country undertakes with partners outside of the EU – helps to compensate for these difficulties (Figure 10). Even on this measure, Ireland still has the greatest trade exposure, with over €16 billion worth of exports and €9 billion worth of imports being bought and sold with non-EU members between November 2003 and April 2004. This exposure to extra-EU trade is in part a historical consequence of our close economic ties with the USA, and the global trade

²⁰ In this case, GDP is the appropriate measure of national output/income to use, as the comparison is between levels of output exported by Ireland against a selection of comparator countries.

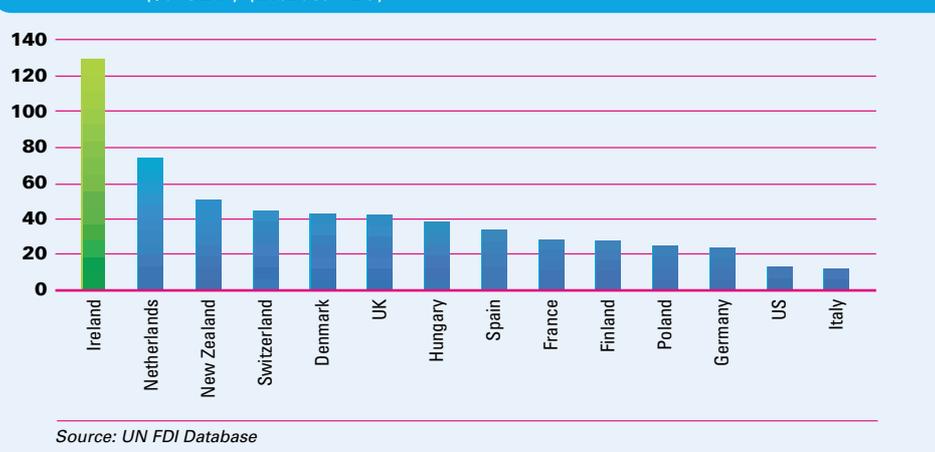
and supply linkages created by multinational companies here. On the downside, it leaves Ireland more vulnerable than most to fluctuations in the value of the euro.

The corresponding figures for services (not shown) are heavily skewed by the ‘import’ of royalty and license payments from overseas based parent companies by subsidiaries based in Ireland. Broadly speaking, however, Ireland is very open to real services trade as well as merchandise trade.

Foreign Investment

The stock of inward Foreign Direct Investment (FDI) in Ireland in 2002 was equivalent to 129 per cent of GDP (or approximately 158 per cent of GNP) – higher than any other country benchmarked on this measure and some distance ahead of second-placed Netherlands (75 per cent of GDP) (Figure 11). The high level of FDI in Ireland is a result of long-standing and deliberate policies designed to attract and maintain investment by multinationals in order to generate employment, but may also make Ireland more vulnerable than other countries to downturns in global investment flows.

Figure 11 Foreign direct investment inward stock 2002
(% GDP) (Indicator 26)

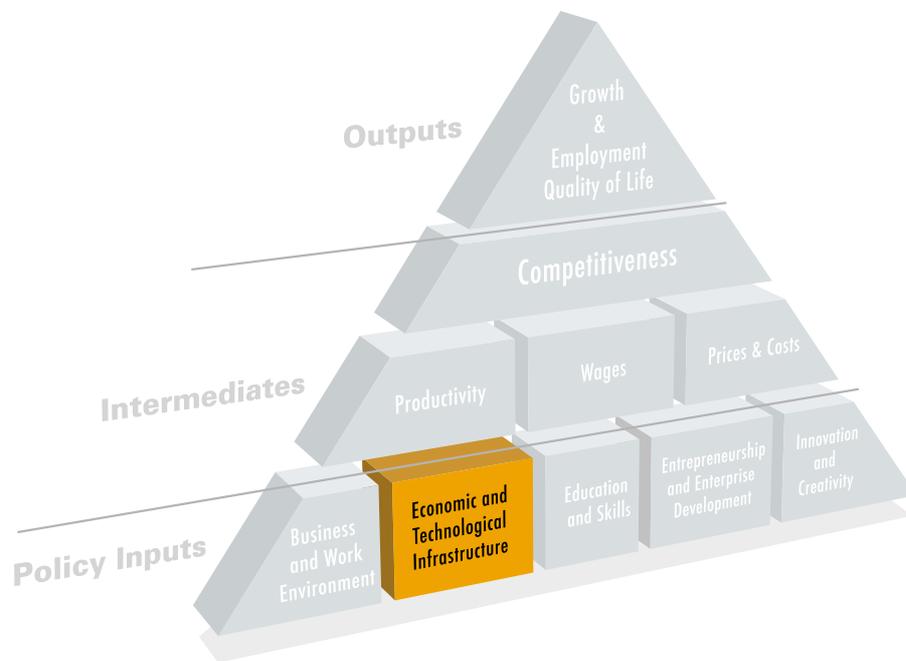


Ireland’s success in attracting high levels of inward direct investment over the last decade has been well documented. The flow of direct investment has not, however, been all in one direction. Although still well below inward flows, outward direct investment from Ireland also rose significantly during the 1990s. By 2002, the stock of outward direct investment by Irish companies was equivalent to 30 per cent of GDP (and 37 per cent of GNP). This ranked Ireland 8th out of the 14 countries benchmarked on this measure (Indicator 27). The distance between Ireland and the leading performers on this measure (Switzerland, UK, and the Netherlands) reflects the fact that Ireland has fewer large indigenous companies in those industries responsible for the bulk of direct investment flows. Other factors include Ireland’s relatively recent industrialisation, the historically heavy focus of development policy on inward investment, and the more active promotion and facilitation of outward investment by other EU governments.

As with the trade data, the FDI data are somewhat distorted by a country’s size. For instance, the USA would initially appear to perform poorly on this measure, yet given the total size of the US economy, its development is not adversely affected by its low (relative) levels of both inward and outward FDI. In absolute terms, the USA remains an enormous contributor to global flows of investment.

Ireland's openness to both trade and FDI is also evidenced by our strong showing in the Index of Economic Freedom 2004 (Indicator 28). This composite indicator measures 50 independent variables divided into ten factors of economic freedom (including trade policy, government intervention, monetary policy, FDI, and regulation) in order to produce an overall ranking. Ireland is ranked 3rd out of 16, just behind Singapore and New Zealand.

2.2 Economic and Technological Infrastructure



Economic and Technological Infrastructure — General Infrastructure

Indicator	29		30		31	
	Year	Rank	Year	Rank	Year	Rank
Infrastructural stock (Real government net capital stock / real GDP)	2002	12	2003	16	2003	11
Source	Kamps (2004) / OECD / Forfas		WEF- Global Competitiveness Report 2003-2004		Eurostat Structural Indicators	
Country						
Denmark	44.7	10	6.7	2	1.6	9
Finland	47.0	8	6.6	4	3.0	7
France	53.6	4	6.5	6	3.2	6
Germany	46.7	9	6.6	4	1.5	10
Hungary	-	-	3.3	14	4.9	1
Ireland	43.6	11	3.2	15	3.9	2
Italy	47.6	7	4.2	13	2.6	8
Korea	-	-	5.2	9	-	-
Netherlands	57.3	2	6.0	8	3.5	4
New Zealand	74.2	1	5.2	9	-	-
Poland	-	-	2.8	16	3.6	3
Singapore	-	-	6.8	1	-	-
Spain	47.9	6	5.0	11	3.5	4
Switzerland	55.4	3	6.7	2	-	-
UK	38.2	12	5.0	11	1.5	10
US	51.7	5	6.3	7	-	-
Ireland (GNP)					4.7	
EU (15)					2.4	
OECD						

*Note: General infrastructure is (1= poorly developed and inefficient; 7= among the best in the world)

Economic and Technological Infrastructure - Transport

Indicator	32		33		34		35		36		37	
	Year	2004	Year	2001	Year	2002	Year	2001	Year	2004	Year	2003
Source	IMD World Competitiveness Yearbook 2004	EU: Energy & Transport in Figures 2003	Eurostat Structural Indicators	Small Firms Association	IMD World Competitiveness Yearbook 2004	Quality of air transportation	Port infrastructure quality*					
Country	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value	Rank	Value
Denmark	2	22.16	5	84.7	10	-	12	8.05	12	6.60	2	-
Finland	3	29.39	4	94.7	7	15	15	8.65	15	6.40	4	-
France	7	18.00	8	95.6	6	15	4	7.57	10	5.80	8	-
Germany	3	33.01	3	102.4	4	53	7	8.39	14	6.30	5	-
Hungary	12	4.82	10	91.4	8	-	3	6.36	3	2.50	16	-
Ireland	15	1.79	11	133.0	2	57	8	6.63	4	3.30	15	-
Italy	16	21.52	6	102.6	3	-	5	4.29	5	4.40	13	-
Korea	13	-	-	-	-	-	-	6.75	5	5.30	9	-
Netherlands	8	55.20	1	97.1	5	14	3	7.67	11	6.60	2	-
New Zealand	9	-	-	-	-	-	-	7.40	8	5.90	7	-
Poland	14	1.27	12	69.8	11	-	-	3.91	1	3.70	14	-
Singapore	1	-	-	-	9	9	1	9.57	16	6.80	1	-
Spain	11	18.95	7	137.4	1	-	6	7.03	6	4.70	12	-
Switzerland	5	40.71	2	-	-	-	-	7.38	7	4.90	11	-
UK	10	14.71	9	86.2	9	13	2	7.47	9	5.10	10	-
US	6	-	-	-	18	18	6	8.07	13	6.00	6	-
EU (15)		16.30		102.4								
OECD												

*Note: Figures for Hungary, Poland & Switzerland are for 2000

** Note: Part Facilities and inland waterways in your country are (1=underdeveloped, 7=as developed as the world's best)

Economic and Technological Infrastructure - Information & Communication Technology

Indicator	38	39	40	41	42	43	44
Year	2001	2004	June 2003	1999	Q4 2003	Q4 2003	2003
Source	IMD World Competitiveness Yearbook 2004	IMD World Competitiveness Yearbook 2004	OECD On-line Statistics	WEF Global Technology Report 2004	Forfás Broadband Telecommunications Benchmarking Study January 2004	Forfás Broadband Telecommunications Benchmarking Study January 2004	UNICE Lisbon Strategy Status 2004
Country	16	16	15	16	12	12	10
	Rank	Rank	Rank	Rank	Rank	Rank	Rank
Denmark	0.588	9.17	11.11	2	4	100	2
Finland	0.523	9.69	6.61	6	6	100	2
France	1.006	8.09	4.13	9	8	11	3
Germany	0.372	8.99	4.84	7	2	37	3
Hungary	1.156	7.70	0.93	13	10	10	6
Ireland	0.646	5.62	0.41	14	5	11	4
Italy	0.333	6.21	2.84	11	7	34	11
Korea	0.786	8.00	23.17	1	15	61	8
Netherlands	0.955	8.41	9.20	3	3	48	3
New Zealand	0.833	7.56	2.07	12	12	-	1
Poland	0.844	5.02	0.21	15	16	-	5
Singapore	1.082	9.29	-	2	14	-	8
Spain	1.313	6.72	4.24	8	9	63	7
Switzerland	0.279	9.06	9.13	4	1	-	7
UK	0.740	7.70	3.63	10	11	25	10
US	0.800	8.65	8.25	5	13	24	9
Ireland (GNP)	0.767						
EU							
OECD							45.44

*Note: Communications technology does/does not meet the needs of business

Economic and Technological Infrastructure - Energy

Indicator	45		46		47	
	Year	2001	Year	2004	Year	1999
Total final energy consumption per capita (metric tons of oil equivalent)	Source	IMD World Competitiveness Yearbook 2004	Energy infrastructure*	IMD World Competitiveness Yearbook 2004	Energy efficiency (GDP per unit of energy consumed; PPP US\$ per kg of oil equivalent)	UN Human Development Report 2003
	Country	16	Rank	16	Rank	16
	Denmark	2.83	8	8.79	2	7.9
	Finland	4.86	15	8.62	6	3.8
	France	2.94	9	8.69	5	5.4
	Germany	2.99	11	8.77	3	6.1
	Hungary	1.74	2	6.24	10	4.9
	Ireland	3.05	12	4.87	15	7.90
	Italy	2.31	3	3.45	16	8.2
	Korea	2.75	7	6.08	11	3.6
	Netherlands	3.76	14	7.82	7	5.7
	New Zealand	3.57	13	5.08	14	3.7
	Poland	1.53	1	5.15	13	4
	Singapore	2.57	5	9.05	1	3.9
	Spain	2.32	4	6.42	9	6.4
	Switzerland	2.98	10	8.71	4	7.5
	UK	2.70	6	6.00	12	6
	US	5.41	16	6.59	8	4.2
	EU					
	OECD					
						4.9

*Note: 10 = Energy infrastructure is adequate and efficient

Economic and Technological Infrastructure - Housing

Indicator	48		49		50		51	
	% of home-owners in population	Latest year	Total housing stock - dwellings per 1000 of population	2002	Housing completions per annum as % of total housing stock	2002	House price index: % change 1997-2004	2004
Year	European Mortgage Federation / EIU		European Mortgage Federation		European Mortgage Federation		Economist - Economic Intelligence Unit	
Source	European Mortgage Federation / EIU		European Mortgage Federation		European Mortgage Federation		Economist - Economic Intelligence Unit	
Country	11	Rank	9	Rank	9	Rank	11	Rank
Denmark	51	9	472.83	4	0.67	8	44	3
Finland	61	6	489.14	3	1.01	4		
France	55	7	495.02	2	1.03	3	68	7
Germany	42	10	471.77	5	0.74	6	-3	1
Hungary			-					
Ireland	77	3	328.36	9	4.51	1	181	11
Italy	80	2	461.04	6	0.65	9	62	6
Korea			-					
Netherlands	53	8	419.99	8	0.99	5	74	8
New Zealand			-				51	4
Poland			-					
Singapore			-					
Spain	85	1	524.10	1	2.01	2	125	9
Switzerland	35	11	-				11	2
UK	69	4	422.94	7	0.68	7	132	10
US	67	5	-				57	5
EU								
OECD								

2.2 Economic and Technological Infrastructure

The second input to competitiveness identified by the Council is Economic and Technological Infrastructure. Economic infrastructure refers to all forms of physical infrastructure which are needed for the efficient functioning of an economy. Key components of economic infrastructure include transport, energy, communications and housing infrastructure. Technological infrastructure is an increasingly important part of the infrastructure network in a modern economy and refers to a wide range of services and facilities, notably information and communications infrastructure (broadband etc.), research centres and technology parks.

The level of infrastructural provision affects the competitiveness and performance of the enterprise sector in a number of ways. The public provision of infrastructure can increase economy-wide productivity levels; thus an inadequate level of infrastructure increases congestion, lowers efficiency and productivity and raises costs. Inadequate infrastructure also decreases the attractiveness of Ireland as an investment location for multinational companies. With migration choices heavily influenced by quality of life considerations, poor infrastructural development can also serve to decrease the availability of skilled and unskilled labour in a country. This chapter examines the quantity and quality of infrastructure in Ireland vis-à-vis 15 comparator countries under 5 main headings:

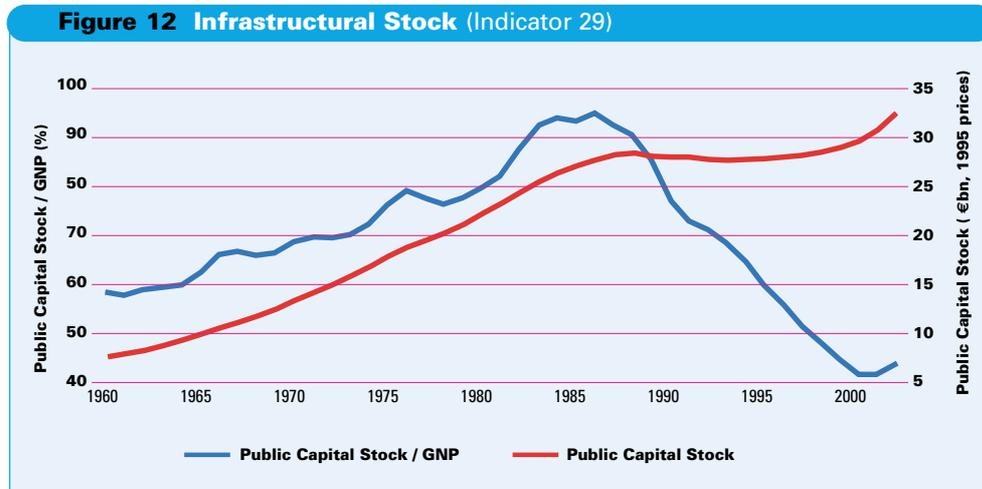
- General Infrastructure
- Transport
- Information and Communications Technology
- Energy
- Housing

2.2.1 General Infrastructure

The first set of indicators examined in this chapter relate to the overall stock and quality of Ireland's infrastructure. Cross-border comparisons of the level of public capital stock have been facilitated, for the first time, by research using historical data on gross government investment for 1960-2002 for a number of OECD countries.²¹ Data for Ireland is presented in Figure 12 below. The *Public Capital Stock / GNP* figure gives the ratio of government capital stock over GNP: this measures the level of our infrastructural wealth relative to our national income. The Irish data shows a remarkable change in trend in the mid to late 1980s. The stock of infrastructure did not keep pace with the increase in national income. In fact, this ratio has decreased by more than 50 per cent over a fifteen-year period. Indeed, the actual level of public capital stock did not increase over a ten-year period, as the darker line in Figure 12 illustrates.

It is important to place these data in an historical context, in particular the necessary fiscal stabilisation in the late 1980s that was a key factor in the subsequent economic recovery of the 1990s. Without those cuts in public investment and current spending, Ireland's economic recovery may have been significantly delayed. Moreover, it is not surprising that infrastructure provision did not keep pace with economic growth in the 1990s given the extraordinary growth rates during the period in question and the lengthy lead-time required for implementation of major infrastructure projects. Nonetheless, these new data still serve to illustrate our present predicament. As a result of the past levels of investment, Ireland has a ranking of 11th out of the 12 comparator benchmarked on this measure.

²¹ 'New Estimates of Government Net Capital Stocks for 22 OECD Countries 1960-2001', C. Kamps, IMF Working Paper WP/04/67, April 2004. The underlying data for Ireland is the variable 'gross physical capital formation of central and local government', taken from Table 25 of National Income and Expenditure (CSO); it should be noted that this is a broad definition of capital formation.

Figure 12 Infrastructural Stock (Indicator 29)

The results of this analysis of historic public investment levels are reinforced by international surveys of industrialists in different countries administered by the WEF. According to the WEF survey, Irish infrastructure is generally deemed to be poorly developed in relation to all forms of transport and communications infrastructure (Indicator 30). Although terms such as ‘quality’ are quite subjective, this indicator does mirror the findings of the previous indicator and accordingly Ireland is ranked just 15th out of 16.

Infrastructural investments under the National Development Plan (NDP) 2000-06 are already making inroads into the Ireland’s infrastructure deficit, although clearly the full benefits of these investments will not be felt until the NDP projects are completed. In 2003, the Government invested 3.9 per cent of GDP (4.7 per cent of GNP) in gross fixed capital formation (Indicator 31). Allied to substantial private sector investment, this is an impressive spend. Indeed, government expenditure on fixed capital formation in Ireland in 2003 was ranked second only to Hungary (4.9 per cent of GDP) among the 10 countries benchmarked on this measure, and was well ahead of the EU average of 2.4 per cent. Of course, many of the other EU countries that currently invest less in infrastructure have already accumulated large stocks of infrastructure wealth from past investments.

The combination of a weak global economic climate, rising domestic costs and increased competition for the finite pool of foreign direct investment (FDI), means that failure to address Ireland’s infrastructural deficit will only serve to increase the risk to jobs in both the indigenous and foreign sectors. A sustained commitment is required over the medium and long term (beyond the completion of the current NDP) in order to ensure that this gap continues to close. At the same time, it is unrealistic to expect Ireland to be ranked first on measures of infrastructure quality across the board. The high fixed investment and scale economies associated with infrastructure provision makes it much more affordable in countries with bigger populations. For example, our low population density outside of Dublin makes rail transport less viable than in countries with dense populations. For this reason, Irish policy makers need to focus our investments and programmes in a way that reinforces the business models of important sectors of the economy. Policy makers must also bear in mind Ireland’s environmental responsibilities when planning infrastructure for the future. Sustainable development must remain a key objective.

2.2.2 Transport

Adequate transport and communications links to support efficient movement of goods, people and information are vital for international competitiveness. Inadequate infrastructure leads to increased transport delivery times and costs, and lower productivity across the enterprise sector.

Indicators that facilitate international comparisons of transport infrastructure are difficult to obtain. According to an IMD survey of industrialists, Ireland scores just 4.63 out of a possible 10 on the efficiency of distribution infrastructure (encompassing all forms of transport including roads, trains and planes), giving us a ranking of 15th out of the 16 countries benchmarked in the ACR (Figure 13). This would suggest that perceptions regarding our weak transport and distribution infrastructure may be impacting on business investment decisions by multinational companies, as well as migration decisions by senior executives.

Figure 13 Efficiency of Distribution Infrastructure (Indicator 32)



Source: IMD World Competitiveness Yearbook 2004

The majority of the other indicators available on transport infrastructure show a similarly poor performance. Ireland's current motorway density ranking is 11th out of 12 according to the EU's *Energy & Transport in Figures 2003* (Indicator 33). The on-going investment in inter-urban motorways is expected to deliver valuable time and cost savings to business, though it may be some time before this is reflected in the international rankings.

Moreover, a good national road network is more important for businesses in Ireland than in most other countries. According to *Eurostat*, Ireland is second only to Spain regarding the volume of freight transport relative to GDP among the 11 countries benchmarked on this measure (Indicator 34). This may reflect Ireland's role as a manufacturing centre producing goods for export to mainland Europe and beyond, as well as the limited rail and inland waterways infrastructure compared with some other EU countries.

Congestion costs are a serious concern for Irish businesses, particularly in the Dublin area. A survey by the *Small Firms Association* indicates that deliveries in Dublin take much longer than deliveries in the capital cities of the seven other countries surveyed (Indicator 35). Although this survey is somewhat dated, it is unlikely that the situation has improved dramatically over the intervening period. This is confirmed by a recent IBEC study which found that 81 per cent of businesses surveyed were adversely affected by traffic congestion.²²

Finally, the quality of air transportation in Ireland is ranked quite highly by the IMD survey (4th out of the 16 countries benchmarked in the ACR) (Indicator 36). On the other hand, Ireland's poor score in a WEF survey regarding *port infrastructure quality* (ranking us 15th out of 16) is cause for concern given Ireland's island status and the need to access foreign markets (Indicator 37).

2.2.3 Information and Communications Technology (ICT)

This section compares the level of investment in information and communications technologies (ICT) across countries and the impact of this investment on the adequacy of communications infrastructure for the needs of industry, including the supply of broadband services (the costs of broadband and other telecoms services are analysed in section 3.1.3)

ICT infrastructure and services that enable the flow of data, voice and image communications simultaneously at very high speeds, are essential for the development of a knowledge-based economy. Differences in the rate of ICT take-up accounted for divergent rates of labour productivity performance in Europe vis-à-vis the US in the 1990s.²³ In an open economy such as Ireland, which has achieved much of its recent success based on the promotion of advance manufacturing and services sectors, the ability of individuals and organisations to access, process, and communicate information more efficiently is essential for future economic growth. In the industrial age, Ireland suffered economically by being peripheral from sources of raw materials and final markets. In the information age, it is primarily the availability of advance telecommunications networks that provides proximity and access to resources and markets. It is a key factor for the attraction of foreign direct investment and development of indigenous companies in research-intensive 'new generation' industries such digital media, biotechnology and eBusiness.

Investment in Telecoms

Ireland performs very poorly across the range of ICT indicators benchmarked. As of 2001, total investment in telecommunications (as a percentage of GDP) measured 0.6 per cent of GDP in Ireland, placing us 11th out of the 16 countries benchmarked and well behind the leading country for this indicator, Spain, which invested over 1.3 per cent of GDP in telecommunications in the same year (Figure 14). It is unlikely that investment levels in Ireland have improved significantly in the interim.

Figure 14 Investment in telecommunications 2001 (% GDP) (Indicator 38)



Source: IMD World Competitiveness Yearbook 2004

²³ While the broad evidence supports this theory, the impact of ICT within Europe has been mixed with large variations between countries and within industries. 'Fostering Productivity: Patterns, Determinants and Policy Implications', G. Gelauff, L. Klomp, Stephen Raes and T. Roelandt, 2004.

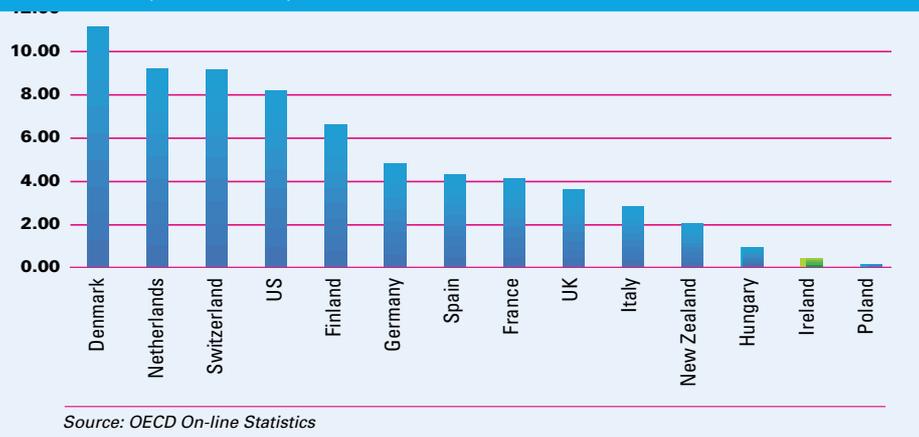
Of course, these investment figures are snapshots in time and the appropriate level of investment in each country is partly determined by the existing stock of telecoms infrastructure. This offers little relief for Ireland, however. According to an IMD survey, Ireland scores 15th out of the 16 ACR countries for industrialists' perceptions of the adequacy of the stock of communications technology for industry needs (Indicator 39).

Broadband Access

Overall levels of broadband access in Ireland are very weak relative to the other advanced countries. As of December 2003, Ireland ranked 24th in the OECD in terms of broadband lines per 100 inhabitants. Using the standard set of countries benchmarked in this report, Ireland was ranked 14th out of 15 countries, ahead of only Poland (Figure 15). By comparison, Hungary, the next placed country, has twice as many DSL lines.²⁴ An assessment of Irish broadband services by Forfás covering access, take-up and pricing indicates that Ireland is currently about three years behind the EU-15 average in terms of overall broadband take-up and five years behind the best countries.²⁵ While there are growing number of operators now providing broadband services (Digital Subscriber Lines (DSL), cable, wireless, satellite), the Irish market is unusual in terms of the restricted range of services available to consumers. In Ireland, DSL the dominant form of broadband access is only available at one speed at the lower end of the broadband spectrum.

While Ireland does perform better in terms of ISDN (Integrated Services Digital Network) subscribers, and is ranked 5th out of 16, this is an outdated technology and is only used due to the absence of a broadband alternative (Indicator 41). Although progress is being made in the rollout of infrastructure, the cost and availability of broadband would seem to be major barriers to improved take-up of services by the general population.

Figure 15 Broadband access (June 2003) (Lines per 100 population) (Indicator 40)



DSL Take-Up by Business

Broadband offers significant benefits not just to households and individual consumers but to the enterprise sector as well; application of ICT by firms is a key driver of business process innovation. Increased use of broadband by businesses can also stimulate demand for, and use of, ICT services amongst the population at large. The Forfás study found, however, that just

²⁴ For reasons of scale, Korea (23 per cent) has been omitted from Figure 15.

²⁵ 'Broadband Telecommunications Benchmarking Study', Forfás, January 2004.

11 per cent of businesses in Ireland were subscribers to DSL. This equates to a ranking of joint 10th out of the 11 countries benchmarked on this indicator (Figure 16). An equally poor performance was recorded in terms of broadband take-up amongst the population with just 0.42 per cent subscribing to DSL service (Indicator 43).

Figure 16 DSL Take-Up by Business (Indicator 42)



Source: Forfás Broadband Telecommunications Benchmarking Study January 2004

In much the same manner as the enterprise sector, the government has a key role to play in stimulating demand for broadband services. By offering an increasing number of services online, the government can incentivise both business and the general public to use the internet. According to EU statistics, almost 48 per cent of public services in Ireland are available online. This sees Ireland ranked 6th out of the 10 ACR countries for which data is available on this measure (Indicator 44).

To date, efforts to put in place the foundations of a knowledge economy and the necessary ICT infrastructure have been hindered by the lack of a clear state policy on broadband infrastructure provision. While this is a complex issue, it is clear that urgent action is required to address Ireland's broadband deficit and that the Government needs to clearly define its own role in tackling these issues.

2.2.4 Energy

This chapter examines three aspects of the energy sector: total energy consumption (demand for energy), adequacy of energy infrastructure (supply of energy) and finally the energy efficiency of firms and households. Energy cost comparisons are provided in Section 3.1.3.

Reliable, secure and competitively priced energy supply is a vital ingredient in the competitiveness of industry and long term economic development. Firms must have access to an adequate supply of energy to meet their needs. Surety of supply is an important consideration for all firms when deciding on potential locations for investment.

Business and household demand for energy in Ireland has grown strongly in line with the rapid economic expansion. In terms of energy consumption per capita, Ireland is ranked 12th out of 16 countries, with 3.1 metric tonnes of oil equivalent (MTOE) energy used per head of population in Ireland in 2001. The USA uses the most energy per capita (5.4 MTOE) and is consequently deemed the least competitive out of 16. It should be noted that in high levels

of energy consumption are also reflective of high levels of economic development. Hence, the two least developed countries (Poland and Hungary) score best under this indicator (Figure 45).

There are also concerns at the ability of Ireland's energy infrastructure to keep up with demand. An IMD survey examining the adequacy and efficiency of the energy infrastructure ranked Ireland 15th out of 16 comparator countries, a deterioration of three places since 2003 (Figure 17). These survey results undoubtedly reflect widespread media coverage over the past year regarding potential shortfalls in Ireland's energy producing capacity. This, in turn, partly reflects the failure of market liberalisation to stimulate private investment in the power generation market (despite rising demand and prices – see Section 3.1.3), stemming from the high level of risk for private entrants as a result of the current regulatory model and the dominance of the incumbent operator.

Figure 17 Adequacy of Energy Infrastructure (Indicator 46)



Source: IMD World Competitiveness Yearbook 2004

Finally, the UN Human Development Report 2003 ranked Ireland 2nd out of 16 in relation to energy efficiency of firms and households (measured as GDP per unit of energy consumed; PPP US\$ per kg of oil equivalent). Only Italy performed better under this measure (Indicator 47). One explanation for this strong performance is the make-up of the Irish industrial sector, which is dominated by relatively low energy users. In fact, Ireland's performance under this indicator has improved throughout the 1990s, reflecting the change in Ireland's industrial structure and the growing importance of services, which are less energy-intensive than manufacturing. Ireland's mild climate is another contributor to our strong performance on this indicator

2.2.5 Housing

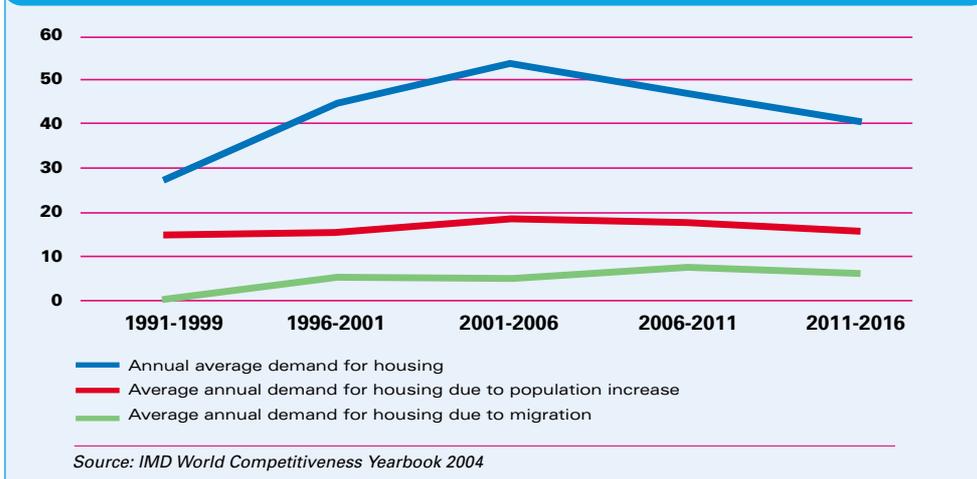
The housing market has an important impact on the functioning of the entire economy. A stable, affordable housing market contributes positively to wage and price growth moderation which is a fundamental element of a stable macroeconomic environment. Fast house price inflation often feeds through into increased wage demands. The housing market also influences labour mobility. Dispersed settlement patterns, whether a result of planning regulations, zoning restrictions or high costs close to city centres add to journey times, increase congestion and restrict the ability of workers to change employment.

This section includes benchmarks of housing supply, demand and cost. The NCC will be publishing a more detailed *Statement on Housing* later in 2004.

Housing Demand

Demand for housing is driven by a number of factors, not least of which is the change in a country's demographics over time. In Ireland, natural population growth has underpinned strong demand for housing. This has been further boosted by the rise in immigration, falling average household sizes and the increased demand for replacement and second dwellings. Forecasts by the ESRI suggest that the average annual requirement for new dwellings is over 53,000 units per annum between 2001 and 2006 (Figure 18).

Figure 18 Decomposition for Housing Demand in Ireland
(‘000s, annual averages)



Ireland has one of the highest rates of owner occupiers amongst 11 countries benchmarked, with 77 per cent of all houses being occupied by their owners (Indicator 48). This gives Ireland a rank of 3rd out of 11.

Housing Supply

Housing supply is measured by the existing housing stock combined with the number of new houses built each year. Figure 19 displays both housing stock and housing completions in 2002 for a selection of 9 countries. Figure 20 illustrates the trend in housing completions in Ireland between 1992 and 2003.

Figure 19 Housing Supply 2002 (Indicator 49 & 50)

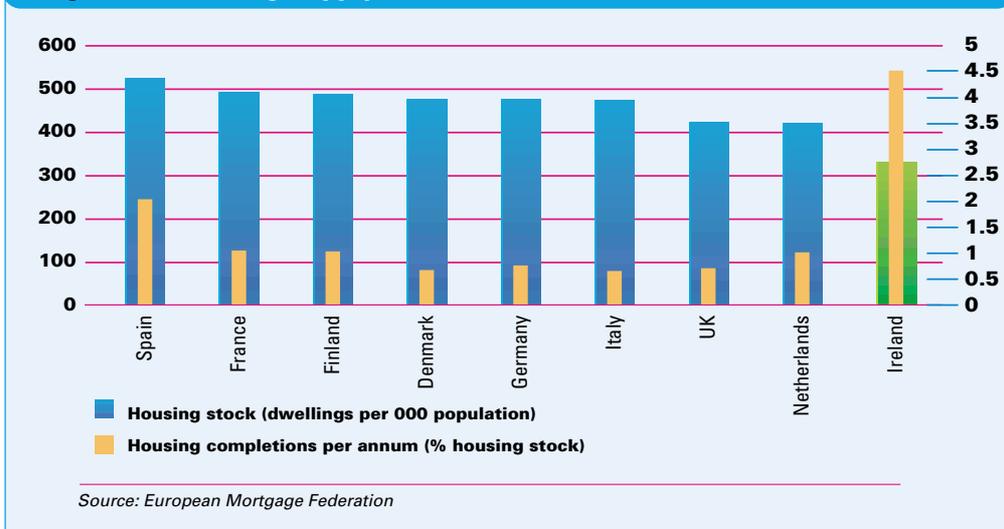


Figure 20 Housing Completions in Ireland 1992 - 2003

Source European Mortgage Federation

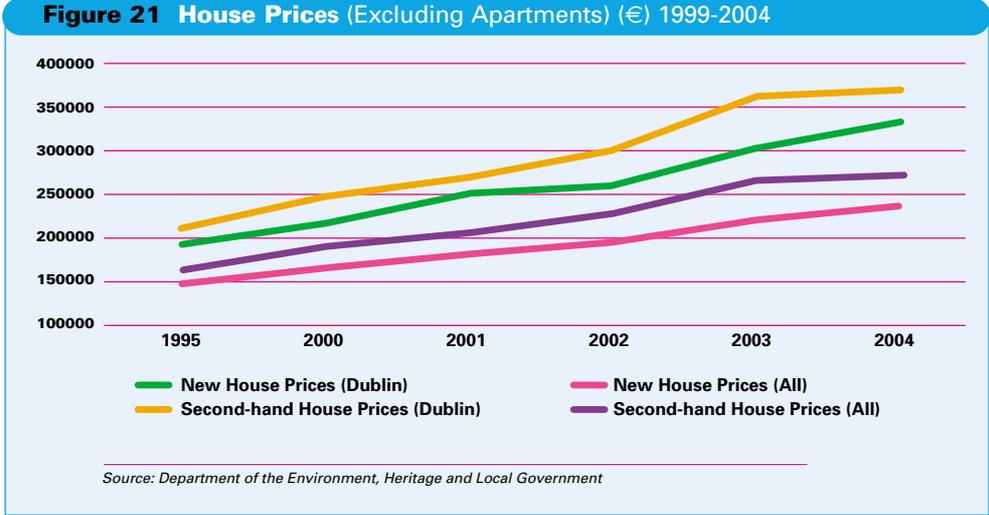
It is clear that while the total housing stock in Ireland remains, on a per capita basis, well behind all of the countries surveyed (equating to a rank of 9th out of nine), rapid progress is being made in terms of house building. In 2002 (the latest year for which internationally comparable data is available), over 57,000 houses were built in Ireland. This was equivalent to 4.5 per cent of the existing housing stock, placing Ireland 1st amongst nine countries. In fact, this was more than twice the rate of housing completions in Spain, the 2nd placed country.

The rate of house completions accelerated further in 2003 when over 70,000 houses were built. By comparison, approximately 185,000 houses were completed in the UK over the same period, a country with a population 15 times larger than that of Ireland. This suggests housing supply in Ireland has reacted strongly to increases in demand, albeit with a lagged effect. One point to note however is that despite the bulk of the demand for additional housing originating in the Dublin region, just 21 per cent of all housing completions last year occurred in the capital. A further 12 per cent of completions were recorded in the surrounding counties of Kildare, Meath and Wicklow.

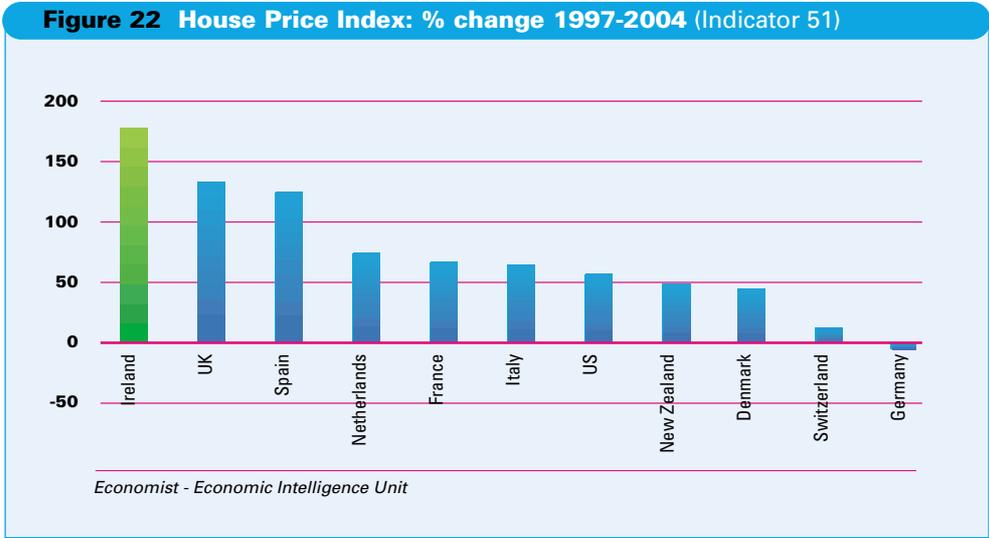
Housing Prices

House prices are determined by the interaction between demand and supply. While demand for housing grew extremely rapidly during the period of high economic growth in the late 1990s, supply by its nature was slower to respond. Figure 21 below illustrates the increase in domestic house prices both in Dublin and on a national basis between 1999 and 2004. New house prices in Dublin have increased by almost 74 per cent (to €330,000) over the period in question. Second-hand house prices in Dublin increased by a similar amount and the average price now stands at €370,000. Substantial increases in average national house prices were also recorded.²⁶

²⁶ Data taken from 'Housing Statistics Bulletin', Department of Environment, Heritage and Local Government, March 2004. Price data refers to average house prices for which loans were approved.

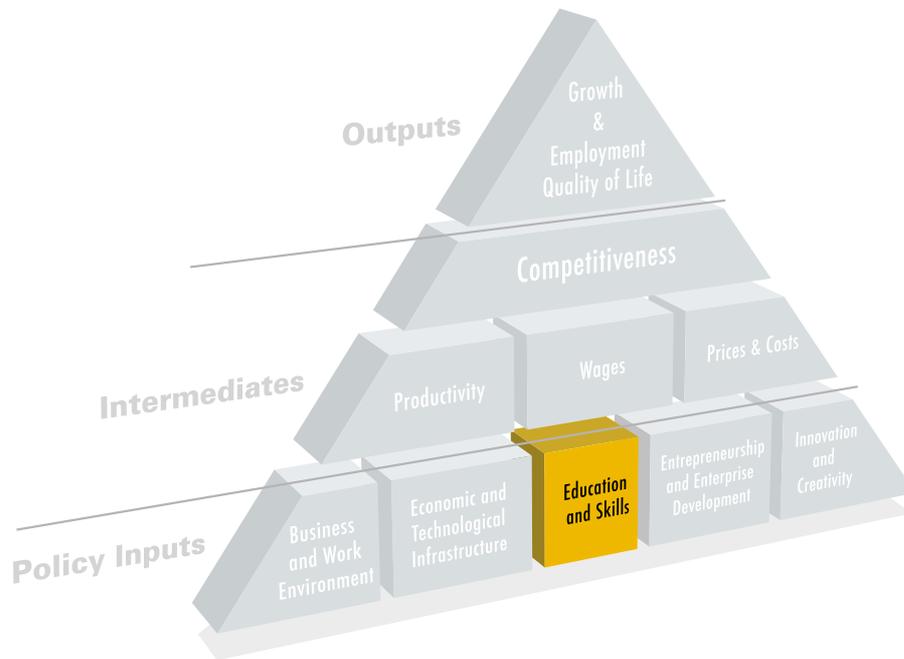


On an international basis, Figure 22 illustrates the degree to which Irish house price growth has dramatically outstripped that of our competitors.



Between 1997 and 2004 the house price index for Ireland compiled by the *Economist's Economic Intelligence Unit* increased by 181 per cent. This was significantly more than the UK (132 per cent) and Spain (125 per cent). As a result of the dramatic increase in prices there is widespread concern about house price affordability and the impact of high house prices on wage expectations.

2.3 Education and Skills



Education and Skills - Investment

Indicator	52		53		54		55		56		57		58	
	Public and private expenditure on educational institutions (% of GDP)	2001	Annual expenditure on educational institutions per student (US\$ PPP) – pre-primary education*	Rank	Annual expenditure on educational institutions per student (US\$ PPP) – primary education	Rank	Annual expenditure on educational institutions per student (US\$ PPP) – secondary education**	Rank	Ratio of students to teaching staff in educational institutions (all secondary education)***	Rank	Ratio of students to computer in upper secondary education	Rank	Annual expenditure on educational institutions per student (US\$ PPP) – tertiary education	Rank
Year	2001	2001	2001	2001	2001	2001	2001	2002	2000	2001	2000	2001	2001	2001
Source	OECD Education at a Glance 2004	OECD Education at a Glance 2004	OECD Education at a Glance 2004	OECD Education at a Glance 2004	OECD Education at a Glance 2004	OECD Education at a Glance 2004	OECD Education at a Glance 2004	OECD Education at a Glance 2004	OECD Education at a Glance 2003	OECD Education at a Glance 2004	OECD Education at a Glance 2003	OECD Education at a Glance 2004	OECD Education at a Glance 2004	OECD Education at a Glance 2004
Denmark	7.1	3	4542	6	7572	1	8113	4	14.2	7	3	1	14280	3
Finland	5.8	5	3640	9	4708	7	6537	7	13.4	5	5	2	10981	5
France	6.0	4	4323	7	4777	6	8107	5	12.2	4	6	3	8837	9
Germany	5.3	9	4956	5	4237	9	6620	6	15.1	10	-	-	10504	7
Hungary	5.2	12	2882	12	2592	13	3768	13	11.7	3	10	6	7122	12
Ireland	4.5	15	4026	8	3743	11	5245	11	14.3	8	13	8	10003	8
Italy	5.3	9	5972	4	6783	4	8258	3	10.2	1	12	7	8347	10
Korea	8.2	1	1913	14	3714	12	5159	12	18.4	14	6	3	6618	13
Netherlands	4.9	13	6733	3	4862	5	6403	8	15.9	12	13	8	12974	4
New Zealand	5.5	7	-	-	-	-	-	16.6	13	13	-	-	#N/A	#N/A
Poland	5.6	6	2220	13	2322	14	2592	14	13.9	6	-	-	3579	14
Singapore	-	-	-	-	-	-	-	-	-	-	-	-	#N/A	#N/A
Spain	4.9	13	3608	10	4168	10	5442	10	11.2	2	16	10	7455	11
Switzerland	5.3	9	3080	11	6889	3	10916	1	-	1	9	5	20230	2
UK	5.5	7	7595	2	4415	8	5933	9	14.8	9	-	-	10753	6
US	7.3	2	8522	1	7560	2	8779	2	15.5	11	-	-	22234	1
Ireland (GNP)	5.3	-	-	-	-	-	-	-	-	-	-	-	-	-
EU	-	-	-	-	-	-	-	-	-	-	-	-	-	-
OECD	5.5	-	4187	-	4850	-	6510	-	13.6	-	-	-	10052	-

*Note: For children 3 years and older enrolled in education

**Note: Figure for Poland refers to upper secondary education only

***Note: Lower Secondary for Ireland

Education and Skills - Participation & Attainment

Year	59	60	61	62	63	64	65	66	67	68	69	70												
	Full and part-time students in public and private institutions as a % of population aged 15-19 (%)	Upper secondary graduation rates as a % total population at typical age of graduation	% of population aged 25-64 that has at least upper secondary level education	Mean performance on the PISA reading literacy scale (age 15)	Mean performance on the PISA scientific literacy scale (age 15)	Mean performance on the PISA Mathematical literacy scale (age 15)	Change in enrolment to tertiary education (Change not attributable to demographic change)	% of population aged 25-34 that has at least third level education	Science and engineering graduates (% population aged 20-29)	Life long learners in EU member states*	Extent of staff training**	Course hours per 1000 working hours in all enterprises												
	2002	2002	2002	2000	2000	2000	2002	2002	2001	Q2 2003	2003	1999												
	OECD Education at a Glance 2004	OECD Education at a Glance 2004	OECD Education at a Glance 2004	OECD PISA Database 2001	OECD PISA Database 2001	OECD Education at a Glance 2004	OECD Education at a Glance 2004	OECD Education at a Glance 2004	European Innovation Scoreboard 2003	Eurostat	WEF- Global Competitiveness Report 2003-2004	Eurostat Statistics in Focus 1/2003												
Country	15	11	15	14	14	14	9	15	13	11	16	8												
	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank												
Denmark	81.1	8	1	80	4	497	8	481	13	514	7	130	3	31	8	11.10	6	18.9	2	6	1	14	1	
Finland	85.0	5	85	75	6	546	1	538	2	536	3	123	7	39	3	16.00	4	17.6	3	5.8	5	11	2	
France	86.7	3	82	65	10	505	6	500	6	517	6	106	9	36	6	19.60	2	7.4	6	5.2	9	-	-	
Germany	89.2	1	93	2	83	2	484	12	487	11	490	10	114	8	22	12	8.00	8	5.8	8	5.9	3	5	6
Hungary	81.1	8	82	6	71	7	480	13	486	8	488	11	207	1	15	14	3.70	13	6.0	7	3.5	16	3	7
Ireland	81.6	7	77	9	60	12	527	3	513	5	503	8	127	5	36	6	21.70	1	9.7	5	4.9	11	9	4
Italy	75.8	13	82	6	44	14	487	11	478	14	457	14	-	12	15	5.70	12	4.2	11	4.3	13	-	-	
Korea	79.9	11	-	71	7	525	4	582	1	547	1	175	2	41	1	-	-	-	-	4.9	11	-	-	
Netherlands	86.5	4	-	66	9	-	-	-	28	10	6.10	11	16.5	4	5.5	7	11	2	-	-	-	-	-	
New Zealand	72.1	15	-	76	5	529	2	528	4	537	2	-	-	40	2	-	-	-	-	5	10	-	-	
Poland	86.8	2	90	3	47	13	479	14	483	12	470	13	-	16	13	7.40	10	5.0	10	3.6	15	2	8	
Singapore	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	5.7	6	-	
Spain	80.4	10	68	11	41	15	493	10	491	10	476	12	128	4	37	5	11.30	5	5.8	8	4.3	13	6	5
Switzerland	82.7	6	90	3	82	3	494	9	496	8	529	4	-	26	11	7.60	9	-	6	1	-	-	-	
UK	76.8	12	-	64	11	523	5	532	3	529	4	126	4	31	8	19.50	3	21.3	1	5.4	8	-	-	
US	74.8	14	73	10	87	1	504	7	499	7	493	9	-	39	3	10.20	7	-	5.9	3	-	-	-	
EU																								
OECD	79.4	81	65	499	502	498	137	28	11.5	8.9														

*Note: Life long learners are defined as persons aged 25 to 64 in receipt of education (either formal or non formal) in the four weeks prior to the survey.

**Note: 1=Companies generally invest little in training and employee development; 7= invest highly

2.3 Education and Skills

The third input to competitiveness is Education and Skills. As knowledge becomes the basis for competition, education is increasingly important to economic performance. Education increases individual incomes, and an increase in a country's average education level positively affects aggregate output.²⁷ In addition to the positive economic returns, the evidence suggests that high levels of investment in education lead to a number of other social benefits, including increased social inclusion, lower crime, reduced welfare dependence and better health.²⁸

The indicators examined under this heading cover two main areas:

- Investment in Education and Skills
- Educational Participation & Attainment

Whereas the investment indicators examine the resources committed to education and can thus be considered as inputs to education, the participation and attainment statistics measure the output of the system in terms of both quantity and quality. The relationship between these two sets of indicators gives an indication of the overall efficiency of the education system.

2.3.1 Investment in Education and Skills

The first heading examined in this chapter is the level of investment in education. While it is important that the education system operates in a manner that is efficient and effective, it is equally important that educational institutions receive adequate funding to fulfil their role in society.

The return on investment in education accrues both to society as a whole as well as to the individual. While it is difficult to quantify the exact magnitude, the literature is in broad agreement about the nature of the returns to increased investment in education. In macroeconomic terms, there is an initial reduction in the labour force as individuals remain longer in education. When their education is completed and these individuals re-enter the labour market, the stock (and quality) of human capital increases, and the economy benefits from higher productivity. For the private individual, the return for income forgone while studying is a higher probability of employment and improved earning potential: the average return to a year's education is about seven per cent.²⁹

Public and Private Expenditure on Educational Institutions

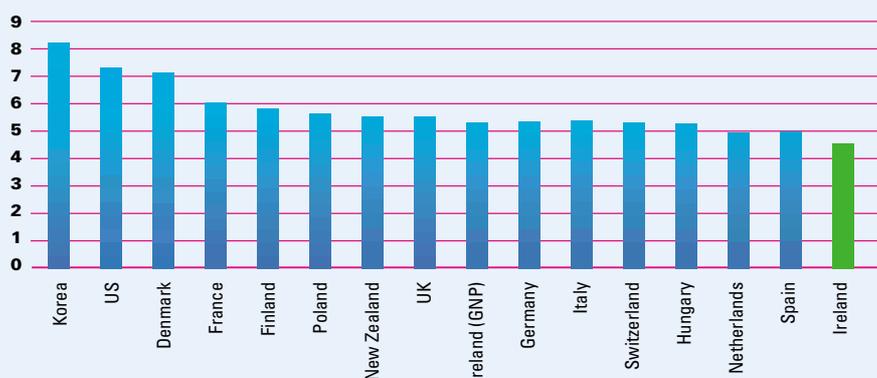
According to OECD data from 2001, Ireland invested approximately 5.3 per cent of GNP in public and private educational institutions equating to a rank of 9th out of 15 (Figure 23). If GDP is used instead, Ireland's rank deteriorates significantly (to 15th out of 15), with 4.5 per cent of GDP being spent on education. Both of these figures are lower than the OECD average of 5.5 per cent. The figures for Ireland reflect a traditionally low spend on education. The poor Irish performance also reflects the rapid economic growth in the 1990s which lowered education spending as a proportion of national income and output.

27 'Education for Growth: Why and for Whom', A. Kruger and M. Lindahl, Swedish Economic Policy Review (1999).

28 'European Economy No. 6 / 2003', European Commission.

29 'The Returns to Education: a review of the empirical macro-economic literature' B. & J. Van Reenen, 2002. IFS Working Paper W02/05, Institute for Fiscal Studies. The seven per cent figure is an average that masks potentially considerable variation along two dimensions: first, the returns for certain types of education may be higher than others; second, the return to education may vary across individuals.

Figure 23 Public and Private Expenditure on Education 2001
(% GDP) (Indicator 52)



Source: OECD Education at a Glance 2004

The overall figures for expenditure on education also mask some important underlying caveats and trends. First, when deciding on the appropriate level of expenditure on education, demographic factors must be taken into consideration. A country with a relatively large youth population (under 18) will require a larger proportion of expenditure on education than a country with an older population.

Second, the figure for total expenditure on educational institutions does not differentiate between public and private funding sources. While Ireland lags the leading performing countries in terms of overall spending on education, a closer examination of the data reveals that much of this differential is accounted for by differing levels of private funding. For instance, the private sector in Ireland spends 0.3 per cent of GDP on education. This is a marked contrast with Korea and the US (the two countries with the highest overall spend) where private sources spend 3.4 and 2.3 per cent of GDP on education respectively.

Third, an overall expenditure statistic does not distinguish between expenditure on pre-primary, primary, secondary and tertiary education. Such a distinction is very important since evidence suggests that the returns to investment in education vary at different stages in the education system, and are influenced by a country's level of economic development. The remaining indicators in this section examine the level of expenditure per student according to level of education. Per capita expenditure data can be affected by differences in how countries define various levels of education, as well as by the average length of schooling, participation rates and the minimum school-leaving age.

International evidence suggests that investment in pre-primary education and childhood development offers potentially high returns, improving children's school readiness and positively impacting on subsequent attainment levels.³⁰ Yet in this area, Ireland's performance is quiet weak. Expenditure of \$4,026 per child (aged over three years of age) sees Ireland ranked 8th out of 14 countries (Indicator 53). This approximates to 0.1 per cent of GDP. Of course, this figure does not take account of the average age at which children enter the formal primary school cycle, i.e. in some countries children begin formal primary education earlier than in others, thus reducing the time spent in pre-primary educational institutions. It should also be noted that the number of children engaged in pre-primary education in Ireland is extremely low.

Per student expenditure on primary school students is also low in Ireland. Ireland is ranked 11th out of 14 countries spending \$3,743 per student, well behind Denmark (\$7,572) and the US (\$7,560) (Indicator 54). Next, looking specifically at spending per student in second level educational institutions, Ireland again performs poorly and is ranked 11th out of 14 countries (Indicator 55). Ireland spends \$5,245 per pupil; this contrasts most unfavourably with the best performing country, Switzerland which spends \$10,916 per pupil. Despite the low levels of expenditure per secondary student, Irish secondary school class sizes are reasonably small with the average class consisting of 14.3 students (Indicator 56). This figure gives Ireland a rank of 8th out of 14 countries.

Ireland's ambitions of progressing towards a knowledge economy require an increased emphasis on ICT and a greater provision of ICT infrastructure. Currently there is just one computer for every 13 students in Ireland (Indicator 57). In comparison with the Scandinavian countries this is a very weak performance, corresponding to a rank of 8th out of 10.

In terms of expenditure on tertiary education, Ireland's performance is somewhat better. Expenditure of \$10,003 per student in tertiary education (or 1.3 per cent of GDP) is equivalent to a rank of 8th out of 14 (Indicator 58). Of this, 1.1 per cent is accounted for by the public sector and the remaining 0.2 per cent is drawn from private sources. In contrast, private investment in tertiary education in the USA equals 1.8 per cent of GDP, on top of public investment of around 0.9 per cent of GDP. It is noteworthy that Ireland invests a larger proportion of educational expenditure in third level education than most of the surveyed countries. On the basis of empirical research indicating that there may be higher social returns to public investment in primary and secondary education rather than in tertiary education, it may be that scarce resources for education have been concentrated in the wrong area.

2.3.2 Participation and Attainment

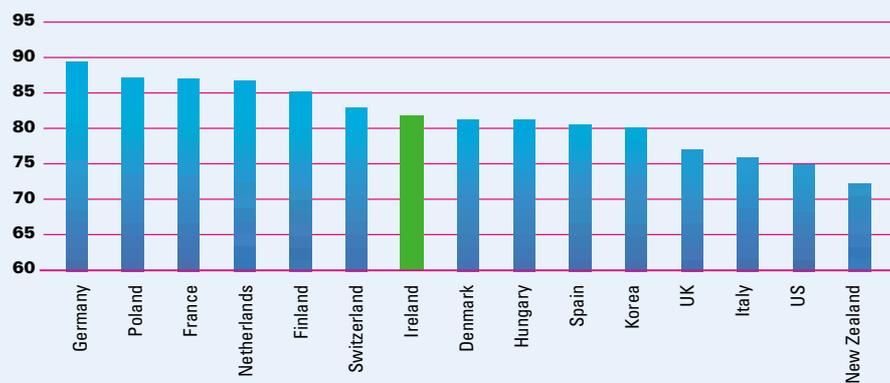
This section examines participation and attainment rates at both second and third level, as well as looking at the extent of life long learning. It is crucial for international competitiveness that the education system produces a steady flow of well qualified graduates to meet the needs of enterprise. Increased rates of participation feed through to improved average attainment levels and thus boost the stock of human capital. Although traditional economic models have placed more emphasis on quantity rather than quality, the quality of education is at least as important as the quantity of graduates. In Ireland, radical changes to the structure of the education system in the 1960s (particularly the introduction of free secondary education) resulted in significantly improved participation rates. In order to continue Ireland's development as a high-tech, knowledge-based economy, it is necessary to improve both the quantity of individuals enrolling in the system and the quality of graduates that emerge from secondary and tertiary courses.

Second Level Participation and Attainment

Educational participation rates amongst 15-19 year olds in the 15 ACR countries for which data is available range from 72 per cent in New Zealand to almost 90 per cent in Germany. Despite improvement in these figures over time, a significant proportion of most countries' populations still leave the education system without completing upper-secondary schooling. Microeconomic evidence indicates that improving the participation (and attainment) levels of the lowest-skilled members of society delivers favourable long term benefits in terms of both individual employment prospects and overall productivity. With this in mind, the EU through the Lisbon agenda has targeted a 50 per cent reduction in the numbers of early school leavers.

Statistics from *OECD Education at a Glance 2004* show that 81.6 per cent of 15-19 year olds in Ireland were enrolled in either public or private institutions in 2002 (Figure 24). This accords Ireland a rank of 7th among the 15 ACR countries for which data are available. Of course not all students engaged in secondary education go on to complete their formal education. The OECD measures upper secondary graduation rates as a percentage of the total population at the typical age of graduation. This shows that on average just 77 per cent of the relevant Irish cohort complete upper secondary school education each year, ranking 9th out of 11 on this indicator (Indicator 60). Furthermore, this figure masks a significant gender divide; just 70 per cent of males, compared with 84 per cent of females graduate each year.

Figure 24 Full and Part-time Students in Public & Private Institutions 2002 (% population aged 15-19) (Indicator 59)



Source: *OECD Education at a Glance 2004*

Looking next at the overall stock of secondary graduates, Ireland again performs poorly. According to the OECD just 60 per cent of 25-64 year olds have attained at least upper secondary education (Indicator 61). This low figure gives Ireland a rank of 11th out of 15. The relatively late introduction of free secondary education is the principle explanation for this poor performance. An examination of the same data for Ireland broken down by age confirms this: while just 37 per cent of 55-64 year olds in Ireland have attained at least upper secondary education, this figure increases to 51 per cent for 45-54 year olds, 65 per cent for 35-44 year olds and 77 per cent for 25-34 year olds.

Data facilitating international comparisons of educational attainment at secondary level are limited. Internationally comparable tests are limited to reading, mathematical and scientific literacy and these must serve as proxies for the quality of general education received by

students. For our purposes, we examine the performance of 15 year-olds in a variety of tests carried out by the OECD under the auspices of the *Programme for International Student Assessment (PISA)*.

According to the PISA results, Ireland is ranked 3rd out of 14 for literacy skills among 15 year-olds (Indicator 62). This performance is bettered only by Finland and New Zealand. The results for mathematical and scientific literacy levels in Ireland are less encouraging. Irish students ranked 5th out of 14 for scientific literacy (Indicator 63), and were ranked only 8th out of 14 for mathematical literacy (Indicator 64). Korea was the top performing country in both cases.

Third Level Participation and Attainment

Due to difficulties in differentiating between various forms of third level courses it is not possible to provide an overall tertiary enrolment rate. It is clear, however, that given the already high rates of enrolment in the more developed economies that there is less scope for large increases in the participation rates than in some of the less developed countries. It is not surprising therefore that countries such as Poland and Hungary demonstrate relatively large increases in tertiary enrolments vis-à-vis countries such as Germany and France which have long had high rates of participation in third level education. In Ireland, there was a 27 per cent increase in the rate enrolment in third level institutions between 1995 and 2000.³¹ This puts Ireland in a ranking of 5th out of the 9 ACR countries for which data was available (Indicator 65).

As of 2001, 36 per cent of the Irish population aged 25-34 had some form of third level qualification, placing Ireland 6th out of the 15 countries for which data was available (Figure 25). By comparison, 39 per cent of US citizens in the same age cohort had third level education. These figures do not differentiate between various levels of third level attainment (i.e. diplomas, degrees etc.). The higher rate of third level education in the USA compared to Ireland (and most other EU countries) may be one of the possible explanations for higher US productivity growth over recent years. Third level attainment rates among the Irish population as a whole will increase over time, reflecting the high rate of participation among younger age cohorts. According to the Higher Education Authority, first time admission rates to third level for Irish school leavers now stands at approximately 53 per cent, up from 11 per cent in 1965.

Figure 25 Percentage of Population Aged 25-34 that has at least 3rd Level Education 2002 (Indicator 66)



Source: OECD Education at a Glance 2004

³¹ This statistic illustrates the changes in tertiary enrolment in third level institutions that is not explained by demographic changes.

Ireland's ambitions of becoming a knowledge based economy are dependent on an adequate supply of science and technology graduates. Scientific literacy, as proxied by scores on science tests, has a particularly strong positive relationship with economic growth.³² Ireland performs very well in this area and is ranked 1st out of 13 countries for the number of science and engineering graduates per 1,000 of the population aged between 20 and 29 (Indicator 67). This seems to confirm Ireland's internationally acknowledged reputation for producing large numbers of science and engineering graduates. One important caveat to the data is the inclusion of certificates and diplomas in the overall statistics. This may distort the results as other countries have different forms of tertiary qualifications. In addition, the fall off in the take-up of science subjects amongst secondary school students will have an adverse impact on this figure in years to come. In 2002 the Task Force on the Physical Sciences concluded that there had been a fall-off in interest in science subjects throughout the education system. This scenario may pose a significant impediment to the further development of Ireland as knowledge-based economy, as Ireland's economic future greatly depends on the supply of qualified scientists.

Finally, it should be remembered that in order to become a world leader in R&D, the supply of 4th level graduates in these fields will be crucial; Ireland is currently ranked just 6th out of 12 for the total number of new science and engineering PhDs per 1000 population aged 25-34 (this issue is discussed further in section 2.5.1).

Life-long Learning Participation and Attainment

A large body of international evidence concludes that life long learning and job-related training contributes positively to the development of human capital.³³ While the productivity effects of continued education are dependent on the form of training undertaken, there is general consensus that the returns to life long learning are similar in magnitude to the returns from traditional schooling.³⁴ The International Labour Organisation (ILO) estimate that 80 per cent of the global workforce of 2015 is already in the labour force but that many of their skills will have been rendered obsolete by that time due to changes in technology and process innovation.³⁵ In Ireland's case, demographic changes (an ageing society) will mean that employers and employees alike will increasingly depend on life long learning and skills acquired outside of the traditional forums in order to remain competitive.

It is of concern, therefore, that Ireland ranked 5th out of 11 in terms of the percentage of 25-64 year olds classified as engaged in life long learning in 2003 (Figure 26). This indicator measures the percentage of persons aged 25 to 64 in receipt of education in the four weeks prior to the survey and includes both formal and non formal education. Of the 22 per cent who are engaged in continuing education and training in Ireland, however, only 70 per cent are involved in training activities that are related to their employment.³⁶

32 'Human Capital Growth in Cross-Country Regressions', R.J. Barro, *Swedish Economic Review*, 1999.

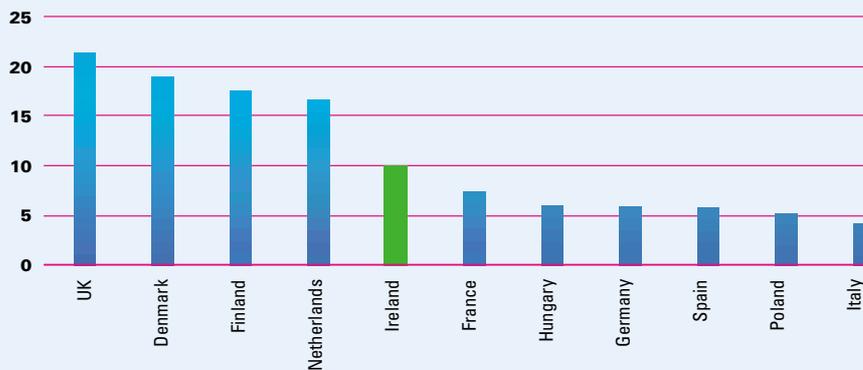
33 'Fostering Productivity: Patterns, Determinants and Policy Implications', G. Gelauff, L. Klomp, S. Raes and T. Roelandt, 2004.

34 'European Economy No. 6 / 2003', European Commission.

35 'Towards a Strategic Plan', B. Ásgeirsdóttir, Deputy Secretary General, OECD.

36 'Benchmarking Education and Training For Economic Development in Ireland', Pg 51, Expert Group on Future Skills Needs

Figure 26 Life long learners in EU member states Q2 2003
(% 25-64 year olds) (Indicator 68)



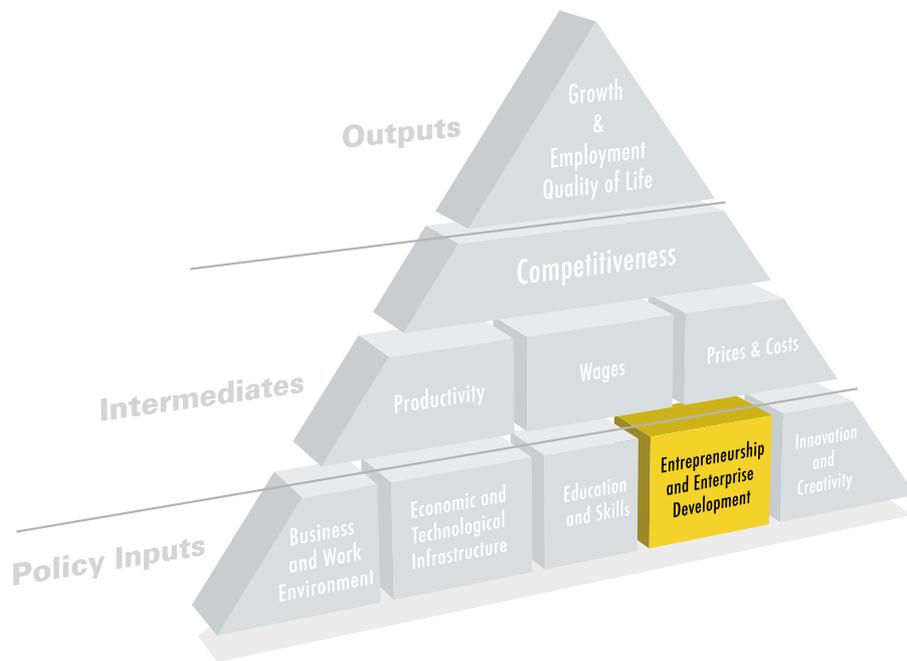
Source: Eurostat

The low level of commitment in Ireland to staff training is also reflected in an IMD survey which concludes that Irish companies generally invest little in training and employee development relative to companies in most of the other countries benchmarked. Ireland is ranked just 11th out of the 14 countries for which data is available on this indicator (Indicator 69). Both of these statistics tally with the Eurostat measure of course hours taken by employees per 1,000 working hours (Indicator 70). This ranks Ireland 4th out of the eight ACR countries for which data was available, behind the Scandinavian countries and the Netherlands, but ahead of Germany, Hungary and Spain.

The relatively low levels of life-long learning in Ireland may be a result of a combination of factors, including reluctance on the part of employers to release their staff from regular work duties to participate in relevant courses and a lack of awareness amongst employees about the private benefits which accrue from improved education. There does not, however, appear to be a lack of government support or funding as a significant proportion of the finance allocated to the National Training Fund has not been drawn down to date.³⁷

³⁷ For example, in 2003 €280 million was allocated to FÁS for training schemes and another €10 million went to SkillsNets and Enterprise Ireland.

2.4 Entrepreneurship and Enterprise Development



Entrepreneurship and Enterprise Development - Entrepreneurship & Business Formation

Year	71		72		73		74		75		76		77		78		79		80		81		
	Total Entrepreneurial Activity (TEA) Rate	Rank	Ratio of men to women entrepreneurs	Rank	Cumulative venture capital raised - % change	Rank	High tech investment (% of total private equity investment)	Rank	% of private equity investment directed to seed/start-up	Rank	Stock market capitalisation (% GDP)	Rank	Domestic informal investment as percentage of GDP	Rank	Business angels - number of networks	Rank	Administrative burden for start-ups*	Rank	Creation of firms**	Rank	Number of days to start a business	Rank	
2002	Global Entrepreneurship Monitor 2003 Executive Report	16	Global Entrepreneurship Monitor 2003	16	PWC European Technology Investment Report 2004	16	PWC European Technology Investment Report 2004	9	PWC European Technology Investment Report 2004	11	IMD World Competitiveness Yearbook 2004	2002	Global Entrepreneurship Monitor 2003	16	European Business Angels Networks Statistics Compendium 2003	16	WEF - Global Competitiveness Report 2003-2004	2003	IMD World Competitiveness Yearbook 2004	16	IMD World Competitiveness Yearbook 2004	16	Rank
Denmark	6.20	8	2.38	14	-24.8	10	-	52.9	2	5.64	13	1.14	7	8	5	4.7	9	7.11	3	4	2	2	
Finland	5.70	10	2.17	11	26.3	4	36.0	4	41.6	3	99.31	4	0.43	1	10	5.6	2	6.86	4	33	9	9	
France	2.40	16	1.71	4	6.0	6	22.0	5	32.0	4	63.52	9	-	48	2	3.2	15	5.34	13	53	13	13	
Germany	5.20	12	1.93	8	-63.2	11	17.0	6	27.4	5	32.50	11	1.30	5	40	3	4.3	10	4.59	15	45	12	
Hungary	6.60	6	1.89	7	200.0	1	44.0	3	0.0	12	0.78	15	0.35	14	-	5.2	7	6.85	5	65	14	14	
Ireland	8.60	4	2.54	16	-19.1	9	97.0	1	10.9	10	65.78	7	0.74	3	6	4.7	9	6.73	7	12	5	5	
Italy	4.60	13	1.43	1	110.4	2	-	27.4	5	37.85	10	0.50	12	10	4	3.5	14	4.88	14	23	8	8	
Korea	14.50	1	2.34	13	-	-	-	-	-	0.04	16	5.24	1	-	-	4.2	11	5.46	12	33	9	9	
Netherlands	4.10	15	1.88	6	-72.7	12	-	17.6	9	90.29	5	1.08	8	3	6	5.0	8	6.88	8	11	4	4	
New Zealand	13.80	2	1.55	3	-	-	-	-	-	17.72	12	3.61	2	-	-	5.4	5	6.76	6	3	1	1	
Poland	4.40	14	1.51	2	90.0	3	-	1.1	11	3.73	14	-	-	-	3.8	13	4.03	16	43	11	11		
Singapore	5.40	11	2.49	15	-	-	-	-	-	64.47	8	1.25	6	-	-	5.6	2	8.34	1	8	3	3	
Spain	6.30	7	2.03	9	-17.7	7	-	27.4	5	66.30	6	1.34	4	3	6	4.1	12	6.00	10	115	15	15	
Switzerland	7.30	5	2.14	10	-18.8	8	56.0	2	55.2	1	132.70	2	1.90	3	6	5.5	4	6.46	9	20	7	7	
UK	6.00	9	2.17	11	9.0	5	15.0	7	21.1	8	176.74	1	0.61	11	51	1	5.3	5.68	11	18	6	6	
US	11.30	3	1.72	5	-	-	-	-	-	105.45	3	0.99	9	-	-	5.8	1	7.82	2	4	2	2	
Ireland (GNP)										80.58		0.91											
EU																							
OECD																							

*Note: Starting a new business is generally (1 = extremely difficult and time consuming; 7 = easy)

**Note: Creation of firms is (1 = hindered by legislation; 7 = supported by legislation)

Entrepreneurship and Enterprise Development - Firm Level Management Skills

Indicator	82		83		84		85		86	
	Competent senior managers		Adaptability to market changes*		Extent of marketing**		Customer satisfaction***		Value chain presence****	
Year	2004	Rank	2004	Rank	2003	Rank	2004	Rank	2003	Rank
Source	IMD World Competitiveness Yearbook 2004		IMD World Competitiveness Yearbook 2004		WEF- Global Competitiveness Report 2003-2004		IMD World Competitiveness Yearbook 2004		WEF- Global Competitiveness Report 2003-2004	
Country	16	Rank	16	Rank	16	Rank	16	Rank	16	Rank
Denmark	7.570	2	7.38	3	5.60	7	7.66	1	6.3	3
Finland	7.050	7	7.45	2	5.60	7	7.57	3	6.4	1
France	7.030	8	5.22	14	6.10	4	5.97	12	6.2	5
Germany	6.890	9	5.45	13	6.30	1	5.83	13	6.4	1
Hungary	6.000	10	5.76	11	3.90	16	5.15	15	4.0	14
Ireland	7.370	3	7.00	4	5.20	13	6.93	7	5.3	11
Italy	5.340	15	5.14	15	5.30	11	4.91	16	5.9	8
Korea	5.540	13	5.63	12	5.00	14	7.54	4	5.1	13
Netherlands	7.220	4	6.41	7	5.90	6	6.63	9	5.7	9
New Zealand	5.480	14	6.92	5	5.30	11	7.12	6	3.9	16
Poland	4.880	16	4.61	16	4.50	15	5.18	14	4.0	14
Singapore	7.140	6	6.90	6	5.60	7	7.48	5	5.7	9
Spain	5.850	11	5.88	9	5.40	10	6.05	11	5.2	12
Switzerland	7.190	5	5.97	8	6.00	5	6.58	10	6.3	3
UK	5.840	12	5.88	9	6.20	3	6.65	8	6.2	5
US	7.680	1	7.86	1	6.30	1	7.59	2	6.1	7
EU										
OECD										

*Note: Adaptability to market changes is low/high for companies in the economy

**Note: The extent of marketing is (1=limited and primitive; 7= extensive and employs the world's most sophisticated tools and techniques)

***Note: Customer satisfaction is/is not emphasised

****Note: Exporting companies are (1= primarily involved in resource extraction or production; 7= not only produce but also perform product design, marketing, sales, logistics and after sales services)

Entrepreneurship and Enterprise Development - Networks and Clusters

Indicator	87	88	89	90
State of cluster development*		Extent of collaboration among clusters**	Local availability of specialised research and training services	Knowledge transfer between companies and universities***
Year	2003	2003	2003	2004
Source	WEF- Global Competitiveness Report 2003-2004	WEF- Global Competitiveness Report 2003-2004	WEF- Global Competitiveness Report 2003-2004	IMD World Competitiveness Yearbook 2004
Country	16	16	16	16
Denmark	4.4	4.8	5.6	5.95
Finland	6	6.0	6.0	7.82
France	4	4.7	5.5	4.80
Germany	4.1	5.3	5.9	5.21
Hungary	2.7	3.1	4.0	5.06
Ireland	4.8	4.7	4.8	5.86
Italy	5.8	5.5	5.1	3.66
Korea	4.8	4.7	4.9	4.04
Netherlands	4	4.6	5.6	5.51
New Zealand	3.3	4.1	5.0	5.00
Poland	3.2	4.0	4.6	4.30
Singapore	5.2	4.9	5.0	7.10
Spain	3.5	3.9	4.7	3.85
Switzerland	4	4.5	5.7	6.77
UK	4.2	4.4	5.9	4.21
US	4.9	5.7	6.4	6.92
EU				
OECD				
	Rank	Rank	Rank	Rank
	7	6	6	5
	1	1	2	1
	10	6	8	11
	9	4	3	8
	16	15	16	9
	5	6	13	6
	2	3	9	16
	5	6	12	14
	10	9	6	7
	14	12	10	10
	15	13	15	12
	3	5	10	2
	13	14	14	15
	10	10	5	4
	8	11	3	13
	4	2	1	3

*Note: Clusters are (1= limited and shallow clusters; 7= common and deep)

**Note: Collaboration in your clusters with suppliers and partners is (1= almost nonexistent; 7= extensive and involves suppliers, local customers and local research institutions)

***Note: 1= Knowledge transfer between companies and universities is lacking; 7= highly developed

2.4 Entrepreneurship and Enterprise Development

The fourth input to competitiveness focuses on issues at firm level and is titled Entrepreneurship and Enterprise Development. Entrepreneurship is the process of creating new enterprises and is characterised by risk-taking and innovation. Enterprise development is the process by which start-up and existing companies grow into larger internationally-trading companies.

The indicators examined in this chapter are classified under 3 main headings:

- Entrepreneurship and Business Formation
- Firm Level Management Skills
- Clusters and Networks

2.4.1 Entrepreneurship and Business Formation

Economic theory suggests that high levels of entrepreneurship have a positive impact on growth in productivity and competitiveness because new firms typically use a more efficient mix of labour, capital and technology than existing firms. This is confirmed by empirical evidence which shows that countries with higher levels of entrepreneurial activity also enjoy higher rates of growth and lower unemployment.³⁸

Total Start-up Activity

The key indicator in this section is Total Entrepreneurial Activity (TEA). The TEA is a composite indicator published in the *Global Entrepreneurship Monitor* (GEM) report.³⁹ It measures levels of entrepreneurial activity in both the 'start-up phase' of a firm (i.e. the period prior to trading commences, when business plans are formulated and the firm is actually created) and the 'new firm phase' (the first 42 months of a firm's existence).⁴⁰

Ireland consistently performs quite well under this measure. The average TEA rate of 8.6 equates to a ranking of 4th out of the 16 ACR countries (Figure 27). In other words, 8.6 per cent of all adults (aged 18-64) are engaged in entrepreneurial activity of some form. According to GEM estimates, over 210,000 people are currently employed in Ireland in start-up firms. While this remains quite an impressive performance and tops the performance of most European countries, it is still a long way behind the leading countries such as Korea (14.5), New Zealand (13.8) and the USA (11.3). Significantly, this is the first time in a number of years that the TEA in Ireland has fallen behind US levels, with Ireland's performance declining by approximately 33 per cent since 2001.

³⁸ 'Promoting Entrepreneurship and Innovative SMEs in a Global Economy', OECD, June 2004.

³⁹ Global Entrepreneurship Monitor, 2003 Executive Report'

⁴⁰ Entrepreneurial activity refers to any action related to the establishment or financing of a new enterprise or the management of a recently established firm.

Figure 27

Source: Global Entrepreneurship Monitor 2003 Executive Report

The strong performance in overall entrepreneurship rates masks a significant gender divide. For every female entrepreneur, there are 2.54 males involved in a start-up firm. Of all the countries benchmarked in the ACR, Ireland has the worst gender imbalance for entrepreneurship (Indicator 72).

It is likely that the high rates of entrepreneurship in Ireland (relative to other European countries) are due to a range of factors including a favourable tax environment, positive cultural attitudes towards risk-taking, development agency supports for start-ups and a generally healthy economic environment.

There remains, however, a sizeable gap between levels of entrepreneurship in Ireland and the best performing countries. This may be partially explained by weaknesses in two areas: the difficulties in accessing finance faced by start-ups in Ireland and the growing administrative burden on start-ups in Ireland. Both of these issues will need to be addressed by policymakers if Ireland is to close this gap, or even maintain its present position.

Finance for Start-ups

Ready access to finance is a facilitator of continued high levels of entrepreneurship. There are a number of worrying trends in respect of finance for start-ups in Ireland.

First, formal levels of venture capital seem quite low. This is indicated by the 19 per cent fall in the level of cumulative venture capital invested in technology in Ireland (although this was on the back of a very strong performance in 2002) (Indicator 73).⁴¹ This was one of the biggest drops in the flow of venture capital recorded and corresponds to a rank of 9th out of 12 among the countries benchmarked in the ACR. This indicator only looks at venture capital investment in technology and so is a subset of total private equity. Nevertheless, from an Irish perspective, it is a very important statistic. The vast majority of private equity in Ireland is invested in high-technology industries. In fact, 97 per cent of Irish private equity was accounted for by the high-tech sector in 2003 (Indicator 74). This is an increase on the 86 per cent figure recorded in 2002.

Second, a worrying indicator for Irish entrepreneurship is the low amount of private equity being directed into seed and start-up firms. Just 10.9 per cent of all private equity was assigned to this stage of development. This is a poor performance, with Ireland ranking 10th out of the 12 ACR countries for which data is available (Indicator 75). The figures however

41 'PricewaterhouseCoopers' European Technology Investment Report', 2004.

do confirm an international trend of an increasing number of investments being directed towards mature businesses and buyout activity.

Third, the low levels of private equity investment in some countries may be partly explained by a drift towards alternative investments, such as the stock market. The level of stock market capitalisation for example in Switzerland is amongst the highest in the world and this may be one of the explanations for the poor Swiss levels of venture capital. This is not the case for Ireland, as the level of investment in the stock market is not particularly high. Stock market capitalisation in Ireland measured 65.7 per cent of GDP (80 per cent of GNP) in 2003, putting Ireland in 7th place out of the 16 ACR countries (Indicator 76).

Finally, Ireland also performs poorly with regard to informal sources of funds for entrepreneurship. Ireland is ranked 10th out of 14 countries in relation to the levels of domestic informal investment as a percentage of GDP, suggesting that levels of finance for start-ups are low by comparison with many key competitors (Indicator 77). This suspicion is reinforced by the observation that there are just three 'business angel' networks available in Ireland (Indicator 78). Business angels (informal private investors) are important for the financing of innovative start-up firms. In addition to investing capital in a firm, they also offer experience in company management and can play an important role in leveraging finance from more traditional sources. Ireland is ranked 6th out of 10 according to the *European Business Angels Network*. One point to note about the data is that it does not differentiate between the size and quality of these networks, nor does it take account of country size.

Administrative Burden for Start-ups

As discussed in Section 2.1.1, most regulations – whether through legislation or administrative procedures – are implemented for valid public policy reasons, such as protecting the environment, consumers and employees. When well-designed, business regulation can improve the functioning of markets and achieve environmental and social goals without imposing a significant compliance burden on firms. International surveys of industrialists administered by the WEF and the IMD are the primary sources of information regarding the impact of regulation, legislation and administrative procedures on the administrative burden facing entrepreneurs across different countries. According to both surveys, Ireland's performance relative to our competitors has deteriorated in recent years.

Figure 28



Source: WEF Global Competitiveness Report 2003-2004

The WEF survey regarding the administrative burden has seen Ireland's score gradually decline over the last few years, from 5.1 in 2002 to 4.8 in 2003 and to 4.7 in 2004 (a score of one indicates that starting a business is extremely difficult and time consuming; a score of seven indicates that starting a business is easy). Although this is a relatively modest decline, our relative position has also deteriorated by a greater extent and Ireland is now ranked 9th out of 16 (Figure 28). This is a fall of three places since 2002. The IMD survey examines whether the creation of firms is either hindered or supported by legislation (Indicator 80). As with the WEF survey, Ireland's decline in its ranking among the countries benchmarked in the ACR has been dramatic, falling from 1st to 7th between 2002 and 2003.

These figures do not necessarily suggest that it is becoming more difficult to start a business in Ireland; rather they most likely reflect the fact that Ireland's traditional advantage in this area is being eroded by the actions of others. It is also likely that changes in legislation affecting existing firms may have contributed to the belief that the regulatory burden for start-ups is also increasing. In fact, according to the IMD (using figures sourced from the World Bank), the number of days it takes to form a business in Ireland has declined from 16 in 2002 to 12 in 2003 (Indicator 81). This indicator takes account of all of the procedures required for an entrepreneur to obtain all necessary permits, and to notify the relevant authorities, in order to legally operate a business. Notwithstanding this improvement, Ireland's ranking among the 16 ACR countries remains at 5th, suggesting that other countries are also improving their performance in this area.

2.4.2 Firm Level Management Skills

Once a firm has been established, certain factors are required to ensure that it survives and prospers. Firm-level competitiveness is governed by more than the external business environment, the supply and cost of skilled workers and the cost of capital. A key element is the quality of firm level management skills. Management skills can include any skill which improves the operating effectiveness and/or efficiency of a company. Success in the areas of product design, process management and marketing are all crucial components which together shape the capacity of a firm to survive in a competitive market place. Evidence from the UK suggests that poor management skills are one of the principle reasons for small firms going out of business.⁴²

Competent Senior Managers

According to evidence from an IMD survey, Irish managers are generally thought of as competent (ranked 3rd out of 16), (Indicator 82) and firms demonstrate impressive adaptability to market changes (ranked 4th out of 16) (Indicator 83). There are noticeable weaknesses nonetheless. In particular, the use of marketing in Ireland is described as limited and consequently Irish firms are ranked 13th out of 16 (Indicator 84). This indicator also finds that even when marketing is used, it does not utilise the most sophisticated tools and techniques available. Ireland is ranked mid table (7th out of 16) for the importance attached to customer satisfaction (Indicator 85). While this is not necessarily a bad performance, it leaves plenty of room for improvement.

Value Chain Presence

This is a WEF statistic which looks at the level of sophistication amongst exporters in each country. An economy is awarded a low score if exporters are primarily involved in resource extraction or manufacturing. Where exporting firms have developed add-on functions to their manufacturing capabilities (for example, in addition to production some firms also

⁴² The skills and productivity challenge: A summary of the evidence base for the SSDA's Strategic Plan 2003-2006.

perform product design, marketing, sales, logistics and after sales services) they are awarded a high score. Value chain presence is not an exact measure of the skills level amongst management in a country or across an entire economy. It does, however, reflect the ability of an economy to support high-value and high-tech functions. Undoubtedly, such a capability is dependent on a strong skills base and good firm level management skills.

Ireland scores relatively badly by this measure (ranked 11th out of 16), behind leading countries such as Germany, Finland and Switzerland (Figure 29). A low score may suggest that many multinational corporations are not deeply rooted in the Irish economy and that many of the higher-value functions (such as research and development) are located elsewhere. On the other hand it may point to a dearth of skills amongst indigenous companies to develop such functions.

Figure 29



Source: WEF Global Competitiveness Report 2003-2004

2.4.3 Networks and Clusters

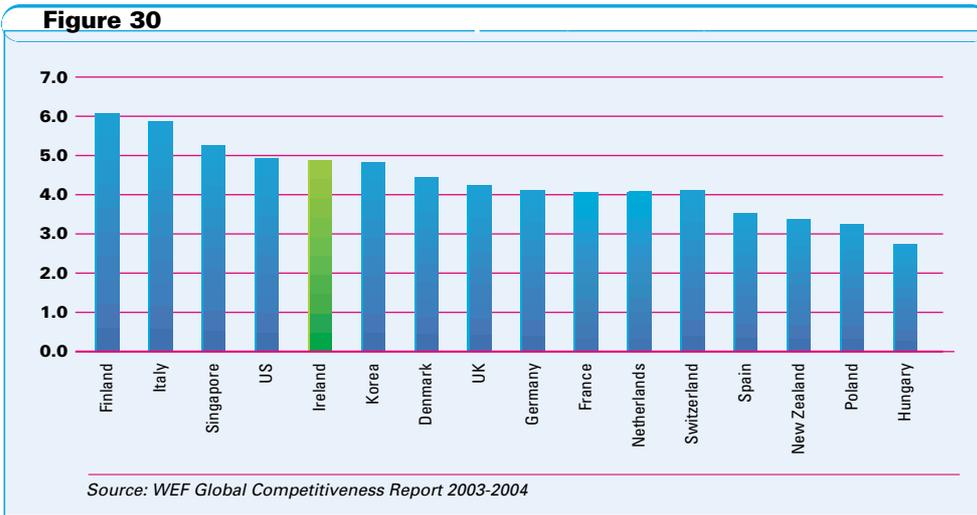
The final section of this chapter examines the development of networks and clusters in Ireland.

Clusters can be defined as geographically proximate groups of interconnected companies, suppliers, services providers and associated institutions in a particular field, linked by commonalities and complementarities. There are a number of benefits to firms that operate within clusters, including the development of a common supplier base and labour pool, smoother production processes, faster rates of innovation and product development, and new business formation that re-enforces the cluster development.

Networks generally refer to a group of firms with restricted membership and specific common objectives likely to result in mutual gains. Networks can develop within clusters especially where a wide range of business transactions conducted over a substantial period of time has helped build up trust in their reliability and willingness to exchange knowledge. The development of networks allows the generation of specialised services to support the needs of large firms. Both networks and clusters play an increasingly important role in international competitiveness.

State of Cluster Development

According to survey evidence from the WEF, cluster development in Ireland has improved since last year. The WEF survey gives a score of one to countries with clusters that are limited and shallow and a score of seven to countries with clusters that are common and deep. Ireland's score of 4.8 (up from 4.3 in last year's report) gives Ireland a ranking of 5th out of the 16 countries benchmarked in the ACR (Figure 30). It should be noted that Ireland's relatively strong performance in the WEF survey regarding cluster development contradicts much of the anecdotal evidence available to the Council.

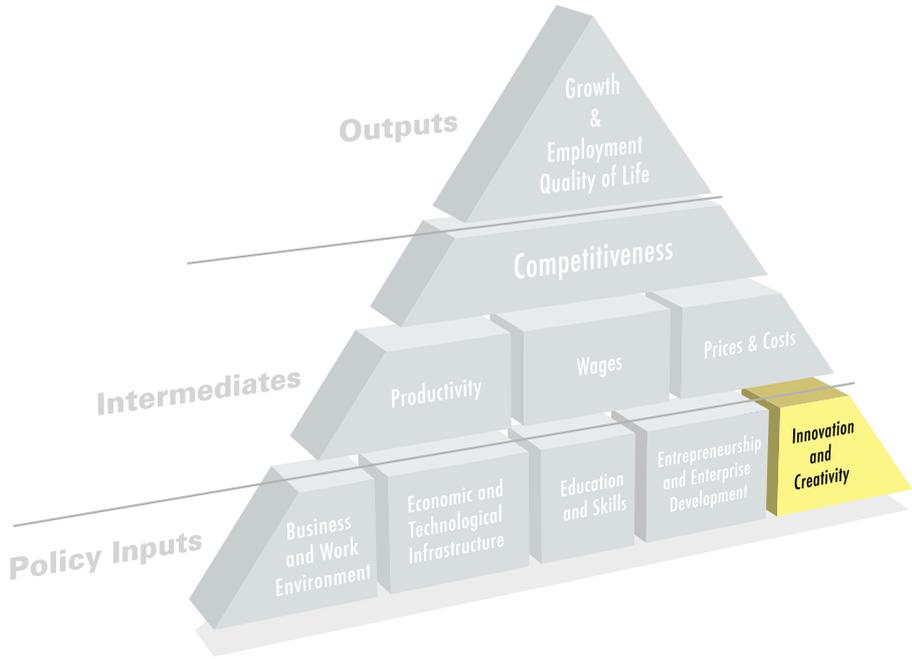


The second indicator used to benchmark cluster development also shows signs of improvement. The WEF survey measuring the extent of collaboration among clusters gives Ireland a ranking of 6th out of 16 among the ACR countries, up six places since last year (Indicator 88). Although there has been improvement in Ireland's cluster performance since last year, the score outlined above still indicate that continued progress is necessary to enhance Ireland's competitiveness. Difficulties in promoting cluster development in Ireland may reflect a lack of effective 'collaborative institutions' in the innovation process.⁴³ Michael Porter has identified such institutions as critical in the development of competitive innovation-driven clusters.⁴⁴ The difficulties in implementing a focused national spatial strategy, Ireland's status as a geographically small country and confusion amongst policy makers about the precise nature of clusters may also hinder cluster development.

A less encouraging indicator regarding cluster and network development is Ireland's score on the WEF survey regarding the availability of specialised research and training services, which places us 13th out of the 16 ACR countries (unchanged from last year) (Indicator 89). The final indicator measuring the development of networks is an IMD survey that examines perceptions among industrialists regarding the level of knowledge transfer between companies and universities (Indicator 90). This survey rates Ireland relatively highly (ranked 6th out of the 16 ACR countries) suggesting that knowledge transfer mechanisms between universities and industry are well developed. This does seem to contradict much of the anecdotal evidence available to the Council.

⁴³ Collaborative institutions are public or quasi-public organisations where competitors, suppliers and buyers can interact to exchange information, ideas and technologies.
⁴⁴ The Competitive Advantage of Nations, Michael Porter, 1990.

2.5 Innovation and Creativity



Innovation and Creativity - Investment in Knowledge

Indicator	91	92	93	94	95	96	97	98	99
	Gross domestic expenditure on R&D (% GDP) GERD - Total	Business R&D expenditure (%GDP) BERD	R&D expenditure of foreign affiliates as a % of BERD	R&D spending performed in public sector (% GDP) including GOVERN and HERD*	Government R&D appropriations (% GDP) GBAORD	Total new science and engineering PhDs per 1000 population aged 25-34 years	Total researchers (per 1000 total employment)	Employment in high-tech manufacturing (% of total employment)	Employment in high-tech services (% of total employment)
Year	latest data	latest data	latest data	2002 or latest data	2002 or latest data	2001	latest data	2002	2002
Source	OECD Main Science and Technology Indicators 2004	OECD Main Science and Technology Indicators 2004	OECD Main Science and Technology Indicators 2004	Forfás/OECD Main Science and Technology Indicators 2004	Forfás/OECD Main Science and Technology Indicators 2004	European Commission: Science and Technology Report 2000	OECD Main Science and Technology Indicators 2004	European Innovation Scoreboard 2003	European Innovation Scoreboard 2003
Country	15	15	10	15	14	12	15	13	11
	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank
Denmark	2.52	1.75	-	0.76	0.72	0.49	7.0	6.33	4.74
Finland	3.46	2.41	14.2	1.02	1.01	1.01	16.4	7.39	4.74
France	2.20	1.37	21.5	0.80	1.03	0.71	7.2	6.82	4.06
Germany	2.50	1.73	19.0	0.78	0.80	0.80	6.8	11.36	3.33
Hungary	1.02	0.36	78.5	0.60	0.30	0.60	3.9	8.50	3.06
Ireland	1.15	0.80	65.2	0.35	0.30	0.60	5.0	6.89	4.30
Italy	1.11	0.55	-	0.56	0.69	0.18	2.8	7.37	3.02
Korea	2.91	2.18	-	0.69	0.90	-	6.4	-	-
Netherlands	1.89	1.03	18.7	0.78	0.77	0.38	5.5	4.75	4.40
New Zealand	1.18	0.43	-	0.75	0.52	-	6.9	-	-
Poland	0.59	0.13	4.6	0.45	0.40	0.26	3.9	7.54	-
Singapore	-	-	-	-	-	-	-	-	-
Spain	1.03	0.56	31.0	0.47	0.69	0.35	5.1	5.35	2.50
Switzerland	2.57	1.90	-	0.62	0.65	1.11	6.3	7.75	3.97
UK	1.88	1.26	38.0	0.59	0.77	0.68	5.5	6.72	4.47
US	2.62	1.81	14.9	0.68	1.08	0.41	8.6	2.02	-
Ireland - GNP	1.38	0.98	-	0.43	0.36	-	-	-	-
EU	1.93	1.24	-	0.66	0.55	-	5.8	-	-
OECD	2.26	1.54	-	0.66	0.65	-	6.5	-	-

*Note: Higher education expenditure on R&D + Government expenditure on R&D as a percentage of GDP

Innovation and Creativity - Application of Knowledge

Indicator	100		101		102		103		104	
	Nature of competitive advantage*	2003	Production process sophistication**	2003	EPO patent applications (per million population)	2001	EPO high-tech patent applications to (per million population)	2001	New-to-market products (% of all turnover in manufacturing)	Latest data
Year	2003		2003		2001		2001		European Innovation Scoreboard 2002	
Source	WEF- Global Competitiveness Report 2003-2004		WEF- Global Competitiveness Report 2003-2004		European Innovation Scoreboard 2003		European Innovation Scoreboard 2003		European Innovation Scoreboard 2002	
Country	16	Rank	16	Rank	13	Rank	12	Rank	10	Rank
Denmark	6.2	1	6.0	3	211.0	5	42.1	5	7.1	6
Finland	6.2	1	6.4	1	337.8	1	136.1	1	7.3	5
France	5.7	6	5.9	5	309.9	3	30.3	8	7.9	4
Germany	6.2	1	6.1	2	145.3	7	48.8	4	7.1	6
Hungary	3.1	16	3.9	15	19.0	12	4.3	10	-	-
Ireland	4.7	11	5.4	10	85.6	9	30.7	7	8.4	3
Italy	5.3	9	5.0	12	74.7	10	6.5	9	13.5	1
Korea	4.7	11	4.9	14	-	-	-	-	-	-
Netherlands	5.4	8	5.7	8	242.7	4	68.8	2	6.9	8
New Zealand	3.7	14	5.1	11	-	-	-	-	-	-
Poland	3.2	15	3.7	16	2.5	13	0.2	12	-	-
Singapore	5.2	10	5.8	7	-	-	-	-	-	-
Spain	3.9	13	5.0	12	24.1	11	3.6	11	9.8	2
Switzerland	6	4	5.9	5	327.1	2	-	-	3.4	10
UK	5.9	5	5.6	9	133.5	8	35.6	6	6.7	9
US	5.6	7	6.0	3	169.8	6	57.0	3	-	-
EU					161.1		31.6		6.5	
OECD										

*Note: Competitiveness in international markets is primarily due to (1 = low cost, natural resources; 7 = unique products and processes)

**Note: Production processes use (1 = labour intensive or uses previous generations of process technology; 7 = the world's best and most efficient process technology)

2.5 Innovation and Creativity

Innovation is the creative process that transforms new and existing knowledge and technology into commercial value, and reconfigures existing processes in new ways. Innovation and technological change are the main drivers of long run productivity growth and, as outlined in the introduction, productivity growth must increasingly become the driver of economic growth and improved per capita income in Ireland.⁴⁵ In this way, technological and non-technological innovations in product and process design are crucial to future Irish competitiveness. The indicators examined in this chapter are divided into two main areas:

- Investment in Knowledge
- Application of Knowledge

Investment in knowledge and the application of knowledge through scientific and engineering research are essential components of innovation. A good 'national innovation system' is, however, dependent on more than just investment in research activities; innovation is essentially a societal process involving interplay over time between many different actors.⁴⁶ In this context, there are many key drivers of innovation, including the way in which research activities are managed and linked to the needs of industry, improvements in human capital and technological infrastructure, framework and market conditions such as finance and competition and the regulatory framework which must protect intellectual property rights in order to induce innovation. Ireland's performance on many of these drivers of innovation has been examined in previous chapters of this report.

2.5.1 Investment in Knowledge

The transition to a knowledge economy requires high levels of investment in research and development, both in terms of capital infrastructure and softer supports and programmes. This section benchmarks the financial investment in R&D and the level of human resources engaged in innovation across the 16 countries.

The investment indicators are broken down into a number of categories:

- Gross Expenditure on R&D (GERD) which represents the sum of all expenditure by the enterprise, higher education and government sectors on research and development;
- Business Expenditure on R&D (BERD) is expenditure on R&D by enterprises only;
- Public Sector Expenditure on R&D includes all R&D expenditure by the higher education sector (HERD) and government agencies
- Government Appropriations of R&D (GBAORD) is the total budget allocated by the Government to R&D regardless of whether the research is carried out in the public or private sector. Public sector R&D is, therefore, a subset of GBAORD.

Gross Expenditure on R&D (GERD)

In March 2002, the EU set a target to increase the overall level of expenditure on R&D (GERD) from 1.9 per cent of GDP in 2002 to three per cent of GDP by 2010.⁴⁷ By comparison, GERD in the USA and Japan amounted to 2.7 per cent and 3.1 per cent respectively. Ireland's performance not only trails these leading performers, but with GERD levels of just 1.15 per cent of GDP (1.38 per cent of GNP) is significantly behind the EU average. This amounts to a rank of 11th out of 15 (Figure 31).

45 'A Contribution to the Theory of Economic Growth', R.M. Solow, *Quarterly Journal of Economics*, 1956; 'Endogenous Technological Change' P.M. Romer, *Journal of Political Economy*, 1990.

46 A system of innovation has been defined as the "all important economic, social, political, organisational, and other factors that influence the development, diffusion and use of innovations," in 'Systems of Innovation: Technology, Institutions and Organisation', C. Edquist, 1997.

47 The Irish Government recently announced a BERD target of 2.5 per cent of GNP by 2010.

There are a number of plausible explanations for this disparity. Some of these explanations are a result of developments within the business and public sectors and are dealt with later in this section. At a statistical level, recent rapid economic growth has meant that expenditure on R&D has not kept pace with growth in national income. Therefore while the actual amount of funding on R&D has increased, it has declined as a proportion of GNP. In fact, between 1997 and 2001, GERD as a percentage of GNP fell by more than two per cent per annum.

Figure 31

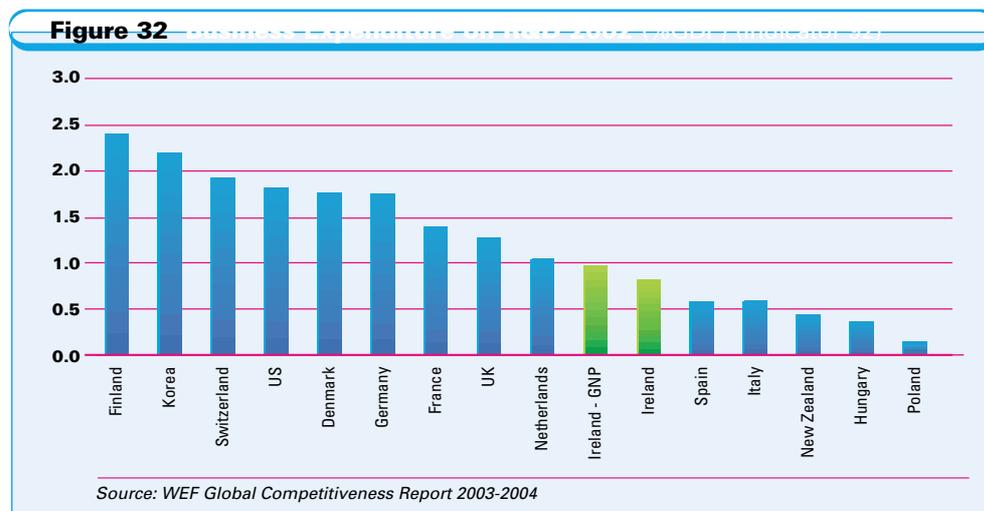


Source: OECD Main Science and Technology Indicators 2004

Business Expenditure on R&D (BERD)

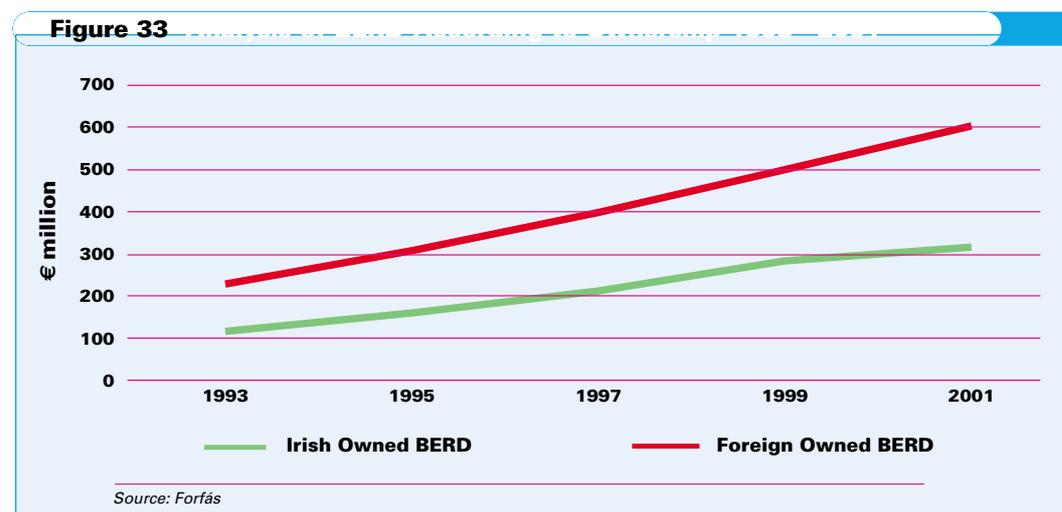
The business sector is one of the principle sources of investment in research. This is known as BERD. Its importance to overall levels of GERD is highlighted when the differential in R&D investment between the EU and the USA is examined. Overall, the USA spent €120 billion more on R&D than the EU in 2000; of this 80 per cent was accounted for by a higher R&D spend by the business sector in the USA. The EU has recognised the importance of the business sector for the promotion of innovation and accordingly has stated that business expenditure on R&D should reach two per cent of GDP by 2010 in order to reach the GERD target of three per cent of national income.

Ireland's performance under this indicator is disappointing. Irish business spends 0.80 per cent of GDP (0.96 GNP) on R&D, resulting in a rank of 10th out of the 15 ACR countries for which data is available (Figure 32). Industry in Finland, the best performing country, spends 2.41 per cent of GDP on R&D. The Irish performance also lags the EU average expenditure. It is hoped that the recent introduction of a tax credit for R&D will boost private sector spending on R&D.



Looking more closely at the Irish performance according to firm ownership and over time, indigenous industry accounted for 35 per cent of BERD in 2001 (Indicator 93). This equates to €319 million. Foreign affiliates accounted for the remaining €598 million. Among the 10 ACR countries benchmarked regarding the degree to which private R&D investments are accounted for by foreign affiliates, only Hungary has a higher foreign-affiliate proportion. While there is no optimum level for the indigenous/foreign divide, these figures may indicate the weakness of indigenous industry in terms of investment in R&D.

In certain sectors (for example the electrical and electronic equipment sector), foreign owned firms dominate R&D expenditure. A large proportion of the R&D performed by indigenous firms is concentrated in a few high-tech sectors. For example, 38.8 per cent of indigenous BERD is spent in the software and computer related services sector.⁴⁸



48 'Business Expenditure on Research and Development' Forfás, 2001

The final two investment measures focus on the public sector. The first of these indicators looks at the sum of R&D expenditure by both the government sector and the higher education sector (Indicator 94). By this measure, Ireland is ranked 15th out of the 15 ACR countries for which data was available, with 0.35 per cent of GDP being spent on R&D in the public sector. One mitigating factor which partially explains Ireland's poor performance is the lack of Irish expenditure on military research – some of the best performing countries spend significant amounts on research for the military.

It should be noted that over recent years, the level of publicly-funded research in Ireland has been increased dramatically under the auspices of Science Foundation Ireland (SFI) and through a number of other schemes such as the *Programme for Research in Third Level Institutions*. To date, the impact of this funding is not reflected in the statistics as these funds did not come on stream until 2002. This investment will appear in both the figures for GERD as well as the figures for public sector R&D. Nevertheless the scale of these programmes is evident when one considers that SFI has already committed to invest in 153 research programmes with a total of 750 researchers.

The second indicator examines the amount of funding the Government provides for R&D each year. The research funded by GBAORD is not necessarily carried out within the public sector as GBAORD can take the form of subsidies to private sector firms. Once again, Ireland is a weak performer, ranked 14th out of 15 (Indicator 95).

Human Resources Engaged in R&D

In addition to an appropriate level of funding, high levels of research and innovation require an adequate supply of skilled workers. While the skills agenda is discussed in more detail in Section 2.3, a number of indicators are examined in this chapter which focus on skills needed for research and innovation.

It is crucial that knowledge-driven firms have access to a large pool of skilled researchers, including science and engineering graduates. Ireland currently has a large number of science and engineering graduates per annum (see Section 2.3.2). Research suggests, however, that the number of science and engineering PhDs per 1,000 population (aged 25-34) in Ireland is quite low. Whereas Switzerland produced 1.11 PhD's per 1,000 population, Ireland produces just 0.60. This gives Ireland a rank of 6th out of the 12 ACR countries for which data is available (Indicator 96).

Ireland also performs very poorly in terms of the numbers actually employed as researchers. For every 1,000 employees, just five are engaged in research. This weak performance indicates the distance Ireland still has to travel to match the leading research economies, such as Finland and the USA where there are 16.4 and 8.6 researchers per 1,000 employed respectively (Indicator 97).

In terms of employment in high-tech manufacturing firms (including firms in the chemicals, electrical equipment and telecommunications sectors), Ireland is ranked 7th out of the 13 ACR countries for which data are available (Indicator 98). High-tech firms are classified as firms who rely on continual innovation through creative, inventive activity. Almost seven per cent of those in employment in Ireland work in high-tech manufacturing firms.⁴⁹ The contribution of these industries to national productivity growth far exceeds their contribution to employment. This is discussed further in Section 3.1.1. One final interesting point to note is the high level of employment in high-tech firms in low cost countries such as Poland and Hungary.

⁴⁹ Employment in high-tech manufacturing firms and high-tech service industries includes all staff employed, not just actual researchers.

Ireland scores quite highly in terms of the numbers employed in high-tech service industries (Indicator 99). The high-tech services sector includes firms engaged in telecommunications, information technology and software development. These firms provide services directly to consumers and also provide inputs to the innovative activities of other firms, thus supporting knowledge and innovation diffusion. In 2002, 4.3 per cent of the work force in Ireland was employed by firms in the high technology service sector, giving Ireland a rank of 5th out of 11. Ireland's success in attracting a large number of high-tech firms has occurred despite the low numbers of research staff and the relatively low levels of funding for R&D.

2.5.2 Application of Knowledge

This section focuses on the outputs of the investment in R&D outlined previously. Product innovation which results in new or improved goods and service coming onto the market can expand consumer choice, improve competition and ultimately reduce costs. Process innovation can boost firm efficiency and improve competitiveness on international markets.

The statistics selected include a number of survey/opinion-based indicators which capture the degree to which those surveyed consider the economy as a whole to be innovative. Further indicators provide actual quantitative evidence of the numbers employed in knowledge intensive firms and the subsequent output of these firms (in terms of patents and new products and processes).

Nature of Competitive Advantage

A WEF survey of leading business people is used to measure the nature of 'competitive advantage' for each of the 16 countries benchmarked. The WEF survey assesses perceptions regarding the degree to which an economy's competitiveness in international markets is based primarily on low costs and natural resources, or unique products and processes and can be viewed as a proxy for the level of technology diffusion. Those countries which depend more on unique products and processes are deemed to be more innovative and therefore given a higher ranking. Ireland does not perform very well under this heading with a ranking of 11th out of 16 (Figure 34). As might be expected, the Scandinavian countries are the strongest performers while the recent EU accession countries of Hungary and Poland are the worst performing, reflecting their stage of economic development.

Figure 34



Source: WEF- Global Competitiveness Report 2003-2004

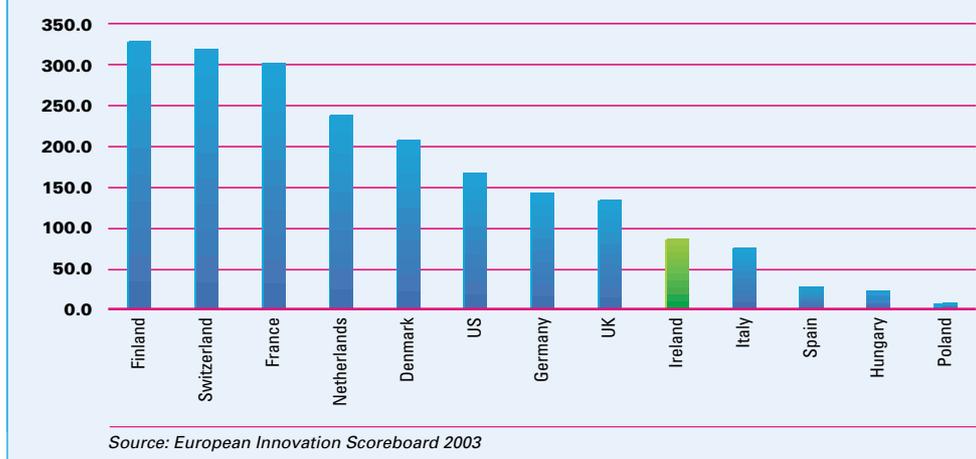
A second WEF statistic measuring the level of product process sophistication tells a very similar story. Product process sophistication refers to the degree to which an economy depends either on labour intensive industries (using outdated processes) or whether it employs the world's most efficient processes (Indicator 101).⁵⁰ Again Ireland is ranked in the bottom half of the table (10th out of 16) ahead of the eastern European and Mediterranean countries but behind the Scandinavians and northern Europeans.

EPO Patent Applications

Looking more specifically at the quantifiable outputs relating to investment in R&D, Ireland performs relatively poorly in terms of patent applications. Patent applications reflect the attempt to innovate. Using information collected by the European Patent Office, Ireland is ranked 9th out of 13 countries, with almost 86 patents being filed per million population (Figure 35). The use of patents to protect intellectual property rights may cause difficulties for some small firms as the entire process can be quite expensive. In many cases where patents are not sought, firms rely on trade secrets to protect their innovations.

Figure 35

(Indicator 102)

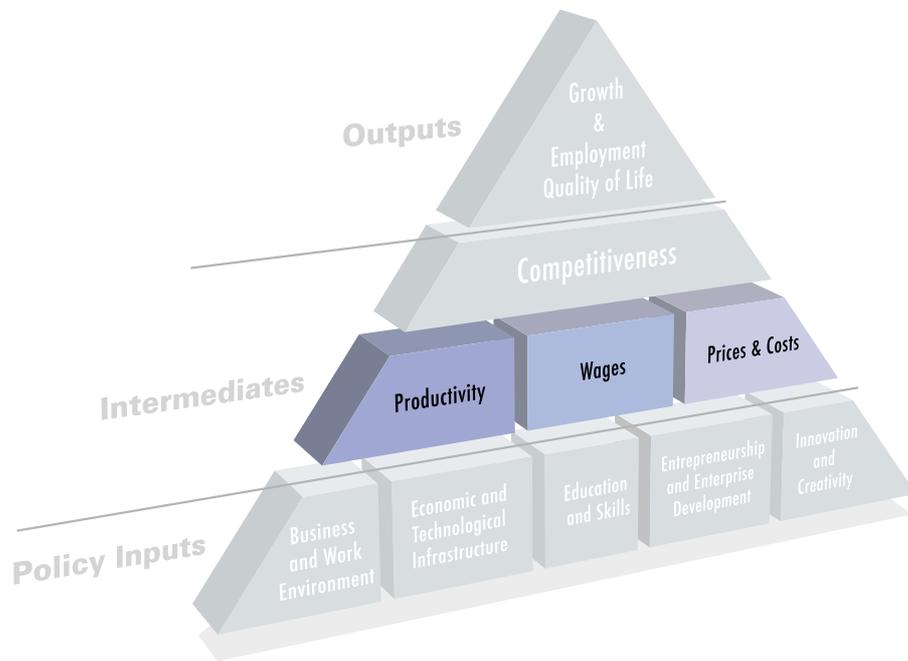


Examining the patent data further, Ireland performs quite badly for the number of high-tech EPO patent applications and is ranked 7th out of 12 with 30.7 high-tech patent applications (per million population) being filed in Ireland in 2001 (Indicator 103). Given Ireland's aspirations to be a world leader in many high-tech industries, this performance is particularly worrying. Finland (136.1) and the Netherlands (68.8) are the best performing countries.

Finally, Ireland is ranked 3rd out of eight countries for new-to-market products (as a percentage of turnover in manufacturing firms) according to data released by the European Commission (Indicator 104). This indicator measures the turnover of new or significantly improved products which are also new to the market. While this indicator does capture innovations which may be world firsts, it also includes the introduction of products which were developed elsewhere and later adapted for the local market, thereby boosting the innovation performance of some less innovative countries.

Outputs to Competitiveness 3

3.1 Intermediate Policy Objectives



Intermediates - Productivity

Indicator	105		106		107		108		109	
	Overall productivity: GDP (PPP) per employee per annum (US\$)	2003	Hourly productivity based on GNP (€)	2003	Productivity growth 1998-2003: percentage change in real GDP per hour	1998-2003	Index of service sector productivity*	2003	Public sector performance**	2000
Year	IMD World Competitiveness Yearbook 2004	National Accounts / Forfás derived	National Accounts / Forfás derived	National Accounts	National Accounts / Forfás derived	European Competitiveness Index 2004	European Central Bank: Working Paper No. 242			
Country	16	Rank	13	Rank	13	Rank	10	Rank	12	Rank
Denmark	61,439	6	24.3	6	0.8	10	110.600	4	1.06	4
Finland	58,658	7	-	7	-	8	92.200	8	1.12	2
France	66,150	5	29.8	2	2.2	6	117.200	2	0.95	10
Germany	58,399	8	27.0	3	1.6	8	110.800	3	1.01	7
Hungary	36,269	15	6.2	13	3.9	3	-	-	-	-
Ireland	80,237	1	22.8	8	3.1	4	87.700	9	0.97	9
Italy	69,342	3	21.8	9	0.5	11	110.600	4	0.81	12
Korea	37,596	14	12.7	11	4.6	2	-	-	-	-
Netherlands	66,331	4	26.1	4	0.1	12	94.400	7	1.07	3
New Zealand	45,493	13	-	-	-	-	-	-	1.03	5
Poland	31,050	16	7.5	12	5.7	1	-	-	-	-
Singapore	49,766	12	-	-	-	-	-	-	-	-
Spain	53,866	10	16.9	10	0.9	9	79.100	10	0.93	11
Switzerland	52,142	11	25.5	5	-0.2	13	133.900	1	1.17	1
UK	55,266	9	22.9	7	1.9	7	101.600	6	0.99	8
US	77,159	2	32.9	1	2.5	5	-	-	1.01	6
Ireland (GNP)									0.82	
EU									0.96	
OECD										

*Note: Refers to the private sector

**Note: Unweighted average of 'opportunity' indicators measuring performance in administration, education, health and infrastructure. Forfás derived.

Intermediates - Wages

Indicator	110		111		112		113	
	Nominal compensation per employee (€ 000 per annum)*	Rank	Nominal compensation per employee 1999 - 2004 (% change)	Rank	Nominal compensation per employee 2003 - 2004 (% change)	Rank	Unit labour costs in the total economy - relative EU performance (double export weighted 1995=100)	Rank
Year	2004 (estimate)	14	2004 (estimate)	14	2004 (estimate)	12	2004 (estimate)	10
Source	AMECO Database DG ECFin		AMECO Database DG ECFin		AMECO Database DG ECFin		AMECO Database DG ECFin	
Country								
Denmark	41400.0	13	20.70	9	3.50	8	105.40	5
Finland	35130.0	8	18.12	7	3.30	6	92.70	2
France	40370.0	11	13.34	5	2.30	2	84.70	1
Germany	33750.0	7	8.80	2	1.60	1	96.60	3
Hungary	10920.0	3	75.28	14	8.00	12		
Ireland	38140.0	10	36.80	13	5.00	10	107.50	6
Italy	32730.0	6	16.77	6	3.20	5	121.30	9
Korea	15160.0	4	10.74	4				
Netherlands	43360.0	14	25.03	11	2.70	3	107.60	7
New Zealand	26280.0	5	27.63	12				
Poland	8340.0	2	10.46	3	3.00	4		
Singapore								
Spain	2815.0	1	20.66	8	3.50	8	108.10	8
Switzerland								
UK	35750.0	9	21.27	10	5.00	10	142.40	10
US	40740.0	12	-0.71	1	3.30	6	103.4	4
EU15	34630.0		15.8		2.9		111.3	
OECD								

*Note: Sourced from Eurostat, National Accounts. Refers to total economy. Full time equivalence used whenever available.

Intermediates - Prices & Costs

Indicator	114	115	116	117	118	119	120	121	122	123	124	125
Consumer prices (12 month Rate of Change to March 2004)	2003	2003 (e)	2003	Jan-04	Jan-04	May-04	May-04	Aug-04	Aug-04	2003	latest data	2003
OECD Main Economic Indicators	OECD Economic Outlook 2004	OECD Economic Outlook 2004	CB Richard Ellis: Global Market Rents August 2004	Eurostat: Statistics in Focus 2004	Eurostat: Statistics in Focus 2004	Teligen	Teligen	Teligen / Comreg Key Data for Irish Communications Market September 2004	Teligen / Comreg Key Data for Irish Communications Market September 2004	Swiss Re: Sigma No. 3/2004 World Insurance in 2002	Economia Research & Consulting: Costs for Municipal Waste Management in the EU	IMD Competitiveness Yearbook 2004
Year	2003	2003 (e)	2003	Jan-04	Jan-04	May-04	May-04	Aug-04	Aug-04	2003	latest data	2003
Country	15	15	16	9	10	15	15	9	9	16	10	16
	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank
Denmark	0.7	3	314.0	6	10.69	10	665.53	1	17.22	2	94.0	9
Finland	-0.5	1	311.0	5	10.27	9	832.26	4	37.93	4	587.7	5
France	1.7	8	744.0	15	7.19	6	952.90	9	16.15	1	930.5	8
Germany	1.1	4	307.0	4	9.32	7	1010.27	6	39.90	6	1120.8	11
Hungary	6.7	15	265.0	3	6.25	3	2443.86	15		2	148.7	2
Ireland	1.3	6	602.0	14	7.01	5	886.87	4	38.19	5	77.5	8
Italy	2.3	12	440.0	11	9.44	8	1160.73	10	46.51	8	72.5	7
Korea	3.3	14	481.0	12			1283.41	11			369.4	4
Netherlands	1.1	4	374.0	7			859.60	3	25.14	3	1532.4	14
New Zealand	1.5	7	165.0	1			1300.03	12			943.1	9
Poland	1.7	8	378.0	8	5.90	2	1975.95	14			102.3	1
Singapore	-	-	251.0	2							320.3	3
Spain	2.1	11	421.0	10	5.40	1	1031.83	7	59.88	9	657.5	6
Switzerland	0.5	2	557.0	13			803.38	2			2228.5	16
UK	2.6	13	1575.0	16	6.28	4	1354.01	13	43.53	7	1441.4	13
US	1.7	8	416.0	9			1139.24	9			1980.2	15
EU15	1.8	106.4					32.39		36.08		974.8	
OECD	1.8						1061.85				1008.6	

*Note: Average values used where only a range was available

**Note: Lending rate minus deposit rate

3.1 Intermediate Policy Objectives

The intermediate, or secondary, policy objectives benchmarked in this section of the competitiveness framework comprise three areas:

- Productivity
- Wages
- Prices and Costs

These intermediate policy objectives should not be thought of as a separate link in the production chain, but rather as a set of policy goals which are a means of attaining the higher primary policy objectives. It therefore incorporates the cumulative affect of the policy inputs, and in turn feeds in to Ireland’s ability to achieve its ultimate policy goals, such as higher employment, living standards and quality of life.

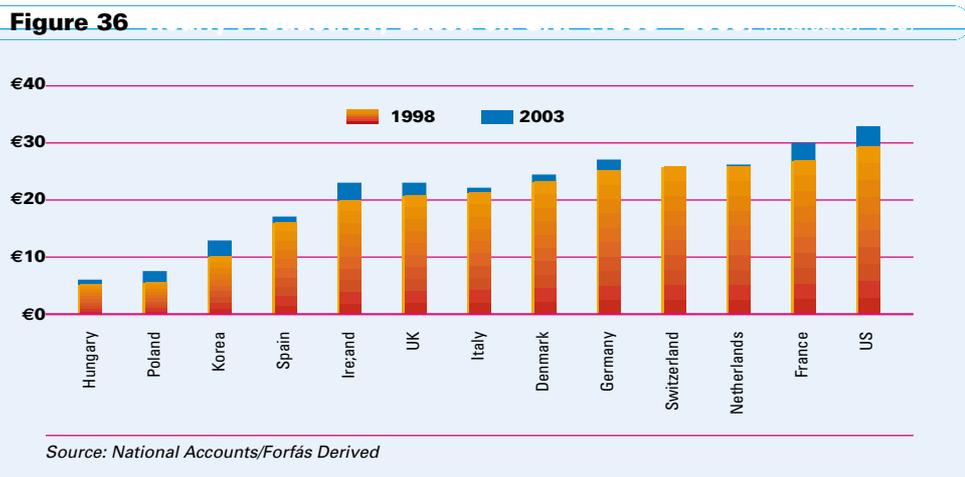
3.1.1 Productivity

Overall Hourly Productivity

As can be seen from Figure 36 below, Ireland’s hourly productivity lags that of many of its peers. The table ranks a selection of the ACR comparator countries in terms of hourly productivity in 1998, and then maps the subsequent growth up to 2003.

In 1998, Ireland was in fifth last place of the countries shown, only ahead of Spain, Korea, Poland and Hungary. In the five years after 1998, Ireland enjoyed a catch-up period resulting in a narrowing of the gap between Ireland and its EU partners.

Ireland fares much better when the measure is output per head of population because of the relatively high number of hours worked per employee (1,682) compared with the EU average (1,583) (Indicator 105).



In the sections below, the productivity of Ireland, vis-à-vis a number of EU countries and the USA is compared based on a number of sub-industry classifications. These statistics should be treated with a degree of caution – productivity is very difficult to measure, and important differences in the complicated techniques and/or product mix between various sources can prove important in any measurement of relative performance. Further, the recurrent problem of transfer pricing distorts Irish productivity figures as compared to our international partners. The next section intends to give a broad indication of the relative position of Irish industry to its peers.

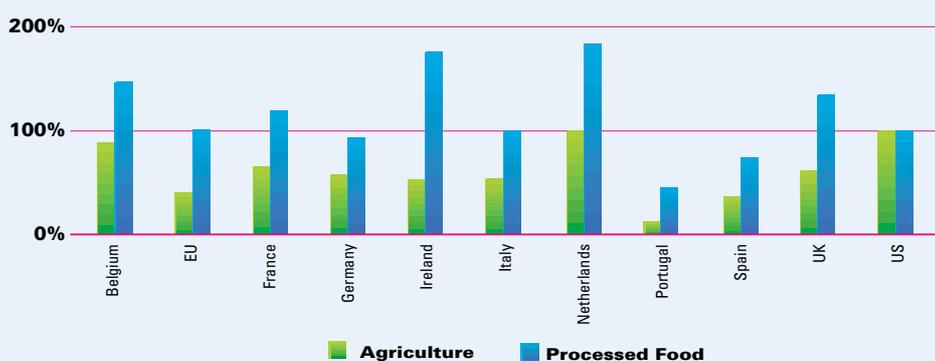
Industry Group 1: The Food Industry

The Food Industry can be divided into two components – primary agriculture and secondary processing. Figure 37 shows the productivity level for nine European countries compared with the US level. It shows two salient features:

First, primary agricultural productivity in Europe lags behind that in the USA to a significant extent, with only the Netherlands managing to match US levels. The full extent of the failure of the Common Agricultural Policies stated aim in the Treaty of Rome of increasing productivity is evident in these figures. In fact, the EU productivity level of 39 per cent of the US level is substantially below the corresponding figure for 1979 (54 per cent), indicating the extent to which the situation has deteriorated.

Second, Europe and the USA have similar levels of productivity in the food processing sector, though there is substantial variation from country to country. Ireland fares well in this regard, only being outperformed by the Netherlands.

Figure 37 Food Industry Productivity 2001 (US = 100%)



Source: European Commission/Forfás Derived

Industry Group 2: Efficiency of Getting a Product to Market

The cost of getting imports (both intermediary inputs and final consumer products) into Ireland and getting exports out of Ireland depend on the productivity of a number of industries, which in turn depend *inter alia* on a number of country specific factors such as the quality of infrastructure and the geographical location of the country. The degree of efficiency of these sectors can be particularly important for small open economies, as it may be an important factor in determining the level of consumer prices relative to other countries of similar levels of development.⁵² Figure 38 shows the productivity level for nine European countries compared with the US level for two industry categorisations, namely trade (comprising both retail and wholesale industries) and transport (which incorporates all transport, for example freight costs, internal movement of persons etc.).

⁵² 'Assessing Ireland's Price and Wage Competitiveness', P. R. Lane, Institute for International Integration Studies (IIIS) and Economics Department, Trinity College Dublin and CEPR, July 2004.

The advantage of the USA over the EU in terms of the productivity of trade workers largely reflects the effect of large out of town stores. Ireland is typified by a relatively fragmented retail structure, in part due to the fact that the development of large out of town centres is prohibited for planning reasons, resulting in relatively low productivity. Turning to transport, the EU in general is shown to be marginally more productive than the USA, and Ireland falls only modestly behind both, despite being a geographically marginalised island economy.

Figure 38



Source: European Commission/Forfás Derived

The relatively low efficiency of these industries in Ireland is ultimately paid for by the consumer through higher retail prices, which in turn impacts on the wage demands of Irish workers with the consequent implications for national competitiveness.

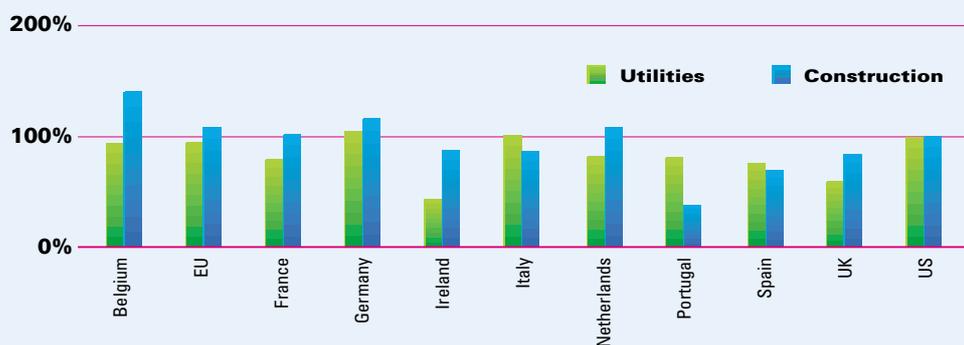
Industry Group 3: Costs Related to Fixed Infrastructure

An important aspect of the competitiveness of any country is the cost of the construction and maintenance of fixed infrastructures: this can mean the cost of public infrastructure, such as roads, bridges or sewerage systems, or private infrastructure, such as an office or factory. The costs relating to building and maintaining a fixed infrastructure is reflected in the cost of utilities and the cost of construction as shown in Figure 39. As can be seen from the graph, Irish productivity in the provision of utilities is substantially below that of the USA and our European peers, while construction productivity also falls short of average international levels, though only marginally.

The productivity of public infrastructure is important both in itself (as final consumers buy electricity, use roads etc), but also as a cost for companies operating in Ireland. The fact that productivity in utilities falls so short of international standards to a degree partially reflects Ireland's small size, as utilities provision requires a large fixed investment, and can reap great scale economies from large populations. The graph shows that the Portuguese utilities industry, which also operates in a peripheral, low density country, has much higher productivity than its Irish counterpart. This suggests that other factors are important too. In particular, market structure, and the way in which regulation is implemented, is of great importance.

While the productivity of the construction industry in Ireland lags behind that of both the EU and the USA, there has been a substantial catching up process, particularly since 1996. There are two explanations for this. As construction workers have become more and more expensive due to the ongoing construction boom, construction has become more capital intensive. Furthermore, there has been greater focus on projects which need less labour (e.g. wooden frame houses, apartments). In addition, there has been a quiet productivity revolution in the way Irish construction firms operate, with a move to greater specialisation from the previous practice of an individual contractor doing all tasks on an individual project.

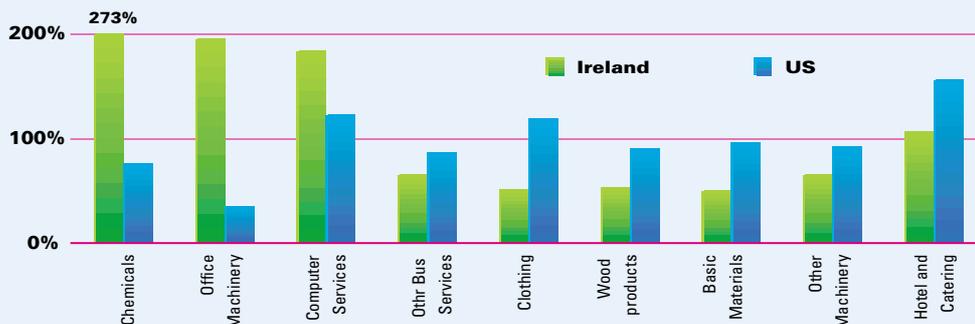
Figure 39



Source: European Commission/Forfás Derived

General Industry Group

Figure 40



Source: European Commission/Forfás Derived

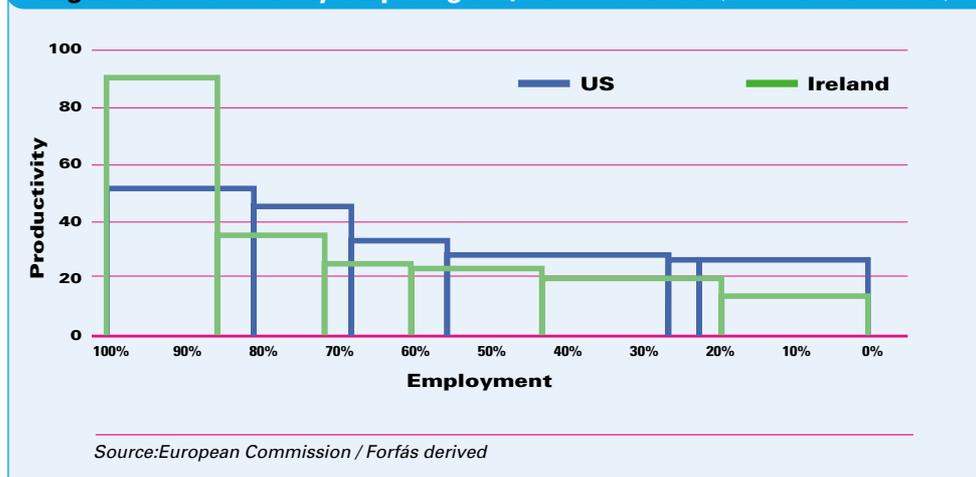
The hourly productivity of Irish and EU industry relative to US levels is shown in Figure 40. The first three industries listed, namely chemicals, office machinery and computer services, are heavily dominated by multinational enterprises in Ireland, with the result that recorded productivity is a large multiple of both the US and particularly the EU level. Much of this performance reflects productivity gains imbued in patented products and processes originating overseas wrongly being credited to Irish workers.

In other sectors, Ireland generally lags behind both the EU and the USA. In traditional sectors such as wood products (which incorporates all stages of production including forestry), clothing and basic materials the levels of hourly productivity are particularly weak. Over the last five years, these industries have made some modest progress in closing the productivity gap with their European counterparts, although as can be seen from the graph above, the gap remains large.

Elsewhere, according to European Competitiveness Index, Irish service sector productivity ranks second last out of ten European countries, only managing to finish ahead of Spain (Indicator 108). Other evidence from the European Central Bank suggests that the public sector in Ireland also performs poorly and as a consequence is ranked 9th out of 12 countries measuring performance in administration, education, health and infrastructure (Indicator 109).

Another way of illustrating the economy wide productivity data is by way of a 'Productivity-Step-Diagram'⁵³ as illustrated in Figure 41 below. For each industry, the height of the box shows the industry's hourly productivity in Euro, which can be read off the vertical axis. The length of each box shows the employment in that industry, and can be read off the horizontal axis. What is clear from the graph below is that the US productivity slope is both higher and a lot flatter than that of Ireland. This indicates two facts: first the USA has higher productivity than Ireland as a result of consistently high productivity across a spectrum of industries. Second, in Ireland the very high productivity in certain key industries (e.g. chemicals) is in marked contrast to the relatively low productivity in the employment intensive industries, indicating a duality in Ireland's economic structure.

Figure 41 Productivity Step Diagram, Ireland and US (Based on 2001 Data)



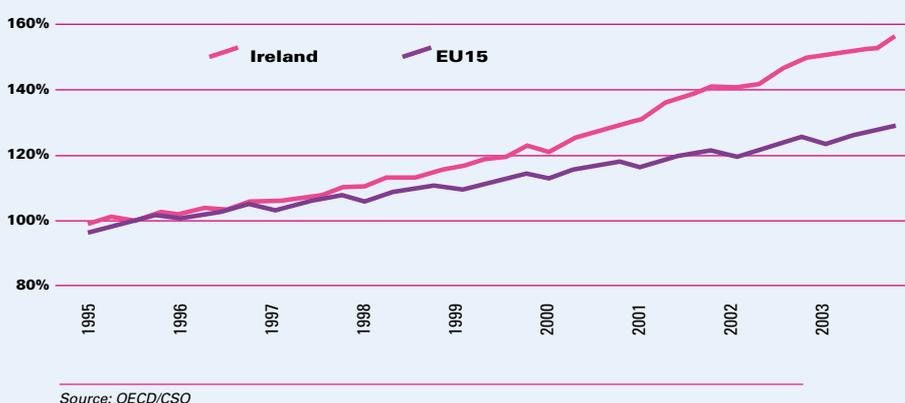
In summary, despite improvements in several areas, productivity in many Irish industries lags behind that of their European and US counterparts. Particular areas of weakness include agriculture, the provision of utilities and certain traditional indigenous sectors. This analysis serves to re-emphasise the fact that, to a significant extent, Ireland remains a dual economy.

⁵³ The total length of the base of the graph represents all of the national employment in each country. Therefore, going from right to left, the industry with the lowest average hourly productivity is shown, followed by the industry with the next highest productivity etc., until the most productive industry is reached. A long, low box indicates an industry with high employment but low productivity, while a narrow, high box indicates an industry with low employment levels but very high productivity.

3.1.2 Wages

Irish wages have been rising faster than in many competitor countries for a number of years. Figure 42 below shows that compared to the EU, Irish hourly wages in manufacturing have risen by around one fifth more than in the EU15. By 2004, annual nominal compensation per employee in Ireland (before taxes) was estimated at €38,140 – the fifth highest level of the 14 countries benchmarked on this indicator (with only the Netherlands, Denmark, the USA and France enjoying higher wage levels) (Indicator 110). Between 1999 and 2004 increases in annual nominal compensation for Irish workers were exceeded only by that of their Hungarian counterparts (Indicator 111). Moreover, this analysis does not take into account the impact of tax cuts on take-home pay over the same period.

Figure 42 Irish and EU15 Hourly Manufacturing Wage Indices
(1995 Q3 = 100)



Of interest for policy makers is the question as to whether these higher wages simply reflect higher productivity which rightly translates for Irish workers into higher standards of living? Conversely, if these higher wages are not the result of increased productivity, then could they rapidly threaten the sustainability of higher employment levels in Ireland?

To differentiate between wage increases which are earned by higher productivity, and those that threaten future competitiveness, the analysis of changes in wage rates must balance three factors:

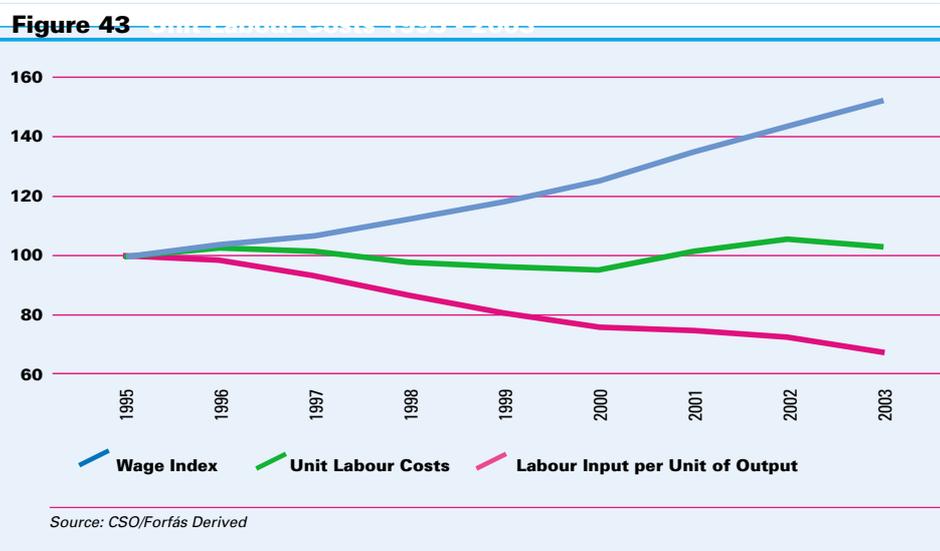
- The size of the increase in wages
- Changes in the nominal exchange rate vis-à-vis our trading partners
- Changes in productivity relative to our trading partners

A good way of capturing all these elements is through a two stage analysis. The first stage is an examination of domestic factors. More specifically, we examine whether Irish wage increases have been matched by higher productivity, which gives an indication of how sustainable both the employment and wage increases are likely to be, other things being equal. The second stage of the analysis takes the results of the first stage, and compares them with similar changes in Ireland's trading partners, also taking into account exchange rate movements.

The first stage can be analysed through the so-called unit labour cost index, which compares wage rate growth with productivity growth. This index is a measure of the cost of employing sufficient labour to produce a fixed output of goods. For example, if workers become more

efficient and need to spend ten per cent less time to produce affixed quantity of goods, then if their wage rates are unchanged, unit labour costs will have fallen by ten per cent. Conversely, if workers' efficiency does not change, but wages increase by ten per cent, then it costs more to produce the same output as before, so unit labour costs in this case rise by ten per cent. Clearly, wage costs are only one aspect of the costs facing a firm - the wider issue of the general price level is discussed section 3.1.3.

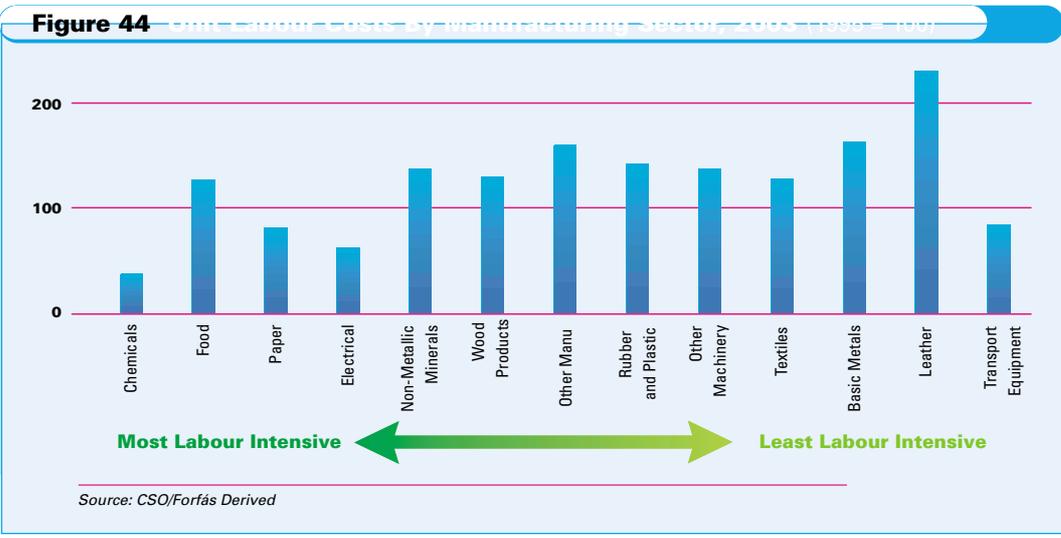
As can be seen from Figure 43 employment-weighted unit labour costs in Ireland have remained almost unchanged over much of the last decade.⁵⁴ The stability of unit labour costs shows that wage rises (the higher line) have almost exactly matched the gradual reduction in labour inputs needed to produce a given unit of output (the lower line). Unit labour costs fell very gradually from 1996 to 2000, indicating a competitiveness improvement, as wage increases did not quite keep pace with productivity improvements. This trend was, however, subsequently reversed in 2001 and 2002, indicating a deterioration in competitiveness. Last year, however, saw a mini-productivity surge which outpaced wage growth, improving competitiveness. This was entirely accounted for by an improvement in unit labour costs in machinery production.



The observation that aggregate unit labour costs have remained largely unchanged since 1995 obscures a lot of inter-industry variability. For this reason, the change in unit labour cost by industry is illustrated in Figure 44. For labour intensive firms, wage costs, and therefore unit labour costs, matter a lot more than for capital intensive firm. Therefore, a deterioration in unit labour costs is a much larger problem for labour intensive firms, and is an early indication of a possible threat to future employment levels.

In Figure 44 industries are listed in order of increasing labour intensity measured as the percentage of value added accounted for by wages. Therefore, the left most industry (chemicals) is the least labour intensive, while the right most industry (transport equipment) is the most labour intensive. What is clear from the graph is that, generally, the more labour intensive firms have suffered a rise in unit labour costs since 1995, while capital intensive firms have generally enjoyed a reduction in unit labour costs. This is clearly a very worrying trend.

⁵⁴ This index is a weighted average of the unit labour costs of Irish industry based on a 15 industry disaggregation, with mid-period fixed employment weights. Employment weights are used rather than the traditional production weights which tend to exaggerate the importance of MNCs to employment.

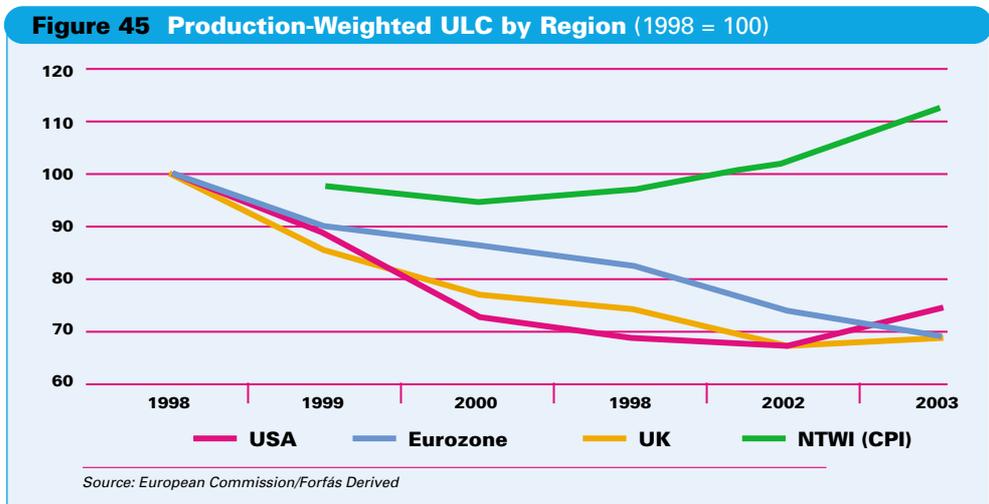


The analysis suggests that Irish wage growth in aggregate has been very much in line with productivity improvements since 1995, though a more worrying picture emerges from an industry breakdown. On an economy-wide basis, there is strong *prima facie* evidence that the strong wage growth enjoyed by Irish workers has been sustainable, though to complete the analysis, we must take the results of the first stage and compare them with the experience of our overseas trading partners. The results of the previous analysis could be invalidated if:

- Overseas workers are accepting lower wage increases than their own productivity growth would suggest they could enjoy;
- A movement in the exchange rate made Irish goods more expensive overseas;

To do this, we compare the real exchange rate based on production/employment weighted unit labour costs for three of Ireland's most important trading regions, namely the eurozone, the UK and the USA. For comparison purposes, the trade weighted competitiveness indicator for Ireland is also shown. The lines should be interpreted as follows: an upward sloping line indicates a deterioration in competitiveness for Ireland vis-à-vis the region in question, while a downward line a competitiveness improvement.

As can be seen from Figure 45 below, the calculated unit labour cost estimates indicate that Ireland has experienced a gradual improvement in its competitiveness position vis-à-vis these three trading blocks since 1998. This is in sharp contrast with the Nominal Trade-Weighted Competitiveness Indicator (NTWI) as produced by the Central Bank, which indicates a substantial deterioration in competitiveness. This is largely as a result of the weight of multinational companies in the index. A discussion of the statistical problems associated with measuring competitiveness is included in Box 1.



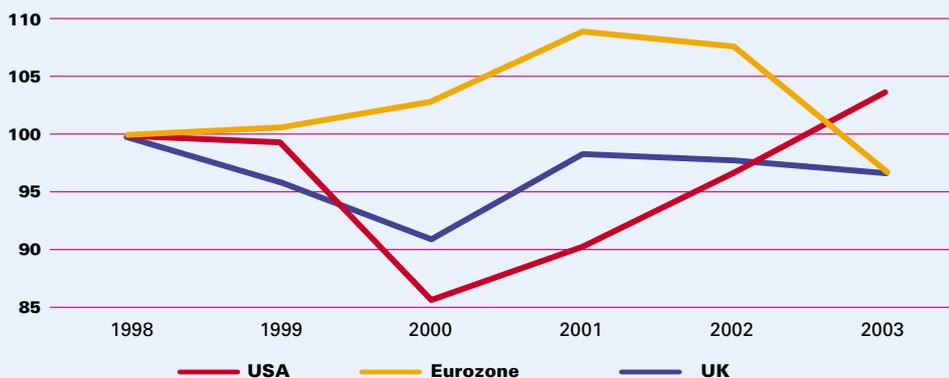
Box 1: Comparing Ireland's Competitiveness

There are two facts that are clear from any analysis of Ireland's recent economic growth: first, there have been substantial improvements in productivity over time, and second that wage rates have risen substantially. How does our performance compare internationally? In particular, why do the two methods shown in Figure 45 above provide contrasting views as to the direction of competitiveness?

The trade weighted competitiveness indicator (which from Figure 45 shows a deterioration in competitiveness) is an imperfect measure because it ignores productivity. While Ireland has become a more expensive place to do business than before, a lot of this may be down to the fact that we simply enjoy higher productivity than our trading partners, so can afford the luxury of higher wages. Unfortunately, completing the exercise by comparing productivity internationally is not straight forward. The problem is that the productivity performance of multi-national's in Ireland distorts the statistics to a substantial degree.

One way to get around this problem is to use an employment-weighted ULC. The reasoning behind this is that employment generation, as a policy goal, constitutes a crucially important social goal, more important than the aggregate amount of output per se. In practical terms, this has the effect of greatly reducing the importance of the multinational sector in the ULC figures. Unfortunately, while we can calculate employment-weighted ULCs for Ireland, the employment-weighted ULC figures for other countries are not available. It is not statistically valid to directly compare the employment-weighted ULC figures for Ireland with the traditional production-weighted ULC figures for other countries. Therefore, an experimental adjustment procedure was employed to make more meaningful comparisons between employment-weighted Irish ULCs and production-weighted overseas ULCs, the results of which are shown in Figure 46.

Figure 46 Employment-Weighted ULCs By Region (1998 = 100)



Source: OECD/Forfás Derived

As can be seen from the above graph, Ireland has experienced contrasting fortunes in its competitiveness position vis-à-vis these three trading blocks since 1998. On the one hand, the weakness of the dollar up to 2000 was advantageous, though the subsequent strengthening has evaporated any temporary advantage we had. In terms of trade with Europe, Ireland returned in 2003 to the same competitiveness it had in 1998 vis-à-vis Europe, after suffering some erosion of competitiveness in the interim. This perhaps reflects Ireland's greater exposure to the USA, with the cost of productivity gains made in trade with the USA spilling over to adversely affect our position relative to Europe. Our competitiveness position relative to the UK has been relatively stable over the period in question.

The NCC will continue to work towards defining measures of productivity which can capture the impact of movements in wage rates, productivity and exchange rates on our relative competitiveness.

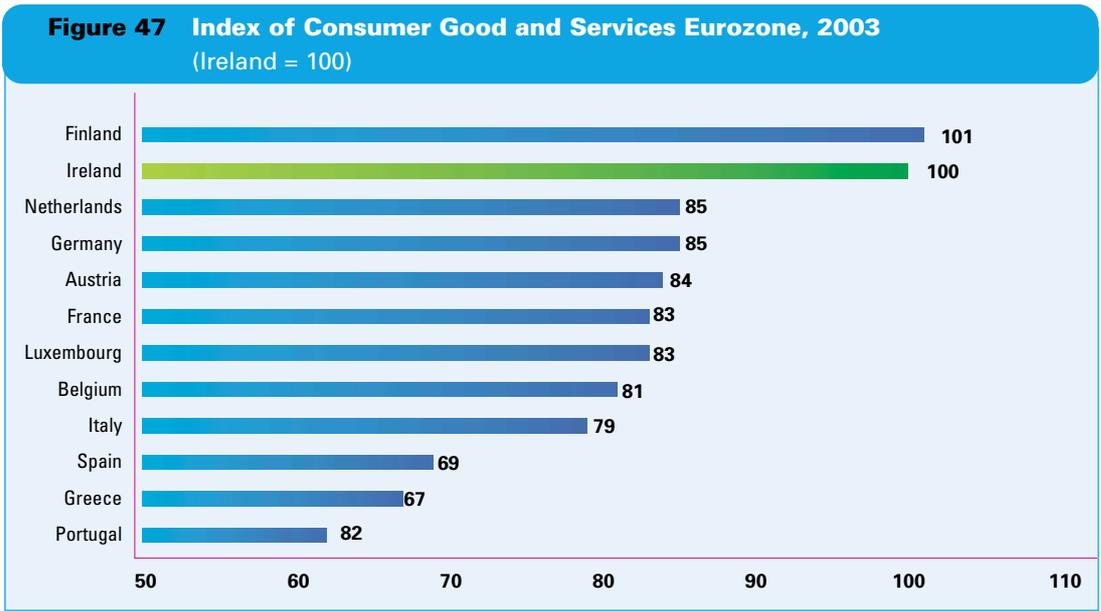
3.1.3 Prices and Costs

This section illustrates the impact of exchange rate fluctuations and high inflation on the overall price level and subsequently on national competitiveness. Thereafter, the Council focuses on the price firms in Ireland pay for particular goods and services. Unfortunately unlike consumer price inflation which is monitored by the monthly *Consumer Price Index*, there is no similar analysis performed on business costs. Therefore in the absence of a dedicated business cost index, the Council have relied on a plethora of sources, each focusing on a particular aspect of a firms cost base. While the list of indicators is not exhaustive, it does cover most of the principle expenses amassed by an average firm. The indicators measuring firm level costs are broken down into two sub headings covering for example office rents, energy costs, telecommunications costs and insurance costs.

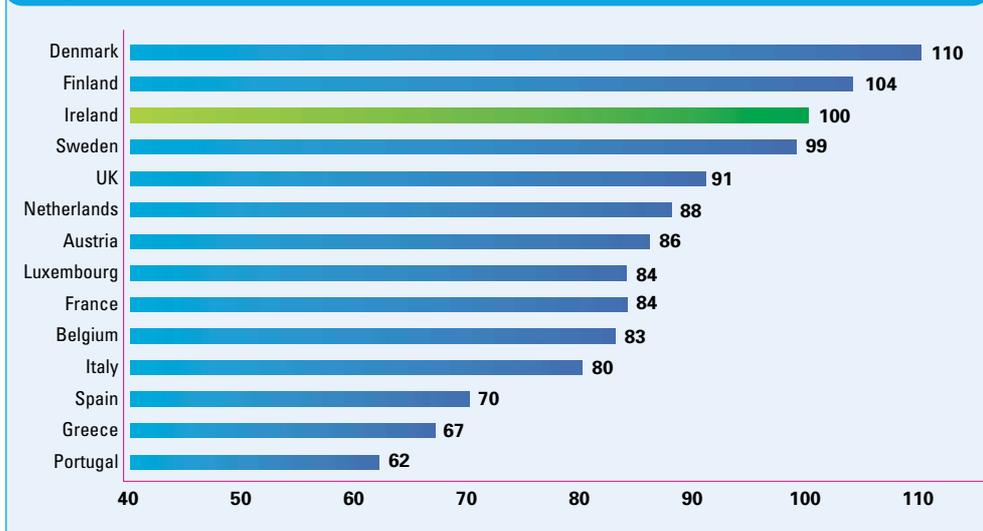
The primary goal of Irish policy makers should be to increase the competitiveness of Irish firms in international markets, through improvements in productivity performance. While it may not be realistic or even desirable for Irish companies to compete on a low-cost basis, it remains fundamental to the future success of the economy to minimise the cost base for enterprise.

Price Level

Sustained inflation over the last few years combined with movements in the external value of the euro has resulted in a dramatic escalation of the price level and cost base in Ireland, undermining international price competitiveness and threatening employment levels. An update of key data from the Forfás Consumer Pricing Study 2003 emphasises just how expensive Ireland has become. The charts below use Eurostat/PPP comparative price data to benchmark Irish price levels against the 11 eurozone members and the EU15.



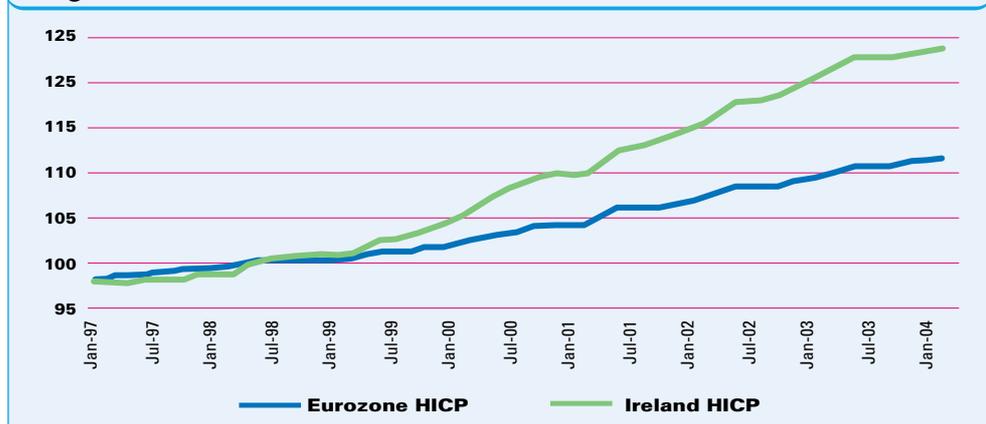
Ireland is now virtually equal with Finland as the most expensive country in the eurozone and both countries are significantly more expensive than the next cluster of countries with relatively low price levels (Figure 47). Ireland's ascent through the ranks has slowed. In 1999, Ireland was the 5th most expensive country in the eurozone. Most of the catch-up occurred in 1999 and 2000. The Mediterranean countries (Portugal, Greece and Spain) remain the cheapest in the eurozone.

Figure 48 Index of Price of Consumer Goods and Services (Irl = 100)

Looking at the EU15, Ireland is 3rd most expensive country behind Denmark and Finland and has become more expensive than the UK and Sweden over the last 12 months (Figure 48). One of the principle explanations for Irish prices overtaking UK prices has been the strength of sterling on international currency markets. The two main explanations for this escalation in costs are outlined below.

Domestic Inflation

Following a sustained period of low inflation for most of the 1990's Ireland's inflation rate accelerated and has exceeded the eurozone average for the past seven years. This is illustrated in Figure 49 below which shows the cumulative divergence in the *Harmonised Index of Consumer Prices* since 1998 vis-à-vis the EU15. Although the rate of divergence has slowed significantly since early 2003, the impact of this sustained difference remains. Consumer prices in Ireland increased by a cumulative 17.5 per cent between December 1999 and December 2003. By comparison, average prices in the eurozone increased by 8.4 per cent over the same period. The recent convergence of Irish inflation with the eurozone average rate has been facilitated primarily through favourable external inflationary influences as well as lower domestically generated inflationary pressures.

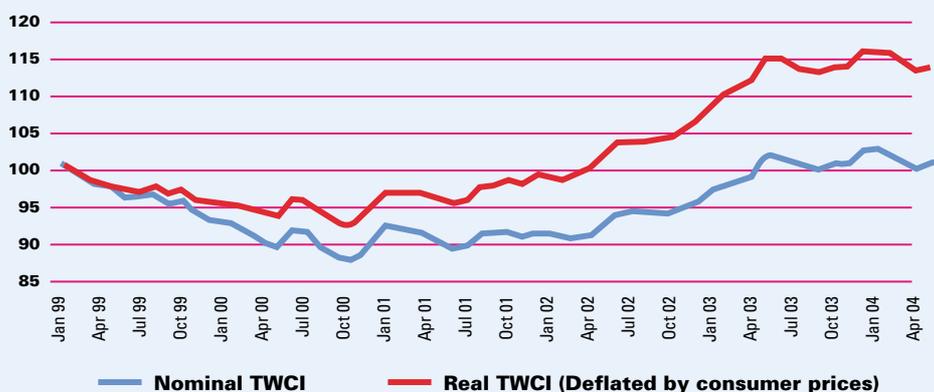
Figure 49

Exchange Rates

In addition to the negative impact that high inflation has had on competitiveness, Irish firms have had to deal with the effect of adverse nominal exchange rate developments. Changes in the nominal exchange rate affect the price Irish firms pay for imports and also manipulate the cost of Irish exports abroad. Movements in nominal exchange rates are captured by the Central Bank's *Nominal Trade Weighted Competitiveness Index* (NTWCI). The graph below shows the NTWCI (essentially the nominal effective exchange rate) and the *Real Trade Weighted Competitiveness Index* (RTWCI). Since 2000 the strengthening of the euro against the dollar has negatively affected Irish exporters by, increasing costs and reducing real revenues (although this has been offset somewhat by the weakness of the euro against sterling).

Ireland's trade with non-EU countries accounts for 34 per cent of GDP. This is a larger percentage than any other member of the eurozone and as a consequence increases the vulnerability of Irish firms to changes in the external value of the euro. The real story is to be seen in the RTWCI however, which takes account of domestic inflation rates. The divergence in the Irish CPI vis-à-vis the rest of the eurozone has resulted in a significant rise in the RTWCI, damaging Irish competitiveness. The RTWCI now stands at 114.23 (May 2004), up from a low of 92.85 in October 2000.

Figure 50



Source: Central Bank of Ireland

Business Costs

Office Rents

Prices published by Hamilton Osborne King show that between the first quarter of 2000 and late 2003, Irish office rents have been relatively stable, with fluctuations in price confined to a narrow band. Office space in Dublin was just four per cent more expensive in Q3 2003 than in 2000. According to separate data published by Lisney, office prices in Dublin have not changed over the last 12 months.⁵⁵

An internationally comparable survey of the cost of office space in capital cities around the world suggests that the recent trend of declining rents has continued into the first half of 2004.⁵⁶ Overall, the EU15 office rent index fell by 1.5pc in the second quarter of 2004. The survey measures the average cost of a typical 'achievable' rent for a 1,000 square metre unit in a Class A building in a prime location. For the purposes of this benchmarking exercise,

⁵⁵ Lisney Property Rentals Indices, July 2004.

⁵⁶ CB Richard Ellis: Global Market Rents August 2004.

the NCC has chosen to use rents in capital cities only. Obviously there is scope for significant diversity in rents between capital and regional cities.

Currently, total occupation costs in Ireland amount to €602 per square metre per annum, making Irish office occupation costs amongst the most expensive surveyed. Of the 16 countries included in this report, only two (London and Paris) were found to be more expensive than Dublin (Figure 51).

Figure 51 Office Rents, total occupation costs Q2 2004

(€ per sq metre per annum) (Indicator 116)



Source: CB Richard Ellis: Global Market Rents August 2004

Other Rents

According to Hamilton Osborne King, Irish retail rents have grown considerably over recent years and by the end of 2003 were over 88 per cent higher than at the beginning of 2000. Separate figures published by Lisney indicate that between January and July 2004 the annual rate of rental increase on Grafton Street was ten per cent. Although this represents a slowing of the annual growth rate from 14 per cent recorded in the six months to January 2004, it nonetheless represents continued fast increases in commercial rental costs for Irish businesses.

In contrast to retail rents, industrial rents have declined somewhat over recent years. Recently published figures (also from Lisney) suggest that the industrial property sector has begun to pick up somewhat and this is reflected in modest rental growth of two per cent over the first six months of 2004.

Energy Costs – Electricity

Energy is a key input to industry and access to an adequate supply of energy at competitive prices is essential to industrial development. The importance of energy costs for a firm depends heavily on the type of sector in which they operate. For instance, while large industrial firms tend to consume large quantities of energy and thus will be hit hardest by increases in end-user charges, smaller service oriented firms are less sensitive to changes in price. The Irish industrial base is dominated by large numbers of small and medium enterprises and with this in mind the Council have chosen to concentrate on medium size energy consumers for both electricity prices and gas prices.

Figure 52 Industrial electricity prices Jan 2004 (€ per 100 kWh for consumer with annual consumption of 10 GWh, with taxes & VAT) (Indicator 117)



Source: Eurostat

Ireland offered competitive electricity prices in the 1990s. Over recent years, however, prices in Ireland have grown substantially. Figures published by Eurostat indicate that energy costs for Irish firms increased by almost 22 per cent between July 2000 and January 2004. Since the publication of the Eurostat data, the Commission for Energy Regulation (CER) sanctioned a further increase in electricity tariffs for business customers of between four and six per cent, which took effect in February of this year. On 3rd September 2004, the CER approved a nine per cent increase in electricity prices for an average customer (applicable from 1st October). For industrial customers, this translates into an increase of approximately 15 per cent, due to the larger proportionate share of generation costs in large industrial tariffs. In addition, the CER has signalled a further 3.5 per cent increase due to be imposed from January 2005. In total, this means a cumulative increase in electricity tariffs of approximately 40 per cent since September 2001.

The recent escalation in domestic energy costs is partly a result of increases in international fuel prices; these fuel price increases however do not justify the high price levels for electricity in Ireland. Even prior to these latest price increases, Irish electricity costs, particularly for industry, were considerably out of line with average EU prices. Of ten countries surveyed in January 2004, Ireland was the second most expensive behind Italy for firms purchasing ten GWh of electricity per annum (Figure 52). The UK was the cheapest. By way of comparison, an Irish firm paid approximately €880,000 per annum for ten GWh of electricity (before the latest price increases), while a firm in the UK consuming a similar amount of electricity pays €530,000. This amounts to a 40 per cent advantage in terms of costs for a UK firm over its Irish counterpart.

For customers consuming either 24 GWh per annum or 70 GWh per annum, the respective prices in Ireland are also relatively expensive. As a consequence, Ireland is deemed to be 3rd most expensive out of nine countries for 25 GWh and 3rd most expensive out of eight countries at the 70 GWh level. Again, the UK is the cheapest location for both user categories. The graph above indicates that Irish energy costs are substantially more expensive than in the majority of the EU. Of the ten countries surveyed, Ireland is the second most expensive behind Germany to purchase ten GWh of electricity (including taxes). Furthermore, figures published by IBEC indicate that energy costs for Irish firms increased by almost 24 per cent in the two years prior to 2003. The Commission for Energy Regulation (CER) sanctioned a further increase of between four and six per cent in electricity tariffs for business customers which took effect in February of this year and thus is not captured by these statistics.

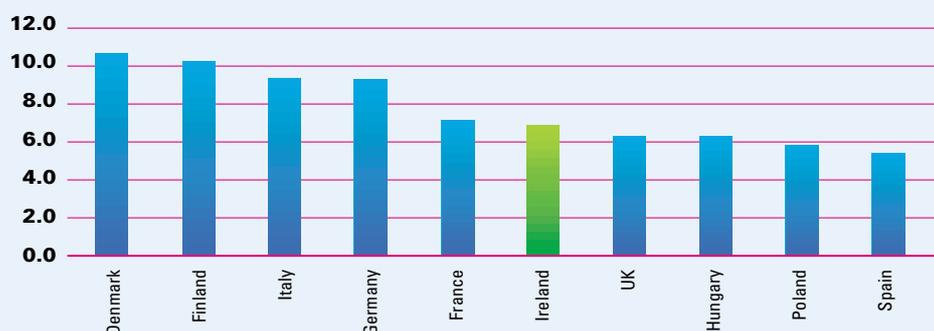
There are a number of explanations for the significant price increases.

- Demand for energy has risen dramatically over recent years. Unprecedented economic growth has seen peak demand in Ireland growing by five to six per cent per annum. Demand has increased from under 2,500MW in 1990 to over 3,800MW in 2001;
- At the same time, supply has been constrained. While generation capacity has increased, supply remains uncertain, threatening investment and damaging Ireland's attractiveness as a location for FDI as well as fuelling further price increases;
- The electricity market structure is not delivering the additional capacity needed and may fail to achieve the cost efficiencies required to minimise price increases;
- Additionally, the vast majority of consumers do not have a choice as to whom they purchase electricity from and at present the ESB continues to dominate the entire industry;
- Looking to the future, significant capital investment in generating plant will be required over the short term, and this will tend to increase prices further. The continuing development of an all-island energy market will on the other hand offer long term potential cost savings;
- Ireland is in an adverse position in this regard in that most of our competitors have surplus generating capacity and therefore may be subject to lower electricity price inflation.

Energy Costs – Gas

Accurate international comparisons of gas tariffs are difficult to find. Many quoted tariffs are unreflective of the experience of the majority of players in the market. For instance, the commodity tariffs published by Bord Gáis Eireann do not apply to large energy users or power generators who together account for approximately 80-90 per cent of actual gas volume. For these customers natural gas transportation charges alone have increased by over 70 per cent since 2001. Nevertheless, more reliable benchmarks for small and medium sized users are available.

Figure 53 Industrial Gas Prices Jan 2004 (€ per GJ for a consumer using 4186 GJ per annum, with taxes and VAT) (Indicator 118)



Source: Eurostat

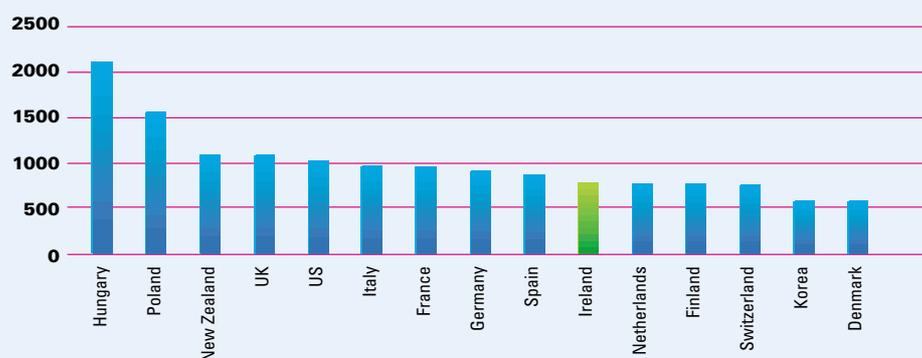
Prices for small consumers (4,186 GJ) remained very stable from the late 1990s until last year, when tariffs increased by approximately eight per cent. For higher volume users (41,860 GJ) prices have increased by almost 90 per cent since 1998. The CER has recently announced its intention to increase gas prices by 11 per cent for domestic customers and by 16 per cent for small industrial customers, commencing 1st October 2004. Before these latest price increases, Ireland was relatively cheap for gas tariffs for small and medium sized users and according to Eurostat data was ranked 5th out of ten countries as of January 2004 (Figure 53).

Communications Costs

Telephone Costs

Communication costs cover a range of services including telephone charges (both fixed line and mobile), internet and broadband charges and postal services. In particular, telecommunication costs impact on firm level competitiveness as a direct input into the cost of production. High telecommunications costs can also act as an impediment to the take-up of new technology. Therefore, it is vital for an economy to ensure a cost-effective and efficient market for telecommunications, both to maintain and enhance competitiveness and to encourage process innovation, technology absorption and productivity gains.

Figure 54 OECD National business basket cost of calls (May 2004)
(US\$ PPP) (Indicator 119)



Source: Teligen

Figure 55 OECD Composite national/international business basket
(May 2004) (US\$ PPP) (Indicator 120)



Source: Teligen

The first statistic examined by the Council measures the cost of a basket of national calls (excluding calls to mobiles) (Figure 54). Tariff data for telecommunications services can be difficult to benchmark accurately due to the high number and frequency of special offers and incentives to new customers. Nevertheless the data does provide a sound indication of relative performance. Ireland has traditionally been ranked quite favourably in terms of telephone costs. This remains the case and accordingly, Ireland is placed 6th out of 15 countries. In terms of a composite basket of national and international business calls, Ireland's performance is also relatively competitive and is ranked 4th out of 15 (Figure 55). While Ireland is relatively cheap for fixed line telecommunications, prices have increased substantially recently. Between 2001 and 2003, the cost of a composite business basket of calls, including both national and international calls, has increased by over 34 per cent. The Commission for Communications Regulation (Comreg) has express concern about the level of accuracy and transparency of pricing information and has recently issued a code of practice designed to alleviate these concerns.

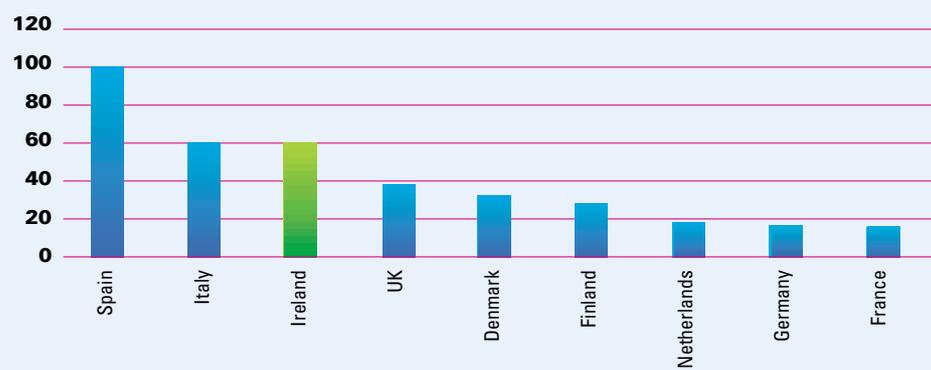
Ireland remains more expensive than the EU average for a range of user types in terms of mobile call charges.⁵⁷ According to data for May 2004, Irish mobile charges are ranked 9th in the EU15 for a low user post paid mobile basket, 11th for a medium user and 13th for a high user. All of these figures make Ireland more expensive than the EU average. Interestingly, Ireland performs much better in terms of a pre-paid mobile basket and hence is ranked 4th amongst the EU15. Pre-paid and post-paid subscribers account for 74 per cent and 26 per cent of mobile subscriptions respectively.

Cost of broadband

The importance of broadband for the development of a knowledge intensive economy is widely known. Yet despite the oft quoted ambition of Irish policy makers to propel Ireland to the forefront of the telecommunications revolution, broadband penetration in Ireland remains one of the lowest in the developed world. One of the principle reasons for the poor levels of broadband take-up has been the high wholesale and retail costs. Recent evidence however indicates that Irish broadband prices have fallen significantly over the past year or so and have moved towards the European average price. For instance, there has a significant reduction in the cost of entry level broadband services (0.25-0.5 Mbit/s) suitable for

residential users and small businesses over the last twelve months. It is estimated that between Q4 2003 and Q3 2004 that entry level prices have fallen by approximately 50 per cent to €33 per month excluding VAT, bringing prices in Ireland for this service down towards the EU15 average.

Figure 56 ADSL Lowest monthly rental, normalised results, 1Mbit/s
(US\$ PPP, including VAT) (August 2004) (Indicator 122)



Source: Teligen

Using ComReg data, Ireland is found to be the 7th most expensive amongst nine countries for the monthly cost of a normalised ADSL basket (US\$ PPP) (Figure 56).⁵⁸ In terms of the minimum monthly cost of an ADSL basket, Ireland is ranked 5th out of nine (Indicator 122).

Insurance Costs

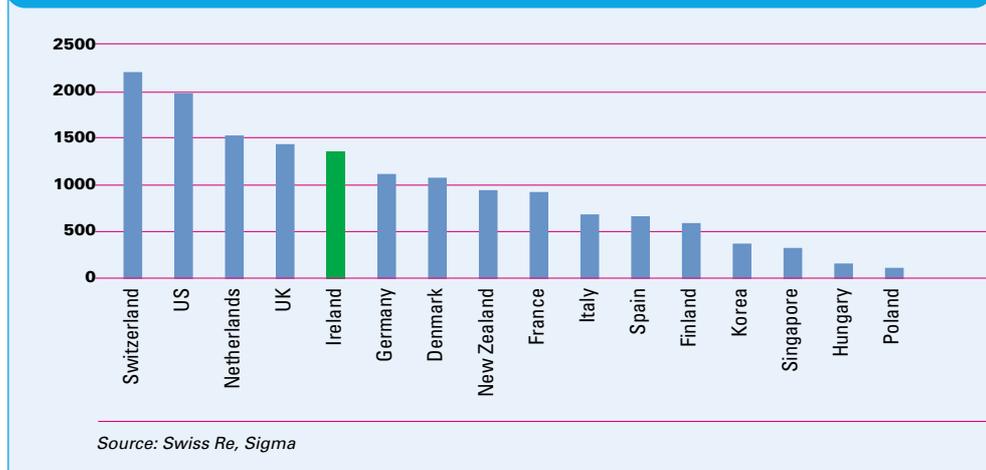
Concerns over the cost of insurance have persisted over recent years, despite a number of positive actions (particularly the implementation of many of the recommendations which emerged for the report of the Motor Insurance Advisory Board and the establishment of the Personal Injuries Assessment Board). Despite premium reductions in some areas, many SMEs in Ireland have been adversely affected by the escalating cost of personal liability insurance over recent years. In a recent IBEC survey on insurance, 47 per cent of companies stated that insurance increases are causing trading difficulties.⁵⁹ International insurance data published by *Swiss Re Sigma* form the basis of most of the analysis below. It should be noted that this data covers expenditure on insurance, which is only a proxy for the relative price of similar insurance services in different countries. Therefore the data should be interpreted with a degree of caution. It is possible that the increase in insurance premiums in Ireland is a result of increased take-up of insurance cover (although there is no evidence of this either). Finally, the use of a tort system in Ireland and the UK increases private premiums vis-à-vis Europe and the USA where the use of a no-fault system (with either the state or employers paying some reduced wage and medical bills without relying on the court system) reduces the level of expenditure on insurance premiums.⁶⁰

⁵⁸ The normalised (1 Mbit/s) figures show the cheapest offering in each country, per 1 Mbit/s of service. This method may favour countries offering higher speeds.

⁵⁹ IBEC, National Survey of Business Costs, November 2003.

⁶⁰ Tort refers to a system of law whereby an action for damages may be brought as a consequence of a wrongful act resulting in injury to another's person, property or reputation.

Figure 57 Insurance Premiums per capita 2003 (non-life business)
(US\$) (Indicator 123)

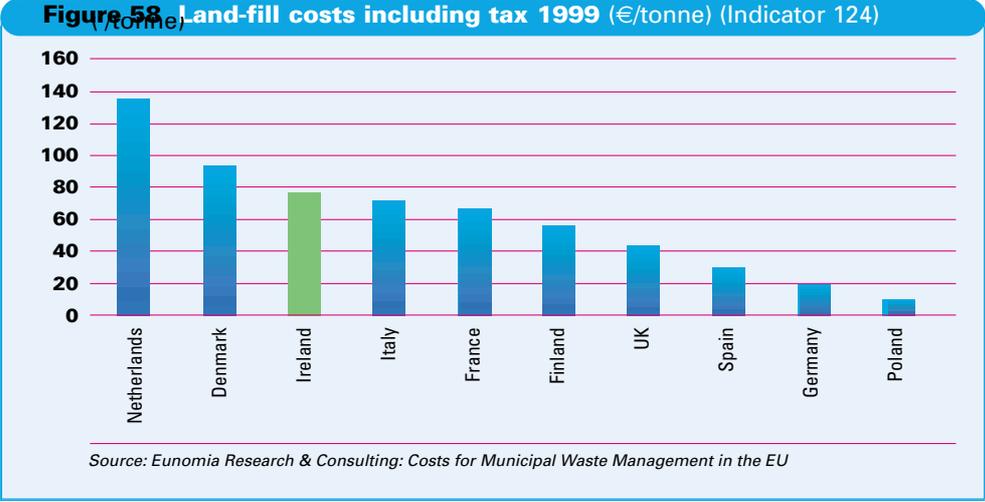


Data published by *Swiss Re Sigma* indicates that inflation adjusted non-life insurance premiums increased by six per cent globally in 2003 (the cost of non-life insurance is more relevant to business competitiveness than the cost of life insurance). By comparison, non-life premiums in Ireland increased by 11.2 per cent. This was the highest increase among EU15 countries and among the 16 countries benchmarked. What is most striking, however, is the percentage increase in premiums per capita between 1998 and 2003. With the exception of Poland, Ireland experienced the largest increases in non-life insurance premiums per capita amongst the 16 countries in this report. Irish premiums are now approximately 120 per cent higher than in 1998. By comparison, premiums in the USA and Finland increased by 38 and 22 per cent respectively.

Irish expenditure on non-life insurance is now the 5th highest among 16 countries surveyed, behind only Switzerland, the USA, the Netherlands and the UK. Irish per capita premiums now amount to \$1,356 per annum, well ahead of the averages for the EU15 (\$974) and the OECD (\$1,008) (Figure 57).

Waste and Environmental Costs

Given the ever increasing environmental responsibilities facing companies, it is not surprising that there is growing concern over the level of local taxation, waste charges and other environmental costs which firms must pay. Local government current expenditure has increased dramatically over recent years. In 1996 current expenditure totalled €1.6 billion. By 2002, current expenditure had reached €3.1 billion, an increase of 93 per cent. In 2002, user charges accounted for 53 per cent of local government income, the vast majority of which was levied on the enterprise sector.

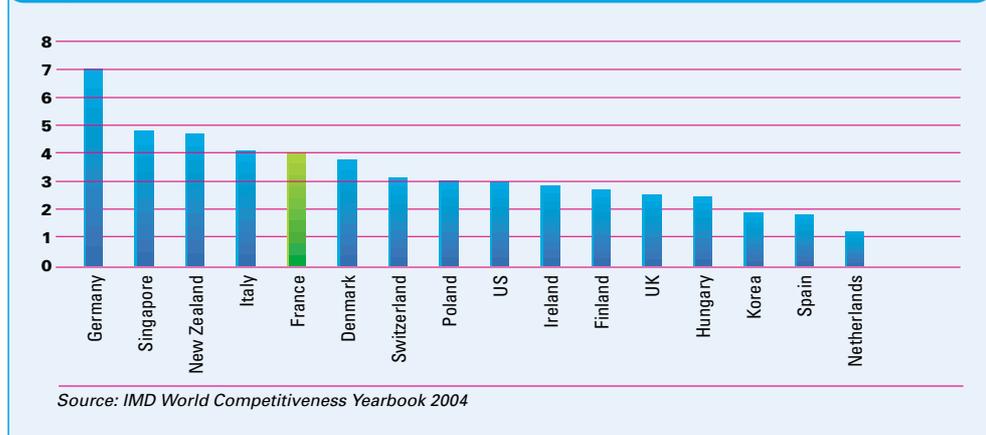


Firms in Ireland have also experienced rapid increases in the cost of waste management services. IBEC have estimated that between 2001 and 2003 Irish companies experienced a cumulative 47 per cent rise in waste management costs. This is partly due to the significant increases in local authority charging for waste management over recent years. In 1999 Ireland was ranked 8th out of ten countries in terms of the cost of land fill per tonne of municipal waste (Figure 58). Only Denmark and the Netherlands were more expensive. Since then there has been a dramatic escalation in local authority charges for landfill and this will have further undermined Irish competitiveness in this area.

Cost of Capital

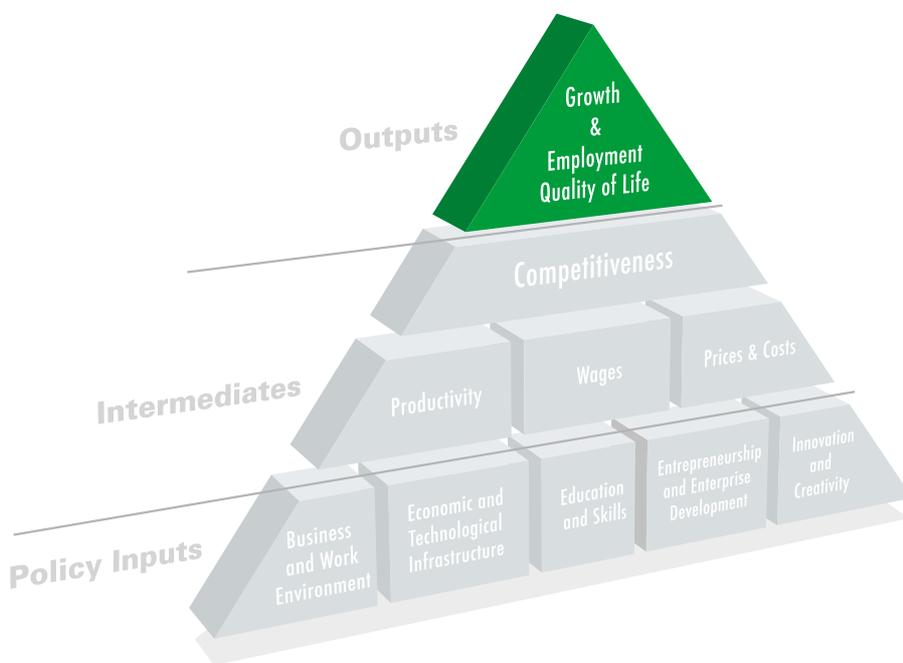
The cost of capital is an important determinant of a firms cost structure. The cost of capital can influence a firm’s decision to invest in productivity enhancing technologies and so it is important for national competitiveness that the banking market operates in a competitive environment, providing an adequate supply of capital at a reasonable price. In fact the efficient operation of the banking system is important for the efficiency of the entire economy – over four per cent of Gross National Product (GNP) is attributable to the banking sector and banking impacts on virtually all other sectors of the economy.⁶¹ The best measure of the competitiveness of the banking sector is the interest rate spread. Sourced from national financial data, this indicator measures the difference between the average lending rate and the average deposit rate available in an economy.

61 The Competition Authority, Study of Competition in the Provision of Non-investment Banking Services in Ireland: Market Definition and Competition Analysis Consultation, August 2003.

Figure 59 Interest Rate Spread 2003 (Indicator 125)

A recent study by the Irish Financial Services Regulatory Authority (IFSRA) found that since the late 1990s (when Irish interest rates fell rapidly), there has been a general reticence amongst Irish lending institutions to pass on reductions in interest rates to their customers in respect of non-mortgage lending products.⁶² According to IFSRA, the result has been a widening of the interest rate spreads on loans and overdrafts to small and medium enterprises (SMEs), resulting in a loss of competitiveness vis-à-vis much of the EU15. Evidence from the IMD however suggests that over the same period, the interest rate spread differential with the USA appears to have narrowed substantially. According to data compiled by the IMD, Ireland performs reasonably with regard to interest rate spread and with an average spread of 2.8 per cent is ranked 7th out of 16 countries (Figure 59).

3.2 Outputs



Outputs - Growth & Employment

Indicator	126	127	128	129	130	131	132	133	134
	Real GDP growth %	Real GDP growth (5 years)	GDP per capita (current prices PPP 000 US\$)	Consumption per capita (PPP 000 US\$)	General government gross financial liabilities (% GDP)	Employment growth	Standardised (ILO) unemployment rate	Projected labour force growth	Projected employment growth
Year	2002-2003	1998-2003	2002	2002	2003	2003	2003	2004	2004
Source	OECD Economic Outlook 2004	OECD Economic Outlook 2004	OECD Economic Outlook 2004	OECD Economic Outlook 2004	OECD Economic Outlook 2004	OECD Economic Outlook 2004	OECD Economic Outlook 2004	OECD Economic Outlook 2004	OECD Economic Outlook 2004
Country	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank	Rank
Denmark	15	10	16	12	13	15	15	15	15
Finland	0.4	8.7	29200	16478	50.7	-0.5	5.6	0.0	0.3
France	1.9	8	26500	14320	52.6	-0.1	9.0	-0.1	0.2
Germany	0.1	14.5	27200	14504	69.5	-0.1	9.4	0.4	0.2
Hungary	-0.1	11.1	25900	15117	65.3	-1.5	9.7	-0.2	-0.4
Ireland	2.9	6.2	13900	3982	32.5	0.0	5.8	-0.1	0.1
Italy	1.4	40.9	32600	15625	117.1	0.9	4.6	1.5	1.3
Korea	0.4	7.6	25600	11562	16.0	1.0	8.6	1.0	1.0
Netherlands	3.1	2	17000	13585	16.0	0.0	3.6	1.0	1.1
New Zealand	-0.7	35.8	29000	9	54.1	-0.9	3.8	1.4	-0.1
Poland	3.0	8.4	21800	3199	38.4	1.8	4.7	1.1	0.9
Singapore	3.7	19.7	10800	12	45.4	-1.0	19.2	0.4	0.6
Spain	1	15.0	24100	11	63.3	-	11.3	-	-
Switzerland	6	16.6	22400	10	63.3	2.6	4.1	2.1	2.5
UK	-0.5	6.4	30500	23846	55.0	-0.9	5.0	0.2	0.2
US	2.2	13.1	28000	17564	63.4	0.9	6.0	0.3	0.5
	3.1	14.6	36100	23762	63.4	0.8	6.0	1.2	1.4
Ireland (GNP)	0.5	9.9	26600	14263	72.6	0.1	8.9	0.6	0.5
EU15			26000						

3.2 Outputs

High and rising levels of productivity, a competitive cost base and success in international markets are not ends in themselves. The ultimate reason for policy makers to pursue national competitiveness is to improve the living standards and quality of life available to people in Ireland. This section of the ACR benchmarks and discusses Ireland's performance regarding desired 'outputs' from national competitiveness, both from an economic and a social perspective. These are covered under two headings:

- Living Standards and Employment
- Quality of Life and Environmental Sustainability

3.2.1 Growth & Employment

Living Standards and Employment

High and rising material living standards and a high level of productive employment are the two main 'economic' measures of increasing national competitiveness. What do these measures tell us about Ireland's competitiveness performance?

Looking firstly at material living standards, these have risen dramatically in Ireland over the last number of years, and are now among the highest in the world. Material living standards are normally assessed by reference to a country's Gross Domestic Product (GDP), which measures the value of all the goods and services produced within that country each year. Internationally, economists consider the growth rate of GDP to be the best measure of a country's economic performance, and the level of GDP per capita (person) to be the best measure of a country's current material living standards.

Given the unusually high proportion of output accounted for by foreign-owned companies in Ireland, economists in this country also pay close attention to the growth rate and level of Gross National Product (GNP), which measures the value of goods and services produced by Irish nationals, irrespective of their location. Because this excludes profits earned and repatriated by foreign companies here, many commentators consider this to be a better measure of Ireland's 'true' economic performance and living standards.

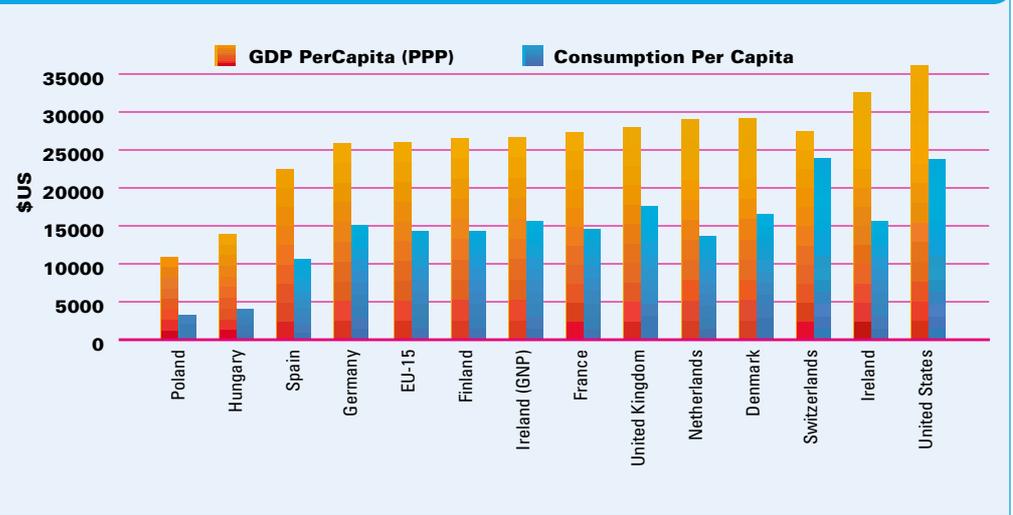
Figure 60 Real GDP Growth 1998-2003 (%) (Indicator 127)



Source: OECD Economic Outlook / CSO National Income & Expenditure

Irrespective of the measure used, Ireland has performed exceptionally in recent years. GDP in Ireland expanded by just under 41 per cent in real terms between 1998 and 2003 (excluding the effect of price changes), ranking Ireland first out of the 15 countries benchmarked on this measure in the ACR (Figure 60). Over the same period, Irish GNP expanded by just under 30 per cent in real terms, slower than the growth in GDP (reflecting the important role of foreign companies in Ireland’s economic expansion over this period), but still well above the growth performance of all the other countries benchmarked on this measure, with the exception of South Korea. To put Ireland’s performance into perspective, the GDP of Germany, once Europe’s engine of economic growth, expanded by just 6.2 per cent in real terms over the same period, while even in the USA, growth was less than half that recorded in Ireland.

Figure 61 GDP and Consumption per Capita (US\$; 2002) Indicators 128 & 129)



Ireland's rapid economic growth in recent years has lifted measured output per capita to among the highest in the world. In 2002, GDP per capita measured \$32,600, second only to the USA amongst the 16 countries benchmarked in the ACR (Figure 61). GNP per capita in 2002 was lower, at \$26,600, putting Ireland in ninth place among the 16 countries.

Consumption expenditure by households is another measure frequently used for assessing a country's living standards. On this measure, Ireland was ranked 6th of 16 in 2002, with private consumption per capita measuring \$15,625 in 2002, 52 per cent below the level of Switzerland, the leading country on this measure. Between 1998 and 2003 private consumption in Ireland grew by an average of 5.9 per cent in real terms, compared with a growth rate of 2.9 per cent for the OECD as a whole.

While Ireland's current levels of output and income per capita are among the highest in the world, this is a relatively recent phenomenon. Unlike many other advanced economies, such as Germany, France and the USA, Ireland has not yet had the opportunity to accumulate a significant amount of material 'wealth', in the form of financial assets, industrial capital, housing stock and physical infrastructure, held domestically or overseas by Irish residents. In this sense, Ireland is not as 'rich' as some countries with lower current levels of output per capita. The high levels of public and private investment needed to make up this infrastructure or 'wealth' deficit has the effect of suppressing current consumption levels and living standards. While there are few reliable measures of a country's wealth, the relatively small stock of outward direct investment by Irish companies compared with other countries is indicative of the fact that Ireland has only recently been promoted to the premier league of economic performers.

Despite the dramatic improvements in recent years, material living standards in Ireland (GNP per capita) in 2002 were still 27 per cent below those of the USA, whose strong economic performance over the last decade has made it the benchmark for policy makers worldwide. Figure 62 illustrates the reason for this differential.

Figure 62 Differentials in GDP per Capita and Their Decomposition, 2002

Percentage point difference in PPP-based GDP per capita with respect to the USA



1. Based on the ratio of the working-age population (15-64 years) to the total population
2. Based on employment rates and average hours worked.
3. GDP per hour worked.

Source : GDP from OECD National Accounts; population, working-age population, labour force and employment from OECD Labour Force Statistics; hours worked from OECD estimates. GDP converted to common currency by 2002 OECD PPP.

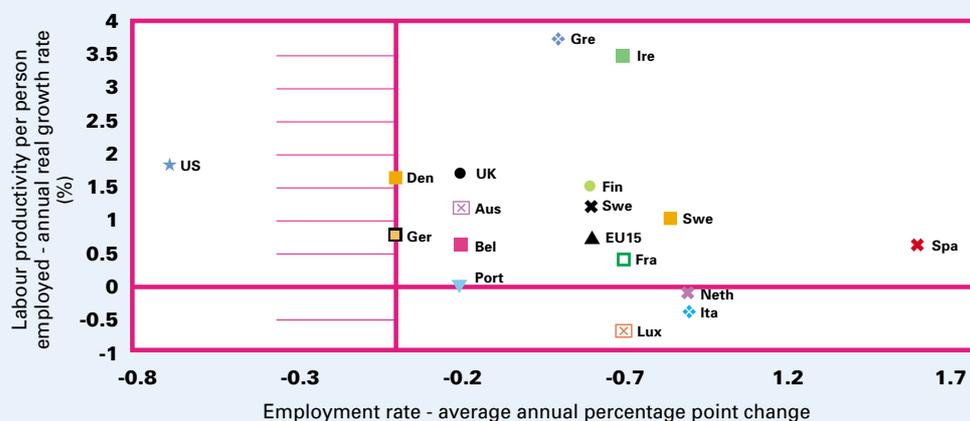
In a purely statistical sense, income (GNP) per capita in Ireland is lower for two reasons. Firstly, Irish people are less engaged in formal employment. Despite having a higher proportion of our population of working age, there are fewer people in work in Ireland as a proportion of the total population compared with the USA (71.2 per cent in USA compared with 65 per cent in Ireland in 2003). Moreover, those who are in employment in Ireland work fewer hours compared with those employed in the USA. This lower level of labour utilisation in Ireland accounted for just over 40 per cent of the difference between Irish and US living standards in 2002, equivalent to around \$3,836 per capita.

Second and more significantly, when output is measured in GNP, people employed in Ireland produce 16 per cent less for each hour worked compared with those employed in the USA. This productivity differential accounted for almost 60 per cent of the difference between Irish and the US living standards in 2002, equivalent to \$5,753 per person. Higher productivity in the USA likely reflects a number of factors discussed earlier in this report, including more

competition and the economies of scale that are available to companies in a large continental market, better infrastructure, higher capital investment by companies, higher research spending by both government and private companies and higher levels of entrepreneurship and innovation. When output in Ireland is measured in terms of GDP, Irish workers actually appear to be more productive than their US counterparts. As discussed earlier, however, this measure overstates Irish output and productivity (see Section 3.1.1 for detailed discussion).

Turning next to Ireland's employment performance, this confirms the strong growth in Irish competitiveness over the last decade. According to OECD data, employment in Ireland grew by 0.9 per cent in 2003, the 4th highest growth rate of the 15 countries measured on this benchmark (Indicator 131). Supported by high levels of immigration, rising labour force participation (particularly among women), natural growth in the native working-age population and falling unemployment, total Irish employment grew by 23.9 per cent in the period between February 1998 and February 2003.

Figure 63 Employment & Productivity Developments in the EU 1999-2003



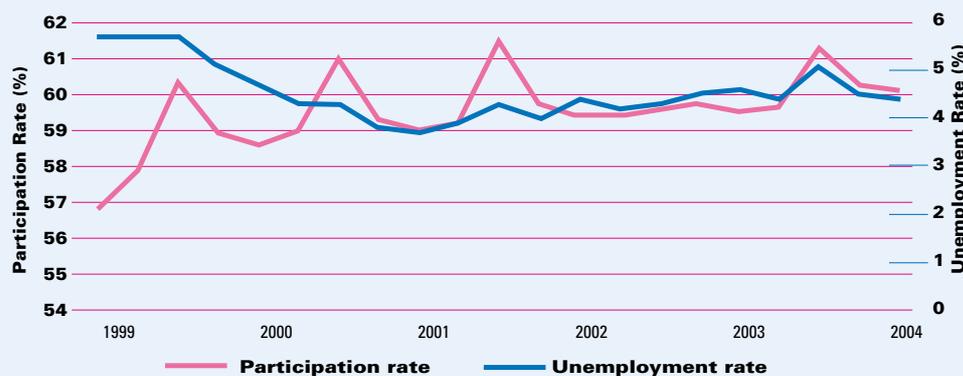
Strong employment growth in recent years meant that Ireland's unemployment rate averaged just 4.6 per cent in 2004, 4th lowest of the benchmarked countries, with most analysts agreeing that unemployment below five per cent of the labour force effectively represents full employment (Indicator 132). As discussed in Section 2.1.2, participation in the labour force among the working-age population in Ireland has increased significantly over the last decade, although at 70.1 per cent, remains well below the rate achieved by Switzerland (86.6 per cent) and other leading countries, reflecting the still relatively low rate of female participation in Ireland compared with many other industrialised countries.

The effect of the measured deterioration in Irish cost competitiveness since 2000, as documented in the 'Intermediates' section of this report is somewhat ambiguous. Figure 64 charts quarterly real growth in GDP and GNP between 1999 and the first quarter of 2004. Both measures of Irish output show a significant deterioration in Ireland's growth performance from 2001 onwards, although most economists suspect that this stemmed more from the sharp downturn in the global economy, and particularly in the global ICT industry, than from a general loss of Irish economic competitiveness. This view seems to be confirmed by the fact that Ireland's growth performance is showing signs of picking up strongly in 2004 (in line with the global economy), without any measured improvement in cost competitiveness.

Figure 64 Irish Quarterly Output Growth 1999-2004 (%) (Constant Prices)

Source: CSO, Quarterly National Accounts

There are, however, visible signs that the loss in cost competitiveness may be having an effect on Ireland's labour market performance. Unemployment, while remaining at an historically low level in broad terms, has risen from a low of 3.7 per cent of the labour force in the first quarter of 2001, while improvement in labour force participation (particularly among women) has stalled over the same period (Figure 65). Employment in manufacturing and other production industries – the sectors of the economy most exposed to international competition – has fallen from a peak of 330,000 in the third quarter of 2001 to 300,000 in the second quarter of this year, a fall of over nine per cent. Growth in overall employment over this period has been taken place almost entirely within the public sector and the construction industry.

Figure 65 Labour Market Performance, 1999 - 2004

Source: CSO, Quarterly National Household Survey

While the fall in competitiveness has been associated with a visible deterioration of the private sector labour market, this should not be exaggerated, in the view of the continuing low rate of unemployment and the still-high rate of participation. Indeed, the limited impact of the measured loss in cost competitiveness on output and employment in Ireland is, to many observers, surprising. A number of explanations are possible. First, recent output and employment performance has to be interpreted in the context of the artificial state of 'super competitiveness' enjoyed by Ireland during the period 1999-2001, as a result of the sharp depreciation in the external value of the euro. Hence, the loss of competitiveness since 2001 may simply be returning Ireland to a more normal 'equilibrium'. Second, the rapid growth in prices and wages in recent

years in part represents a catching-up phase in the wake of prolonged wage suppression during the 1990s as part of the social partnership process.

Finally, and more worryingly, the muted reaction of output and employment so far may in part be the result of firms willing to absorb a temporary decline in profit margins. If the decline in competitiveness persists, a lagged response in terms of loss of living standards and employment may still occur. Indeed, it may well be that Ireland is at an inflection point in terms of its growth profile: going forward the pressures on our competitive position are considerable. These include the continued growth in domestic prices and wages, the growth threat from accession countries and emerging Asia in terms of attracting FDI flows and the substantial possibility that the euro will appreciate further, at least against the dollar.

In summary, policies supporting national competitiveness have resulted in a dramatic rise in Irish material living standards over the last number of years. Fast growth has also brought the economy to effective full employment. Nonetheless, living standards in Ireland are still somewhat behind those of the US, reflecting the lower employment rate and average working hours in Ireland, as well as the lower productivity per hour worked. Moreover, while Ireland's current levels of output and income per capita are among the highest in the world, this is a relatively recent phenomenon. Unlike many other advanced economies, such as Germany, France and the USA, Ireland has not yet had the opportunity to accumulate a significant amount of material 'wealth'.

While the fall in measured cost competitiveness has been associated with some deterioration of the private sector labour market, the limited overall impact on output and employment in Ireland is somewhat surprising. If the decline in competitiveness persists, a lagged response in terms of loss of living standards and employment may still occur.

3.2.2 Quality of Life

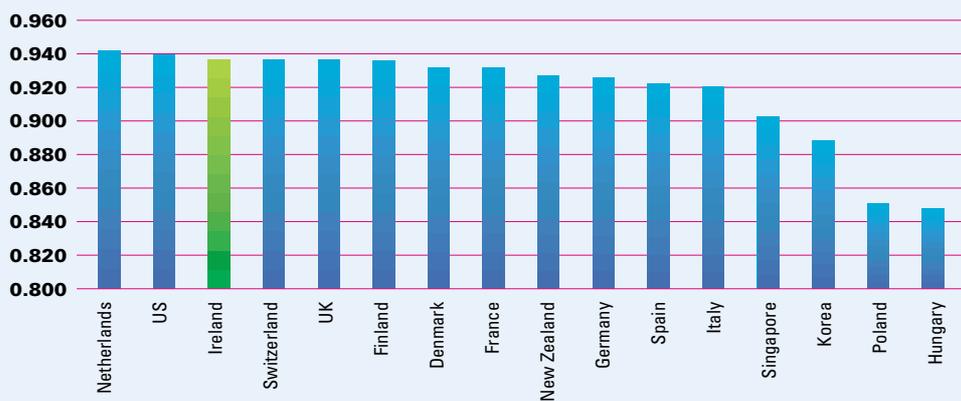
One of the principle purposes of economic policy is to ensure an acceptable quality of life for all citizens, encompassing values such as equality, egalitarianism and environmental sustainability. Whereas the previous section examined the material and financial benefits which accrue to society from national competitiveness, this section measures the more esoteric outcomes which impact on the day-to-day lives of citizens. These are difficult concepts to benchmark. Nevertheless, the NCC has identified a number of statistics which attempt to capture these concepts. The first three indicators deal with broad issues such as quality of life and sustainability. There then follows a brief discussion of a number of environmental indicators. The final three indicators benchmark the resources of the health service and the demographic make-up of society.

Quality of Life

The United Nations calculate a *Human Development Index* (HDI) on an annual basis. This is a composite index measuring deprivations in the three basic dimensions: a long and healthy life; knowledge; and a decent standard of living. The index also takes account of social exclusion. Although the HDI is a useful starting point, it is important to remember that the concept of human development is much broader and more complex than any summary measure can capture, even when supplemented by other indices. For example, the HDI does not include important aspects of human development, notably the ability to participate in the decisions that affect one's life and to enjoy the respect of others in the community. Additionally, the statistic is used on a global basis and is designed to measure development

in the third world as well as the developed economies benchmarked herein. Therefore, given the generally high level of development amongst the 16 ACR countries it is not surprising that all are clustered within a relatively tight range.

Figure 66 Quality of Life: human development index value (Indicator 135)



Source: UN Human Development Report 2004

Ireland scores very well under this indicator and is ranked 3rd out of 16, just behind the Netherlands and the USA (Figure 66). This reflects Ireland's strong performance in terms of life expectancy and income per capita, and a solid performance in terms of education (relative to the rest of the world).

Within some of the HDI sub-indices, however, Ireland's performance is disappointing. While Irish incomes per capita are amongst the highest in the developed world, Ireland has a high level of income inequality (Indicator 136). The Gini Coefficient is an international measurement of income distribution which calculates the distribution of income across all sections of society. A score of zero indicates perfect equality while a score of 100 indicates perfect inequality. Ireland's score of 32.9 equates to a rank of 11th out of 16. The USA has been consistently the worst performer under this heading.

Sustainable Development

Sustainable development refers to development that meets the needs of the present without compromising the ability of future generations to meet their own needs and encompasses social, economic and environmental dimensions. Sustainable development implies economic growth which takes account of the protection of environmental quality and quality of life. The essence of this form of development is a stable relationship between human activities and the natural world, which does not diminish the prospects for future generations to enjoy a quality of life at least as good as our own.

An IMD survey of leading industrialists suggests that sustainable development is not accorded significant priority in Ireland. Ireland's score on this survey indicator ranks us at just 8th out the 16 ACR countries. Switzerland and the Scandinavian countries are the strongest performers under this heading (Indicator 137).

Environment

The challenge of waste management has become a major cause for concern for enterprise. Previously taken for granted because of the availability of low cost landfill sites, the absence of an integrated waste management infrastructure and subsequent rises in waste management costs has become a key issue for many industries. Forfás has pointed out that there has been little progress in recent years to address this infrastructural deficit; rather most of the progress has concentrated on delivering programmes for waste prevention, minimisation and recycling.⁶³ Since there are few statistics available to internationally benchmark environmental infrastructure, this section focuses primarily on the outputs or emissions of the economy as a whole.

Paper and Cardboard Re-cycling

The IMD measures the percentage of paper and cardboard which is recycled as of 2002. Ireland is the worst performer amongst the 13 countries benchmarked. Just 13 per cent of such waste is recycled (Figure 67). This compares most unfavourably with leading countries such as the Netherlands (82 per cent) and Switzerland (80 per cent). The weak commitment to recycling is also reflected in other statistics measuring glass recycling etc. Given the declining amount of land fill available, improved recycling levels are crucial to reduce costs and improve competitiveness.

Figure 67 Paper & Cardboard Recycling (% of Consumption) (Indicator 138)



Source: IMD World Competitiveness Yearbook 2004

The other indicators examined in this section also highlight Ireland's poor environmental record to date: according to the International Energy Association Ireland's CO₂ emissions correspond to a rank of 8th out of 16 countries, with 0.38kg of CO₂ emitted per unit of GDP (Indicator 139). By comparison, the most competitive country is Switzerland, with emissions of just 0.13kg of CO₂ per unit of GDP.

Finally, Ireland is ranked 9th out of 15 by the OECD Selected Environmental Data for the amount of municipal waste generated, indicating that we produce substantially more waste per capita than the best performing countries such as Poland, Korea and New Zealand (Indicator 140).

Health

The penultimate set of indicators examines a number of outputs from the health service. Performance in terms of the number of practising physicians and the number of acute care beds is determined by both the quantity of resources committed to the health service and the efficiency of the expenditure thereafter.

Ireland performs poorly in terms of the number of practising physicians with just 2.4 physicians per 1,000 population. This equates to a rank of 10th out of 15 countries. Italy is the strongest performer here, with 4.4 practising physicians per 1,000 population (Indicator 141).

The availability of beds in hospital is used here as a proxy for the responsiveness of the health care system and the ability of society to meet the health care needs of its citizens. Acute care beds are defined by the OECD as beds accommodating patients in a hospital or hospital department whose average length of stay is 18 days or less. This includes beds used for rehabilitation, palliative care and acute psychiatric care. According to the OECD, Ireland has just three acute care beds per 1,000 population, resulting in a rank of 11th out of 14 (Figure 68).

Figure 68 Acute Care Beds per 1,000 Population, 2002 (Indicator 142)



The final indicator measures the ageing of the population. This statistic is important for policymakers as it determines dependency ratios and hence the appropriate level of expenditure on health and education services going forward, as well as influencing the amount of pension contributions required to sustain current living standards in years to come. Overall, Ireland has quite a young population. It is estimated that in 2015 just 13 per cent of the population will be aged 65 or over. Only Korea and Singapore will have a smaller elderly population (Indicator 143).

Annex 1 - List of 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
Inflation Statement	May 2003
The Competitiveness Challenge, 2003	November 2003
Annual Competitiveness Report, 2003	November 2003
Statement on Innovation	February 2004
Statement on Prices and Costs	September 2004

