

# 2006

## Annual Competitiveness Report 2006,

*Volume 1:*

*Benchmarking Ireland's Performance*



National  
Competitiveness  
Council



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## Foreword by An Taoiseach



Ireland's economic performance over the past decade has been outstanding and, heading into 2007, the Irish economy continues to enjoy a level of growth that is among the highest in the OECD. As economic growth and social progress are intrinsically linked, our sustained performance has brought many benefits to our society. Many of these are highlighted in this report; in particular, improvements in real living standards and in take home pay and the continued availability of good quality jobs.

Ireland's international competitiveness remains the cornerstone of these successes. In order to ensure that living standards continue to rise, therefore, it is vital that we sustain and promote the continued competitiveness of the Irish economy. The need for reports such as this has not diminished with our economic growth, as it highlights that significant steps should be undertaken to preserve Ireland's competitiveness.

Firstly, as restrictions to world trade recede, companies based in Ireland face increasing competition globally, while Ireland itself faces more competition for investment. Therefore, it is important that Ireland remains flexible and able to develop new sectors of expertise. Secondly, productivity growth remains essential to underpinning sustained improvements in the economy. As productivity growth has slowed recently, a renewed focus on productivity across all sectors of the economy – private and public – is vital. Thirdly, as the EU aims to become the world's most competitive economic region, the role for innovation and research and development assumes even greater importance. In this regard, the Government has recently announced its new Strategy for Science, Technology and Innovation which will help to ensure that Ireland moves to the forefront of R&D internationally.

Competitiveness remains a key focus of Government policy. The conditions for enterprises operating in Ireland must be as favourable as possible. As the Council's 'Competitiveness Pyramid' shows, competitiveness can only be maintained by an adequate and well-designed infrastructure. This encompasses policies on the regulatory environment, including taxation, competition and the labour market, on Ireland's physical infrastructure, including transport, ICT and housing, and on Ireland's knowledge infrastructure, including all levels of formal education as well as R&D. In that regard, a report such as this is very useful, as it benchmarks many aspects of these issues in an objective and consistent way.

The National Competitiveness Council provides a valuable input to the formation of Government policies through its work on benchmarking Ireland's performance. I would like, on my behalf and on behalf of my colleagues in Government, to thank the Council for their important work and I am pleased to introduce the Annual Competitiveness Report 2006, Volume 1: *Benchmarking Ireland's Performance*.

A handwritten signature in black ink, which appears to read 'Bertie Ahern'. The signature is fluid and cursive.

Bertie Ahern  
An Taoiseach

## Chairman's Preface



The National Competitiveness Council (NCC) was established in 1997 as a Social Partnership body and reports to An Taoiseach on key competitiveness issues facing the Irish economy. This year, the Council is publishing its ninth *Annual Competitiveness Report*, of which this is Volume 1, *Benchmarking Ireland's Performance*. Volume 2, *Ireland's Competitiveness Challenge*, will be published later this year and builds on the findings of this report to inform public policy in Ireland, in relation to sustaining Ireland's competitiveness in the medium term.

This report analyses Ireland's competitiveness performance using over 130 key indicators, from outcome metrics such as economic growth and quality of life to policy inputs such as the regulatory environment and public spending on infrastructure. Drawing primarily on data from international sources including the OECD and Eurostat, this analysis uses a benchmarking process, which compares and ranks Ireland's competitiveness performance to that of our economic peer group, and traces its evolution over time.

The economic context to the report is generally positive. The Irish economy continues to perform very well. There was further strong growth in the numbers employed, supported by strong inward migration as well as natural population increases. Government finances are healthy and there continues to be steady flows of foreign direct investment into the economy. Overall, figures from the Central Statistics Office suggest that GDP grew by 5.5 per cent in 2005 (and GNP by 5.4%), twice the estimated OECD average of 2.7 per cent.

In this report, we provide an objective evidence base pinpointing growing or potential weaknesses in the factors contributing to Ireland's competitiveness. We have eight areas of concern which we outline in the report:

1. Ireland's outstanding economic performance has for many years been export-led. CSO figures suggest that the balance between exports and import earnings (net exports) has now become a drag on economic growth due to slowing export growth. While economic growth led by growth in consumption (including imports) is a welcome development if it is accompanied by higher standards of living and wellbeing in society, it is important to remember that trade competitiveness and growing our export base remains critical to Ireland's long-term prosperity.
2. Ireland scores relatively poorly in relation to environmental indicators and there are weaknesses in the security of Ireland's energy supply as well as an urgent necessity to diversify sources of energy.
3. Productivity growth, the key driver of economic growth in high-income economies, has slowed in Ireland in recent years, although it is still growing faster than the OECD average. This is reflected in increasing unit labour costs across a range of manufacturing activities, but especially in utilities.
4. While employment in services and construction has increased strongly, the numbers at work in manufacturing is falling in both 'modern' and 'traditional' manufacturing, with the exception of chemicals.
5. Ireland's house price boom has led to high and rapidly growing levels of personal debt, which may lead to volatility in the economy and higher wage demands.

6. Ireland's housing boom has, among other things, pushed up the costs of doing business here. Some of Ireland's costs have grown out of line with many of our economic peer group. This is also true of key services, such as IT services, as well as utility costs. Overall, Ireland has a high cost of living and this is continuing with inflation above the EU average.
7. The utilities sector (electricity, gas and water) is of particular concern. There is a productivity gap between Ireland and the USA of almost 60%, high costs and deteriorating unit labour costs in the sector. Market incumbents still retain a large market share, unlike in other economies.
8. The report shows that, despite strong commitment and investment from Government, much work remains to be done for Ireland to realise its ambition of becoming a world-leading 'knowledge economy'. In formal education, Ireland's pre-primary and PhD education sectors remain small in comparison with other European countries. In secondary education, the computer-student ratio in Ireland is low. In the area of research and development, linkages between industry and higher education remain underdeveloped, while indigenous private sector R&D has not grown in line with public expenditure in the area.

The National Competitiveness Council hopes that this report will, as a reference document, stimulate further debate and discussion on the policy challenges that face us. Our next publication, *Ireland's Competitiveness Challenge*, will examine these issues in more detail and will highlight the key policy directions that are needed to ensure that Ireland can continue to be successful over the next decade.

I would like to acknowledge the Forfás Secretariat for the work that they have done in preparing material for consideration by the Council. I would also like to thank all of the Council members and the advisors from the relevant government departments for their work on this document. The structure of the analysis in this report reflects the evolving thought process of past and current members of the Council.

In particular, I would like to acknowledge the work of past Council members, including the contribution of the two previous chairmen, Brian Patterson and the late William Burgess. Throughout his career, and in many areas of activity, William made outstanding contributions to Ireland's economic and social development. His leadership, energy and experience are greatly missed.

Don Thornhill

*Chairman, National Competitiveness Council*

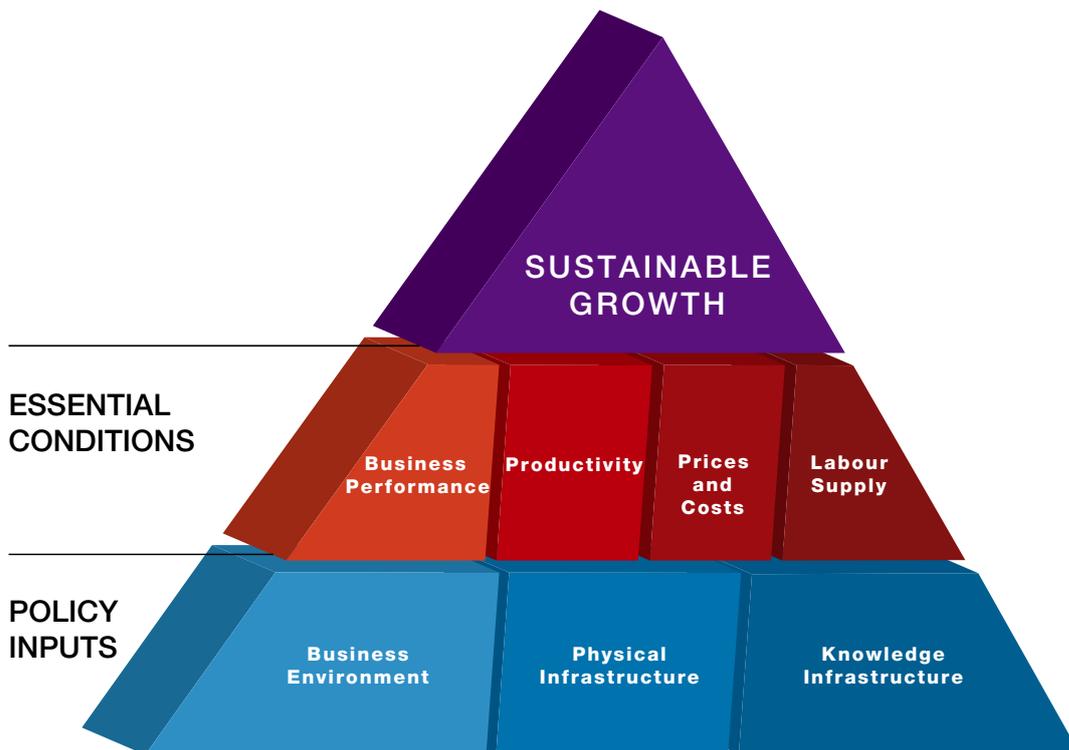
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# 1

## Introduction and Overview

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# 1. Introduction & Overview

## 1.1 What is Competitiveness and Why is it Important?

The NCC defines national competitiveness as all those factors that impact on the ability of firms in Ireland to compete in international markets, in a way that provides Ireland's people with the opportunity to improve their quality of life.

*Competitiveness is partly about costs, prices and wages...*

This definition includes the impact of costs, prices, wages and exchange rates on the ability of firms to compete in international markets. An economy is 'cost competitive' if wages and prices are at levels that allow its firms to export enough goods and services to pay for its import requirements and to maintain full employment.

*...but more about better business performance through innovation and productivity*

More broadly, this definition recognises that competitiveness is, over the longer run, about all those factors that contribute to better business performance, such as good physical infrastructure, high levels of education, training and research and a regulatory and tax environment that encourages entrepreneurship, enterprise, competition and innovation. Firms in Ireland cannot compete internationally on the basis of low wages, but rather on the basis of higher productivity and quality through efficiency, ingenuity and innovation in product and process design and delivery.

*Competitiveness remains a foundation for national economic and social progress*

In the NCC's view, the competitiveness agenda is not one that divides business and wider society. Economic dynamism and social progress go hand-in-hand. Competitiveness through productivity growth makes higher incomes and business success entirely compatible. Much has changed in Ireland in the last decade. What remains constant is that in a small economy like Ireland's, a successful, innovative, technologically advanced and growing base of exporting companies is a foundation for national economic and social progress and for building a fair, inclusive and sustainable society in which all can contribute to and benefit from rising prosperity.

## 1.2 Overview of Ireland's Competitiveness Performance

### 1.2.1 Review of Ireland's Economic Progress

*Ireland has been celebrated as a global economic success story of the last decade*

This year's benchmarking exercise provides a rich account of Ireland's competitiveness performance in recent years. Since 1995, Ireland's economy has grown, and continues to grow, at an exceptional rate by the standards of other advanced economies, allowing per capita incomes to converge with the EU-15 and OECD averages (figs 2.01, 2.03 and 2.04). This growth performance, together with the near elimination of unemployment (fig. 3.53) and the related improvements in measures of life expectancy (fig. 2.10), quality of life (fig. 2.09) and life satisfaction (fig. 2.11), made Ireland one of the world's most celebrated economic success stories of the last decade. Measures of the environmental sustainability of our growth are less positive, suggesting high per capita energy use and a low proportion of our energy mix from renewable sources (fig. 2.12), high and rising levels of per capita carbon emissions (fig. 2.13) and low levels of waste recycling (fig. 2.15).

*There have been two phases in the ‘Celtic Tiger’...*

In previous reports by the NCC and other commentators, it has been documented how the underlying dynamics of Ireland’s growth performance have evolved over the last decade, particularly with regard to changed contributions to our growth performance from international trade, on the one hand, and domestic spending, on the other. Two over-lapping phases in the evolution of the ‘Celtic Tiger’ can be discerned from the data.

*...the first driven by inward investment and export success...*

During the first phase – dating from the mid 1990s into the early years of this decade – rapid growth was set in motion by high levels of foreign direct investment (FDI) into Ireland by multinational companies (MNCs), attracted by our EU membership and pro-enterprise policies in taxation, education, exchange rates and trade and industrial relations. As globalisation gathered pace, Ireland had successfully positioned itself as one of the world’s “super-competitive” locations, earning us a share of rapidly expanding cross-border trade and FDI flows that was out of all proportion to our economic size (fig. 3.02 & 3.06). Fast export growth from MNCs and a growing cohort of successful indigenous exporters saw a rapid increase in Ireland’s global market share. Almost uniquely among developed countries, manufacturing’s share of output and employment increased in Ireland in the 1990s (fig. 3.08).

Productivity of those at work also improved rapidly (fig. 3.21), and a huge expansion in the numbers at work was facilitated by a favourable age structure (figs. 3.46, 3.47), a high initial stock of unemployed workers, immigration (fig. 3.49) and increasing female workforce participation (fig. 3.52). The FDI and export boom had a positive knock-on effect across the economy, stimulating increased household and government spending and rapid, broadly-based, economic growth.

From the late 1990s, the growth pattern and shape of our economy was altered by a number of forces, most notably:

- the emergence in the late 1990s of competition for FDI flows from large parts of Asia and Eastern Europe, particularly for manufacturing projects;
- a loss of Ireland’s cost competitiveness, particularly for manufacturing activities, reflecting domestic price and wage growth (figs. 3.29 & 3.32) and a rise in the euro against the currencies of our trading partners (fig. 3.30), including the USA;
- tax reforms, particularly the extension of a low rate of corporation tax beyond manufacturing and certain internationally trading service activities to all business activities (including domestic services), and the significant tax incentives available for property investment, which diluted the previous policy bias favouring export-oriented sectors over domestically focused sectors;
- Ireland’s entry into European Economic and Monetary Union (EMU), combined with global interest rate cuts in response to the ICT downturn of 2000, which led to a surge of cheap money into the Irish economy.

*...and the next phase driven by residential construction and domestic consumption*

As a result of these forces combined, a second phase of the “Celtic Tiger” emerged. While the economy has continued to grow strongly in the first half of this decade, the underlying impetus to this expansion shifted from the broadly-based, and export-led, growth of the late 1990s to a growth pattern that by 2005-06 had become entirely dependent on domestic consumption and investment (Fig. 2.05).

The scale of this adjustment is illustrated by a number of facts.

- Our market share of world trade peaked in 2002, and has since been in steady decline (fig. 3.08). While world trade grew by an average of six per cent per year between 2002 and 2005 in value terms (euro), the value of Ireland's exports grew by an average of just two per cent per annum over the same period.<sup>1</sup> This loss of market share was most pronounced in manufacturing (figs. 3.07, 3.08, 3.09). Exports of services grew more strongly than manufacturing, although growth also slowed in the 2002-05 period compared with earlier years.
- The current account of Ireland's balance of payments with the rest of the world shifted from a surplus as recently as 1999 to a deficit of €4.2 billion in 2005 (3.0 per cent of GNP), and is forecast to deteriorate to €6.9 billion in 2007 (4.25 per cent of GNP).<sup>2</sup> Irish residents are now spending more than they earn, financed by foreign borrowing and a running down of international assets.
- In the five years to March 2006, manufacturing industries lost over 32,000 jobs, declining as a share of total employment from 15 per cent to 11 per cent. Construction overtook manufacturing as the largest single employment sector in Ireland in 2004, and accounted for 13 per cent of those in employment in March 2006. Another significant change in Ireland's employment structure over this period has been the increase in the share of public services in total employment, which moved from 20 per cent to 23 per cent in the five years to March 2006.

### 1.2.2 Assessment of Ireland's Competitiveness Performance

Is there anything undesirable, or unexpected, about this changed pattern of growth? It was, perhaps, inevitable that the pace of expansion of Irish manufactured exports and employment would ease from the rapid growth rates of the late 1990s, as overseas competition intensified and skilled labour in Ireland became scarcer and more expensive. There is nothing new, or inherently bad, about shifting patterns of international trade and structural change; technological developments and the integration of new centres of production into the global economy have long resulted in the birth and decline of industries in different countries.

It is also the case that household spending patterns reflect a rational willingness by Irish households to take on cheap debt to finance spending on housing, leisure services and imported goods – just rewards, some say, for the economic successes of the 1990s. It is also, of course, a welcome development that Ireland has the resources to address many of the deficiencies in Ireland's housing, transport and broader social infrastructure (e.g. health and education) that have bedevilled our economy and society for so long. At this time of justified economic self-confidence, however, it is important to remind ourselves of the dangers and challenges that our economy faces.

*Construction is 'crowding out' the exporting sectors needed for long-run growth*

The loss of momentum in the exporting sector in recent years stems not only from increased international competition for trade and FDI, but also from much increased internal competition for scarce labour, capital, land and entrepreneurial resources from the booming residential construction and related domestic services sectors. In this sense, the difficulties being faced by some exporting, and particularly manufacturing, activities reflect not just a process of benign "structural change", but also "crowding out" of exporting activities by the rapid expansion of construction and related domestic services, all of which, in the current environment, are out-bidding more cost-sensitive exporters for scarce labour, land and other inputs.

1 For a detailed analysis of Ireland's trade performance over this period, see the Forfás International Trade and Investment Report, 2005

2 Quarterly Bulletin 3, 2006, Central Bank of Ireland

In this environment of rapidly escalating costs, many exporting companies in Ireland do not have the breathing space to adapt to the more competitive environment by repositioning themselves at a higher, and more sustainable, point in the value chain with the help of new technology and organisational change.

*The changed pattern of growth may have weakened our productivity performance*

The high levels of construction investment being stimulated by the current property boom will do little to stimulate productivity growth – the ultimate driver of long-term living standards. As in other advanced economies, Ireland's productivity growth is highest in a small number of high technology export-oriented manufacturing and services sectors (fig. 3.22). Construction and many domestic services are more labour-intensive and less exposed to international competition, with less opportunities and incentives for automation (through ICT for example) and for innovation in design and delivery than in manufacturing and export-oriented services activities. Indeed, the recent pattern of economic growth may already have weakened Ireland's underlying productivity performance; preliminary data suggest that in 2005 Irish productivity growth slowed to its lowest rate since the early 1980s (fig. 3.21).

*Our dependence for growth and employment on construction creates risks*

This pattern of growth in recent years is also undesirable from a risk perspective. By the end of 2005, over 13 per cent of Ireland's employment was accounted for by the construction sector – higher than any other OECD country and over twice the rates of the USA and Germany. Construction alone accounted for over one third of total Irish economic growth in 2005. By definition, the narrow base of Ireland's economic growth in recent years makes the economy too dependent for output and employment growth on a single sector. This has directly increased the economy's exposure to a number of inter-related risks, most notably global house price volatility and interest rate hikes, which have the potential to undermine confidence in the housing market here, reduce growth and increase unemployment.<sup>3</sup> More indirectly, the already high and rising levels of household debt (Fig. 4.40) that have financed the construction boom make the economy more sensitive to other significant global risks, such as energy shortages and a sharp depreciation of the dollar against the euro.

*The construction and consumption boom will inevitably falter*

Even without an external economic 'shock', this pattern of domestically-driven growth cannot sustain itself indefinitely. Irish households, businesses and government combined are spending more than they are earning, and in the process building up foreign liabilities on a scale that cannot continue indefinitely. Rising energy prices and interest rates and the winding down of the boost to consumption from the SSIA's after 2007 will almost certainly weaken real income growth and the impetus to the economy from consumer spending. As Ireland's per capita housing stock converges with the EU average (by 2009 at current growth rates), and as property tax incentives expire, private residential construction will likely ease off. Even assuming greater public investment in infrastructure and social housing, the share of construction in total employment will, over time, fall back towards more "normal" levels. All this suggests that, even under a benign scenario, the momentum to the economy from domestic consumption and construction will ease off in the coming years.

When the current consumption and construction boom runs its course, as it inevitably must, there is a danger that the Irish economy may be left with an artificially-inflated cost base and a depleted stock of companies, managerial know-how and technological sophistication to compete in international markets.

3 A recent simulation by the ESRI suggested that a 40 per cent drop in house prices could reduce GNP growth to one per cent and increase unemployment to over 10 per cent of the labour force (Medium Term Review, 2005-2012, ESRI, December 2005).

### 1.2.3 Regaining of Ireland's Export Competitiveness

*Ireland needs to recover some of its lost export competitiveness.....*

According to the ESRI, the Irish economy has the capacity to grow by up to five per cent per year to the end of this decade.<sup>4</sup> Realising this potential will likely require a stronger expansion of the exporting sectors of the economy over the coming years.

*...requiring a more supportive environment for exporters based in Ireland*

Ireland's ability to recover some of its lost export competitiveness and re-enter a more balanced phase of growth will partly depend on international developments out of Ireland's control, most notably the evolution of interest rates, exchange rates and global economic imbalances such as the large U.S. current account deficit. It will also depend on the domestic environment for exporting companies in Ireland. This year's benchmarking exercise suggests that a number of traditional attractions of the Irish business environment for exporting companies remain intact, most notably:

- Direct personal and corporate tax rates in Ireland remain highly competitive (figs. 4.03, 4.04 & 4.06), although this advantage is partly offset by high local taxes and levies on growth-oriented businesses (figs 4.09).
- Regulation of product and labour markets in Ireland is not perceived by industry to significantly impede business operations, although levels of regulation are perceived to have increased since 2000 (figs. 4.16 & 4.17).
- Ireland is highly open to foreign trade and investment (figs. 3.02, 3.06 & 3.07).
- There are a relatively low number of procedural requirements in Ireland for starting a business (fig. 4.12) and rates of entrepreneurship remain high by EU standards (fig. 3.13).
- Secondary school completion and third level participation rates are rising and compare well with EU averages (figs. 4.48 & 4.53).
- Ireland's labour force is still expanding rapidly by EU standards, reflecting both natural demographic growth and immigration (figs. 3.47, 3.48 & 3.49).
- Productivity levels in 'modern' export-oriented manufacturing and services sectors remain high by global standards (figs. 3.22, 3.23 & 3.24), in large part reflecting the adoption by Irish subsidiaries of MNCs of best global practices in technology, logistics and human resource management.

On the minus side of Ireland's 'competitiveness balance sheet', this year's report highlights some long-standing, and newer, weaknesses in the operating environment for exporters here, most notably:

- Road, air, seaports, energy, and ICT infrastructures are all perceived to remain deficient by the standards of other advanced economies (figs. 4.25, 4.27, 4.29, 4.30, 4.32, 4.35), although industry perceptions have improved in recent years, probably reflecting high levels of public capital investment (fig. 4.26).
- Competition in Ireland's utility industries (figs. 4.13 & 4.14) remains weak, which may in turn explain the low productivity in some utility sectors (fig. 3.27), as well as high utility costs for business compared with other countries (fig. 3.40).

<sup>4</sup> *Medium Term Review, 2005-2012, ESRI, December 2005*

- Too few start-up companies in Ireland progress to become medium- and large-sized Irish-owned exporters, in part reflecting the limited scale of private and public equity markets (figs. 4.22 & 4.23), as well as management weaknesses in marketing, sales and product development.
- The ratio of computers to students in secondary schools (fig. 4.51) remains low, too few businesses and households are connected to broadband (figs. 4.35 & 4.36) and the number of public services that are available online is limited (fig. 4.37), all of which may partly explain the slow progress of the domestic services economy in using ICT to accelerate productivity growth (fig. 3.27).
- The average performance of Irish 15 year-olds with regard to science and mathematical literacy (fig. 4.50), the low numbers of PhD students in science and other research disciplines (fig. 4.54) and the low rates of life-long learning among the adult population (fig. 4.57) suggest that Ireland remains behind leading countries in preparing its work force for the knowledge economy.
- Business expenditure on research and development (as a proportion of output) (figs. 4.61 & 4.62), the numbers of researchers as a proportion of total employment (fig. 4.66), the low numbers of patent applications (fig. 3.18) and the low levels of research collaboration and knowledge sharing between the business and higher education sectors (figs. 4.56 & 4.65) do not suggest the existence of advanced, knowledge-intensive industrial clusters with deep connections into our higher education and research system. Of total business spending on R&D in Ireland in 2003, almost three-quarters were conducted by foreign-owned companies, indicating a weak performance by Irish-owned industry (fig. 4.63).
- Finally, and of most immediate concern, the cost environment for most Irish exporters continues to deteriorate. Between 2000 and 2006, Ireland experienced a significant loss of international price competitiveness, reflecting a combination of higher price inflation in Ireland and an appreciation of the euro against the currencies of many of our trading partners. Ireland has become both an expensive country and one where prices continue to rise faster than in most comparator countries (3.29). A range of non-pay business costs are relatively high, particularly for office and industrial accommodation (fig. 3.39), electricity (fig. 3.40), waste (fig. 3.42) and professional services (fig. 3.43).
- Pay costs have also been rising faster than in other EU-15 countries (fig. 3.32). The impact of rising pay costs on business competitiveness has been offset by rising productivity in some capital-intensive sectors, mainly those dominated by MNCs (fig. 3.38). While these sectors account for the bulk of manufacturing output, they represent a much smaller share of employment. More employment intensive manufacturing (e.g. transport equipment, leather, and textiles), construction and services sectors have generally faced a significant rise in unit labour costs – pay costs adjusted by improvements in productivity – between 2000 and 2005 (fig. 3.38). If productivity continues to grow slowly (1.4 per cent for 2004/2005), it will not be possible to sustain the level of wage increases experienced in recent years, without a further loss of cost competitiveness.

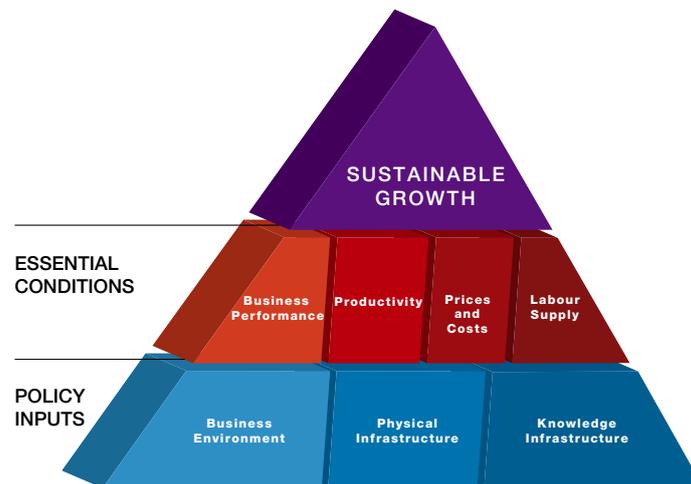
To conclude, this year's benchmarking exercise suggests that while Irish economic performance remains strong, the contribution to growth from the exporting sectors of the economy has been lessened by international competition, as well as an increase in economy-wide pay and non-pay costs, probably associated with a debt-financed boom in residential construction and related services sectors.

### *Strengthening our export competitiveness will be challenging*

The momentum from domestic consumption and construction may ease off in the coming years, and maintaining strong economic growth will require a greater export contribution. Improving export competitiveness will not, however, be easy. While our competitive tax system, good regulatory structures and access to skilled employees (foreign and native) will remain vital (particularly for export-oriented foreign investors), these advantages will need to be reinforced by other, less replicable, location-specific advantages of benefit to knowledge-intensive, innovation-driven, dynamic exporters, both foreign and home-grown. The policy directions needed to underpin this shift in our growth pattern will be discussed in detail in the Competitiveness Challenge Report 2006, due to be published in November.

## 1.3 Reading this Report

This report benchmarks Ireland's performance against other countries across a range of competitiveness factors, using 135 indicators, organised around the competitiveness framework below.<sup>5</sup>



**Sustainable growth** is the ultimate measure of success of competitiveness. The **essential conditions** supporting competitiveness are represented in the middle layer of the pyramid. The key **policy input** areas are shown at the bottom layer.

The NCC believes that international benchmarking is a useful exercise that stimulates debate on Ireland's progress across a range of competitiveness indicators, and on the challenges that the economy faces in sustaining this success into the future. Despite their usefulness, it is important to draw attention to some limitations of competitiveness benchmarking. Firstly, aside from the challenges of securing timely and internationally comparable data for those dimensions of competitiveness which are quantifiable (e.g. output growth, taxation rates, etc.), there is the added challenge that certain competitiveness issues can be difficult to quantify (e.g. the quality of education and national levels of creativity and innovation).<sup>6</sup> Secondly, given the different historical contexts and economic, political and

<sup>5</sup> Ireland's performance is generally charted alongside 16 other countries, in order to reflect Ireland's current trading partners and competitors for investment flows. These include six eurozone countries, six other European countries, including two new EU member states and one non-EU European country, and four non-European countries chosen for either their global importance (USA and Japan) or for their similarity to Ireland in terms of stage or pace of economic development (New Zealand and Korea). Data is provided for additional Asian economies where possible.

<sup>6</sup> The Council does not collect primary data (except in the prices and costs section), but presents and interprets data collected by other agencies. A description of the organisations that collect this data is included in an appendix.

social goals of various countries, and their differing physical geographies and resource endowments, it is not realistic or even desirable for any country to seek to outperform other countries on all measures. Finally, it is important to note that trade and investment between countries is not a zero-sum game; economic advances by other countries can, in aggregate terms, lead to improvements in living standards for the Irish population.

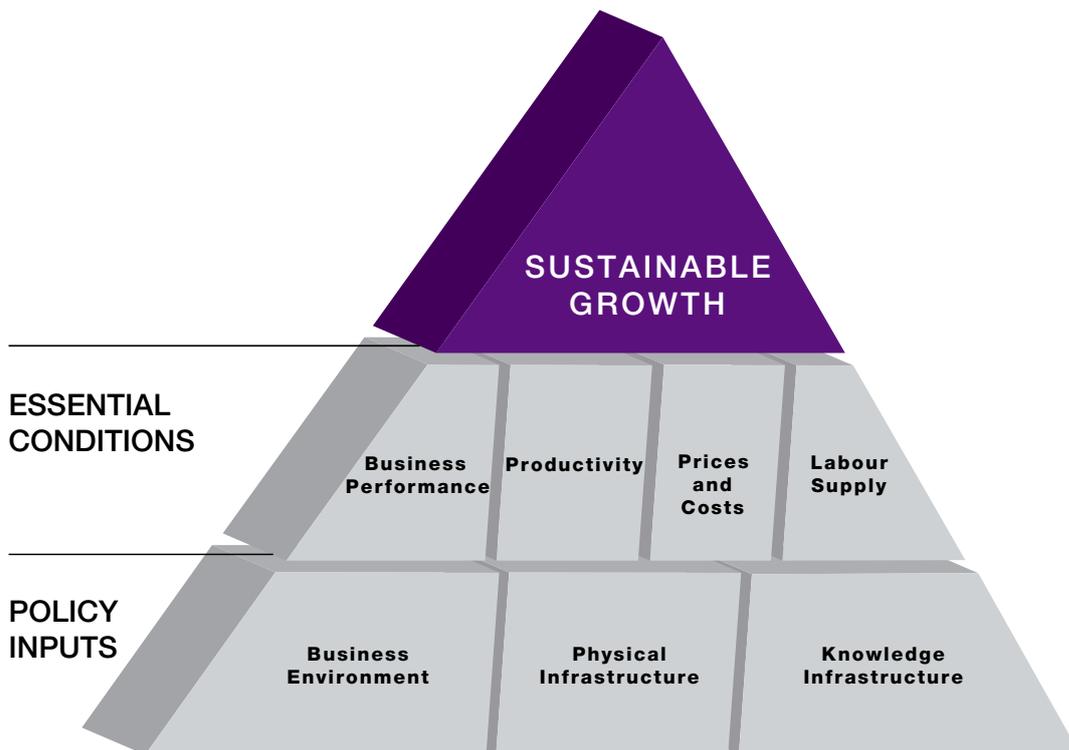
We have endeavoured to ensure that all charts are self-explanatory. However the following points may be of value when interpreting the charts:

- The order of the charts follows the NCC's Competitiveness Pyramid.
- The best performing country is located at the left of the chart (e.g. in vertical bar charts) or at the top of the chart (in horizontal charts). In a limited number of charts, it is not possible to designate a best performer.
- In charts that assess output/income or other factors relative to these, Irish figures are provided in GDP and GNP terms. GDP (national output) is significantly greater than GNP (national income) due to the repatriation of profits and royalty payments by multinational firms based here. Other countries are assessed in GDP terms.
- The text at the right of the chart explains the charts further or provides additional information.
- Ranking are provided where appropriate.
  - In interpreting the ranking for each indicator, a low ranking implies a healthy competitiveness position, while a high ranking implies an uncompetitive position. In a limited number of charts, it is not possible to designate a best performer.
  - The OECD is the preferred comparator group. However, in some cases, rankings are provided relative to the group of countries shown or to the EU, depending on data availability.
  - Changes in rankings generally refer to the change in Ireland's position since 2000. Exceptions to this base year, due to data availability, are highlighted in footnotes. (↑) refers to an improvement in Ireland's competitive position (e.g. ↑4 means an improvement of four places in Ireland's OECD ranking), (--) to no change, and (↓) to a worsening in Ireland's ranking.
- OECD rankings and averages are based on a maximum of 28 countries, as Turkey and Mexico are not included in the analysis. These 28 countries are as follows: Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Hungary, Iceland, Ireland, Italy, Japan, Korea, Luxembourg, Netherlands, New Zealand, Norway, Poland, Portugal, Slovak Republic, Spain, Sweden, Switzerland, UK and the US. Where the sample is less than 28 countries due to data availability, the countries omitted are detailed in the endnotes.
- Using a traffic light system, the heading of the charts are coloured green, orange and red, in order to provide a high level indication of Ireland's performance. Green indicates a strong or improving performance, orange signals an average performance or some cause for concern while red means that Ireland has performed poorly on the indicator.



# 2 Sustainable Growth

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## 2. Sustainable Growth

Competitiveness is not an end in itself, but is a means of achieving sustainable improvements in living standards and quality of life. This section benchmarks Ireland's performance regarding this desired outcome, under three headings: income, quality of life and environmental sustainability.

### 2.1 Income

High and rising material living standards are a key measure of the success of national competitiveness. The indicators in this section cover the level, growth and distribution of Ireland's national income.

Ireland has made significant progress in recent years. Irish output per capita (GDP) is now among the highest in the OECD while income per capita (GNP), a better measure of living standards, is close to the OECD average.<sup>7</sup> In 2005, GNP per capita and GDP per capita grew at similar rates. Both growth rates remain above the OECD average.

Evidence of the strong role of the domestic economy is clear in Figure 2.05, which highlights that the contribution of Ireland's exporting sectors to economic growth, while significant, is faltering. More positively, Ireland's growth has been a combination of strong employment and productivity growth. Finally, while income inequality in Ireland has fallen in recent years, regional disparities have increased marginally.

### 2.2 Quality of Life

A key objective of competitiveness is to ensure an acceptable quality of life, which is broader than material living standards. To measure quality of life, the United Nation's human development index is used, along with life expectancy and the percentage of the population with high life-satisfaction scores.

Ireland continues to perform very well in the human development index and has moved up to eighth position in the OECD – an improvement of 10 places since 2000. Life expectancy for both men and women in Ireland has reached the OECD average. Finally, Irish people state that they are very satisfied with their quality of life to a greater extent than people in many other countries.

### 2.3 Environmental Sustainability

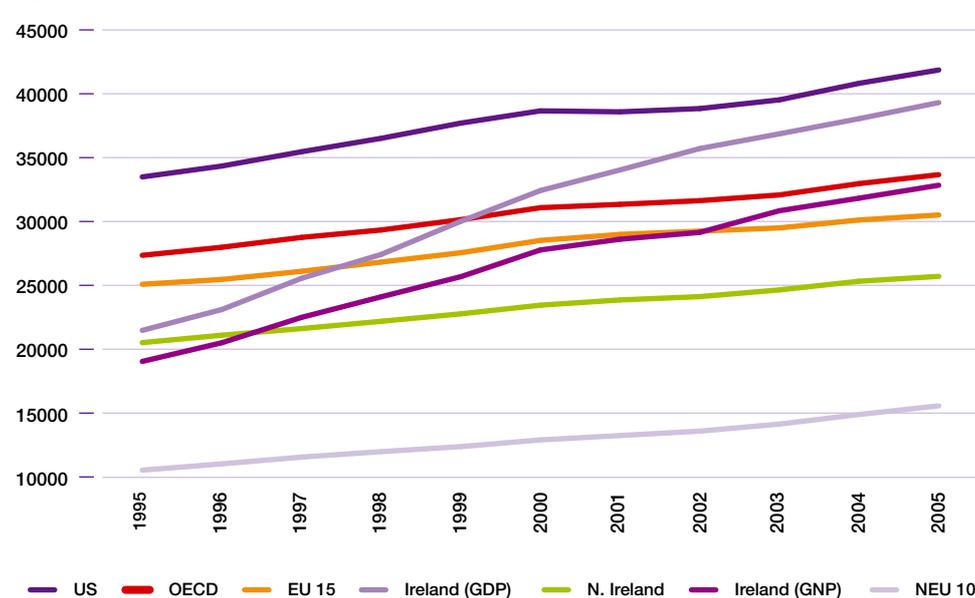
The essence of environmental sustainability is a stable relationship between human activities and the natural world, one that does not diminish the prospects for future generations to enjoy a quality of life at least as good as our own. This section examines Ireland's energy infrastructure and emissions as well as government and private sector attitudes to the environment and sustainable development.

The section highlights Ireland's mixed performance. Ireland consumes the same energy on a per capita basis as the EU 15 average. However, Ireland's share of energy coming from renewable sources is one-third that of the EU 15 average, reflecting our high dependence on fossil fuels. Ireland ranks poorly in per capita carbon dioxide emissions and our rank is weakening further. Finally, the data suggest that Irish companies do not prioritise sustainable development as much as those in other countries do.

<sup>7</sup> GDP (national output) is significantly greater than GNP (national income) due to the repatriation of profits and royalty payments by multinational firms based here. Generally, the GNP figure is the more appropriate metric for Ireland, though both sets of figures are reported in the indicators presented.

## 2.1 National Income

Figure 2.01 Levels of GDP per Capita, Ireland and Selected Economies, 1995-2005 (US\$ PPP)



Ireland's rapid economic growth since 1995 has lifted GDP per capita (output) to among the highest in the world. GNP per capita (income) measured lower, at \$33,000, although it was still in line with the OECD average.

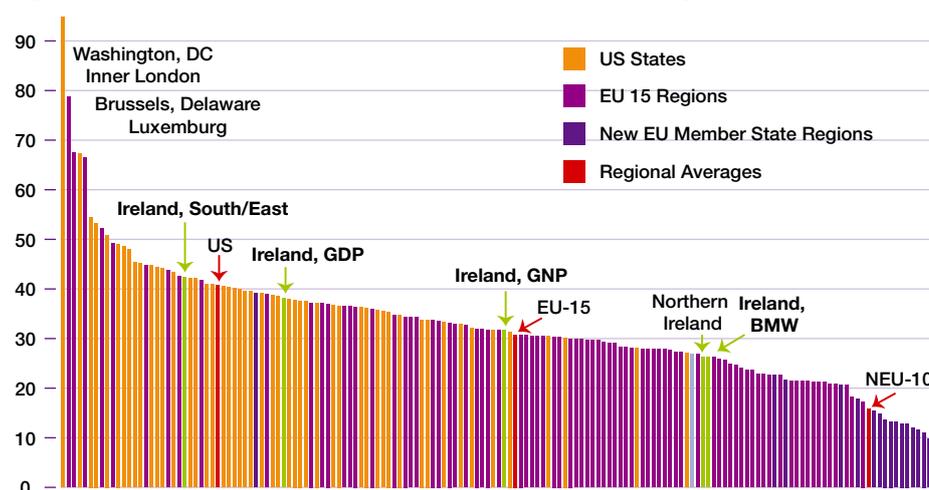
**OECD Ranking:**

GDP: 4(↑1)

GNP: 11(↑10)

Source: Forfás Calculations; Groningen Growth & Development Centre, Total Economy Database, March 2006; OECD, Annual National Accounts Database; United Kingdom, Office for National Statistics, 2006 [online]

Figure 2.02 Levels of GDP per Capita, US States and EU Regions, 2003/04 (US\$ 000s)



Ireland ranks among the wealthiest regions within the EU, although if a US state, it would still rank relatively poorly (GDP 28th, GNP 47th). GNP figures put Ireland closer to the EU 15 average and would place Ireland as the sixth poorest US state. There is a noticeable difference between the South/East and the Border/Midlands/West region based on regional GDP.

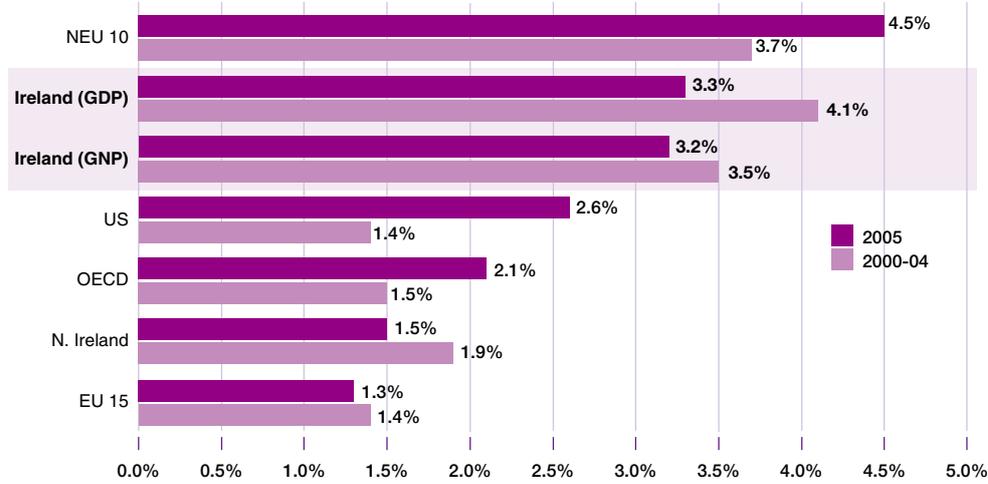
Source: Forfás Calculations; Groningen Growth & Development Centre, Total Economy Database, March 2006; Eurostat, General and Regional Indicators, 2006 [online]; United States, Bureau of Economic Analysis, 2006 [online]

**EU 25 Regions Ranking:**

Ireland S.E: 9

Ireland BMW: 63

**Figure 2.03 Growth Rates (%) in GDP per Capita, 2005 Compared to 2000-04 Average<sup>1</sup>**



In 2005, the growth rates of GNP and GDP per capita were similar. In both cases, it is slower than the 2000-2004 average. Growth in both periods, though, has exceeded growth in the US, the OECD, Northern Ireland, and the EU 15. The ten new EU member states (NEU 10) have achieved high growth rates, and growth accelerated in 2005.

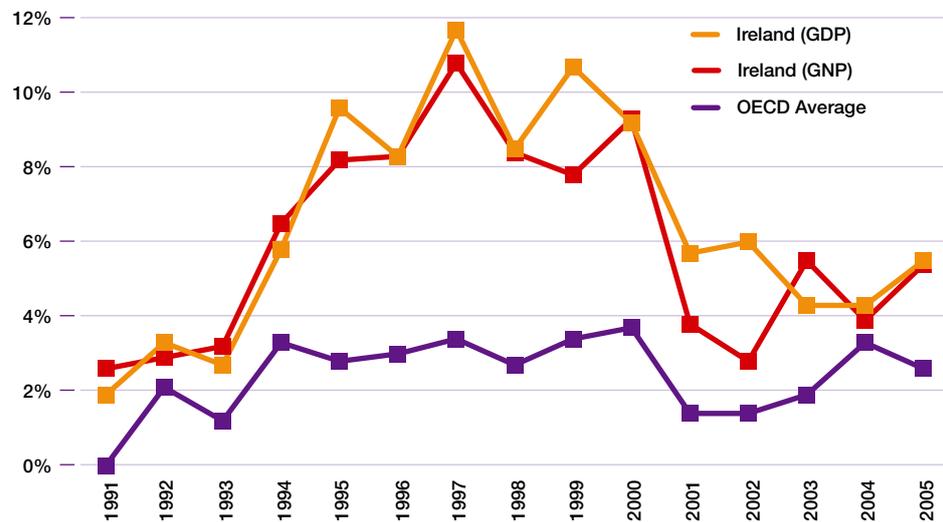
Source: Forfás Calculations; Groningen Growth & Development Centre, Total Economy Database, March 2006; OECD, Annual National Accounts Database; United Kingdom, Office for National Statistics, 2006 [online]

**OECD Ranking:**

GDP: 7(↓3)

GNP: 6 (↓1)

**Figure 2.04 Growth in GDP & GNP in Ireland, Compared to OECD Average, 1990-2005**



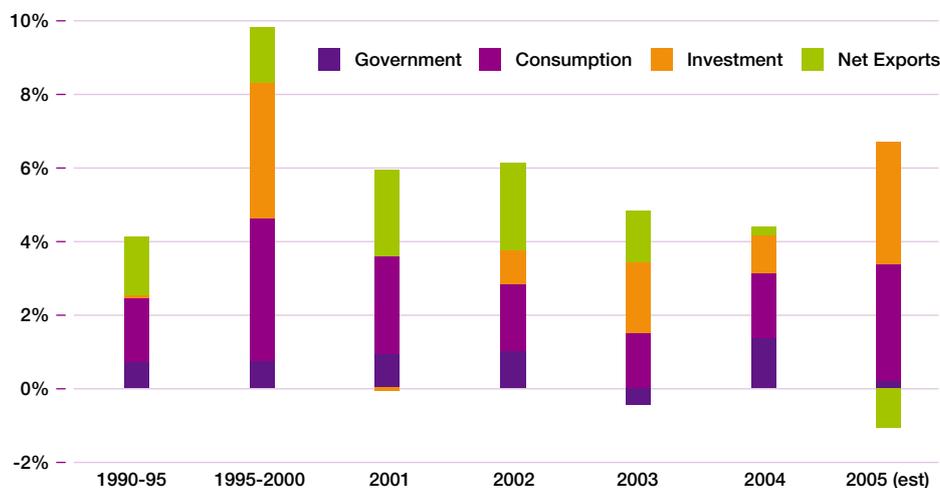
This chart traces the pace of growth in the Irish economy during the period 1990-2005. It shows the huge economic growth in Ireland, particularly between 1995 and 2000. OECD growth has been between 2% and 4% on average. While economic growth in Ireland has slowed recently, it is still well above OECD averages, and is estimated to have been twice the OECD rate in 2005.

Source: Forfás Calculations; Groningen Growth & Development Centre, Total Economy Database, March 2006; Central Statistics Office, Annual National Accounts, 2006 [online]

**Ranking:**

N/A

Figure 2.05 Contribution of Net Exports to Irish Economic Growth, 1990-2005



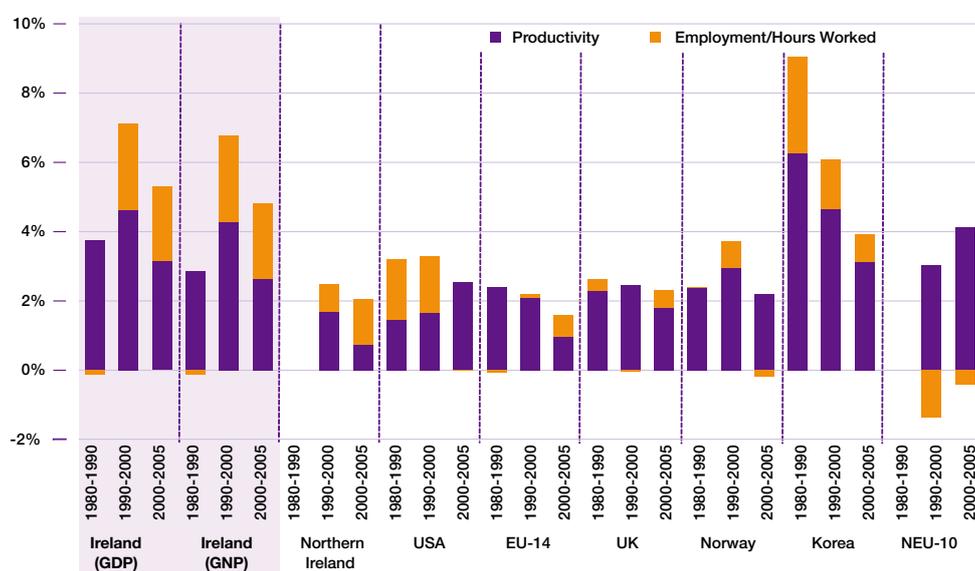
Source: Forfás Calculations, Central Statistics Office, Annual National Accounts, 2006 [online]

This chart breaks down the drivers of Irish economic growth between net exports (exports less imports) and domestic demand (private consumption, government spending and investment). In 2005, the figures suggest that growth was driven entirely by domestic demand, with net exports acting as a drag on economic expansion. This contrasts with Ireland's earlier period of export-driven growth.

Ranking:

N/A

Figure 2.06 Contribution of Productivity to Economic Growth, Selected Economies, 1990-2005



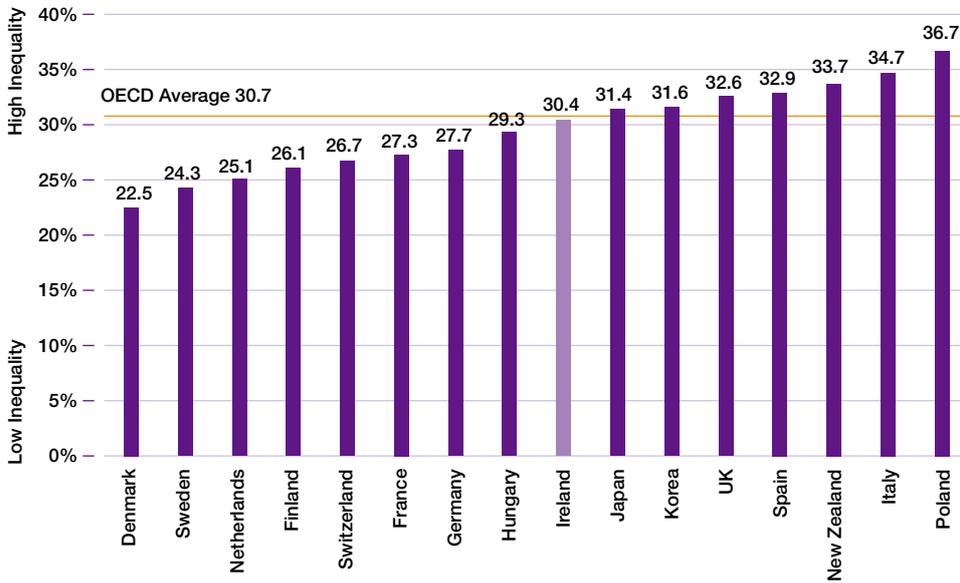
Economic growth can be broken down between labour utilisation (employment and hours worked) and labour productivity. Whereas other OECD countries' economic growth between 1990 and 2005 was driven by increases in productivity (GDP per hour worked) more so than in employment, Ireland's growth has come from gains through both.

Ranking:

N/A

Source: Forfás Calculations; Groningen Growth & Development Centre, Total Economy Database, March 2006; Eurostat, General and Regional Indicators, 2006 [online]; United Kingdom, Office for National Statistics, 2006 [online]; Northern Ireland Department of Enterprise, Trade & Investment, Northern Ireland Labour Force Survey: Historical Supplement Spring 1984 – Spring 2005, August 2005

**Figure 2.07 Levels of Income Inequality (Gini Coefficient), 2000<sup>2</sup>**

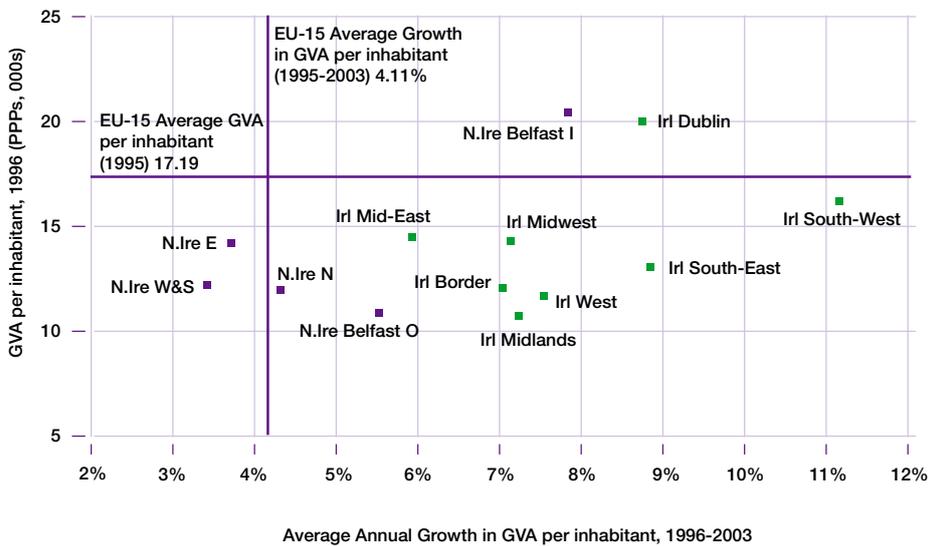


Gini coefficients measure the distribution of income across households. The most recent OECD data show Ireland lying just below the OECD average in terms of inequality. Data on the ratio of the wealthiest 10% to the poorest 10% indicate that Ireland ranks 17th out of 26 OECD countries, but again slightly better than the overall OECD average.

**OECD Ranking:**  
14(↑2)

Source: Forfás Calculations; OECD, Selection of figures from OECD Questionnaire on Income Distribution and Poverty, February 2006; UN Human Development Report, September, 2000-2005

**Figure 2.08 Regional Convergence, Ireland & Northern Ireland, (Growth versus Wealth), 1995-2003**



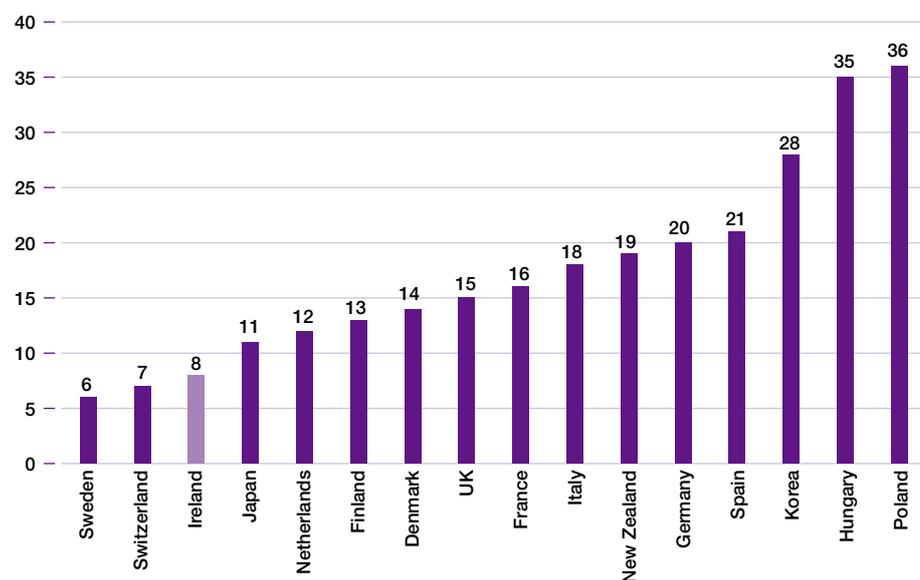
Convergence between regions would be represented in this diagram by a downward sloping trend from left to right for either the Republic of Ireland (green), or Northern Ireland (blue). While there is some suggestion of convergence in Northern Ireland (if Belfast is excluded), the measure points to increasing regional disparity in the Republic, with the wealthiest areas also those growing fastest over the last decade.

**Ranking:**  
N/A

Source: Forfás Calculations; Eurostat, General and Regional Indicators, 2006 [online], UN Human Development Report, September, 2000-2005

## 2.2 Quality of Life

Figure 2.09 Ranking in the United Nation's Human Development Index, 2005<sup>3</sup>

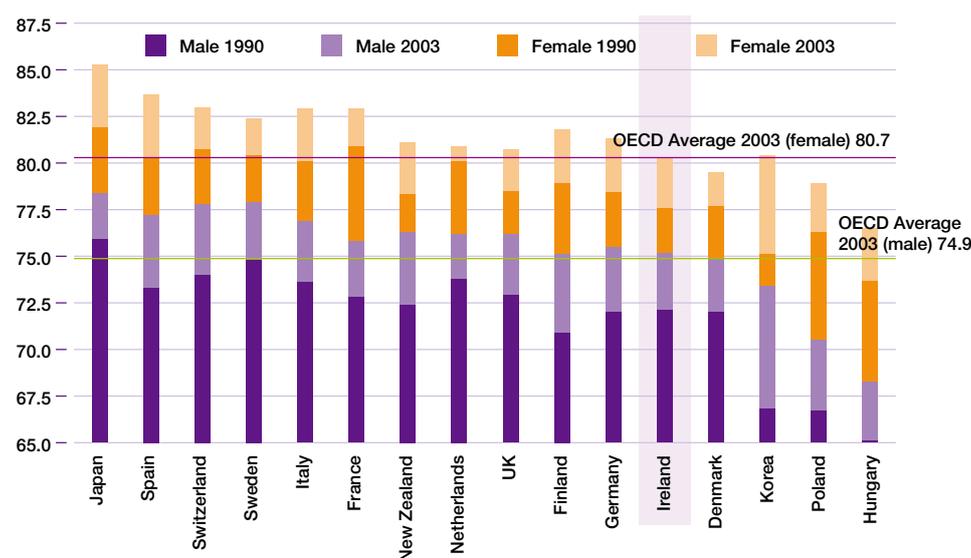


The Human Development Index combines measures of life expectancy, school enrolment, literacy and income. While all of the countries included in this chart fare well in relation to the global average, Ireland ranks particularly highly (8th overall and 3rd among the countries selected).

OECD Ranking:  
8 (↑10)

Source: Forfás Calculations; UN Human Development Report, September, 2000-2005

Figure 2.10 Life Expectancy in Years, by Gender (2003 compared with 1990)

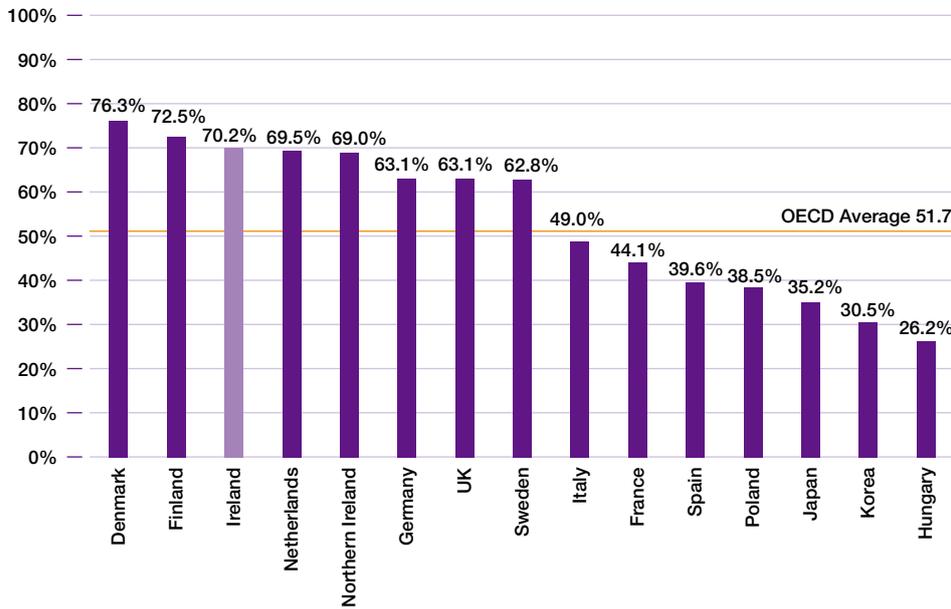


Life expectancy is an important indicator of well-being. Life expectancy in Ireland was above 75 years for males and above 80 years for females in 2003, an increase of about two and a half years for both genders, compared to 1990. This is in line with the OECD average for men and women.

OECD Ranking:  
Males: 17 (↑5)  
Females: 22 (↑2)

Source: Forfás Calculations; OECD Factbook, 2006

**Figure 2.11 Percentage of Population with High Life-Satisfaction Scores, 2000<sup>4</sup>**



Source: Forfás Calculations; World Values Survey, 1989-2004

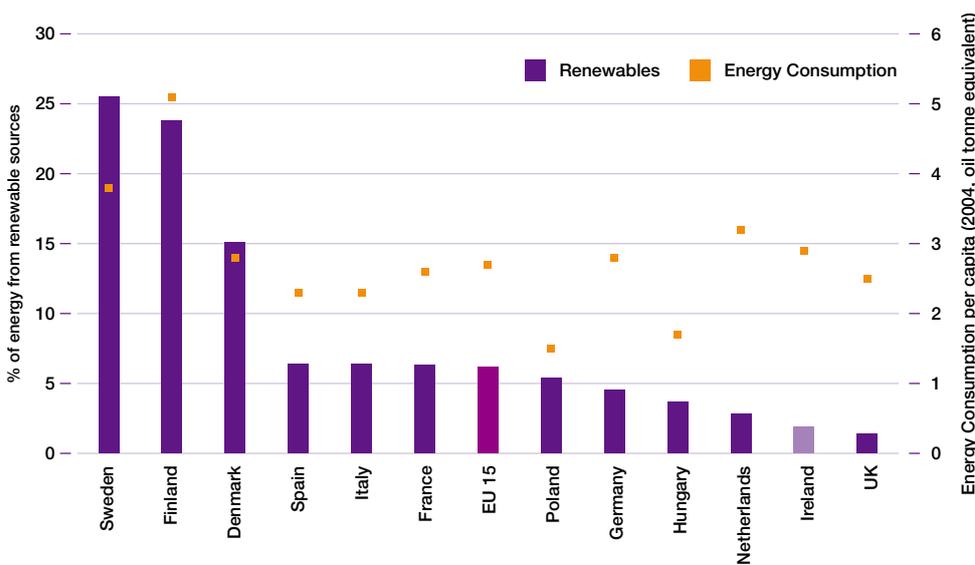


The World Values Survey is an internationally comparable collection of surveys about quality of life. One of its life perception questions asks respondents to score out of 10 their overall life satisfaction. The percentage of respondents scoring 8 or more is charted here. Ireland and Northern Ireland score very highly by this measure. Ireland's score has increased by 4% since the 1990 survey.

OECD Ranking:  
4 (↑2)

### 2.3 Environmental Sustainability

**Figure 2.12 Proportion of Energy from Renewable Sources & per Capita Energy Consumption, 2004**



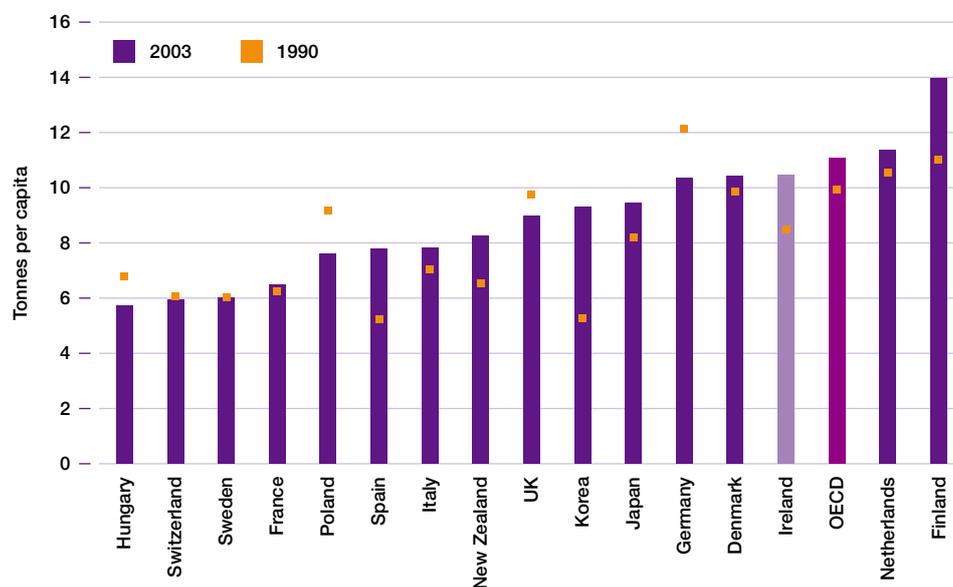
Ireland consumes slightly more energy on a per capita basis than the EU 15 average (right axis). Ireland's share of energy coming from renewable sources was one-third that of the EU 15 average, reflecting our high dependence on fossil fuels for our energy needs.

EU 15 Ranking:  
13 (↓1)  
(ranked by renewables)

Source: Forfás Calculations; OECD Factbook, 2006



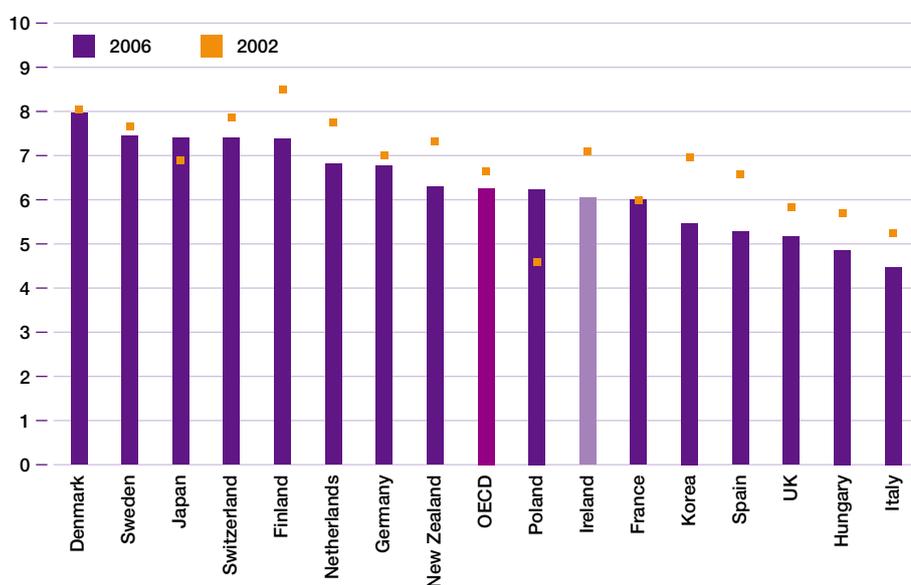
Figure 2.13 Emissions of Carbon Dioxide (per capita), 1990 and 2003



Emissions of carbon dioxide (CO<sub>2</sub>) are widely believed to have contributed to the warming of the planet over the last 150 years. Of the 16 countries studied, Ireland was among the largest CO<sub>2</sub> polluters on a per capita basis in 2003. Furthermore, this marks a worsening of our position since 1990.

OECD Ranking:  
21 (↑)

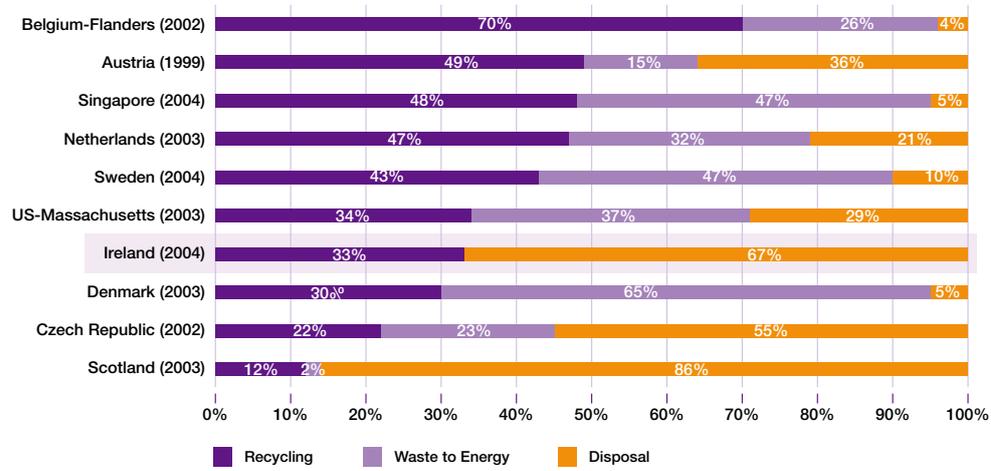
Source: Forfás Calculations; OECD Factbook, 2006

Figure 2.14 Prioritisation of Sustainable Development by Companies, 2006 (Scale 0-10)<sup>5</sup>

The World Competitiveness Yearbook asks business executives to score the priority companies in that country give to sustainable development. Ireland's rating has slipped since 2002. Overall, Ireland performs below the group average on this measure, indicating that sustainable development is perceived as being less important to the private sector in Ireland than elsewhere.

OECD Ranking:  
17 (↓5)

Source: Forfás Calculations; IMD World Competitiveness Yearbook, 2006 [online]

**Figure 2.15 Municipal Waste Treatment Performance, Various Years**

Source: Forfás, *Waste Management Benchmarking Study - A Baseline Assessment, June 2006*

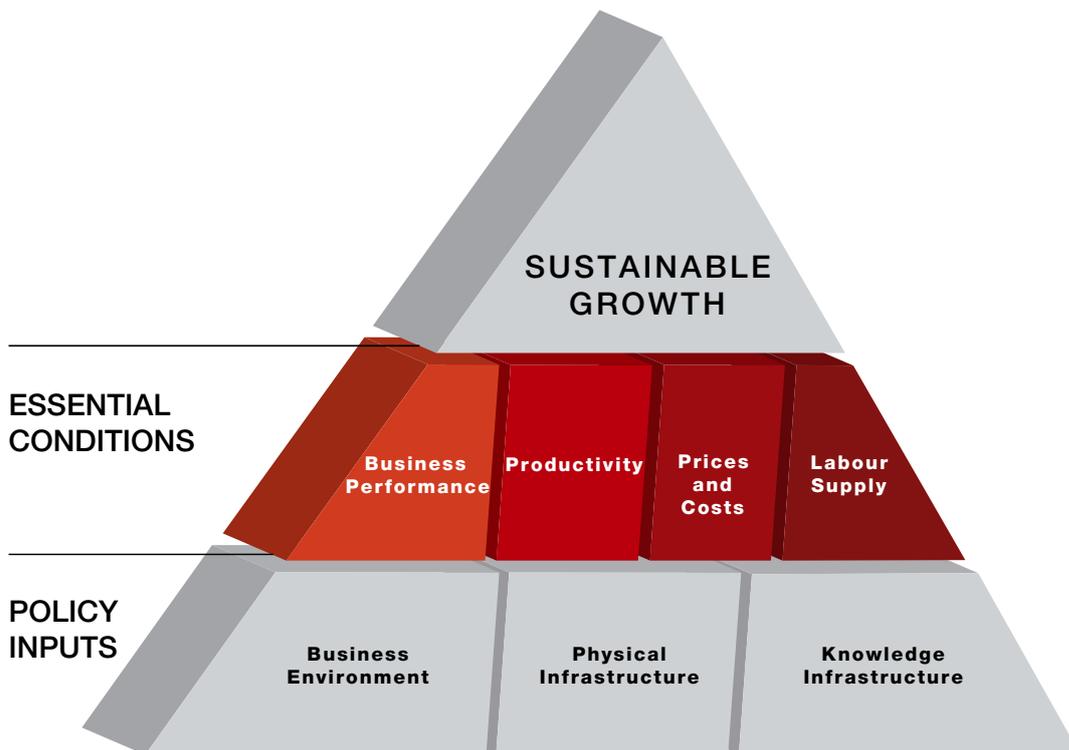
Although the rate of municipal waste recycling in Ireland has improved in recent years, Ireland still ranks 7th of 10 locations benchmarked in this chart with regard to the proportion of municipal waste recycled. Also, none of Ireland's municipal waste is converted into energy, which contrasts with almost two-thirds in Denmark.

Group Ranking (of 10):  
7

# 3

## The Essential Conditions For Ireland's Competitiveness

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## 3. Essential Conditions

Ireland's national competitiveness relies on certain key conditions to support the economic environment. These are intermediate indicators that connect the government's policy inputs with improvements in the quality of life in Ireland. This section benchmarks Ireland's performance regarding four essential intermediate conditions: the performance of Ireland's businesses in terms of trade, investment, employment, and entrepreneurship and innovation, Ireland's productivity performance, Ireland's prices and costs structure and labour supply.

### 3.1 Business Performance

The strong performance of the business sector is critical to growing incomes and maintaining high employment levels in Ireland. Its health is also essential to sustaining strong government finances and spending on public services. This section assesses business performance in Ireland under the headings of investment, trade, employment, and entrepreneurship and innovation.

Ireland ranks very highly in terms of private sector investment in the economy. While this investment is dominated by construction related activities (75%), investment in machinery and equipment is also growing rapidly. Despite growing levels of international competition, Ireland continues to have one of the highest stocks of inward FDI relative to GDP in the OECD; however our rankings have fallen marginally since 2000. The rate of return on US overseas investments has fallen in many countries over the period 1996 to 2004, but particularly in Sweden, Ireland and the Netherlands. Finally, Irish companies are increasingly investing overseas. While the stock of Irish outward direct investment as a share of GDP remains relatively low by international standards, Irish outward FDI stocks have increased from \$28 billion in 2000 to \$96 billion in 2004, demonstrating the growing maturity of Irish firms.

Ireland continues to be one of the most open economies in the OECD in terms of our trade performance. However, the growth rates achieved by Irish exporters have fallen markedly in the last five years. While Ireland's share of world services trade is growing, Ireland's share of world merchandise trade is declining from a peak in 2002. There are clear sectoral differences. In manufacturing, the chemicals and pharmaceuticals sector continues to grow its already strong world market share, while Ireland's market share in office and telecoms equipment has fallen significantly in recent years.<sup>8</sup> In the services sector, finance and information services have experienced significant growth in recent years, but this appears to have slowed in 2004.

Ireland has experienced strong gains in employment in the period 1990-2005, concentrated in certain sectors, particularly construction and domestically traded services, including public services. Between 2000 and 2005, employment in all sectors of manufacturing has been static or falling, with the exception of chemicals, thus reducing overall employment in manufacturing by over 30,000.

In relation to entrepreneurship, the number of those starting or planning new businesses in Ireland increased significantly from 7.7% in 2004 to 9.8% in 2005. Ireland's entrepreneurs are predominantly male. Preliminary Irish community innovation survey data suggests that innovation rates (both product and process innovation) in services sectors are much weaker than innovation levels in industry. Across both services and industry, SMEs perform poorly relative to larger firms. Internationally comparable data will be available in late 2006.

### 3.2 Productivity

In the long run, a country's standard of living depends on its productivity performance. The indicators in this section examine Ireland's overall productivity performance, as well as by broad sector of economic activity.

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<sup>8</sup> In 2003, a VAT fraud concentrated in trade in electrical machinery with the UK was uncovered. Adjusting for this means that the decline in merchandise trade since 2002 may be slightly overstated.

Using GDP as a measure of Irish output, Irish productivity levels are among the highest in the world. GNP statistics, a more realistic measure, suggests a figure that is more in line with the OECD average. Our current productivity levels are the culmination of strong productivity growth throughout the 1980s and 1990s, but productivity growth has slowed between 2000 and 2005. The best sectoral performers in the period 1990-2005, in Ireland as well as in the EU and the USA, have been high technology sectors in manufacturing and services (e.g. ICT production, communications, etc.). A number of large domestically trading sectors in Ireland continue to record relatively low productivity levels and growth rates.

### 3.3 Prices and Costs

While productivity is the key long-run determinant of competitiveness, the cost structure within the economy is a very important short-run factor. This section examines the overall level and inflation in Ireland's prices and business costs, both pay and non-pay.

These indicators highlight that Ireland is one of the most expensive countries in the EU in terms of consumer price levels and also has one of the highest inflation rates. Ireland's trade weighted exchange rate has worsened by 14.8% since 2000, making Irish goods and services relatively more expensive on international markets. The real trade-weighted competitiveness index, and trends in unit labour costs also mirrors this.

Irish labour costs have increased by 29.6% over the period 2000 to 2005, over 6% above the Eurozone average (23.4%). Wage costs of production workers (various skill levels), laboratory technicians, and financial analysts in Ireland remain competitive relative to other high income economies, but are high relative to lower income economies such as India, Hungary and Singapore – countries against which we are increasingly competing with for trade and investment. As labour costs are generally growing faster than productivity, unit labour costs have worsened across a range of sectors, except electronics, which is shedding jobs, and printing/publishing.

A range of non-labour costs for business appear to be relatively high in Ireland. These include the costs of renting an industrial and office area, electricity costs, mobile communications costs, and water and waste costs.

### 3.4 Labour Supply

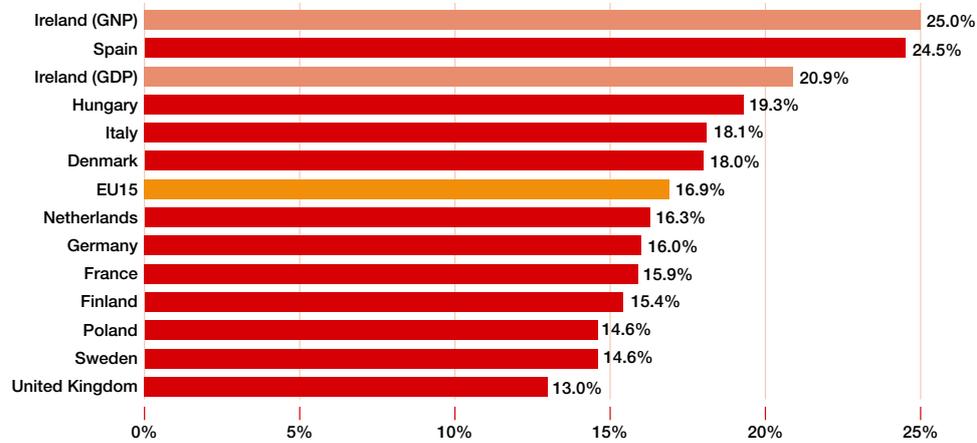
Growth in labour supply has played a key role in Ireland's economic development over the past decade. This section looks at the overall trends in Ireland's labour supply and identifies areas of spare capacity.

The total labour force in Ireland has grown rapidly and now exceeds two million people. Economic growth was facilitated by a significant increase in employment, in turn supported by a growing population of working age, increasing female participation rates and net immigration. Given Ireland's strong performance in terms of lowering unemployment, employment growth is now being supported by natural and migration-induced increases in population. Ireland's population growth is accelerating, as both the natural increase and net migration boost the numbers living here and Ireland's rate of inward migration is more than twice the EU and US averages. Ireland also has the third lowest ratio of workers to dependents in the OECD. In 10 years time, Ireland will still have a young population relative to the OECD average.

Overall participation rates in Ireland climbed from 60% in 1990 to 68.6% in 2004 but remain below the OECD average for both males and females. While participation among women between 25 and 34 is almost 80%, for those over 55, it remains close to 40%. Ireland's national rate of unemployment remains low. However, unemployment rates in the west and in particular the south-east have weakened marginally over the last two years. Average hours worked per person in Ireland have fallen steadily since 1990, reflecting both a reduction in hours and a move away from agriculture.

### 3.1.1 Investment

**Figure 3.01 Gross Fixed Capital Formation by the Private Sector (% GDP), 2004**



Source: Eurostat, Structural Indicators

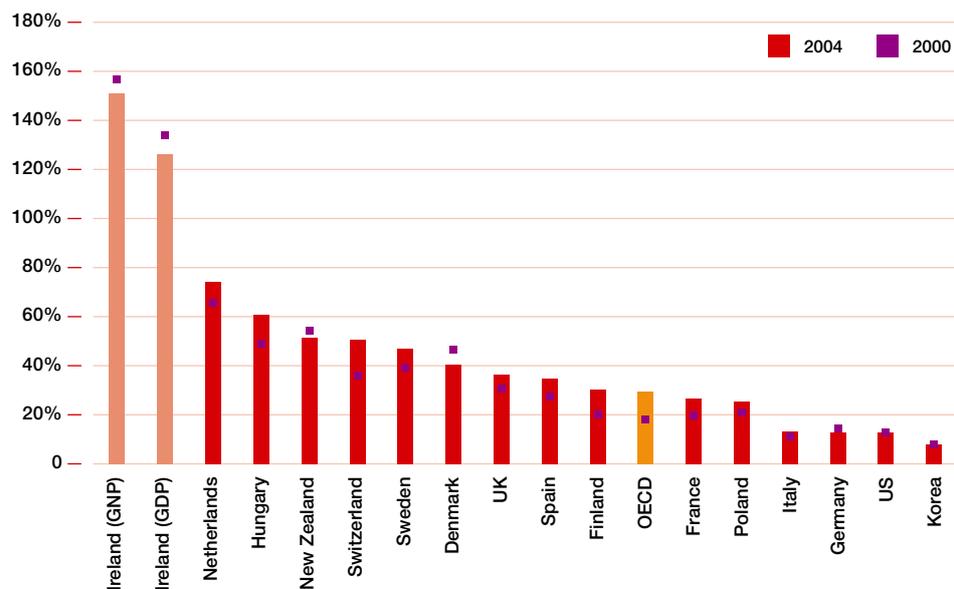
This chart shows the share of GDP that is used by the private sector for investment. Cross-country evidence suggests a strong correlation between investment and strongly growing economies. While investment is dominated by construction related activities (75%), investment in machinery and equipment is also growing rapidly.

**EU 15 Ranking:**

GDP: 4 (↑2)

GNP: 1 (--)

**Figure 3.02 FDI Inward Stock (% of GDP), 2004**



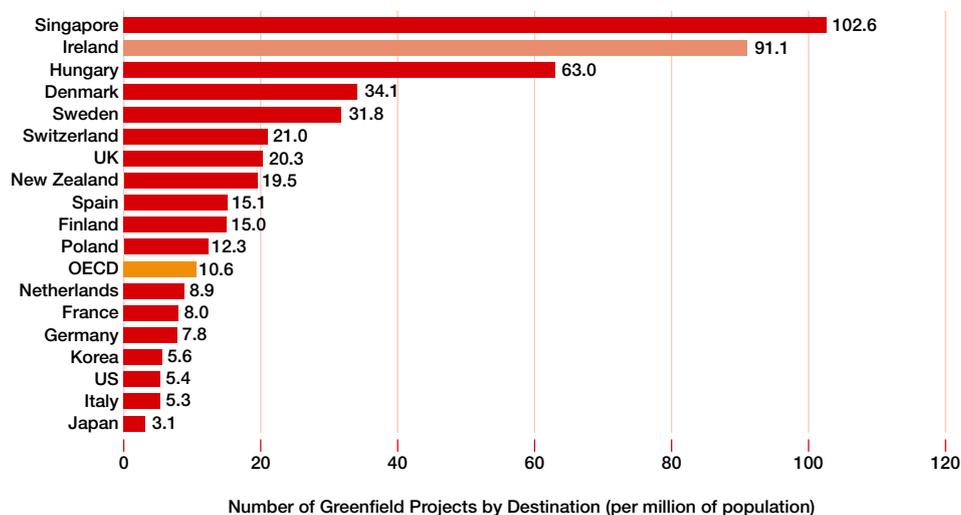
Source: UNCTAD, World Investment Report, 2005

Ireland continues to have a high stock of inward FDI relative to GDP. In 2004, global flows of FDI rebounded slightly after three years of decline. Ireland's experience is somewhat atypical of OECD economies, however, as inflows to developing countries surged by 40% in 2004 compared with a 14% decline in developed countries in the same period.

**OECD Ranking:**

GDP: 3 (↓1)

GNP: 2 (↓1)

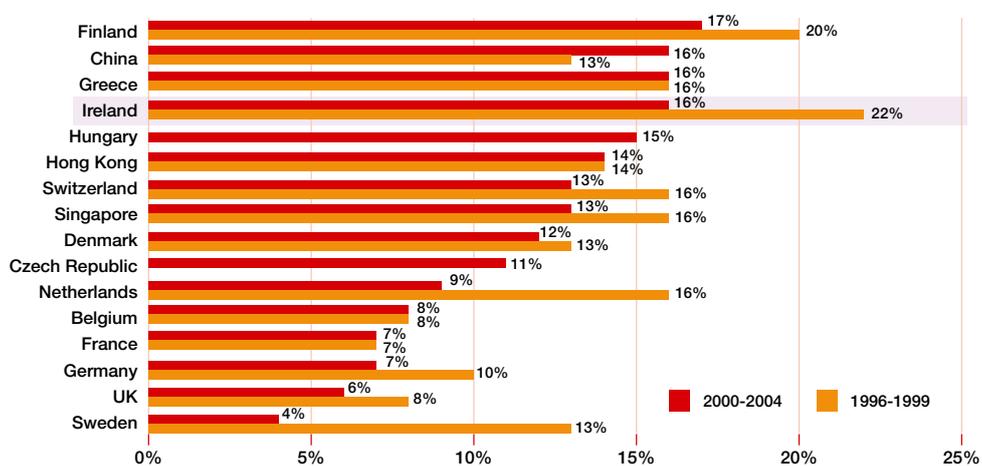
**Figure 3.03 Number of Greenfield Projects by Destination (per million population), 2002-2004<sup>6</sup>**


Global greenfield FDI expanded from an estimated 9,300 projects in 2003 to 9,800 projects in 2004. Ireland continues to attract a large number of greenfield investments from abroad. When adjusted to population, the number of greenfield projects is considerably higher in Ireland than the OECD average and ranks second only to Singapore in the benchmarked countries.

**OECD Ranking:**

1 (↑1)

Source: Forfás Calculations; UNCTAD, World Investment Report, 2005

**Figure 3.04 Rate of Return to US-Owned Companies in Foreign Countries, 1996-2004<sup>7</sup>**


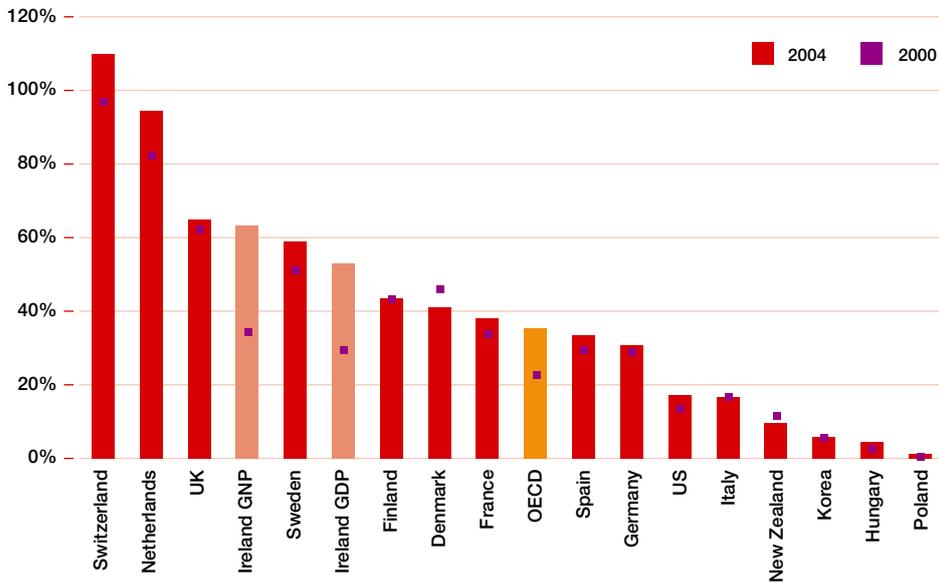
Average rates of return on overseas investments by U.S. companies have fallen in many countries over the period 1996 to 2004, particularly in Sweden, Ireland and the Netherlands. However, Ireland continues to perform well relative to 'old' and 'new' EU member states and the Asian economies benchmarked. In 2003 Ireland accounted for roughly 6% of US FDI going to Europe.

**Group Ranking (of 16):**

4 (↓3)

Source: United States, Bureau of Economic Analysis, 2006 [online]

Figure 3.05 FDI Outward Stock (% of GDP), 2004



Source: UNCTAD, World Investment Report, 2005

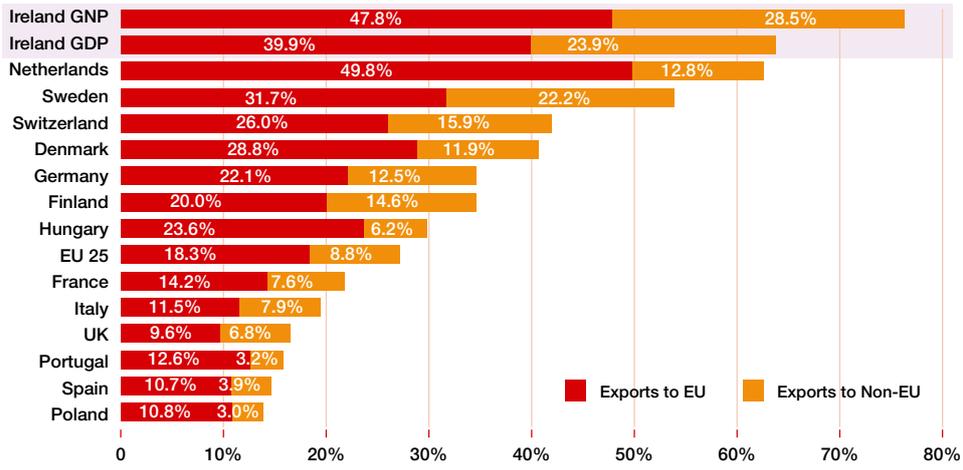


Global FDI outflows increased in 2004 by 18%, to \$730 billion, with firms based in developed countries accounting for the bulk (\$637 billion). Irish outward stocks have increased from \$28 billion in 2000 to \$96 billion in 2004, and as a % of GDP are now higher than those of Finland, Denmark and France.

OECD Ranking:  
GDP: 7 (↑5)  
GNP: 5 (↑3)

3.1.2 Trade

Figure 3.06 Exports of Goods as a Percentage of GDP, 2004



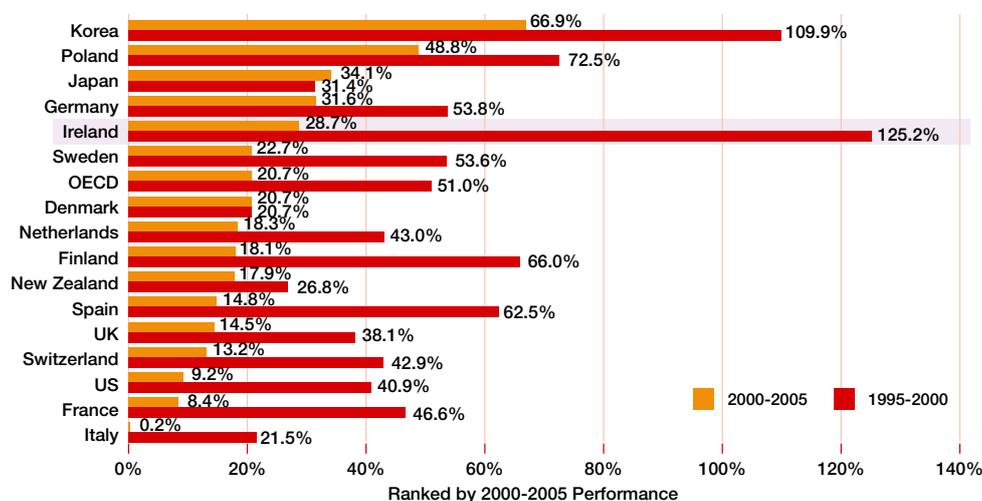
Source: Forfás Calculations; Eurostat, Structural Indicators



Ireland's openness to international trade has been an important factor in driving economic growth. Smaller countries tend to rely more heavily on exports as a source of economic growth. It is also notable that Ireland is more dependent than most other EU countries on trade with non-EU economies.

EU 15 Ranking:  
(ranked by total exports)  
GDP: 3(↓1)  
GNP: 2(↓1)

Figure 3.07 Percentage Growth in Exports of Goods and Services, 1995-2000 & 2000-2005<sup>a</sup>



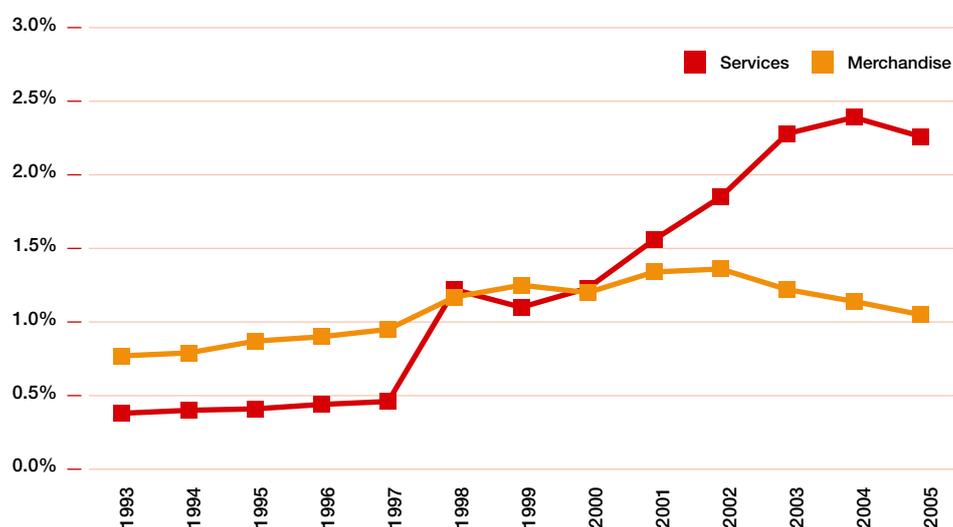
Irish trade growth was particularly high in the period surrounding the Celtic Tiger, but since 2000, growth rates have fallen markedly. However, for most countries growth was lower in the latter period of 2000-2005 due to a slowdown in the global economy. World trade growth has improved in 2003-2005 as the world economy has recovered.

Source: OECD, *Economic Outlook* no. 78, 2005

OECD Ranking:

8 (↓7)

Figure 3.08 Ireland's Share in World Merchandise and Services Trade, 1993-2005



Source: WTO, *Time Series Profiles*

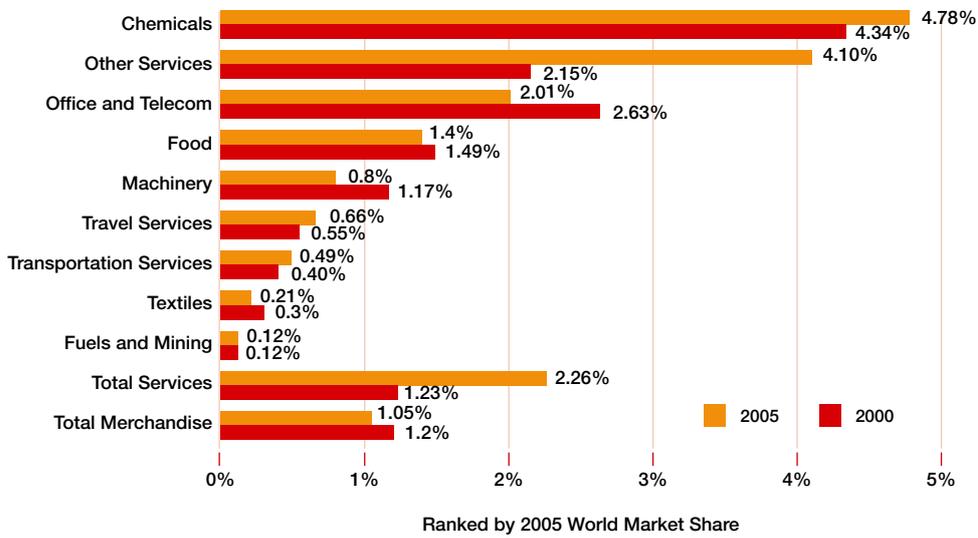
Irish share in world merchandise trade has declined gradually from a peak in 2002 mainly due to declines in export shares for telecom, machinery, etc. which offset strong growth for the pharmaceutical sector. Irish world services trade share has increased sharply, although there was a slight dip in 2005.

World rankings of leading exporters:

Merchandise: 23 (↑1)

Services: 13 (↑10)

**Figure 3.09 Ireland's World Market Share in Merchandise and Services Trade by Sector<sup>9</sup>**



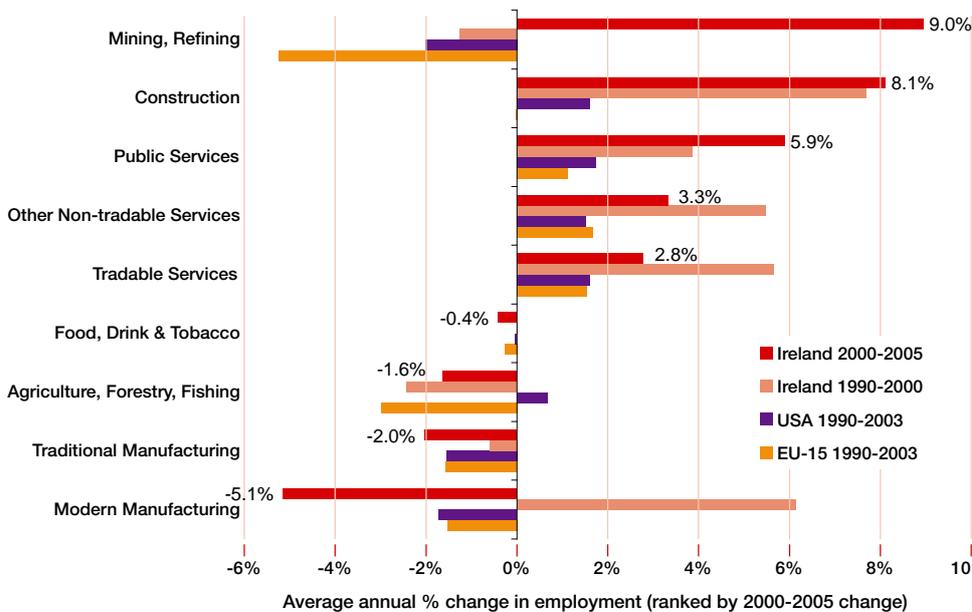
Ireland's share of world merchandise trade has been driven by the chemicals and pharmaceuticals sector. Between 2000 and 2005, Irish services exports have increased in market share substantially. A breakdown of these figures reveals that computer services formed the largest component of services (35%) in 2005, while business services had the highest growth rate since 2000.

**Ranking:**  
N/A

Source: WTO, Time Series Profiles

### 3.1.3 Employment

**Figure 3.10 Change in Employment, 1990-2005, by Broad Sector, Ireland, EU 15 and US**

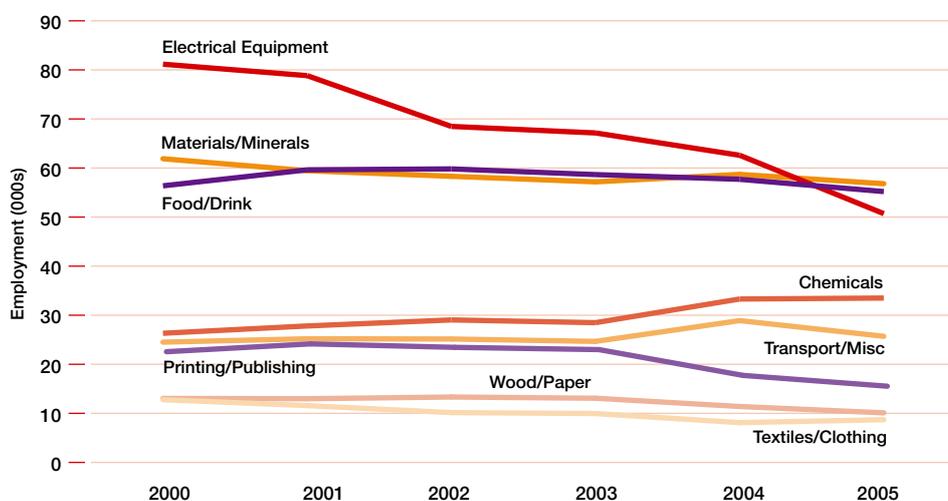


Ireland's employment growth between 1990 and 2000 was mainly due to increases in the construction, modern manufacturing and market services (tradable and non-tradable) sectors. Since 2000, however, modern manufacturing has contracted faster than any other sector. Employment growth has also slowed in market services but has remained strong in construction and accelerated in public services.

**Ranking:**  
N/A

Source: Forfás Calculations; Groningen Growth & Development Centre, 60-Industry Database, October 2005; Central Statistics Office, Quarterly National Household Survey Data, 1990-2005

**Figure 3.11 Employment in Manufacturing, by Sector, 2000-2005**



Source: Forfás Calculations; Groningen Growth & Development Centre, 60-Industry Database, October 2005; Central Statistics Office, Quarterly National Household Survey Data, 1990-2005

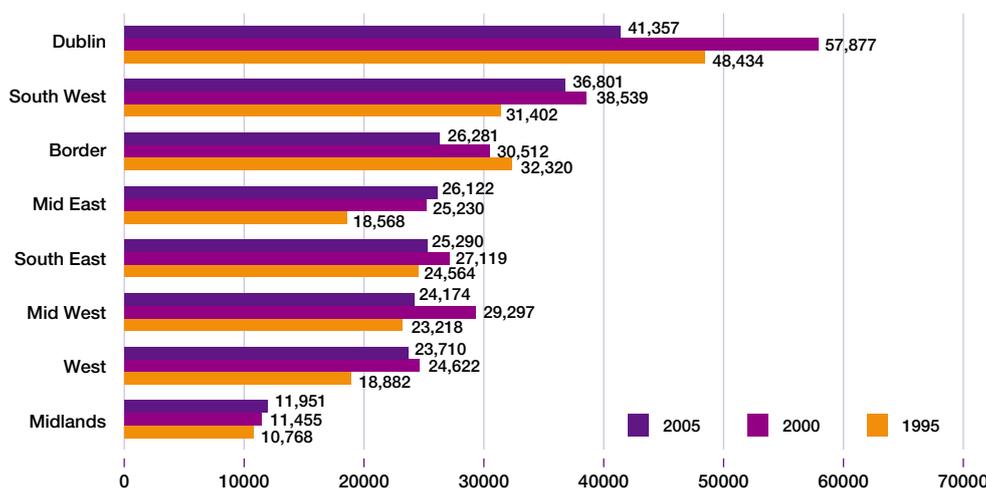


In overall terms, manufacturing employment has fallen by over 31,000 since 2000. This has been driven primarily by job losses in the electrical and optical equipment sector, but also by steady losses in other sectors. Only in chemicals did employment increase during the period 2000-2005.

Ranking:

N/A

**Figure 3.12 Employment Trends in Manufacturing by Region 1995-2005**



Source: Forfás, Agency Employment Data



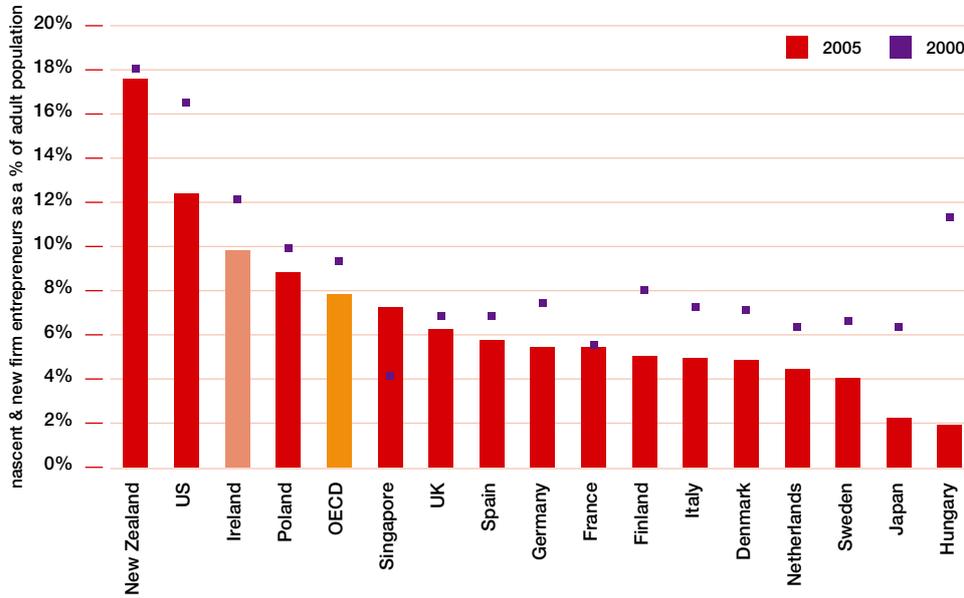
Not all regions have experienced similar declines in manufacturing employment. Most of the recent employment decline in manufacturing has been concentrated in the Dublin, Mid West and Border Regions. By contrast, employment in manufacturing increased in Midlands and Mid East Regions over this period.

Ranking:

N/A

### 3.1.4 Entrepreneurship and Innovation

Figure 3.13 Total Entrepreneurial Activity Rate, 2005<sup>10</sup>



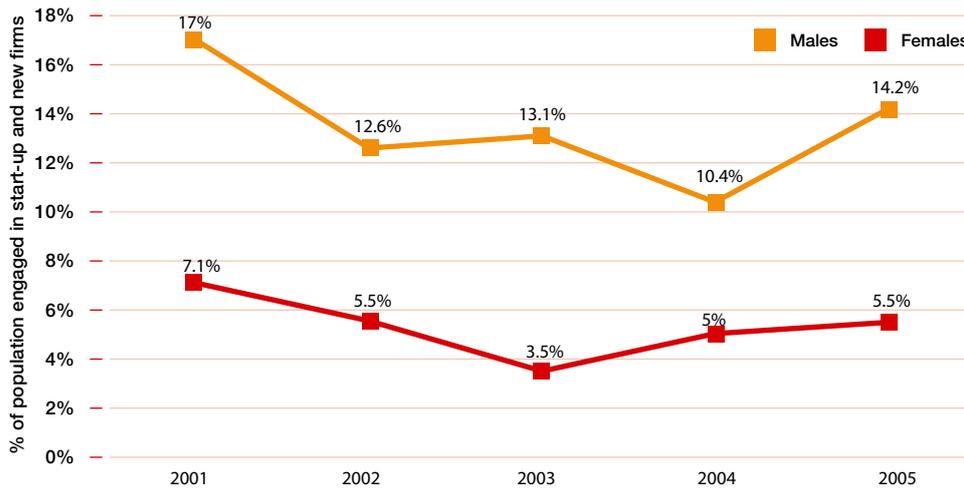
This chart measures the percentage of the adult population engaged in start-ups and new firms. The number of those starting and planning a new business in Ireland increased significantly from 7.7% in 2004 to 9.8% in 2005, but remains below the 2001 level and the level prevalent in the USA.

OECD Ranking:

4 (--)

Source: Global Entrepreneurship Monitor (GEM), GEM Report, 2005

Figure 3.14 Irish Total Entrepreneurial Activity Rates by Gender, 2001-2005

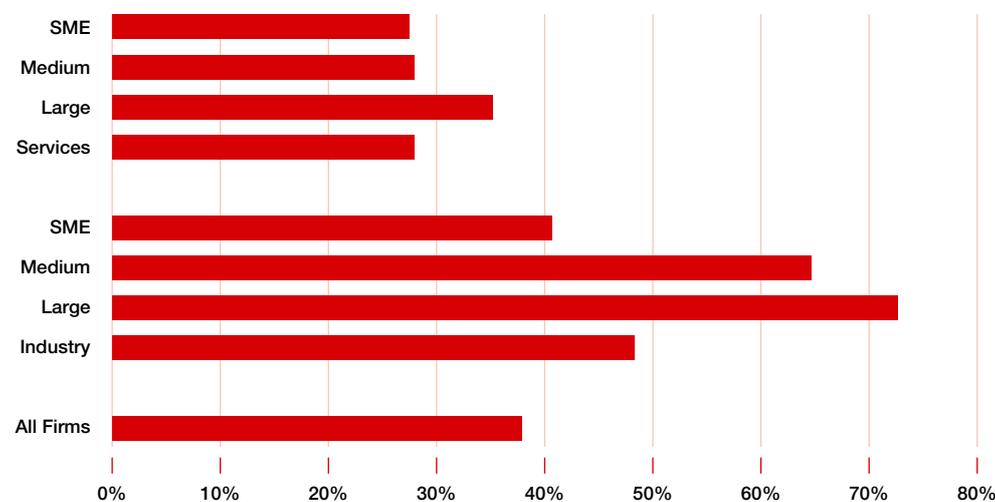


Irish total entrepreneurial activity in 2005 reversed a declining trend over the last number of years. Ireland's entrepreneurs are predominantly male. Not only is this true for early stage entrepreneurial activity as indicated in the chart but it is even more pronounced among entrepreneurs with longer established businesses.

Ranking:

N/A

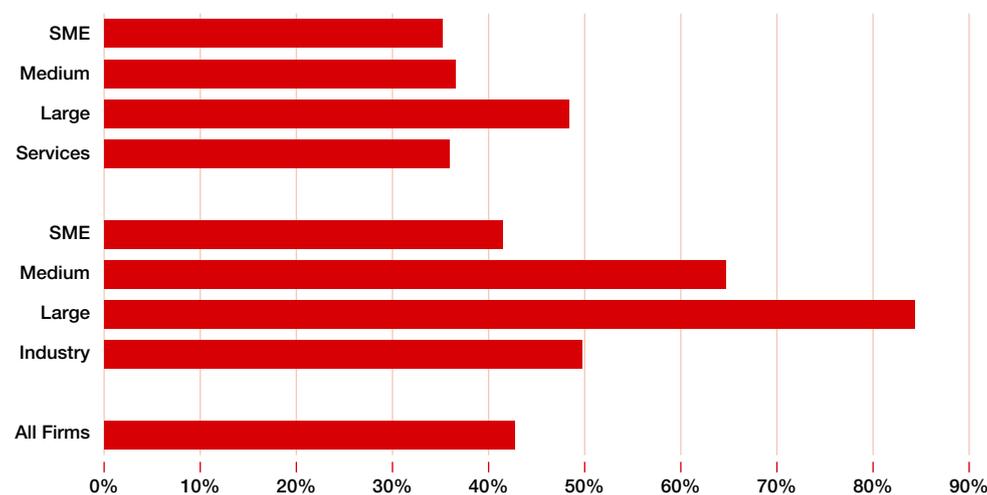
Source: Global Entrepreneurship Monitor (GEM), GEM Report, 2005

**Figure: 3.15 Product Innovation in Ireland by Sector and Firm Size, 2002-2004<sup>11</sup>**

Source: Forfás, *The Fourth Community Innovation Survey-Ireland (Preliminary Data)*

Based on preliminary data, this chart highlights the percentage of Irish businesses that have introduced a product innovation (a new or significantly improved good or service) over the period 2002 – 2004. It indicates that product innovation is weaker in services sectors than industry and that SMEs are less innovative. International data is not yet available.

**Ranking:**  
N/A

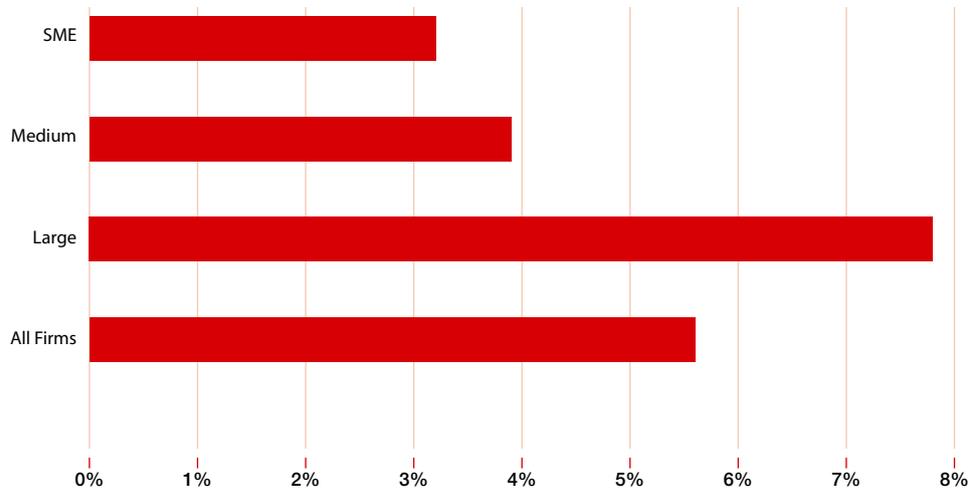
**Figure: 3.16 Process Innovation in Ireland by Sector and Firm Size, 2002-2004**

Source: Forfás, *The Fourth Community Innovation Survey-Ireland (Preliminary Data)*

This chart highlights the percentage of businesses that have introduced a process innovation (a new or significantly improved production process, distribution method or support activity for firm's goods or services) over the period 2002 – 2004. Again, industry performs better than services, and larger firms are more innovative in changing processes.

**Ranking:**  
N/A

**Figure: 3.17 'New to Market' Innovation as a Percentage of Total Turnover, 2002-2004**

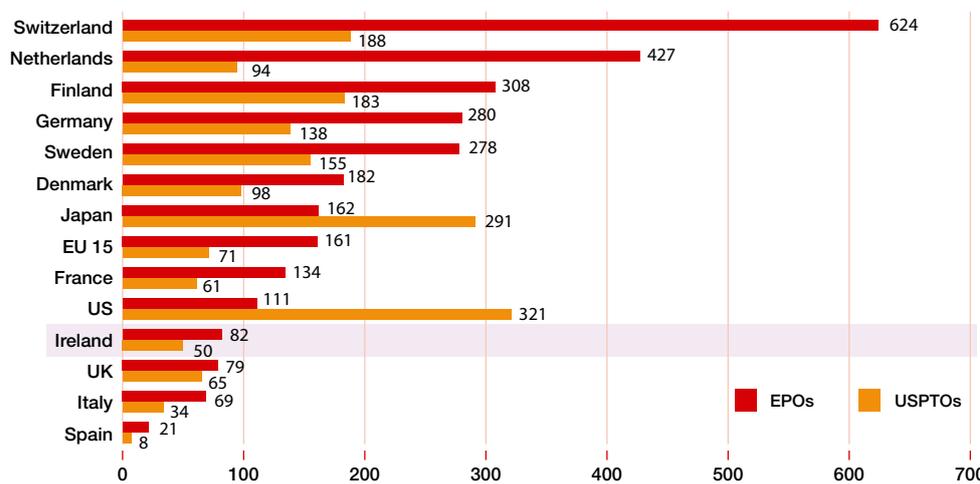


This chart assesses the contribution of 'new to market' products/ services to total firm turnover, a measure of creativity or novelty which indicates successful innovation. Large firms (employing 250 or more) achieved the highest level of sales from new to market products.

Ranking:  
N/A

Source: Forfás, *The Fourth Community Innovation Survey-Ireland (Preliminary Data)*

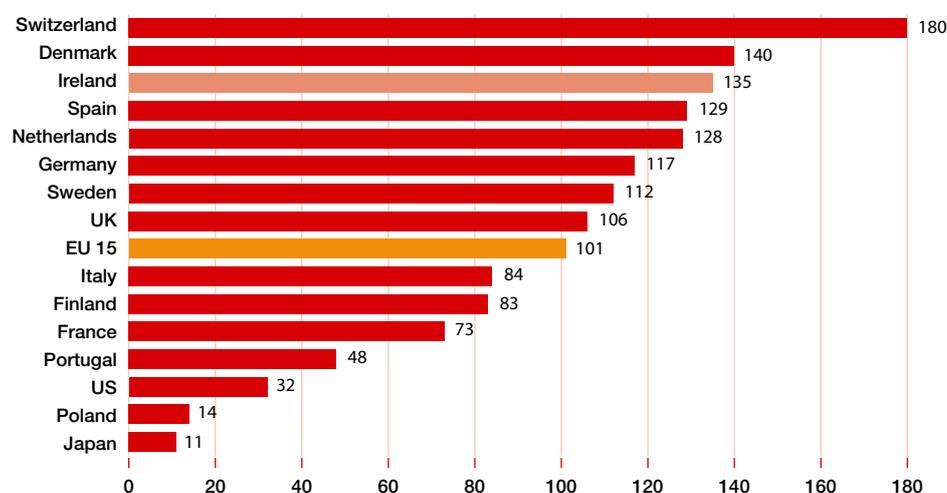
**Figure: 3.18 European and American Patent Office Applications, Patents per Million Population, 2004**



Ireland ranks 10th out of 13 benchmarked countries for the level of European Patent Office (EPO) applications, significantly behind Switzerland, the Netherlands and Finland. Ireland ranks 11th out of 13 benchmarked countries for the level of American Patent Office (USPTO) applications, significantly behind the USA and Japan.

EU 15 Rank:  
EPOs 12 (↓1)  
USPTOs 11 (--)

Source: *European Patent Office, 2005; United States Patent and Trademark Office, Technology Assessment and Forecast Database, 2004*

Figure 3.19 Community Trademarks per Million Population, 2004<sup>12</sup>

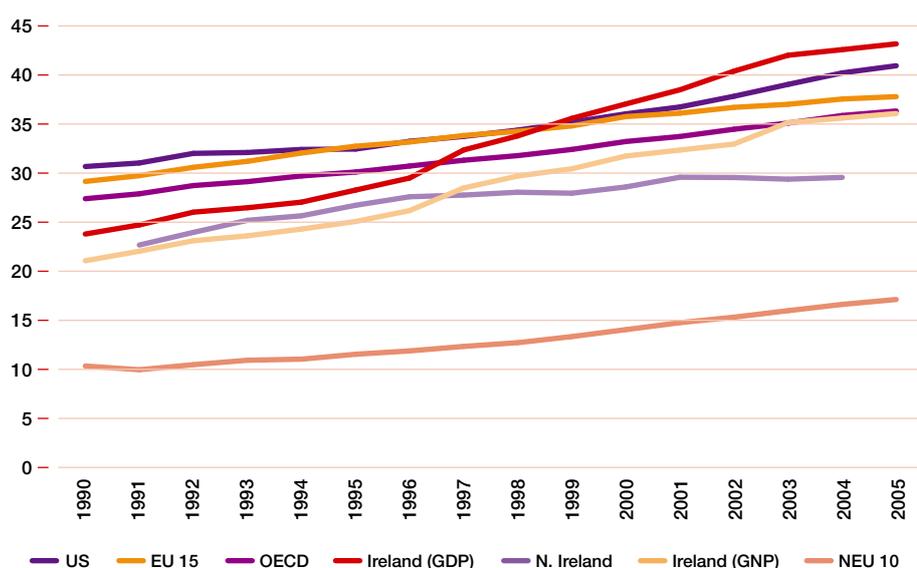
Source: European Commission, European Innovation Scoreboard, 2005

Trademarks play an important role in marketing innovative products and services. A trademark is a distinctive sign that identifies certain goods or services as those produced or provided by a specific person or enterprise.

EU 15 Ranking:  
4 (↓1)

## 3.2 Productivity Performance

Figure 3.20 Per Hour Output, Ireland and Selected Economies, 1990-2005 (€ value added)

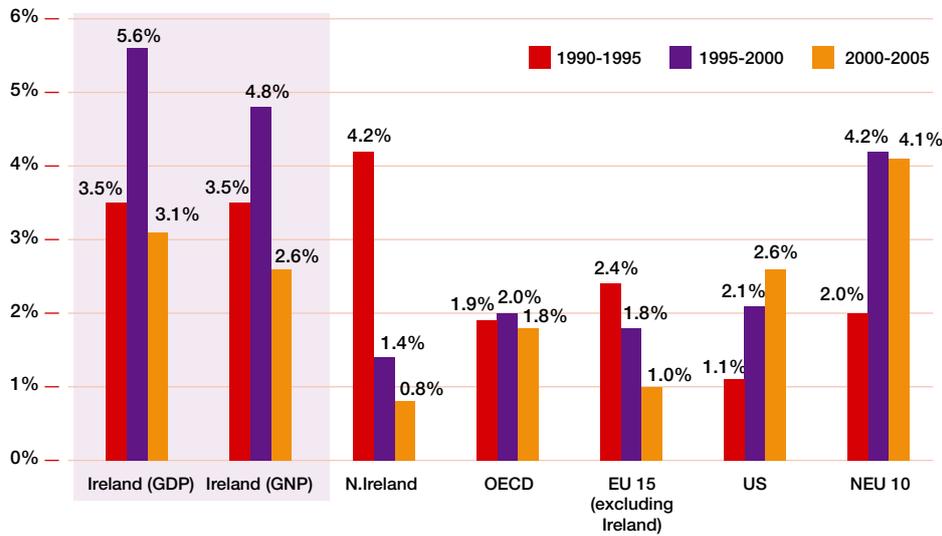


GDP productivity figures suggest that Irish productivity is among the highest in the world. Ireland's rank among OECD countries has improved from 18th in 1990 to 4th in 2005. GNP statistics, a more realistic lower bound, suggest a figure that is more in line with the OECD average.

OECD Ranking:  
GDP: 4 (↑4)  
GNP: 14 (↑2)

Source: Forfás Calculations; Groningen Growth & Development Centre, Total Economy Database, March 2006; United Kingdom, Office for National Statistics, 2006 [online]; Northern Ireland Department of Enterprise, Trade & Investment, Northern Ireland Labour Force Survey: Historical Supplement Spring 1984 – Spring 2005, August 2005

Figure 3.21 Growth in Output per Hour Worked, Selected Economies, 1990-2005<sup>13</sup>



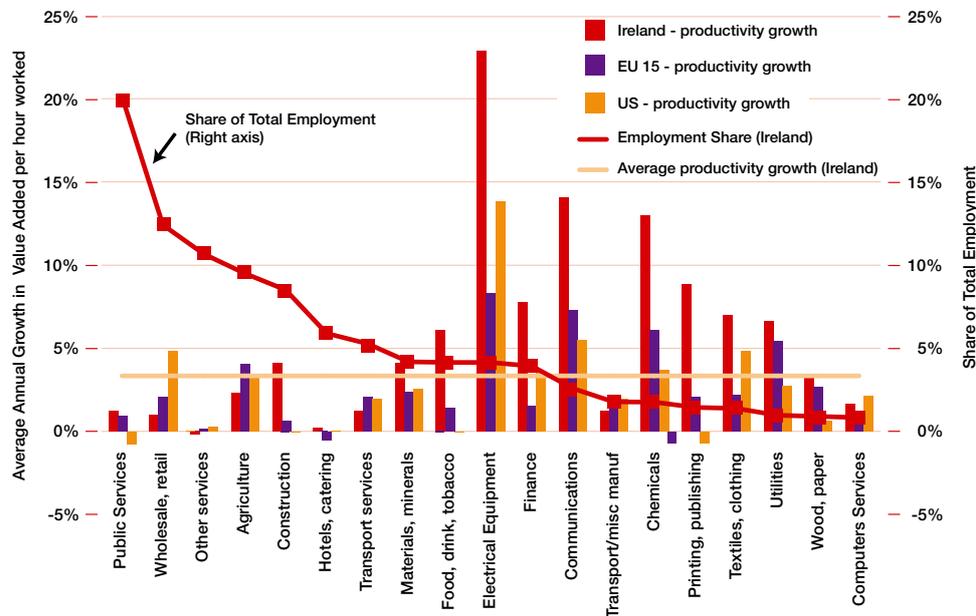
Source: Forfás Calculations; Groningen Growth & Development Centre, Total Economy Database, March 2006; United Kingdom, Office for National Statistics, 2006 [online]; Northern Ireland Department of Enterprise, Trade & Investment, Northern Ireland Labour Force Survey: Historical Supplement Spring 1984 – Spring 2005, August 2005

While Ireland's productivity growth has been strong and remains strong relative to the OECD average, between 2000 and 2005 it slowed to its lowest growth rates since 1980. Between 2000 and 2005, productivity growth accelerated in the US and remained strong in the ten new EU member states, but continued to slow in Northern Ireland and the EU 15.

OECD Ranking:

GDP: 7 (↓6)  
GNP: 9 (↓6)

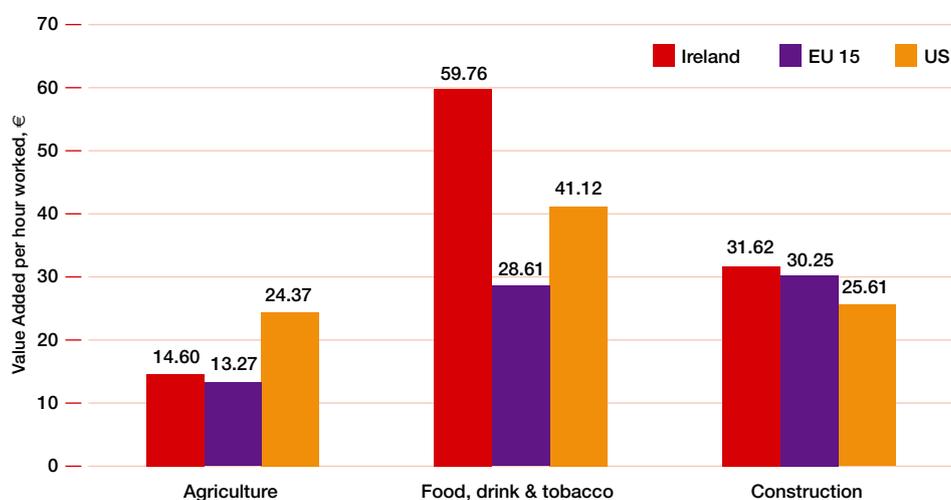
Figure 3.22 Productivity and Employment Share by Sector, Ireland, EU 15 and US, 2003



Source: Forfás Calculations; Groningen Growth & Development Centre, 60-Industry Database, October 2005

This chart shows average annual growth in productivity across sectors, with the largest sectors in Ireland on the left-hand side. While small sectors such as electronics, chemicals and communications have performed well, of Ireland's seven largest sectors, six of them – comprising two-thirds of total hours worked – performed poorly.

Ranking:  
N/A

**Figure 3.23 Per Hour Output Levels in Agriculture, Food & Construction, 2003**

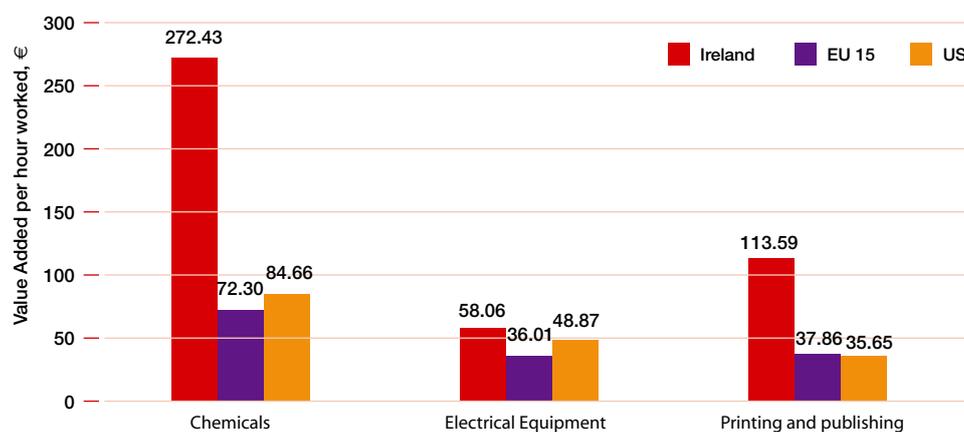
Source: Forfás Calculations; Groningen Growth & Development Centre, 60-Industry Database, October 2005



This chart graphs levels of output per hour worked, in agriculture, food processing and construction. Productivity growth, since 1990, has been fastest in the food, drink and tobacco industry relative to the EU15 and US. While Ireland performs favourably in food and construction, the performance in agriculture has not been as solid. There are also concerns about measurement of productivity in the food sector.

**Ranking:**

N/A

**Figure 3.24 Per Hour Output Levels in 'Modern' Manufacturing, 2003**

Source: Forfás Calculations; Groningen Growth & Development Centre, 60-Industry Database, October 2005

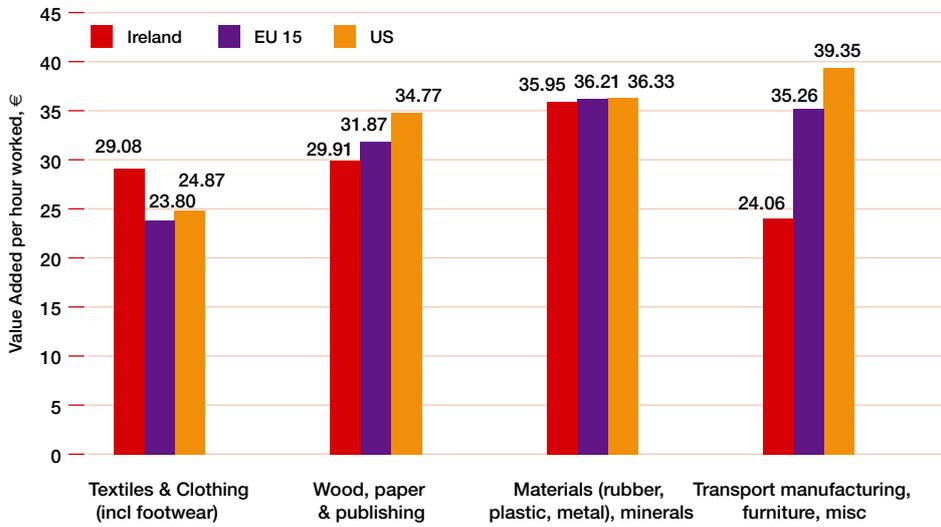


Estimation of Ireland's productivity statistics is made difficult by the significant role of multinational firms in the Irish economy. This is particularly evident in the apparent productivity figures for the chemicals industry. Growth rates have been fastest in the electrical equipment industry, across all three economies, where figures take account of the huge changes in quality since 1990.

**Ranking:**

N/A

**Figure 3.25 Per Hour Output Levels in 'Traditional' Manufacturing, 2003**



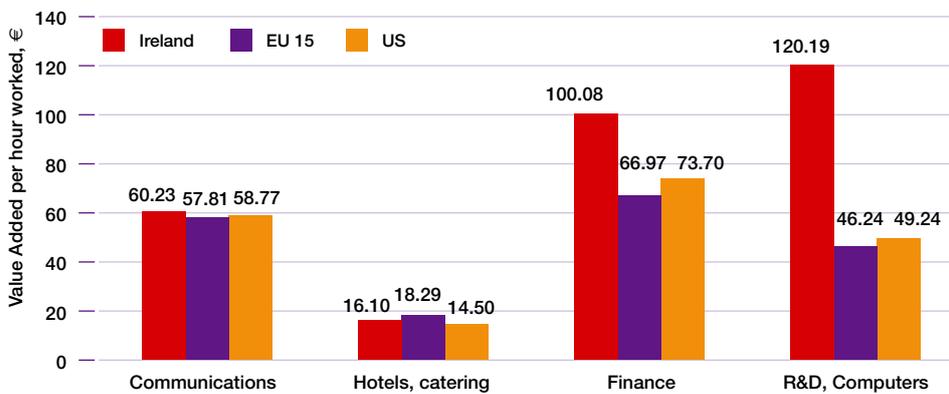
Source: Forfás Calculations; Groningen Growth & Development Centre, 60-Industry Database, October 2005



Productivity in Ireland lags the EU and the US in industries such as wood/paper and materials but particularly in transport goods. While Irish growth rates in all sectors have been faster on average than the EU and the USA since 1990, this masks a poorer performance across traditional manufacturing since 1999.

**Ranking:**  
N/A

**Figure 3.26 Per Hour Output Levels in Tradable Services, 2003**



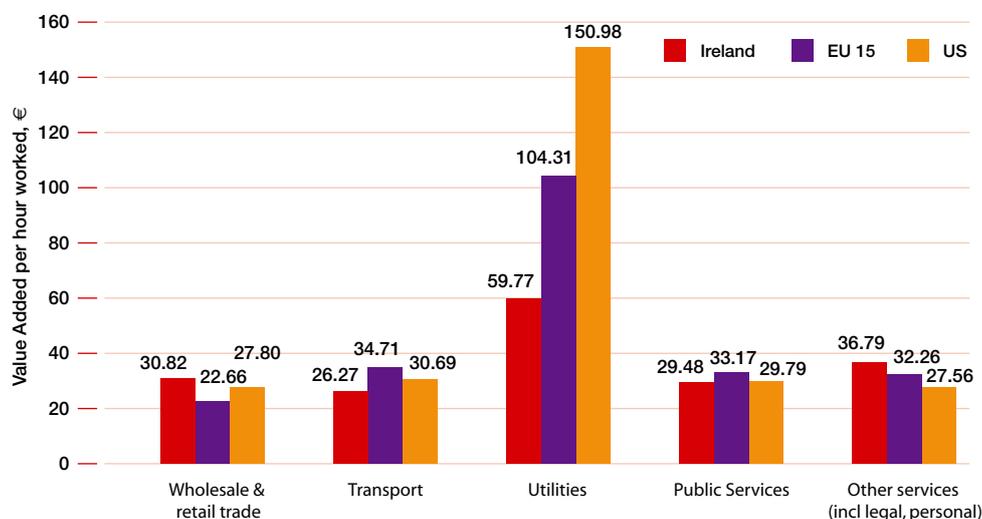
Source: Forfás Calculations; Groningen Growth & Development Centre, 60-Industry Database, October 2005



In services that face international competition, the productivity performance varies across sectors. Productivity in communications in Ireland is on a par with the EU and US, but the figures suggest a better performance in finance, while a significant presence of MNCs appears to distort the figure for computers/ R&D. Productivity in tourism (hotels and catering) remains low.

**Ranking:**  
N/A

Figure 3.27 Per-hour Productivity (Levels) in Non-tradable Services, 2003



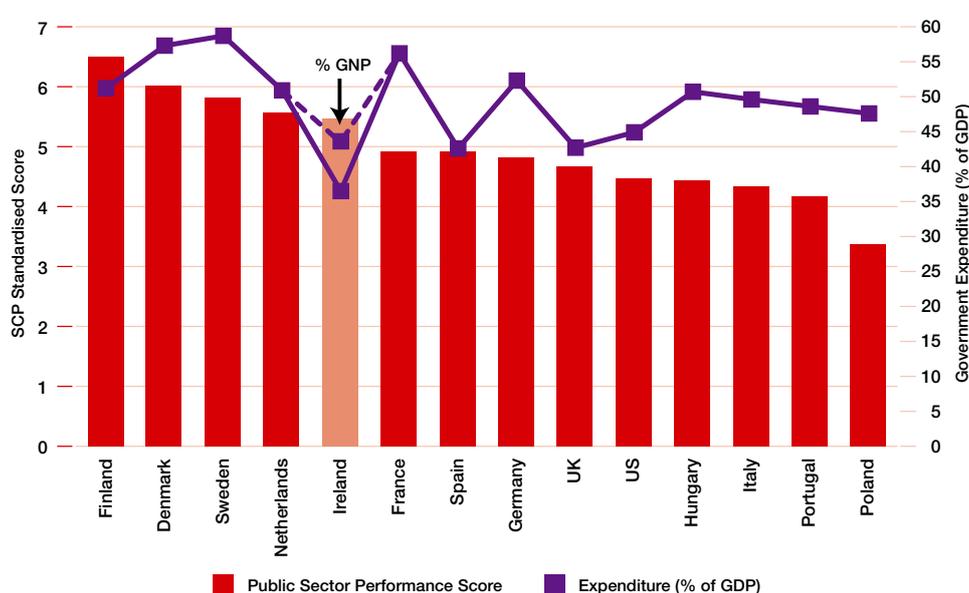
Measuring productivity in services is difficult, as higher value added may just reflect higher prices. Productivity in the wholesale and retail trades appears to have stagnated in Ireland since 1990, while it has improved in the US. A large gap remains in the utilities sector, while productivity growth in other services sectors is very low or negative.

Ranking:

N/A

Source: Forfás Calculations; Groningen Growth & Development Centre, 60-Industry Database, October 2005

Figure 3.28 Productivity in the Public Sector, 2004



This chart suggests that Ireland performs well in relation to the main functions of the public sector. Coupled with Ireland's relatively lower levels of expenditure (blue line), this suggests a reasonably good 'productivity' performance overall. It should be stressed, however, that techniques for measuring public sector productivity are not well developed.

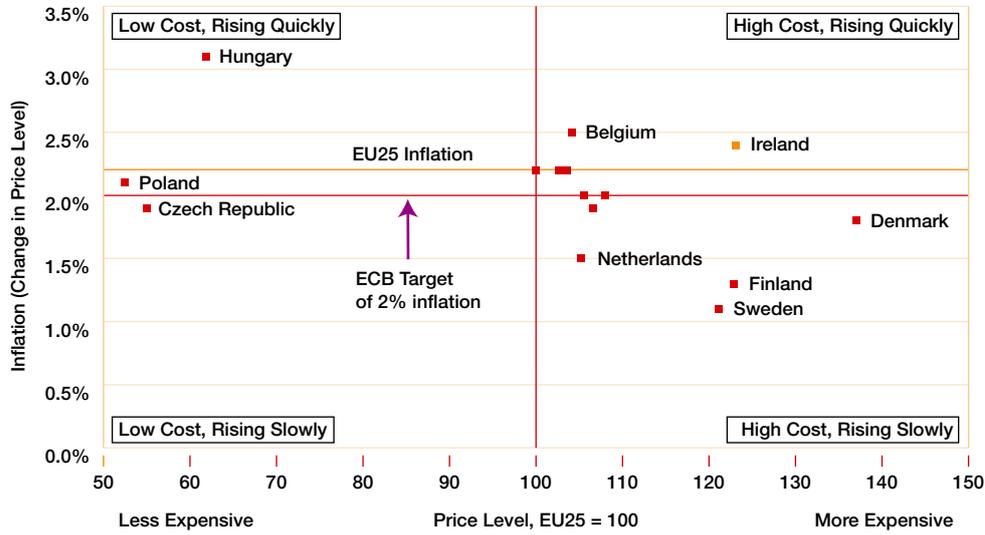
Ranking:

N/A

Source: Forfás Calculations; Social and Cultural Planning Office, The Hague, Public Sector Performance, an International Comparison, September 2004

### 3.3.1 Prices

Figure 3.29 Price Level 2004, and Inflation (2004 to 2006 average), EU Member States



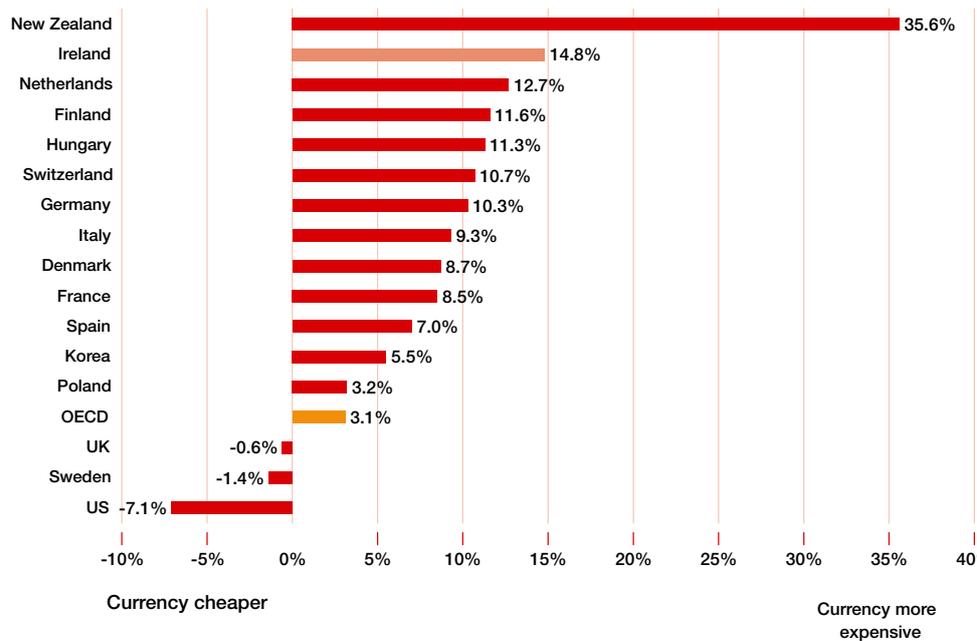
Source: Eurostat, Economy and Finance Indicators, 2006 [online]



The latest rate of change in prices shows Ireland to be ahead of the European Central Bank target of 2% inflation. Not only has Ireland superseded the EU25 average inflation rate of 2.2% but Ireland is also situated in the most expensive quartile among the benchmarked countries due to the combination of higher price levels and price growth.

EU 15 Ranking:  
Price Level 14 (↓3)  
Inflation 11 (↑4)

Figure 3.30 Percentage Change in the Trade-Weighted Exchange Rate, 2000-2005<sup>14</sup>



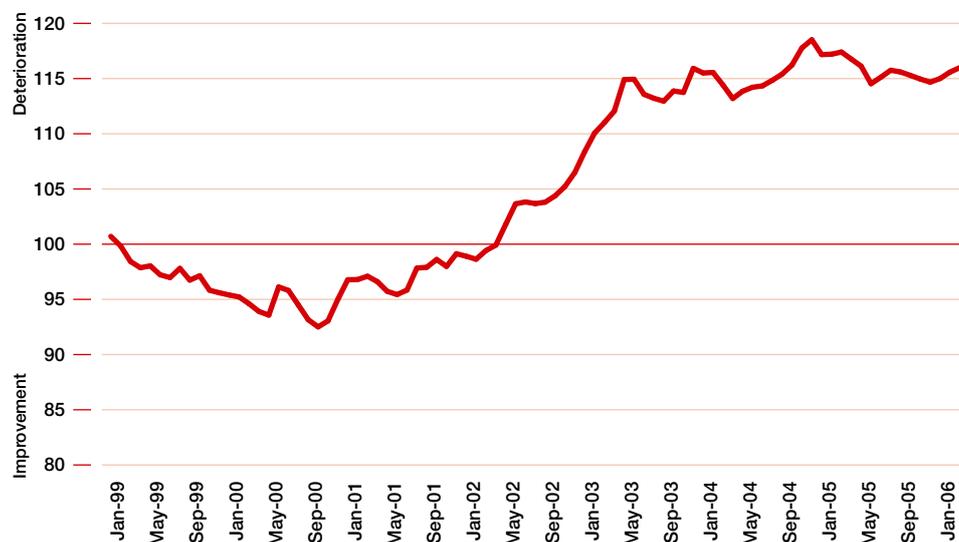
Source: Forfás Calculations; OECD, Economic Outlook no. 78, 2005



Exchange rates affect the competitiveness of products/ services from different countries. This chart shows the change in a country's exchange rate weighted by the importance of each trading partner. Ireland's trade weighted exchange rate has appreciated by 14.8% since 2000, making Irish goods and services more expensive on international markets.

OECD Ranking:  
24 (↓5)

**Figure 3.31 Real Trade-Weighted Competitiveness Index, 1999-2006 (1999 Q1 = 100)**



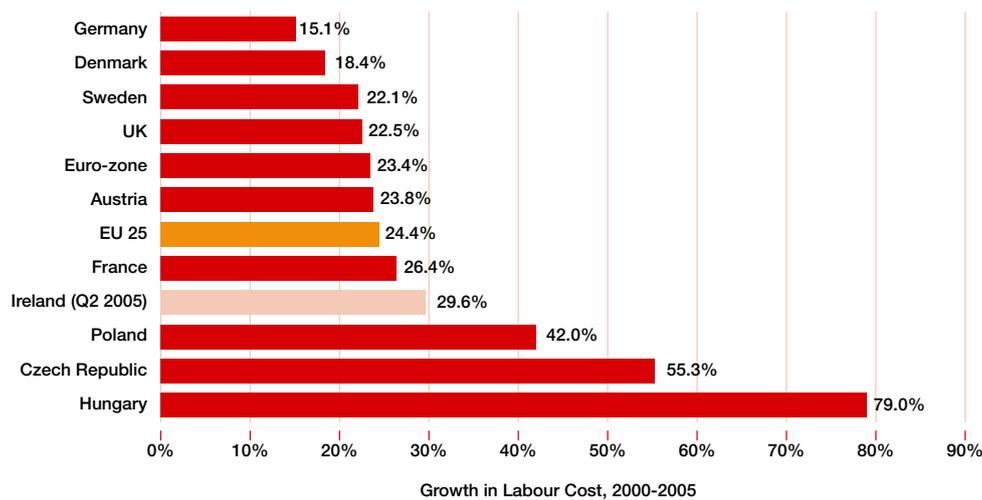
This chart combines changes in inflation and movements in the effective exchange rate. Since 2000, there has been a loss of price competitiveness, reflecting the combination of higher price inflation in Ireland and an appreciation in our trade-weighted exchange rate.

Ranking:  
N/A

Source: Central Bank of Ireland

### 3.3.2 Pay Costs

**Figure 3.32 Labour Cost Growth Rate, 2000-2005<sup>15</sup>**

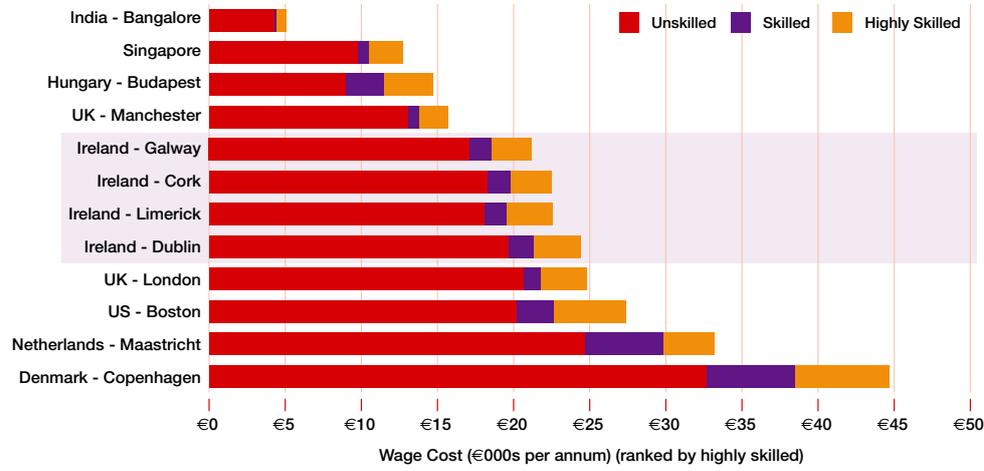


Labour cost indices show developments in the total cost for employers of employing workers on an hourly basis. Growth rates are lower in more developed slow growing EU countries. Eastern European countries have experienced high labour cost growth rates, albeit from a relatively low base.

EU 15 Ranking:  
13

Source: Eurostat, General and Regional Indicators, 2006 [online]

**Figure 3.33 Wage Costs for Production Operatives (Unskilled, Skilled and Highly Skilled), 2005**



This chart measures the cost of an unskilled, skilled and highly skilled production worker. Dublin is considerably cheaper than the most expensive location in terms of skilled labour as Copenhagen is 81% more expensive, while highly skilled wage costs for production workers are 84% more expensive in Copenhagen than Dublin.

Source: OCO Consulting: Costs of Doing Business in Ireland

**Group Ranking (of 12):**  
Dublin 8, Galway 5,  
Cork 6, Limerick 7

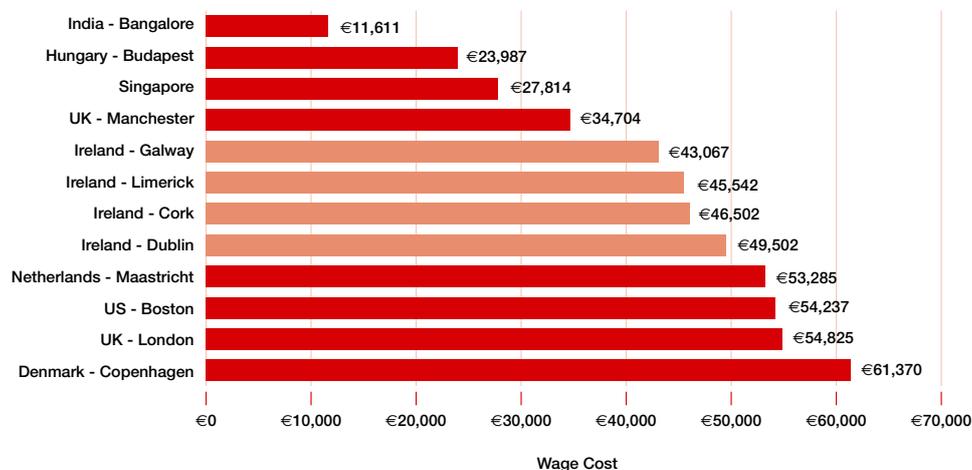
**Figure 3.34 Wage Costs for Laboratory Technicians, 2005**



Laboratory technicians undertake research at the final stage of research development. Wage costs for laboratory technicians are over 4 times higher in Ireland than the least expensive location, Bangalore. Dublin as Ireland's highest cost location is still 41% lower than Copenhagen, Denmark.

Source: OCO Consulting: Costs of Doing Business in Ireland

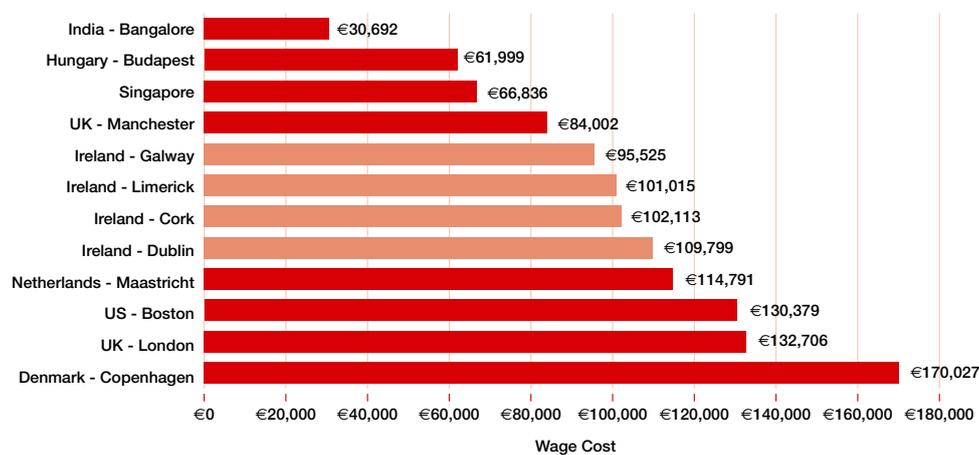
**Group Ranking (of 12):**  
Dublin 8, Galway 5,  
Cork 7, Limerick 6

**Figure 3.35 Wage Costs for Financial Analysts, 2005**

Source: OCO Consulting: Costs of Doing Business in Ireland

Financial analysts assess economic trends and risk. They account for a large part of the cost base of a fund administration company. In Ireland, wage costs for financial analysts are significantly higher than the cheapest location, Bangalore.

**Group Ranking (of 12):**  
Dublin 8, Galway 5,  
Cork 7, Limerick 6

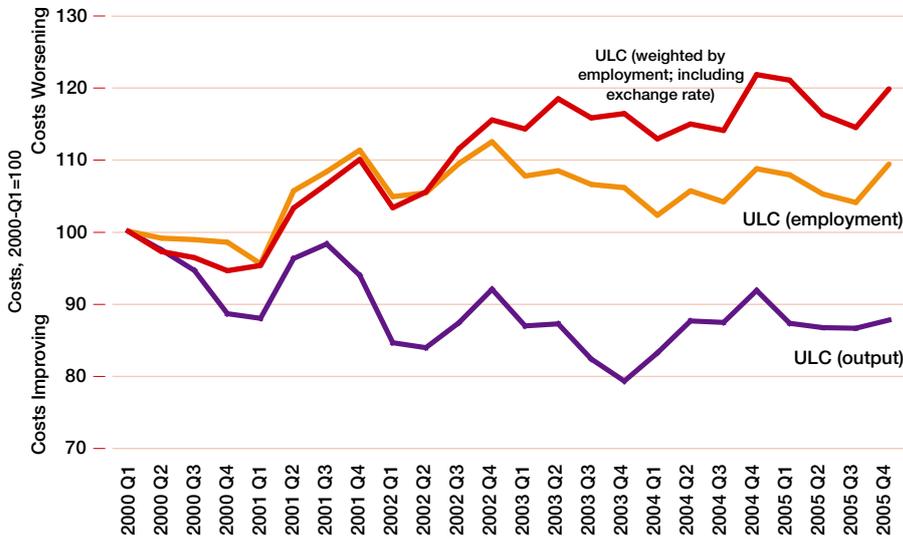
**Figure 3.36 Wage Costs for Directors of Research & Development, 2005**

Source: OCO Consulting: Costs of Doing Business in Ireland

A director of R&D has at least 15 years of experience, and has complete control of the R&D function of a company that exports to international markets. In the biotechnology R&D sector, the cost of a research director varies significantly. The cost of a research director is 55 per cent higher in Copenhagen than in Dublin.

**Group Ranking (of 12):**  
Dublin 8, Galway 5,  
Cork 7, Limerick 6

**Figure 3.37 Changes in Unit Labour Costs (including Exchange Rate Changes), 2000-2005**

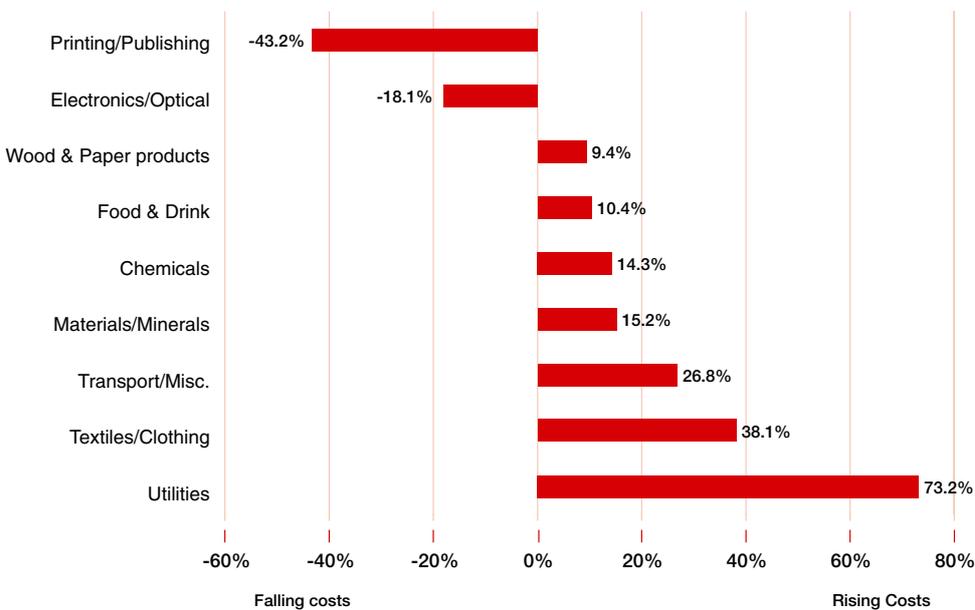


Source: Central Bank of Ireland; Central Statistics Office, Industrial Production, Industrial Earnings, Employment (by 2 digit NACE codes)

Unit labour costs measure how changes in wages compare to changes in productivity. A fall indicates that productivity rose faster than wages, which is good for competitiveness. While figures weighted by output show a fall in costs since 2000, a more representative weighting by employment suggests costs have risen. Including exchange rate movements increases the losses in Ireland's competitiveness since 2000.

**Ranking:**  
N/A

**Figure 3.38 Percentage Change in Unit Labour Costs (ULCs) in Manufacturing, 2000-2005**



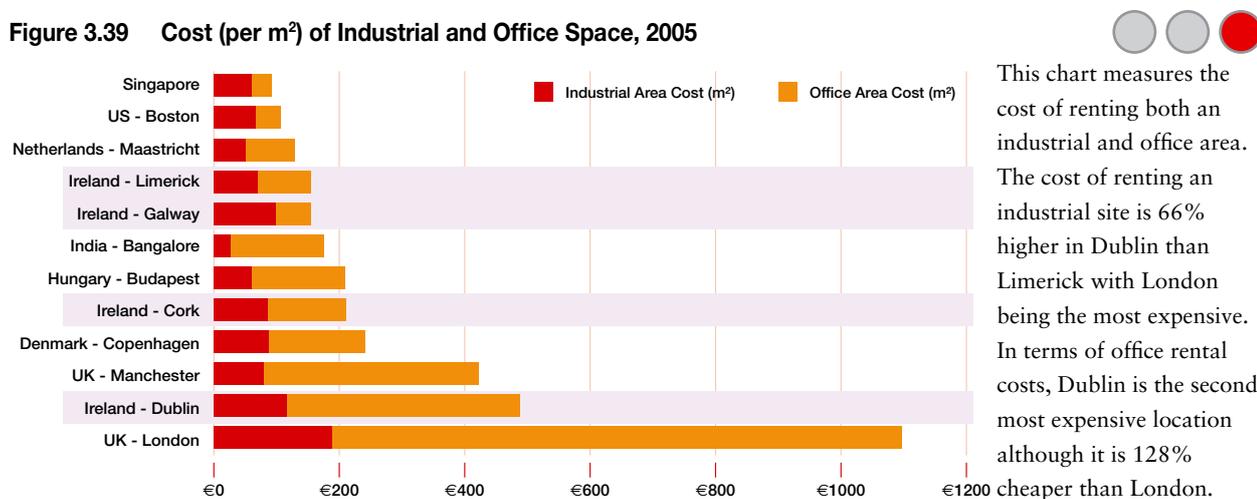
Source: Forfás Calculations; Central Statistics Office, Industrial Production, Industrial Earnings, Employment (by 2 digit NACE codes)

Unit labour costs measure how changes in wages compare to changes in productivity. This chart highlights large sectoral differences in the percentage change in unit labour costs between 2000 and 2005. Utilities (electricity, gas, water) and traditional manufacturing in particular have experienced a significant increase in unit labour costs over the period, thus weakening their competitiveness.

**Ranking:**  
N/A

### 3.3.3 Non-Pay Costs

**Figure 3.39 Cost (per m<sup>2</sup>) of Industrial and Office Space, 2005**

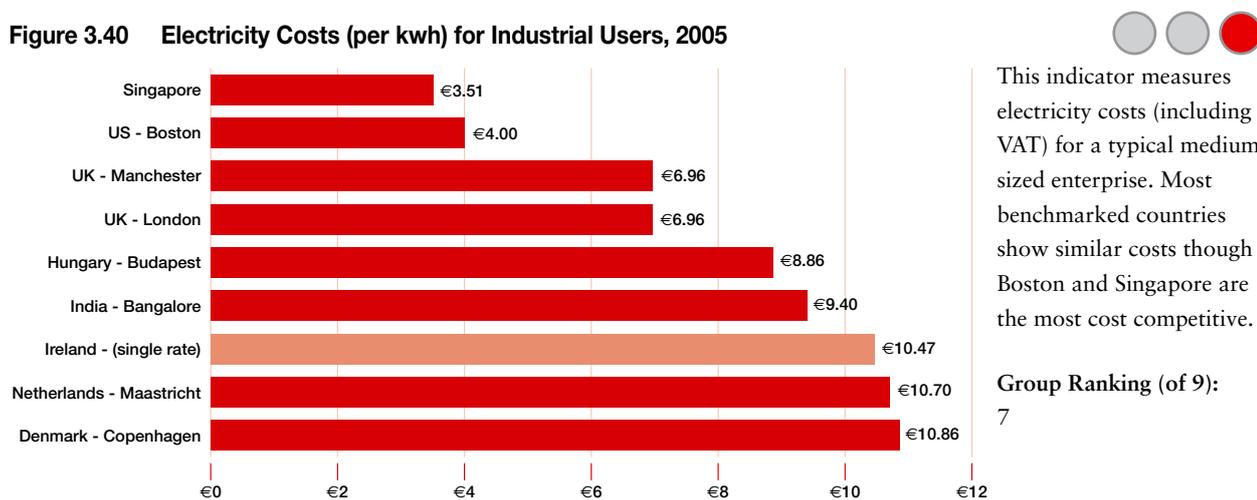


Source: OCO Consulting: Costs of Doing Business in Ireland

This chart measures the cost of renting both an industrial and office area. The cost of renting an industrial site is 66% higher in Dublin than Limerick with London being the most expensive. In terms of office rental costs, Dublin is the second most expensive location although it is 128% cheaper than London.

**Group Ranking (of 12):**  
 Dublin 11, Cork 8,  
 Limerick 4, Galway 5

**Figure 3.40 Electricity Costs (per kwh) for Industrial Users, 2005**

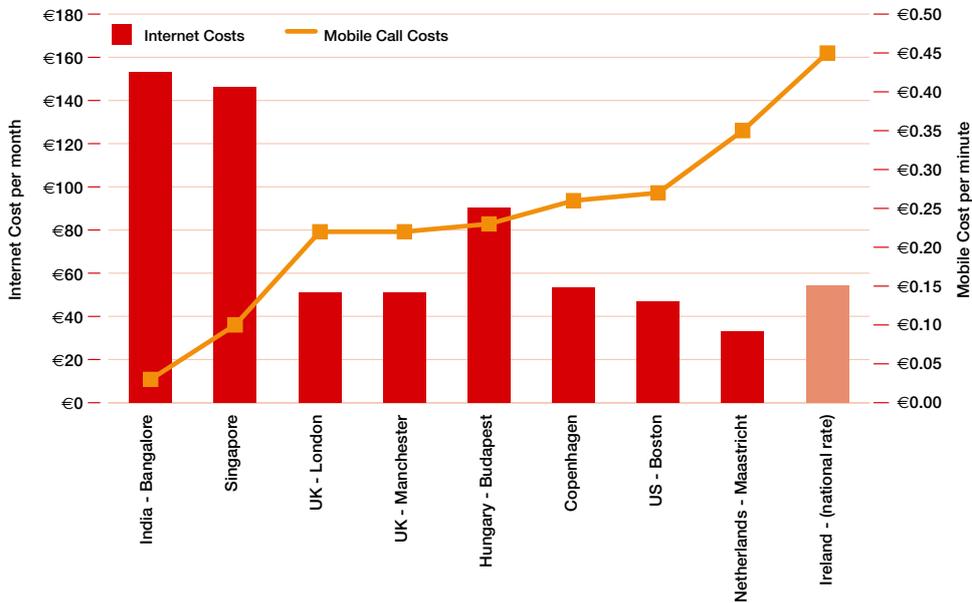


Source: OCO Consulting: Costs of Doing Business in Ireland

This indicator measures electricity costs (including VAT) for a typical medium sized enterprise. Most benchmarked countries show similar costs though Boston and Singapore are the most cost competitive.

**Group Ranking (of 9):**  
 7

Figure 3.41 National Mobile Telephone (per min) and Internet (per month) Costs, 2005

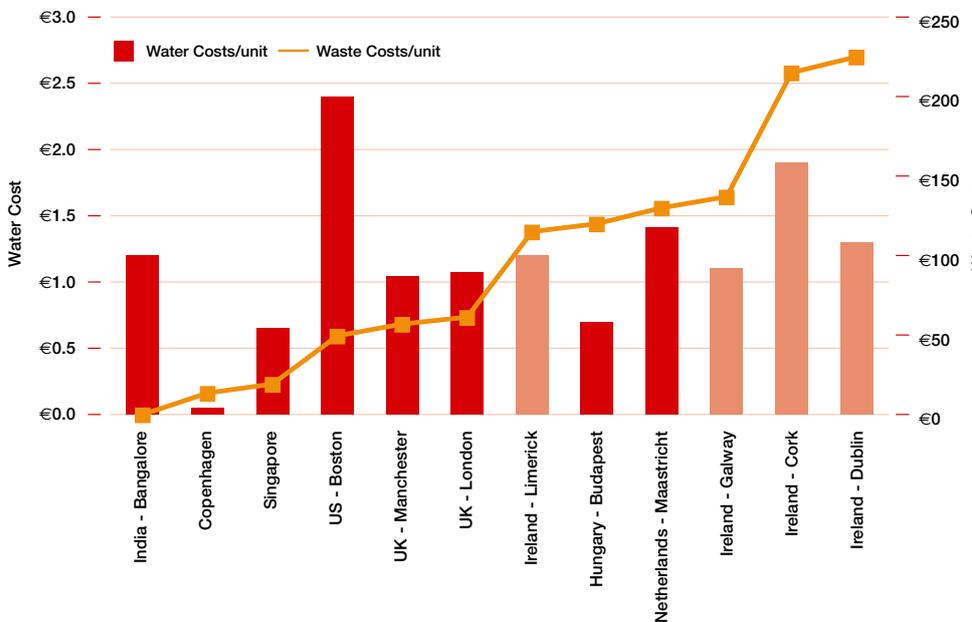


National mobile costs (right axis) show Ireland as the most expensive, 29% higher than the second most expensive benchmarked location. Internet costs (left axis) measuring the internet connection cost for a 2MB DSL service for a business user are relatively competitive in Ireland.

Group Ranking (of 9):  
 (ranked by mobile costs) 9  
 (ranked by broadband) 6

Source: OCO Consulting: Costs of Doing Business in Ireland

Figure 3.42 Costs of Waste Disposal (per tonne) and Water (per cubed metre), 2005

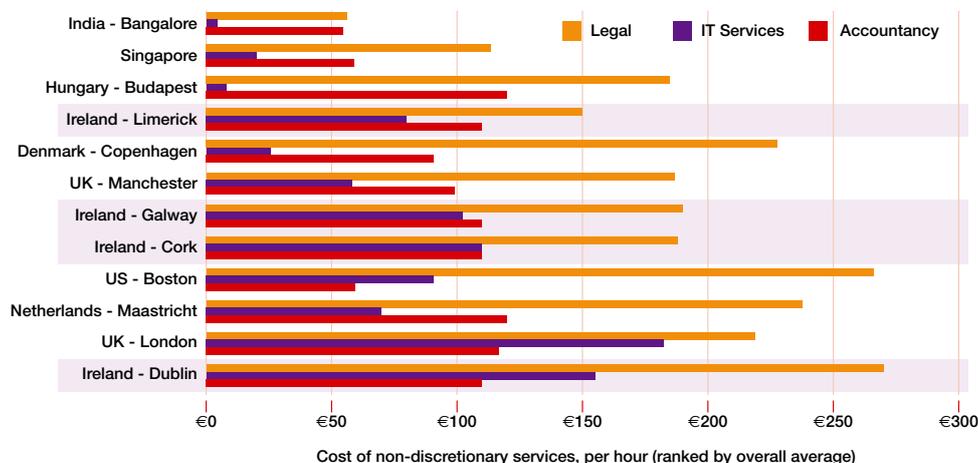


Water costs (left axis) measure the cost for industrial users per metre cubed and are 73% higher in Cork than Galway. Waste costs (right axis) measure the cost of disposing a tonne of non-hazardous waste into landfill. They are 100% higher in Dublin relative to Cork.

Group Ranking (of 12):  
 Water Cost - Cork 11, Dublin 9, Limerick 7, Galway 6  
 Waste Cost - Dublin 12, Cork 11, Galway 10, Limerick 7

Source: OCO Consulting: Costs of Doing Business in Ireland

**Figure 3.43 Legal, IT and Accountancy Fees per Hour (ranked by average cost), 2005**

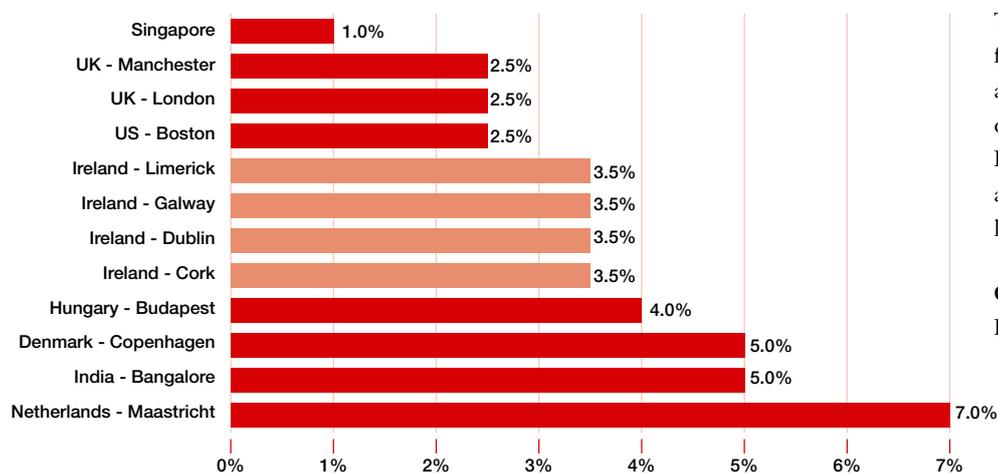


Source: OCO Consulting: Costs of Doing Business in Ireland

This chart measures legal, IT services and accountancy fees per hour. Legal fees in Dublin are 86% higher than in Limerick while IT fees in Dublin are 93% more expensive than Limerick. Accountancy fees are 9% lower in Ireland than the most expensive location, Maastricht.

**Group Ranking (of 12):**  
(ranked by overall average), Dublin 12, Cork 8, Galway 7, Limerick 4

**Figure 3.44 Insurance Costs (premium as a % of assets insured), 2005**

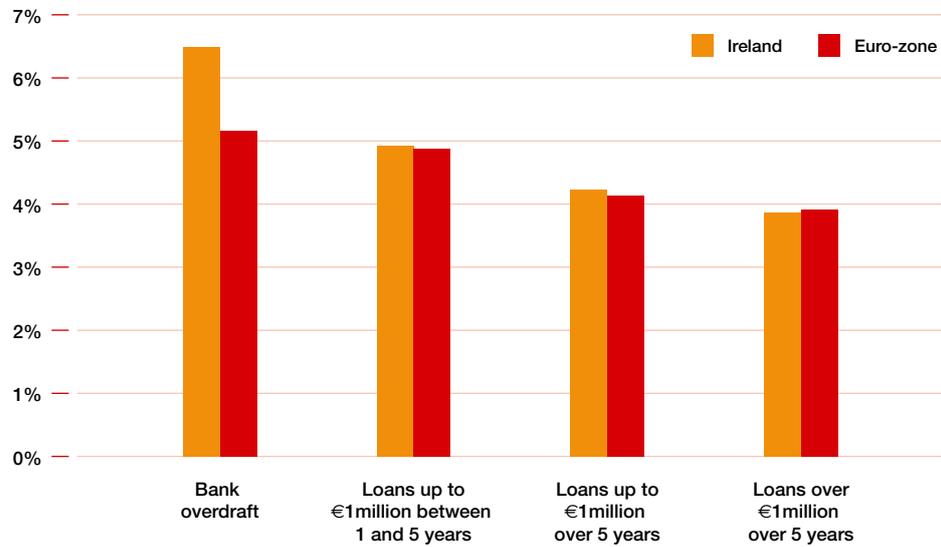


Source: OCO Consulting: Costs of Doing Business in Ireland

This chart measures basic fire insurance premiums as a percentage of the value of the assets insured. All Irish locations rank jointly as the fifth most expensive locations.

**Group Ranking (of 12):**  
Ireland 5

**Figure 3.45 Interest Rates, 12 month Average to March 2006**



Source: Central Bank of Ireland; European Central Bank

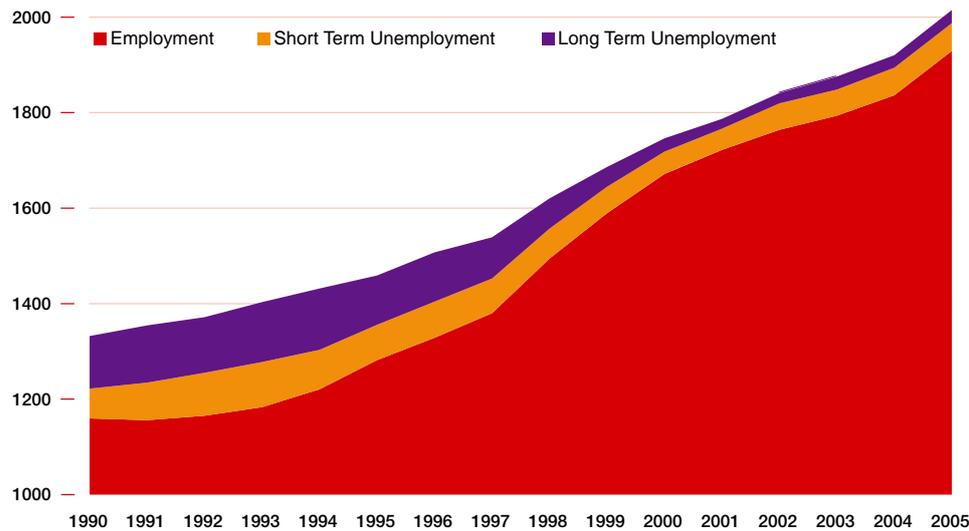


This chart displays average interest rates applied to non-financial corporations. Irish interest rates are close to the Euro-zone average, except for overdrafts. However, in the second half of 2005 and early 2006, interest rates in Ireland diverged from the EU average, particularly for longer-term loans which have traditionally been cheaper in Ireland.

**Ranking:**  
N/A

### 3.4 Labour Supply

**Figure 3.46 Labour Force (Employment & Unemployment), 000s, 1990-2005**



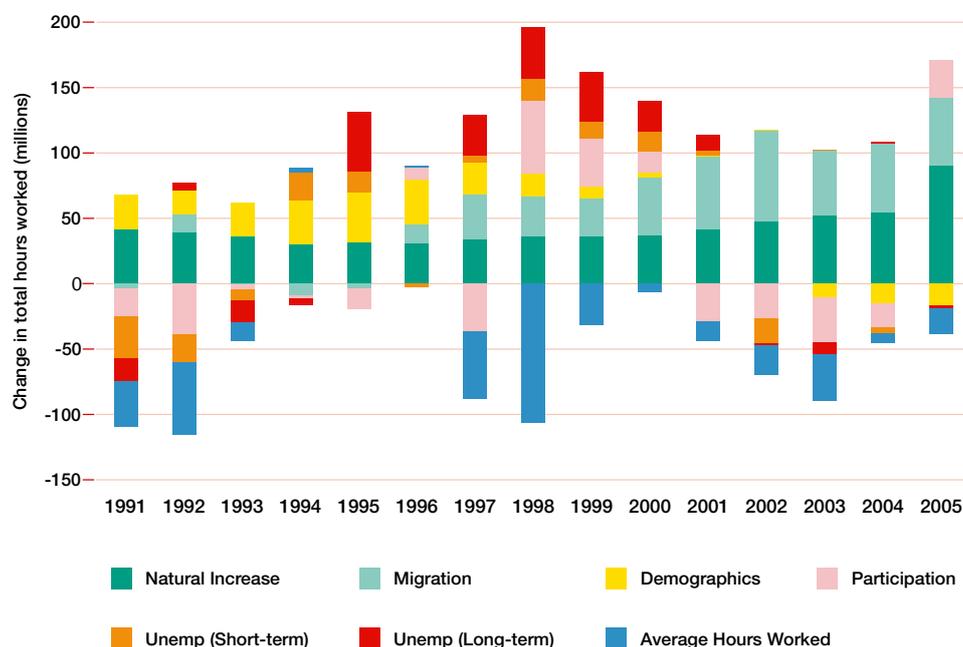
Source: Forfás Calculations; Central Statistics Office, Quarterly National Household Survey Data, 1990-2005



Employment growth has risen steadily since the early 1990s, driving increases in the total labour force. The total labour force in Ireland now exceeds two million people. In particular, long-term unemployment fell sharply between 1995 and 2000. Growth in employment has accelerated since 2003.

**Ranking:**  
NA

**Figure 3.47 Decomposition of Change in Total Hours Worked, 1990-2005**

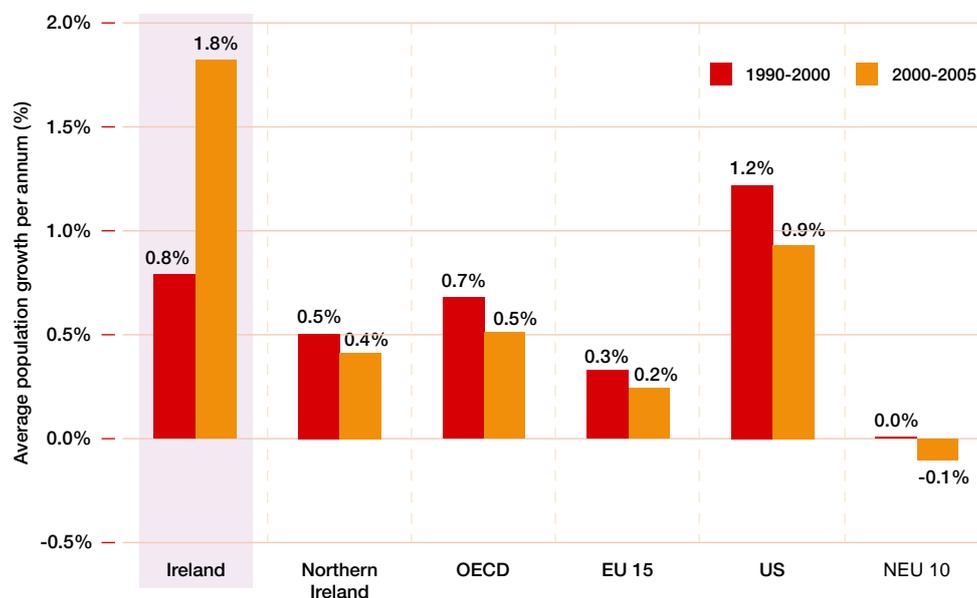


Changes in total hours worked in the Irish economy depend on: natural increases in population (dark green), net migration (light green), demographics (yellow), labour market participation (pink) and unemployment, both frictional (orange) and long-term (red). It can also be due to working fewer hours on average (blue). Natural and migration-induced increases in population are now driving employment growth.

**Ranking:**  
NA

Source: Forfás Calculations; Groningen Growth & Development Centre, 60-Industry Database, October 2005; Central Statistics Office, Quarterly National Household Survey Data, 1990-2005

**Figure 3.48 Average Population Growth per Annum, 1990-2005<sup>16</sup>**

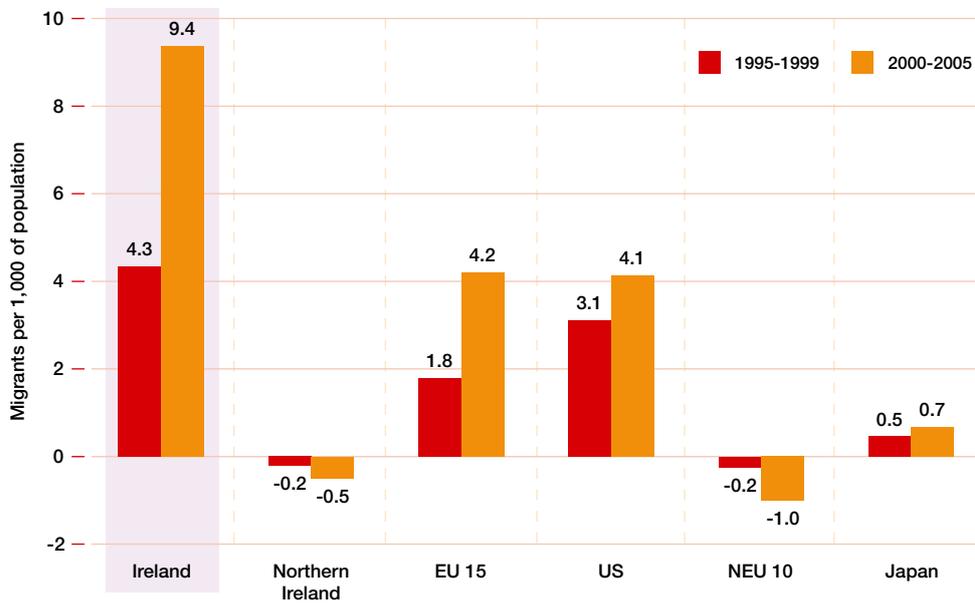


Ireland's population growth is accelerating, as both the natural increase (dark green in 3.47) and net migration (light green) boost the numbers living here. Population growth since 1990 in Ireland has been faster than in Northern Ireland or the OECD and EU averages. According to Census 2006 figures, the rate of growth is now almost twice as fast as any other OECD country.

**OECD Ranking:**  
1 (↑7)

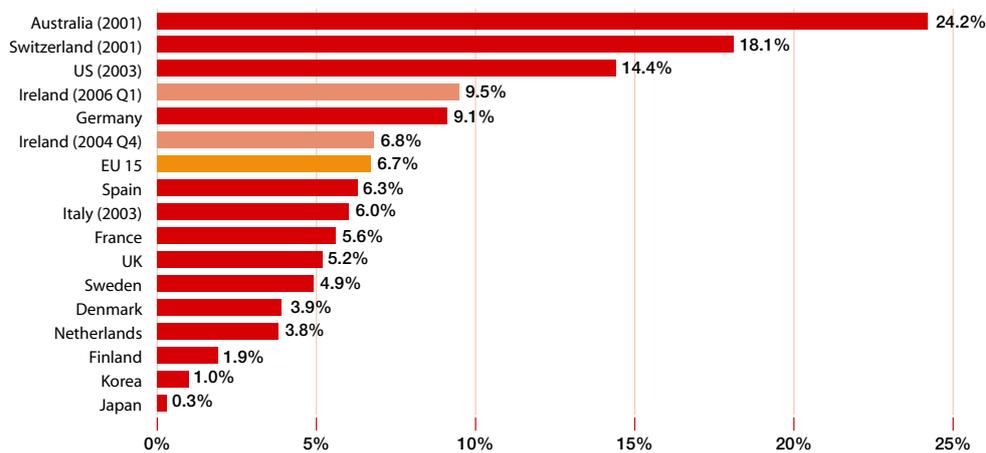
Source: Forfás Calculations; Groningen Growth & Development Centre, Total Economy Database, March 2006; United Kingdom, Office for National Statistics, 2006 [online]

Figure 3.49 Net Migration per 1,000 of Population, 1995-2004



This chart shows the extent of migration into Ireland since 1995. From being the only net exporter of people in the EU in 1994, Ireland is now the second largest per capita importer of people in the EU (after Spain). Ireland's rate of inward migration is more than twice the EU and US averages. In Northern Ireland, the rate of emigration has grown marginally in recent years.

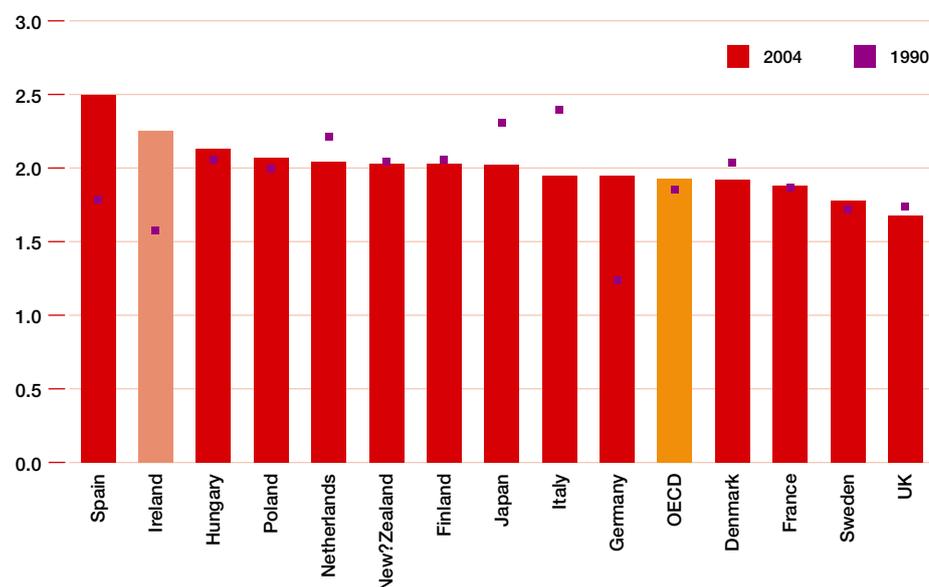
Source: Forfás Calculations; Groningen Growth & Development Centre, Total Economy Database, March 2006; United Kingdom, Office for National Statistics 2006 [online]; Northern Ireland Department of Enterprise, Trade & Investment, Northern Ireland Labour Force Survey: Historical Supplement Spring 1984 – Spring 2005, August 2005

Figure 3.50 Stock of Foreign Labour as a Percentage of the Total Labour Force, 2004<sup>17</sup>

The stock of foreign labour force in Ireland has increased dramatically in recent years, from 6.8% in late 2004 to 9.5% in the first quarter of 2006. These workers are spread across the economy, with the exception of agriculture and public services. They are particularly prevalent in tourism, where they represented 23.7% of total employees employed in this sector in early 2006.

Source: Forfás Calculations; OECD, International Migration Outlook, 2006; Central Statistics Office, Labour Market Statistics; US, Labour Force Survey

EU 15 Ranking: 2004 ranking: 5 (↑5)

Figure 3.51 Number of Persons of Working-Age per Dependent, 1990 and 2004<sup>18</sup>

Source: Forfás Calculations; OECD, *Employment Outlook*, 2005

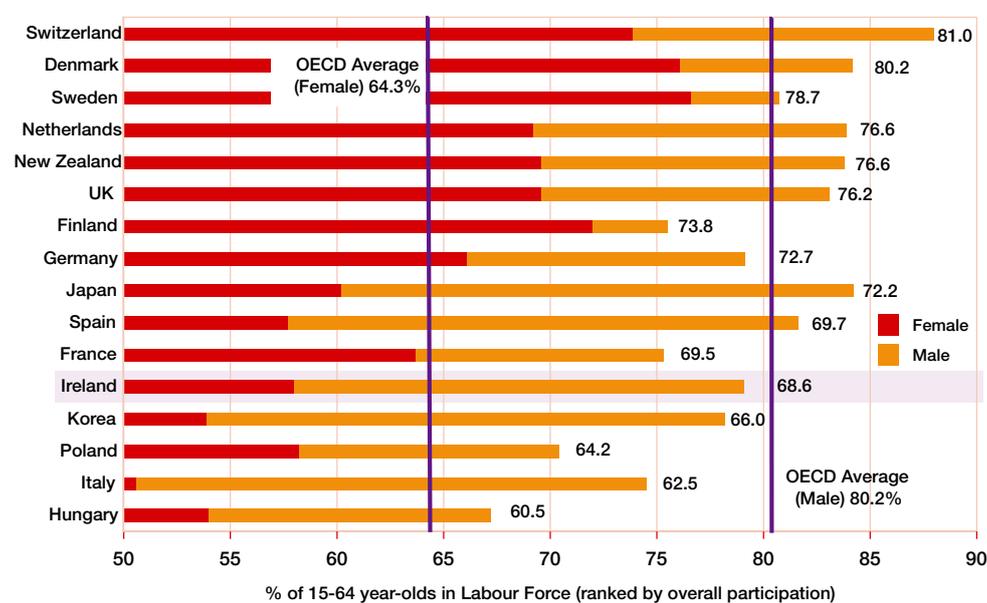


A high ratio of workers to dependents (children and retirees) enables economies to fund their social services more easily. Ireland has enjoyed a significant demographic dividend in recent years as the proportion of the population of working age has increased, due to a peak in births around 1980. Ireland now has one of the highest ratios of workers to dependents, as shown in the chart.

OECD Ranking:

3 (↑6)

Figure 3.52 Participation Rates of 15-64 Population, by Gender, 2004



Source: Forfás Calculations; OECD, *Employment Outlook*, 2005



Overall participation rates in Ireland climbed from 60% in 1990 to 68.6% in 2004. Participation among women has increased by over 15% in the last 15 years, but still lags the top country, by almost 25%. While participation among women between 25 and 34 is almost 80%, for those over 55, it remains close to 40%.

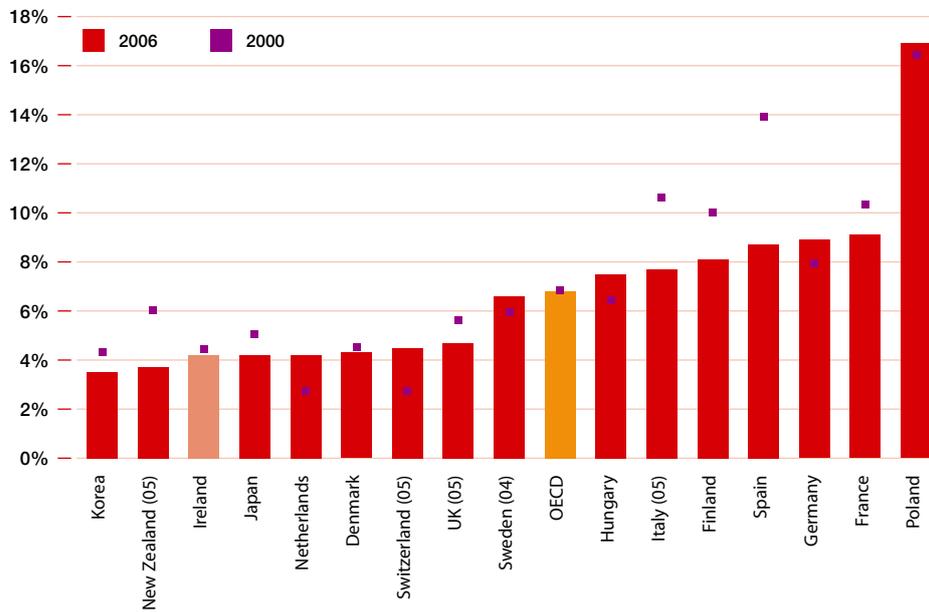
OECD Ranking:

Overall: 21 (↓1)

Males: 14 (↑2)

Females: 21 (↑1)

Figure 3.53 Unemployment, Standardised Rates, 2000 and 2006<sup>19</sup>

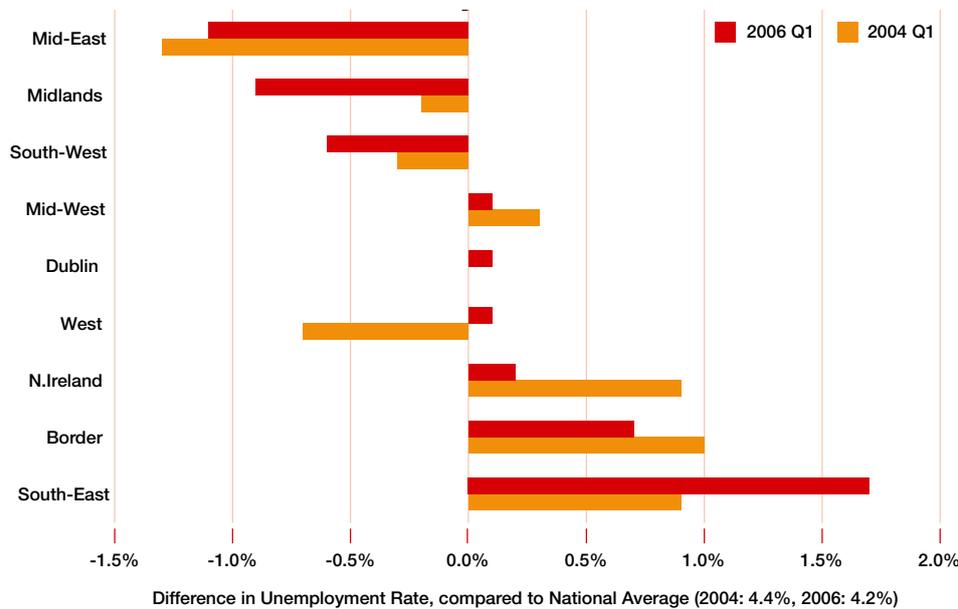


Source: OECD, *Employment Outlook*, 2005

Ireland's rate of unemployment remains low, while employment growth remained well above OECD average. However, there was an increase in unemployment to 88,200 in the first quarter of 2006, up 6,100 year-on-year. Within Ireland's regions, the unemployment rate is highest in the South-East (5.9%) and the Border region (4.9%), and lowest in the Mid-East at 3.1%.

OECD Ranking:  
2(↑7)

Figure 3.54 Regional Unemployment, 2004 and 2006, Ireland and Northern Ireland

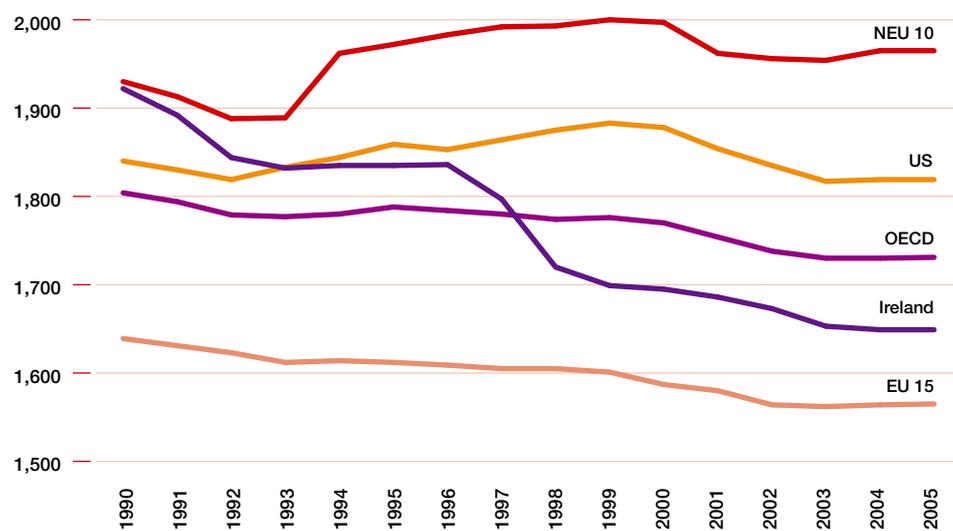


Source: Forfás Calculations; Central Statistics Office, *Quarterly National Household Survey Data, 1990-2005*; Northern Ireland Department of Enterprise, Trade & Investment, *Monthly Labour Market Report*, May 2006

Compared to the national average, the Mid-East, Midlands and South-West regions have lower unemployment rates. This represents an improvement in the relative position of both the Midlands and the South-West. Conversely, the position of the West and in particular the South-East has worsened over the last two years. Unemployment in Northern Ireland is currently close to average levels in the Republic.

Ranking:  
N/A

Figure 3.55 Average Hours Worked per Person Employed per Year



Source: Forfás Calculations; Groningen Growth & Development Centre, Total Economy Database, March 2006



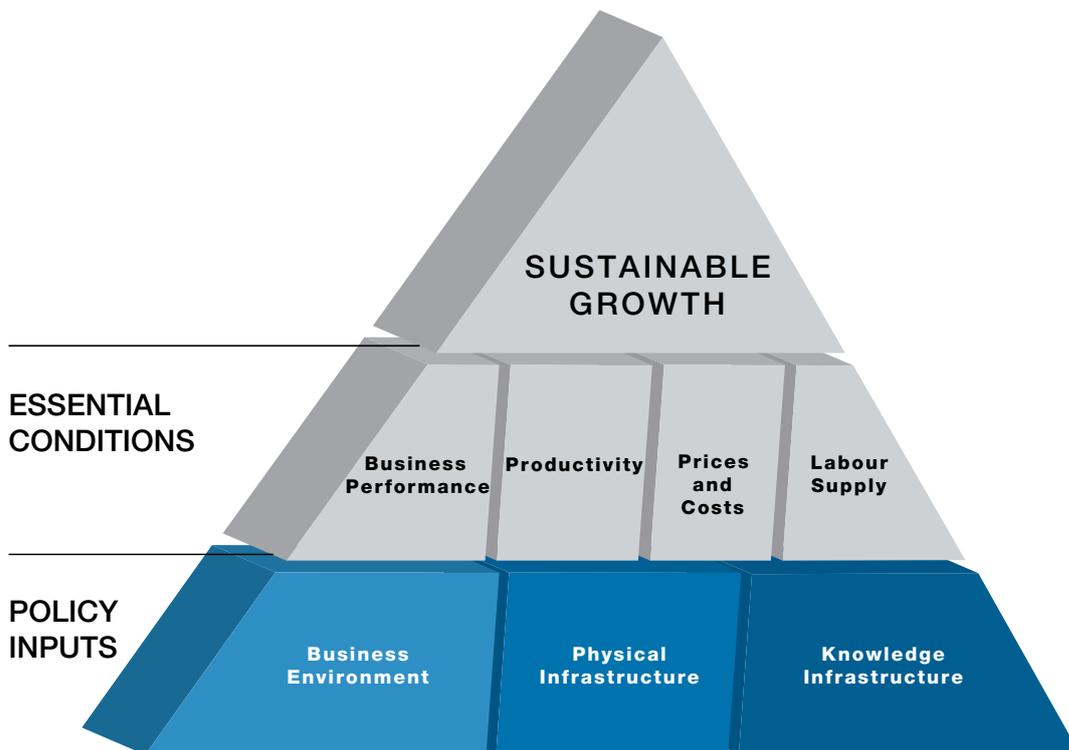
Average hours worked per person in Ireland have fallen steadily since 1990, in particular between 1990 and 1992 and again between 1996 and 1998, reflecting both a reduction in hours and a move away from agriculture. The figure for Ireland is now below the OECD average and well below the US and new EU 10 figures, although still almost 100 hours more per year than the EU 15 average.

OECD Ranking:  
13 (↑1)



# 4 Policy Inputs

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## 4. Policy Inputs

### 4.1 Business Environment

The business environment can have a significant impact on a country's economic performance and competitiveness. In this section, indicators that illustrate Ireland's relative performance on taxation, regulation and competition, labour market regulations and finance are assessed under the following headings:

#### 4.1.1 Taxation

In addition to financing broader social goals, taxation is required to finance government expenditure in areas such as infrastructure, and education and research, which are essential to competitiveness. However, government spending and taxation above certain levels can adversely affect a country's competitiveness by creating disincentives to work and by reducing a country's attractiveness to mobile foreign direct investment.<sup>9</sup> For any given tax yield, the structure of a country's taxation system can also influence its economic performance.

Irish corporation tax rates and personal taxes remain low relative to other countries benchmarked. Notwithstanding this, total tax revenue as a percentage of GDP in Ireland has increased from 28.4% in 2002 to 30.2% in 2004, in a large part due to a surge in capital gains tax and stamp duties. Ireland continues to collect a relatively high share of tax revenue from indirect sources.

#### 4.1.2 Competition and Regulation

The effectiveness and quality of regulation and the institutions that enforce it are a major determinant of a country's prosperity.<sup>10</sup> Well-designed business regulation, adapted to local market conditions (such as, market size), can improve the functioning of markets and can assist in achieving environmental and social policy goals. However, regulations can also have negative implications for a country's performance by adding to administrative costs, and in some cases, by restricting new competition.<sup>11</sup> Market entry by new firms and a high degree of competition between existing firms can improve industry-level productivity and competitiveness.<sup>12</sup> Healthy domestic competition can also reduce price levels for consumers.<sup>13</sup>

The level of regulation in Ireland is perceived as being low, but increasing. In terms of starting a business, there are a relatively low number of procedural requirements in Ireland but Irish costs are higher than those in the leading countries. While key network industries remain relatively concentrated in Ireland, competition legislation is perceived to be relatively efficient. Finally regulatory impediments to product market competition have declined in most OECD countries including Ireland.

#### 4.1.3 Labour Market Regulation

Labour market regulations refer to the set of rules governing the hiring of workers and the conditions of employment guaranteed thereafter by legislation. Labour market regulations in Ireland are not perceived to have a significant impact on business activity.

#### 4.1.4 Finance

The formation of firms and their development is dependent on access to adequate financing. Despite improvements, informal and formal investment rates are relatively low in Ireland and are dominated by high technology ventures.

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

10 *Doing Business in 2004*, World Bank.

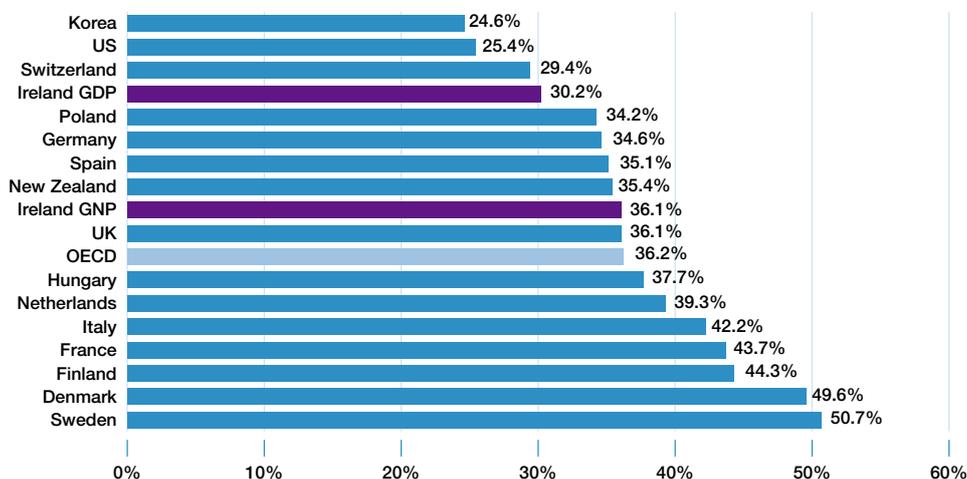
11 *Make Consumers Count - A New Direction for Irish Consumers*, Consumer Strategy Report, 2005

12 'Microeconomic Evidence of Creative Destruction in Industrial and Developing Countries', Bartelsman et. al., October 2004.

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

### 4.1.1 Taxation

**Figure 4.01 Total Tax Revenue (% GDP), 2004**

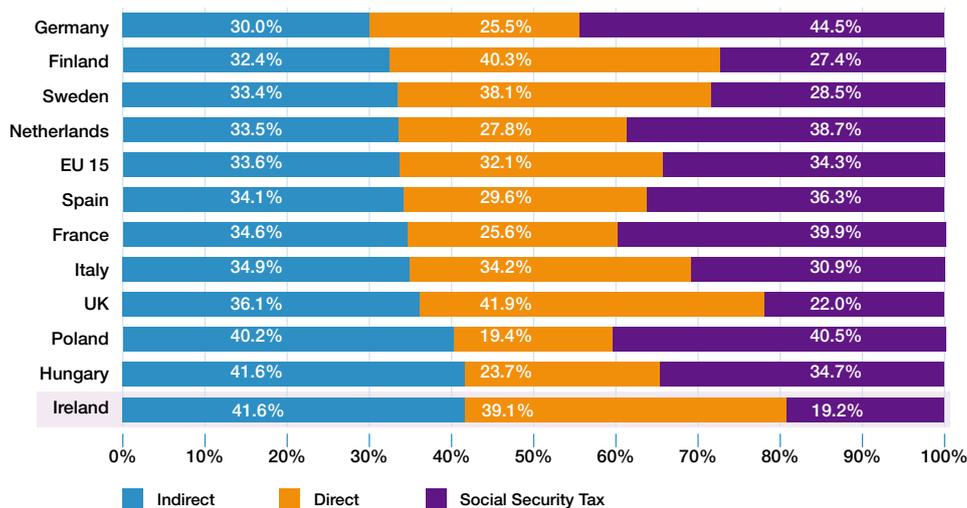


Source: OECD, Revenue Statistics 1965-2004

Total tax revenue as a percentage of GDP in Ireland has increased from 28.4% in 2002 to 30.2% in 2004, in a large part due to a surge in capital gains tax and stamp duties. In 2004, the tax-to-GDP ratio in the OECD was 36.2%, about 11 percentage points above those recorded in the US and Japan.

**OECD Ranking:**  
 GDP: 5 (↑2)  
 GNP 14(↑1)

**Figure 4.02 Breakdown of Tax Revenue, 2004**

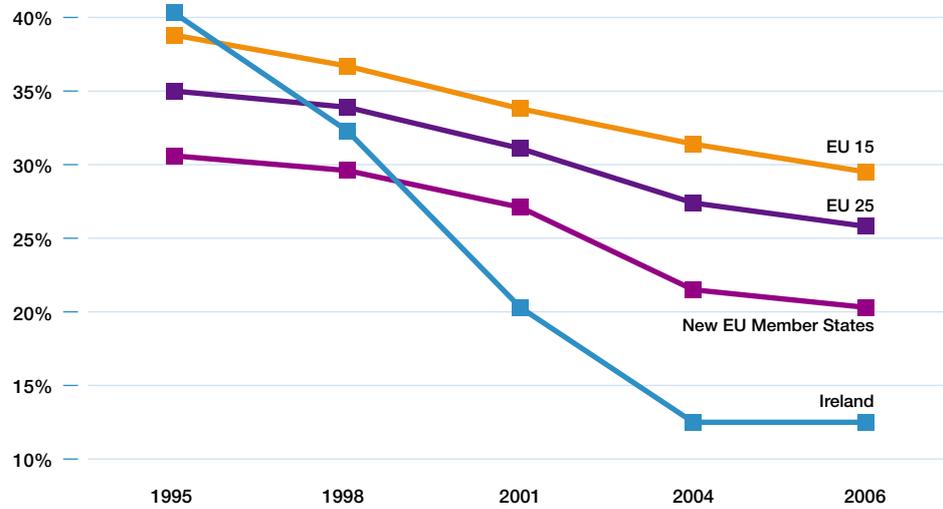


Source: Eurostat, Statistics in Focus 2/2006

A breakdown of total tax revenue between direct (taxes on income, wealth), indirect (taxes on products & imports) and social security tax (compulsory & voluntary contributions paid to government) shows that Ireland has one of the highest shares of indirect tax as a percentage of total tax revenue. This reflects a policy choice made to move taxation away from the factors of production.

**Ranking:**  
 N/A

**Figure 4.03 Top Standard Tax Rate on Corporate Income, 1995-2006<sup>21</sup>**

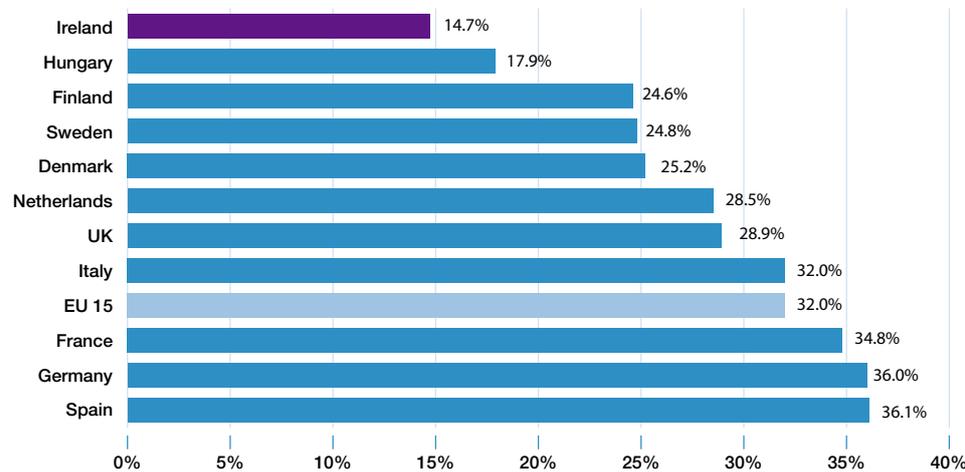


Source: Eurostat, *Structures of the Tax Systems in the EU, 1995-2004*

The EU 15 average top rate of tax on corporate income in 2006 is 29.6%, while the average rate of the ten new Member States (20.4%) is nine percentage points lower. In recent years, there has been a strong tendency to reduce corporate tax rates in both old and new EU Member States, often curtailing special tax regimes at the same time. At 12.5%, Ireland has the second lowest rate in the EU 25.

**EU 25 Ranking:**  
2

**Figure 4.04 Effective Average Tax Rate on Companies, (%), 2005**

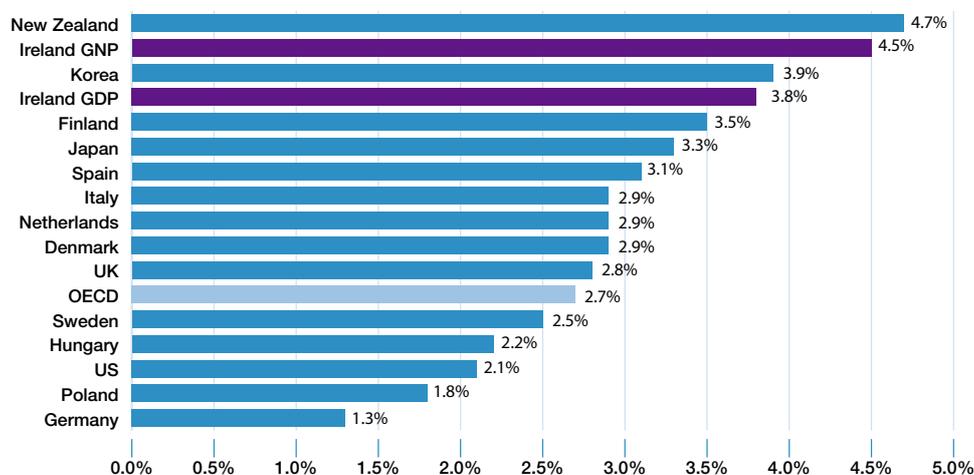


Source: CESifo, *The Effective Tax Burden of Companies in Europe, DICE Report 4/2005*, Michael Overesch

These estimates measure the burden on a hypothetical investment project, taking into account the existing tax rules in each country. It includes corporate tax rates on income, taxes on capital and local taxes (where applicable). While Ireland has the lowest average rate, this composite rate fell in six of the former EU 15 member states in 2005, highlighting a downward trend.

**EU 15 Ranking:**  
1

Figure 4.05 Corporation Tax Receipts as a Percentage of GDP, 2003



While Ireland has a low effective tax rate (standard rate plus or minus other allowances and exemptions), Ireland raises more corporation tax revenues as a % of GDP (3.8%) than most other EU countries (EU 25: 2.9%).

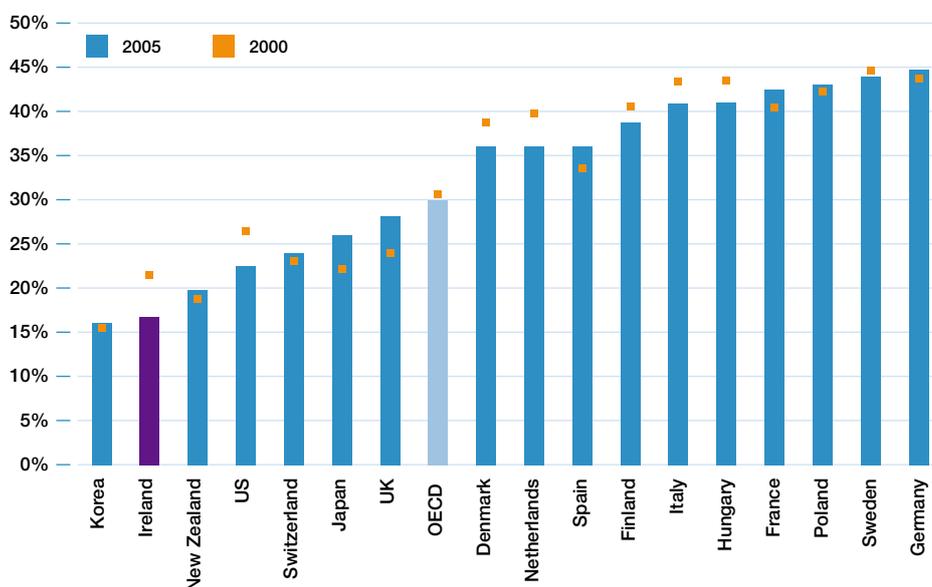
**OECD Ranking:**

GDP: 8 (↑4)

GNP: 6 (–)

Source: OECD, Revenue Statistics 1965-2004

Figure 4.06 Total Tax Wedge, Percentage of Average Earnings, 2005

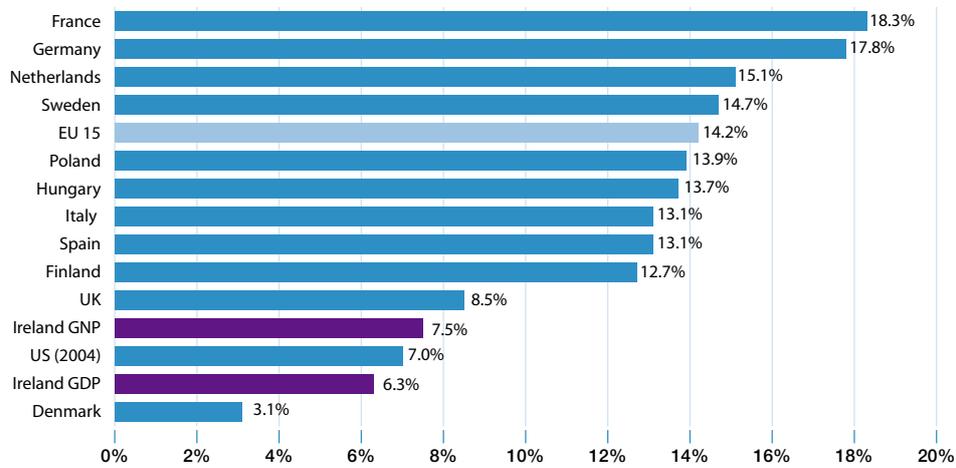


The tax wedge measures the difference between labour costs to the employer and the corresponding net take-home pay of the employee (married couple, two earners, with two children). A low tax wedge should be an incentive to work. Compared to 2000, the tax wedge on labour has fallen in 18 of the 25 EU member states, particularly in Ireland, Denmark and the Netherlands, as well as the USA.

**OECD Ranking:**

2 (↑4)

Source: OECD, Taxing Wages 2004/2005

**Figure 4.07 Social Contributions Received; General Government (% GDP) 2005**

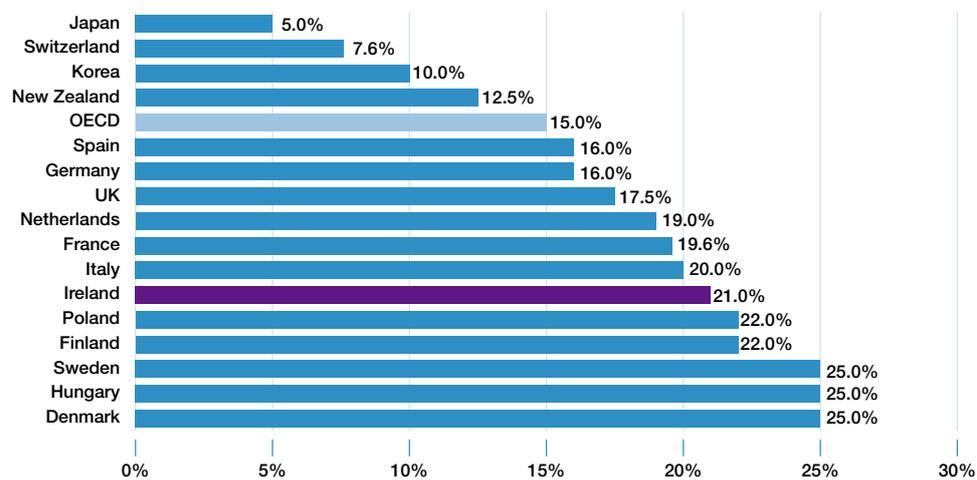
Source: European Commission, AMECO, General Government Data, August 2005

Social contributions are paid by residents or non-residents to social security funds, typically to government, in order to secure the entitlement of social benefits. The level of social contributions received in Ireland as a percentage of GDP has fallen from 7.2 per cent in 1990 to 6.3 per cent in 2005.

**EU 15 Ranking:**

GDP: 14 (--)

GNP: 13 (--)

**Figure 4.08 Value Added Tax, Standard Rate, 2005<sup>22</sup>**

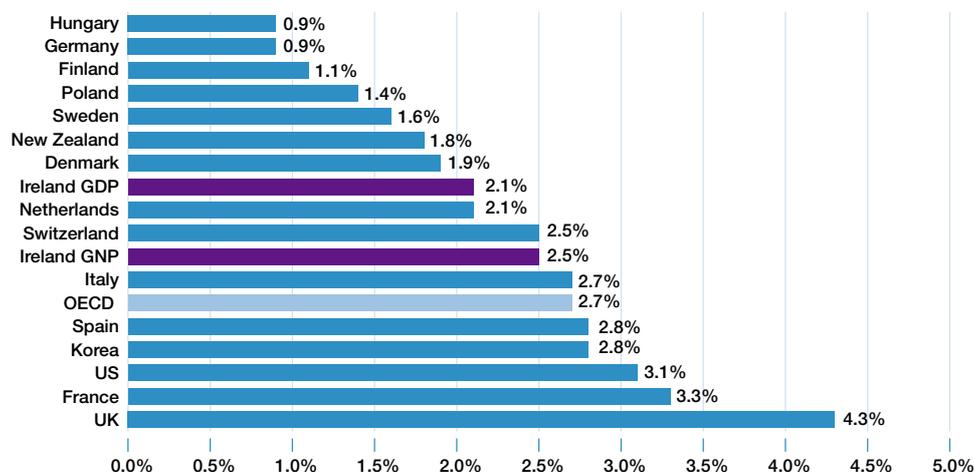
Source: OECD, Revenue Statistics 1965-2004

VAT rates across the countries listed have not changed since 2004. High rates of indirect taxation (e.g. VAT and excise taxes) can contribute to higher price levels and act as a disincentive to overseas tourists to visit Ireland. Irish excise duties on alcohol – another cost borne by tourists – are among the highest in the EU.

**OECD Ranking:**

19 (↓1)

Figure 4.09 Taxes on Property (% GDP), 2004



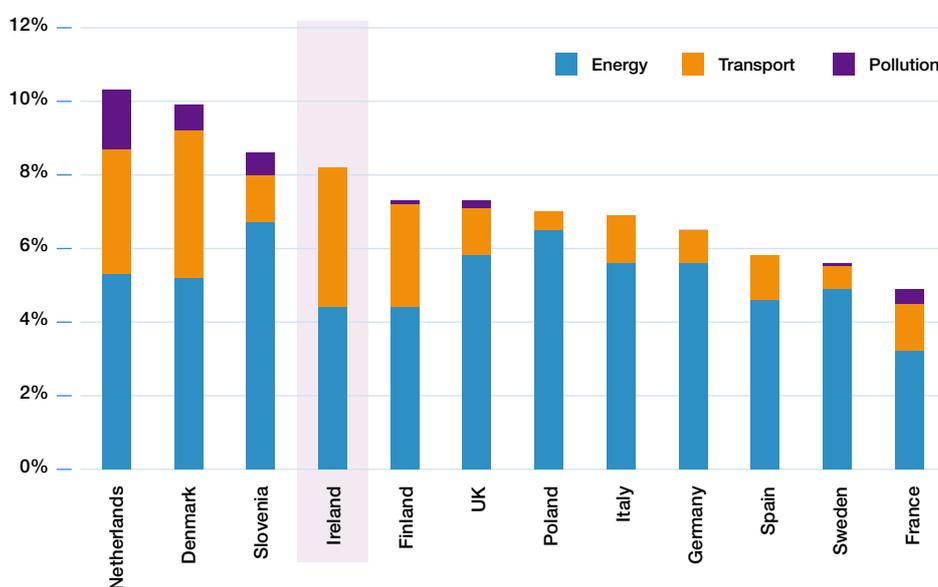
Source: OECD Tax Database [online]

In 2004, revenue from property taxes accounted for 2.5 per cent of GNP relative to the OECD average 2.7%. The major component of property tax in 2004 was stamp duty which was nearly two-third's of property tax, followed by capital gains tax and capital acquisitions.

OECD Ranking:

GDP: 16 (↓4)

GNP: 17 (↓1)

Figure 4.10 Use of Environmental Taxes by Type (as % of Total Tax Revenue), 2004<sup>23</sup>

Source: Forfás Calculations; Eurostat, Economy and Finance Indicators, 2006 [online]

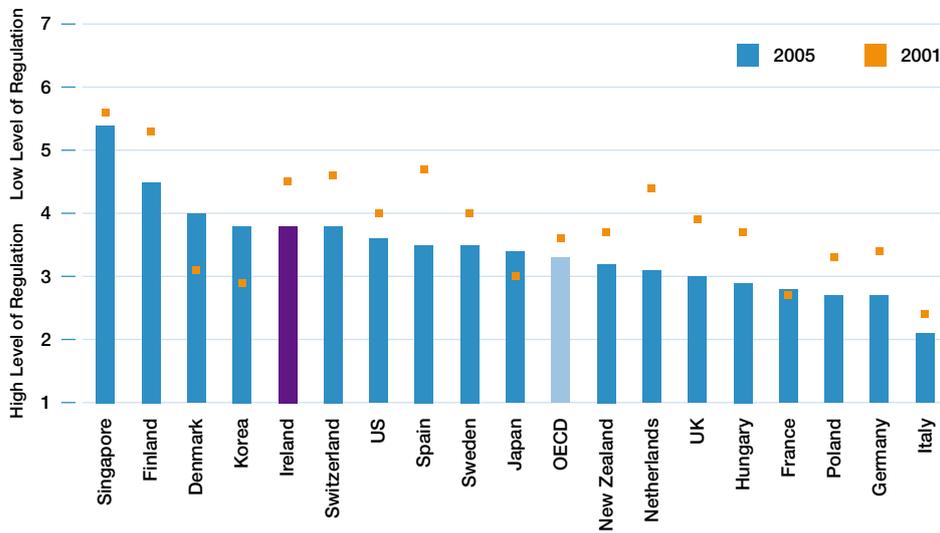
Overall, Ireland collects a relatively large proportion of its tax revenue from environmental sources. However, Ireland is disproportionately dependent on transport taxes and has among the lowest energy tax takes. Direct pollution taxes are becoming increasingly important in some countries.

EU 15 Ranking:

4 (↓1)

### 4.1.2 Regulation and Competition

**Figure 4.11 Level of Regulation, 2005 (Scale 1-7)<sup>24</sup>**



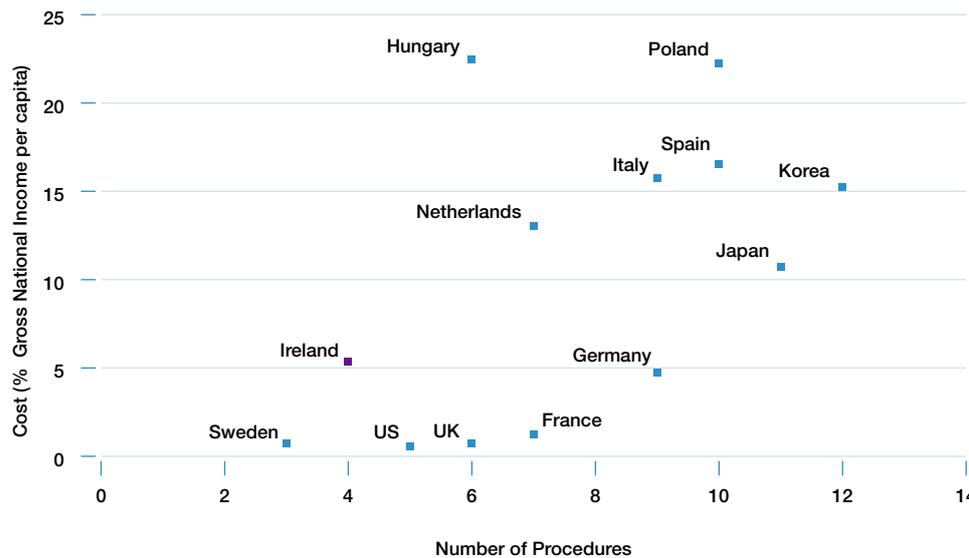
Source: WEF Global Competitiveness Report 2005/06



The WEF survey data suggests that the level of regulation on Irish enterprises is low relative to many of the other countries benchmarked.

OECD Ranking:  
4 (↑1)

**Figure 4.12 Cost of Starting a Business & the Number of Procedures Involved, 2005**



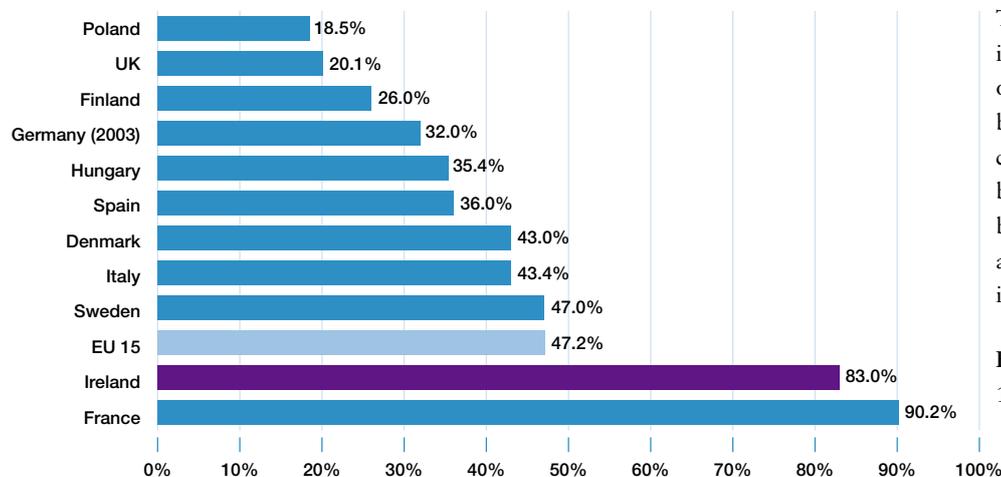
Source: World Bank, Doing Business, 2005 [online]



This chart displays the number of procedures and the cost as a percentage of annual income involved in launching a commercial or industrial firm with up to 50 employees. There are a relatively low number of procedural requirements in Ireland but Irish costs are higher than those in the leading countries.

OECD Ranking:  
14 (ranked by cost)

Figure 4.13 Market Share of Largest Generator in the Electricity Market, 2004<sup>25</sup>



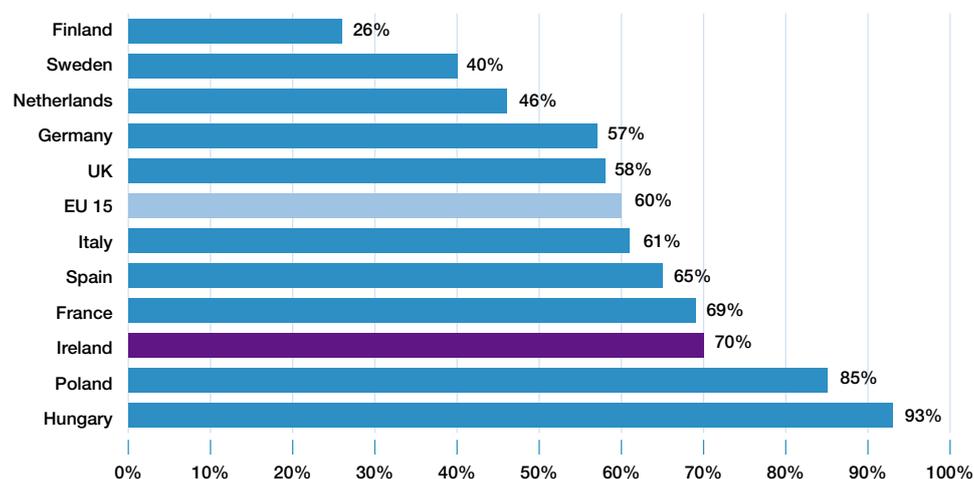
Source: Eurostat, General and Regional Indicators, 2006 [online]



The Irish electricity market is undergoing a process of market opening, but remains highly concentrated. This may be partially explained by limited cross-border and overseas network integration.

EU 15 Ranking:  
11 (↑2)

Figure 4.14 Market Share of Incumbent in International Telephone Calls, 2003<sup>26</sup>



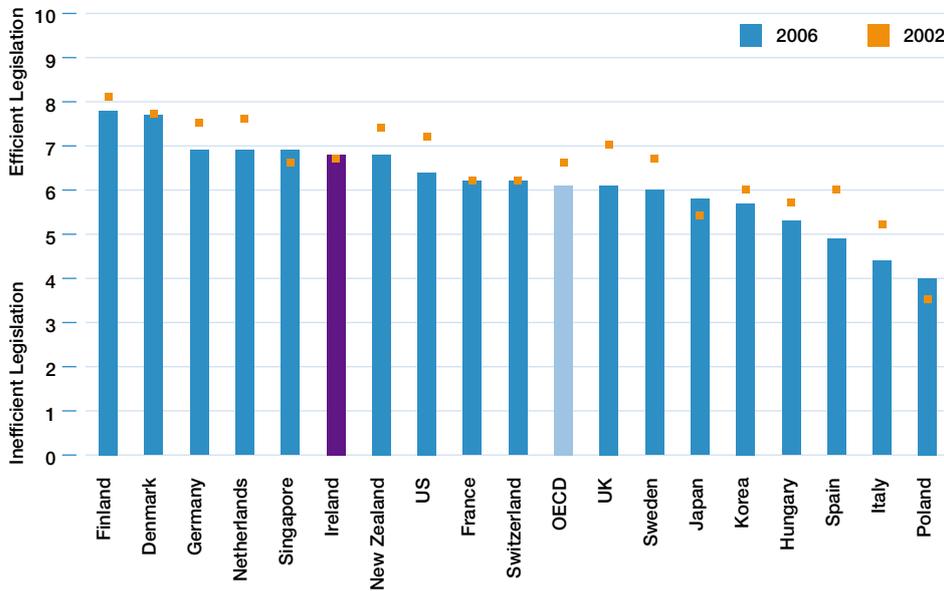
Source: Eurostat, General and Regional Indicators, 2006 [online]



This chart displays the market share of the incumbent (enterprise active on the market before liberalisation) in international calls. While, the Irish telecommunications market is open to competition, the largest player in the market still dominates, with 70% of the market.

EU 15 Ranking:  
11 (--)

Figure 4.15 Efficiency of Competition Legislation, 2006 (Scale 0-10)<sup>27</sup>



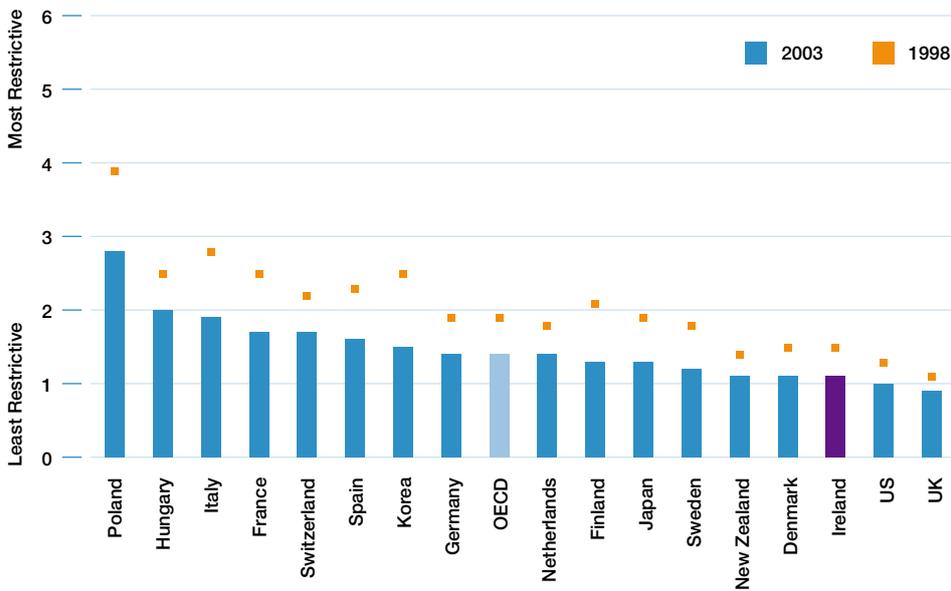
Source: IMD World Competitiveness Yearbook, 2006 [online]



Survey evidence from IMD shows that industrialists perceive Ireland to have relatively efficient legislation in preventing unfair competition.

OECD Ranking:  
8 (↑4)

Figure 4.16 Product Market Regulation, 2003 (Scale 0-6)<sup>28</sup>



Source: OECD, Going for Growth, 2006

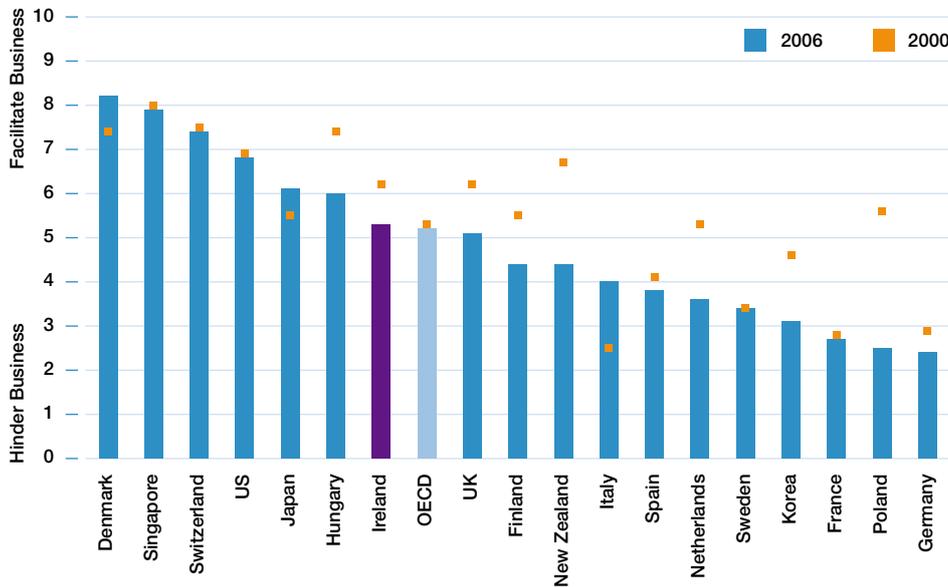


This is a comprehensive measure of the degree to which policies promote or inhibit competition in product markets. Regulatory impediments to product market competition have declined in the OECD since 1998 with product market regulation becoming more homogeneous among countries as they move to more liberalised environments.

OECD Rank:  
5 (↑2)

### 4.1.3 Labour Market Regulations

Figure 4.17 Labour Market Regulations, 2006 (Scale 0-10)



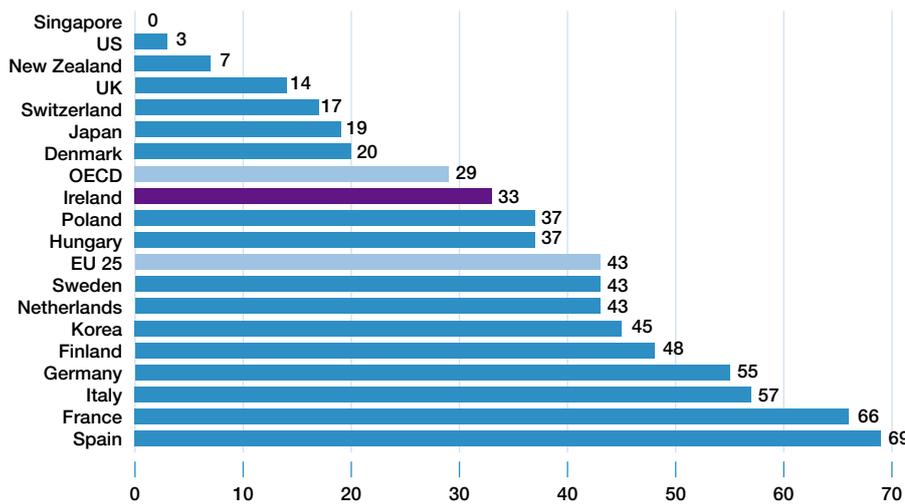
Source: IMD World Competitiveness Yearbook, 2006 [online]



According to IMD survey data, labour market regulations in Ireland are not believed to have a significant impact on business activities. However, IMD survey data suggest that labour market regulations are increasingly impacting on business activities in most countries including Ireland. Denmark is now the leading country.

OECD Ranking:  
12 (↓3)

Figure 4.18 Rigidity of Employment Index, 2005 (Scale 0-100)<sup>29</sup>



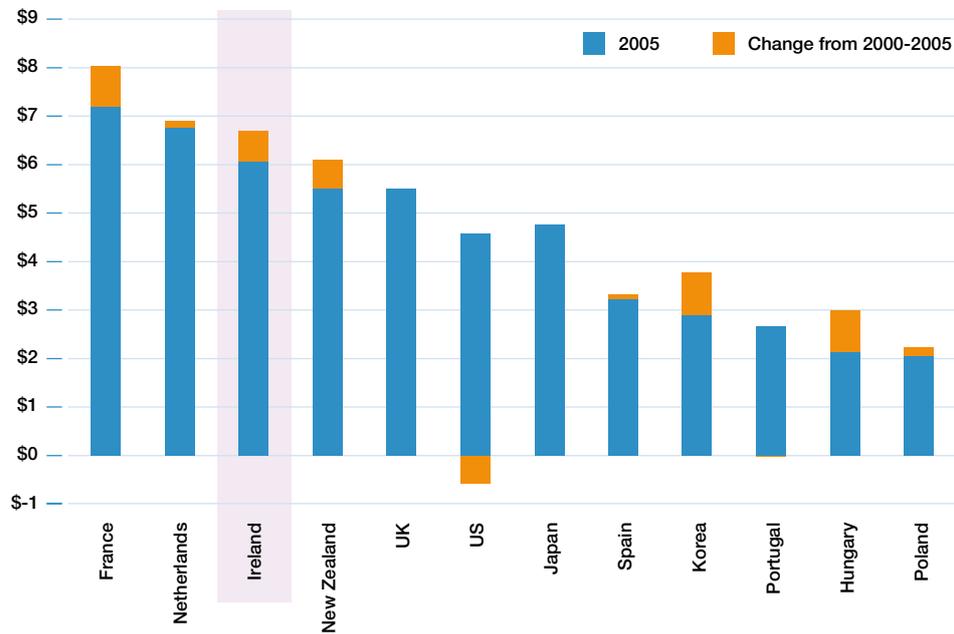
Source: World Bank, Doing Business, 2005 [online]



The World Bank's Rigidity of Employment Index is a composite indicator measuring the difficulty of hiring, the rigidity of hours worked and the difficulty of firing workers. All the sub-indices have several components and take values between 0 and 100, with higher values indicating more rigid regulation.

OECD Ranking:  
11

Figure 4.19 Real Hourly Minimum Wages US \$ PPP, 2005



Source: OECD, Annual National Accounts Database

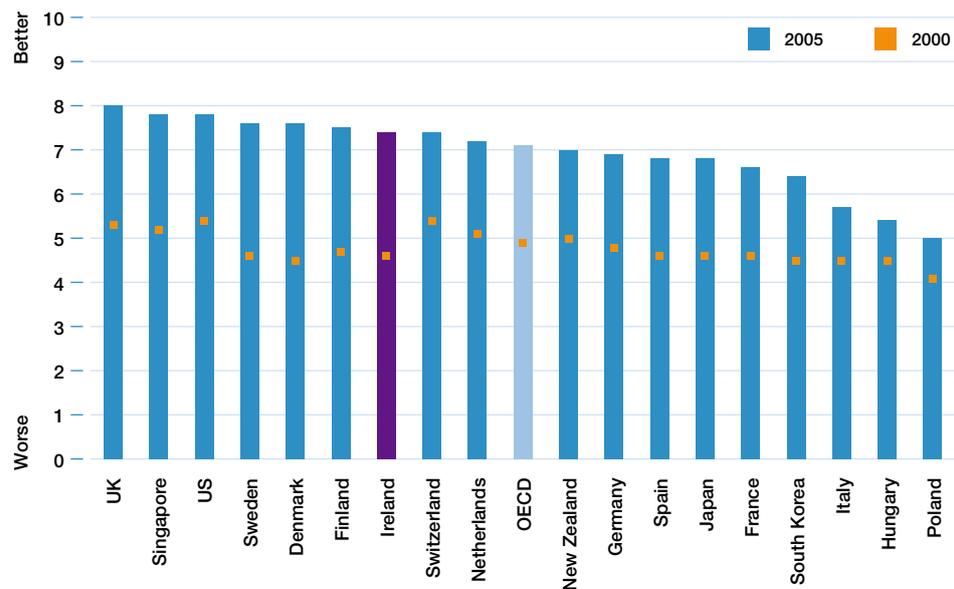


The minimum wage in Ireland increased from €7 per hour to €7.65 in April 2005. Research by ESRI suggests that the relatively high minimum wage in Ireland has had little or no impact on Ireland's national competitiveness.

Group Ranking: 3(↑)

4.1.4 Finance

Figure 4.20 Capital Access Index, 2005 (Scale 0-10)



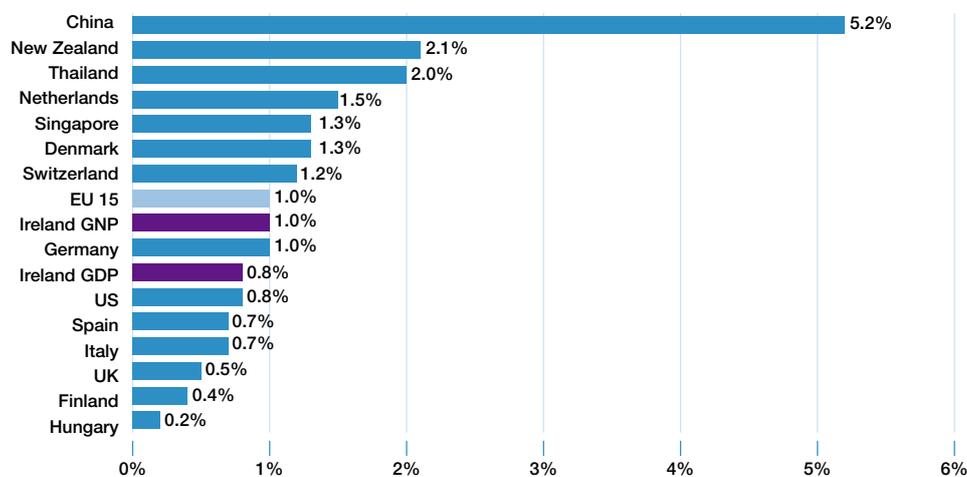
Source: Milken Institute's Capital Access Index, Securitization in Financing Economic Activities, 2005



The Milken Institute's Capital Access Index is a composite indicator of the breadth, depth and vitality of capital markets. It is based on the premise that efficient financial markets, by making capital accessible to the entrepreneurs, are the key to long-term growth. Ireland ranks in 10th place globally, an improvement of 1 place since 2004.

OECD Ranking: 8 (↑3)

**Figure 4.21 Informal Investment (% GDP), 2005<sup>30</sup>**



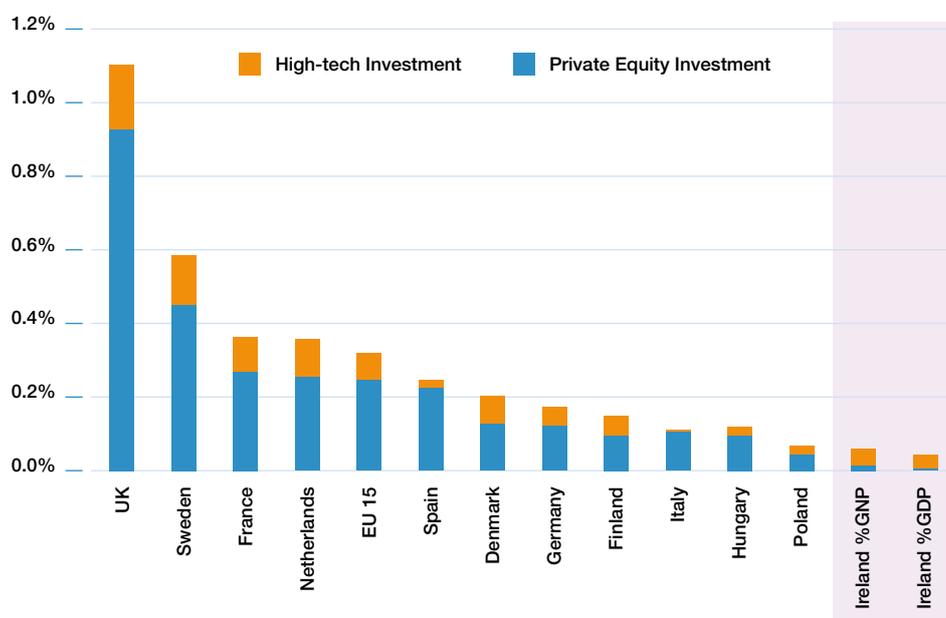
Source: Global Entrepreneurship Monitor, GEM Financing Report, 2005



Informal investments (funds sourced from family, friends or associates) are distinct from formal private equity investments by companies. These forms of investment are critical for financing business formations and start-up activity. Caution is required in interpreting the rankings of countries given the close performance of many countries.

**EU 15 Ranking:**  
 GDP: 8  
 GNP 6

**Figure 4.22 Private Equity Investment including High-Tech Investment (% of GDP), 2004<sup>31</sup>**

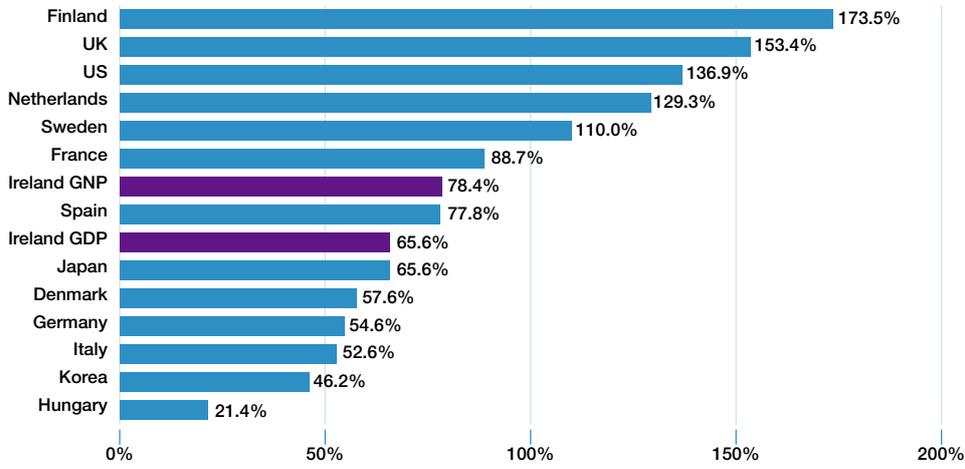


Private equity investment is formal investment outside public capital markets and represents total start up, expansion, turnaround and buyout investments. High technology investment, which is a sub-component of total private equity investment, dominates private equity investment in Ireland.

**EU 15 Ranking:**  
 GDP: 14 (↓4)  
 GNP 13 (↓5)

Source: Forfás Calculations; European Venture Capital Association (EVCA)/Thompson; PricewaterhouseCoopers, European Technology Investment Report, 2005

**Figure 4.23 Market Capitalisation (% GDP), Average 2000-2003<sup>32</sup>**



Source: OECD, *Going for Growth*, 2006



Market capitalization is the total monetary value of all outstanding shares in the national stock market. This measure suggests that the Irish stock market is relatively underdeveloped.

**OECD Ranking:**

GDP: 14

GNP: 10

## 4.2 Physical Infrastructure

The level of infrastructure in a country affects competitiveness and performance in a number of ways. Well developed infrastructure can reduce traffic congestion, increase productivity and reduce costs. This not only affects existing firms, but also affects a country's attractiveness as an investment location and general quality of life. In this section, indicators that illustrate Ireland's relative performance are grouped under four headings; investment in physical infrastructure, transport and energy infrastructure, information and communications technology infrastructure, and housing.

### 4.2.1 Investment in Physical Infrastructure

Cuts in public investment due to the difficult economic circumstances of the 1980s coupled with high GDP/ GNP growth rates in the 1990s placed significant pressures on Ireland's infrastructure. Ireland continues to rank relatively poorly in terms of the level of infrastructure stock relative to national income. However, general government investment is significantly higher in Ireland than in most developed economies. Despite investments to date, Ireland is ranked 22nd in the OECD in terms of perceived quality of infrastructure. However, Ireland's performance has improved noticeably since 2001.

### 4.2.2 Transport and Energy Infrastructure

Ireland as an island economy, trading in the global marketplace, relies heavily on transport infrastructure and services. Well developed transport infrastructure reduces delivery times and cuts costs across the enterprise sector, promotes tourism, and increases consumer choice. Similarly, reliable and competitively priced energy is critical in terms of competitiveness.

Irish business people still rank Ireland poorly for transport (road, air, and sea) and energy infrastructure relative to leading countries. This is supported by harder evidence which ranks Dublin 28th out of 30 cities and regions in terms of the average peak-hour speeds of cars.

### 4.2.3 Information and Communications Technology (ICT) Infrastructure

Improvements in ICT have transformed international commerce, social interaction, political relations and development issues. This section benchmarks ICT expenditure, the usage of broadband and the availability of public services online.

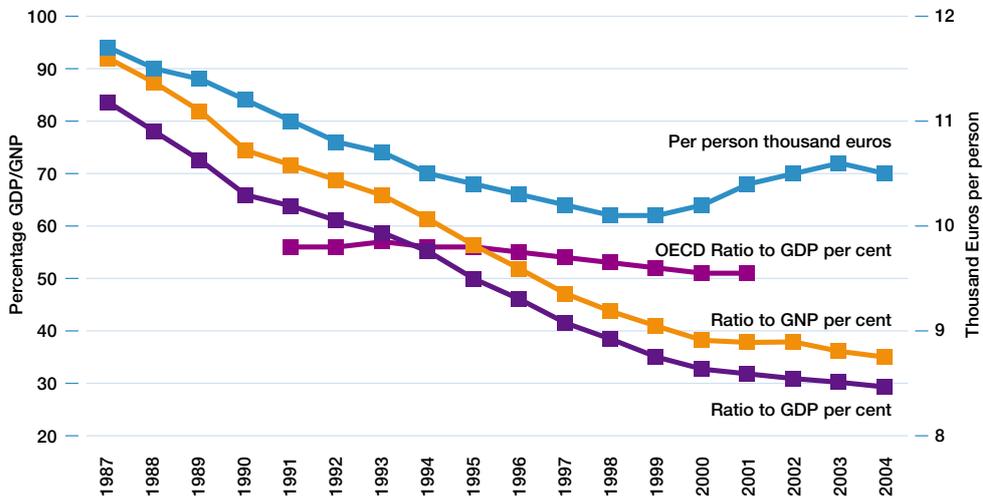
Ireland's expenditure on ICT is close to the EU 15 average. Despite growth, Ireland continues to perform particularly poorly with respect to broadband usage. While Irish enterprise broadband take-up has increased from 19% in 2003 to 48% in 2005, the leading countries have take-up rates of over 80%.

### 4.2.4 Housing

A stable and affordable housing market contributes positively to economic stability and competitiveness. Despite the high rate of housing completions, the stock of housing in Ireland remains below the levels in comparator countries. House prices increased by over 230% over the period 1997 – 2006, the highest rate among the benchmarked countries. Ireland now has highest levels of household indebtedness among the comparator countries, and it continues to grow rapidly.

### 4.2.1 Investment in Physical Infrastructure

**Figure 4.24 Ireland's Public Capital Stock as a % of GDP and per Person (2003 prices)**

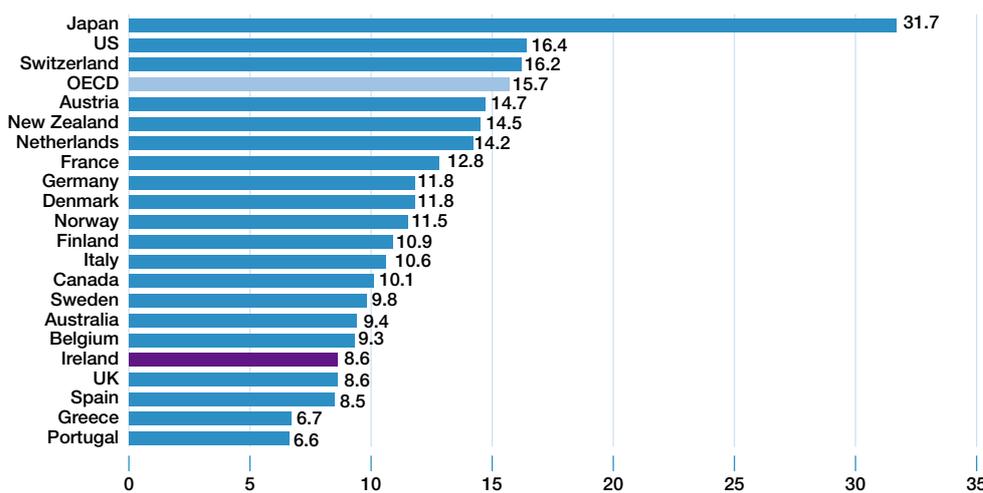


Source: OECD (2005), *Economic Outlook 78 database* and Kemps, C. (2004), "New Estimates of Government Net Capital Stocks for 22 OECD Countries: 1960-2001", IMF Working Paper

This indicator measures the level of public capital stock relative to national income. Examples of government capital stock include roads, railways, airports, schools and hospitals. While capital stock as a percentage of GDP continues to fall, it has started to grow on a per person basis. A high rate of infrastructural investment since 2000 is likely to account for this.

**Ranking:**  
N/A

**Figure 4.25 Public Capital Stock per Person in Thousand \$, 2006<sup>33</sup>**

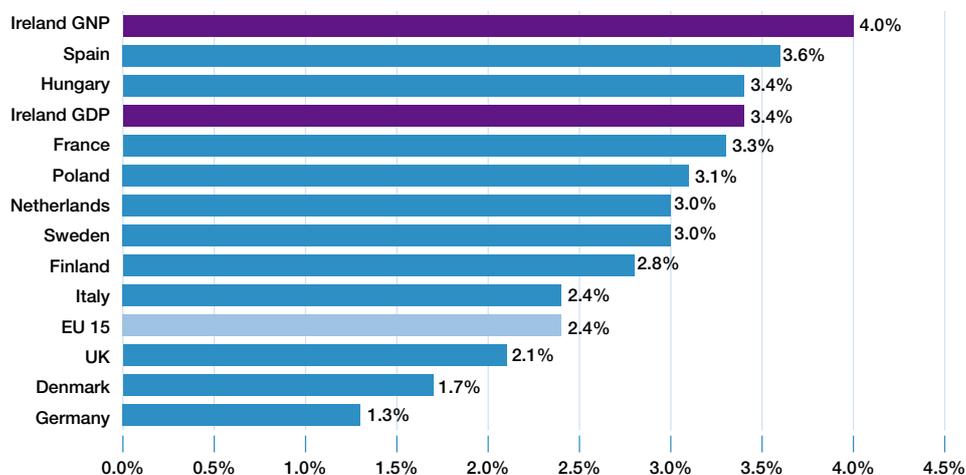


Source: OECD (2005), *Economic Outlook 78 database* and Kemps, C. (2004), "New Estimates of Government Net Capital Stocks for 22 OECD Countries: 1960-2001", IMF Working Paper

Levels of public capital stock per person in Ireland compare poorly with other countries, with the estimated amount just over half the OECD average. Among the OECD countries in the chart, only the UK, Spain, Portugal and Greece rank lower. This may be due to cuts in public investment during the late 1980s, coupled with high growth rates in the 1990s.

**OECD Ranking:**  
17

**Figure 4.26 General Government Gross Fixed Capital Formation (% GDP), 2005**



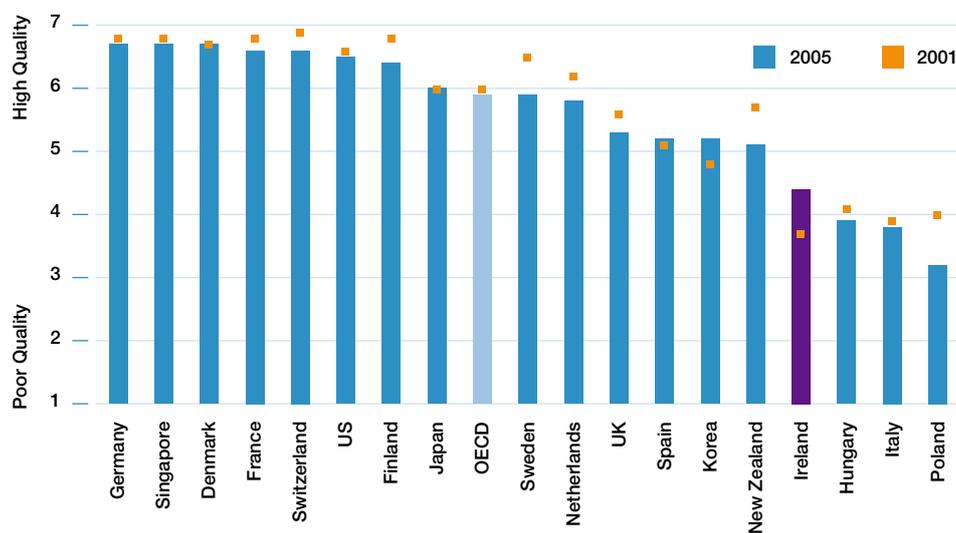
Source: Eurostat, Structural Indicators



The 1999 National Development Plan (NDP), which provided for an investment of €51.5 billion, has resulted in higher levels of investment in gross fixed capital formation as a percentage of GNP in Ireland than in other countries. Direct government investment as a percentage of GNP fell from 4.3% in 2004 to 4.0% in 2005. A New National Development Plan is expected in early 2007.

**EU 15 Ranking:**  
 GDP: 5 (--)  
 GNP: 2 (↓1)

**Figure 4.27 Overall Infrastructure Quality, 2005 (Scale 1-7)<sup>34</sup>**



Source: WEF Global Competitiveness Report 2005/06

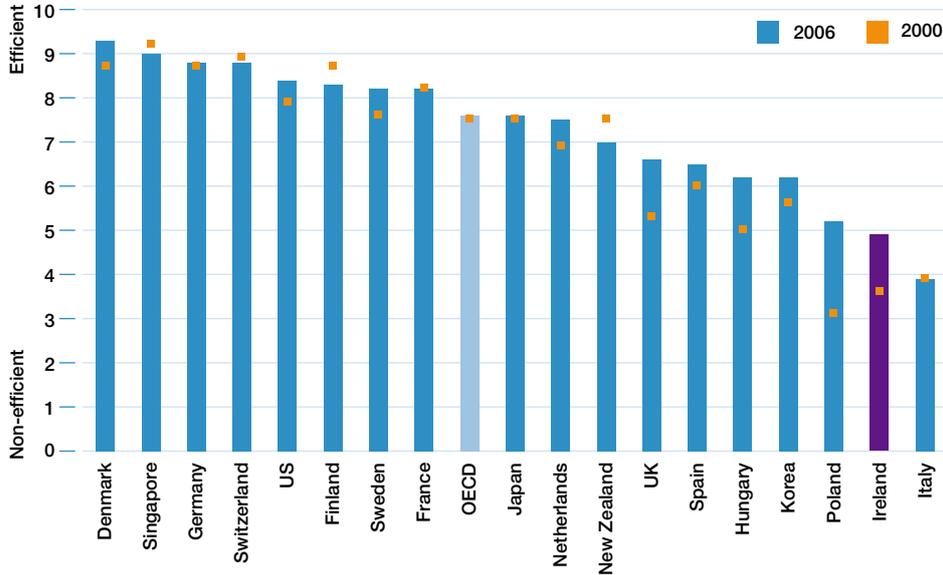


This chart measures industrialists' perceptions of overall infrastructure quality, encompassing transport, energy, ICT and housing infrastructure. The performance of weaker countries such as Ireland and Korea has improved since 2001. The performance of Finland, Sweden, New Zealand and Poland has fallen since 2001.

**OECD Ranking:**  
 22 (↑3)

### 4.2.2 Transport and Energy Infrastructure

Figure 4.28 Efficiency of Distribution Infrastructure, 2006 (Scale 0-10)



Source: IMD World Competitiveness Yearbook, 2006 [online]

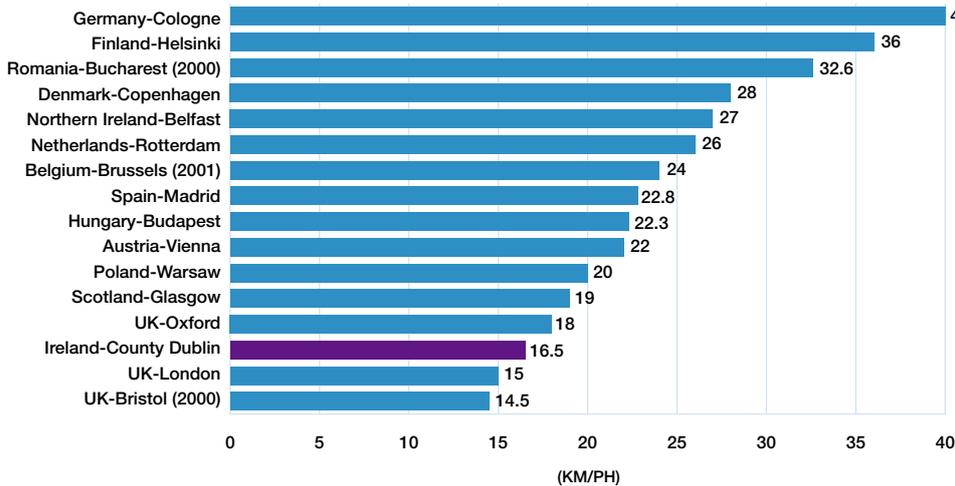


This chart measures industrialists' perceptions of the efficiency of distribution infrastructure and includes road, rail, air and sea transport. While Ireland continues to rank poorly, there has been a notable improvement in our performance since 2000.

OECD Ranking:

27 (↓1)

Figure 4.29 Average Peak Hour Speeds in Major Cities (KM/ Per Hour), 2002/3



Source: Urban Transport Benchmarking Initiative [online] / Dublin Transportation Office

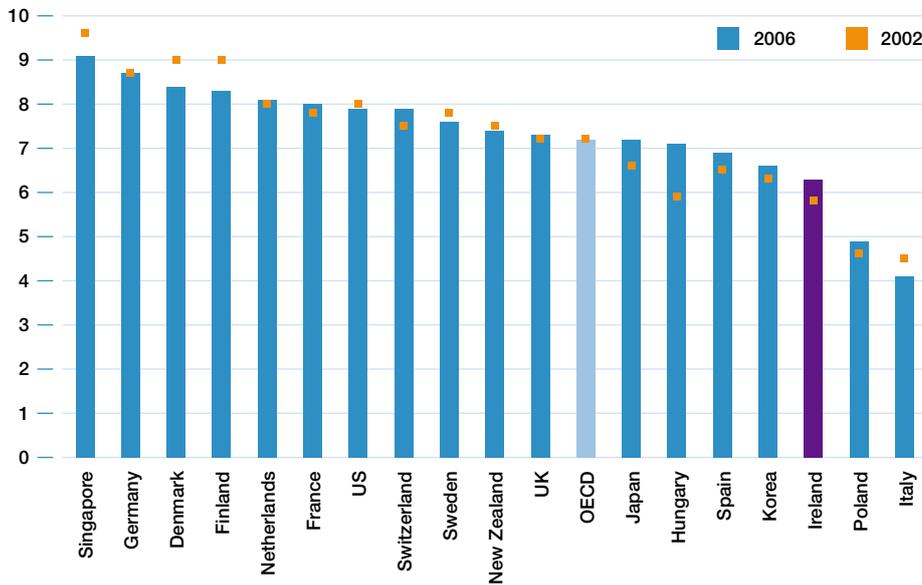


A possible measure of transport congestion in our main cities and regions is the average peak-hour speeds of cars and motorcycles in these cities. Dublin is ranked 28th out of 30 cities and regions on this measure. The Irish car speed data is taken from the Dublin Transport Office. It should be noted that Dublin refers to car speeds only. However, motorcycle speeds have very little bearing on the overall result.

Group Ranking:

17

**Figure 4.30 Quality of Air Transportation, 2006 (Scale 0-10)<sup>35</sup>**



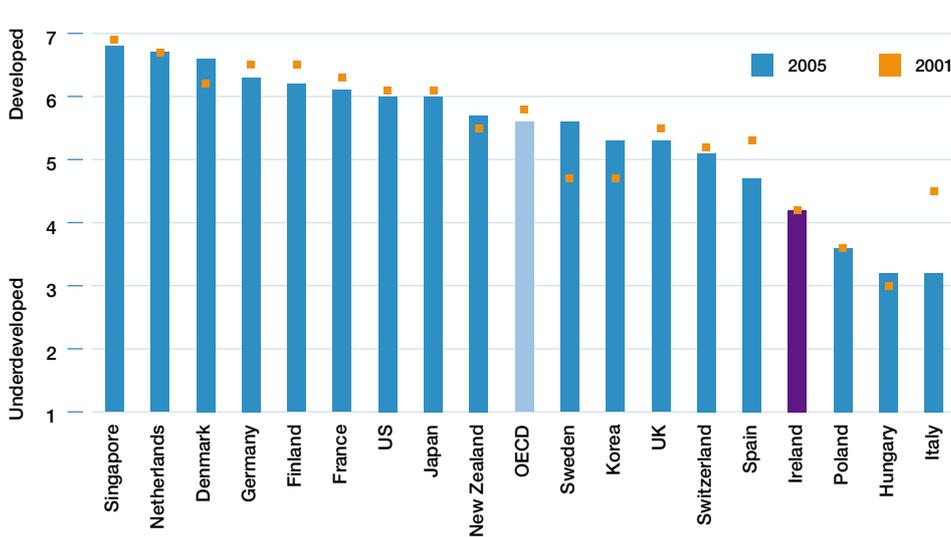
Source: IMD World Competitiveness Yearbook, 2006 [online]



This chart measures industrialists' perceptions of the quality of Ireland's air transportation infrastructure. The second terminal at Dublin airport, scheduled to open in 2009, should enhance Ireland's relatively poor score.

**OECD Ranking:**  
18 (↑7)

**Figure 4.31 Port Infrastructure Quality, 2005 (Scale 1-7)<sup>36</sup>**



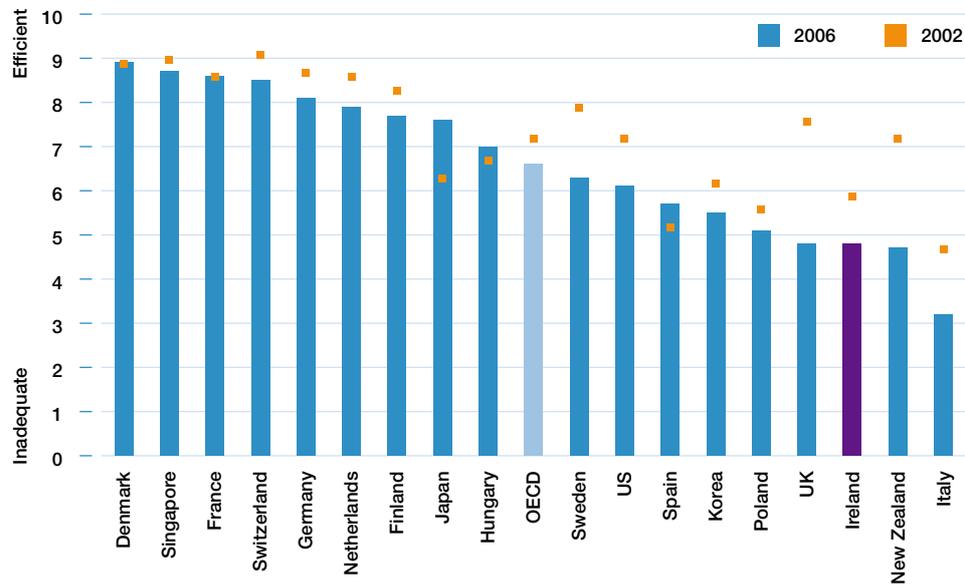
Source: WEF Global Competitiveness Report 2005/06



This chart examines industrialists' perceptions of the quality of Ireland's port infrastructure and inland waterways. Ireland's score in 2005 remains similar to our score in 2001.

**OECD Ranking:**  
23 (↓1)

Figure 4.32 Energy Infrastructure, 2006 (Scale 0-10)<sup>37</sup>



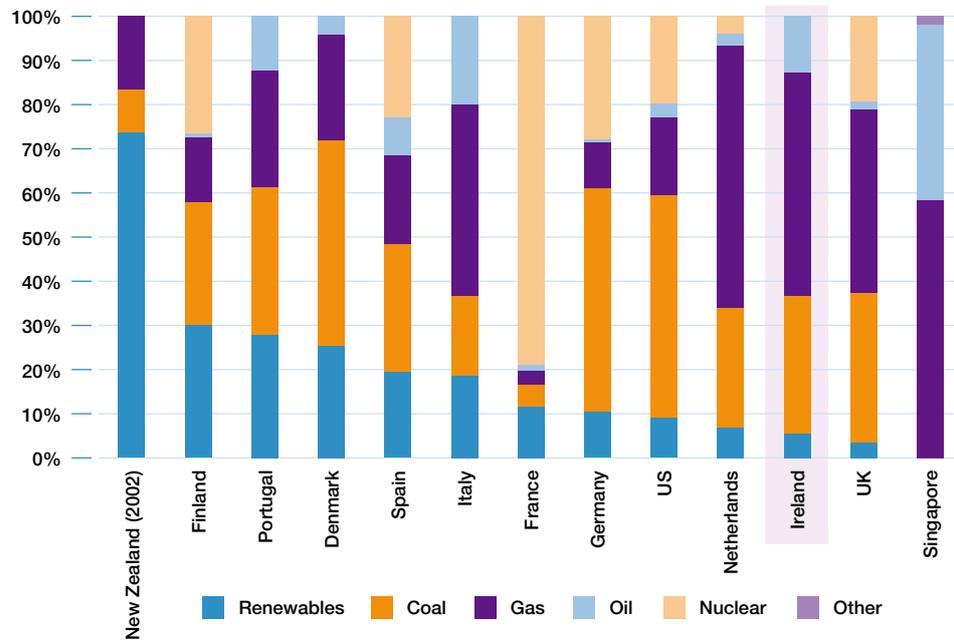
Source: IMD World Competitiveness Yearbook, 2006 [online]



Industrialists' perceptions of the efficiency of energy infrastructure have weakened across many countries since 2002, including Ireland.

OECD Ranking:  
26 (↓2)

Figure 4.33 Fuel Mix for Electricity Generation, 2004<sup>38</sup>



Source: Forfás Calculations; International Energy Agency

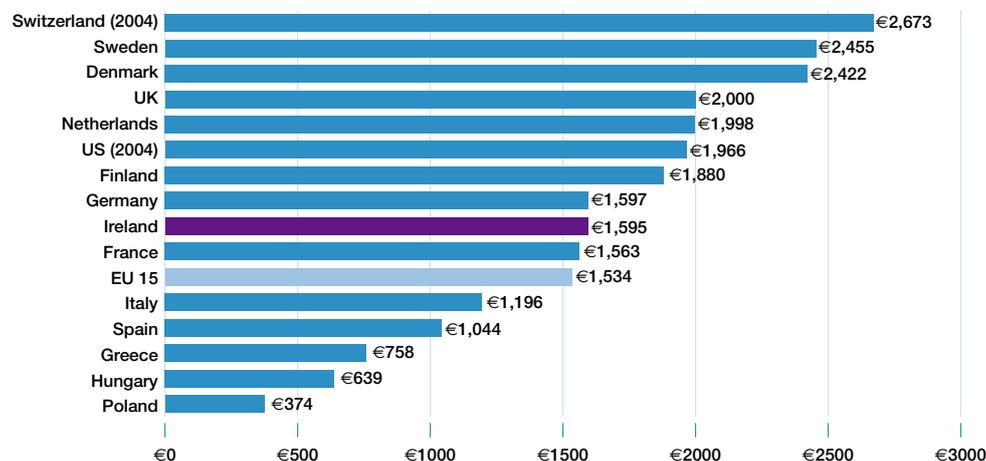


A country's fuel mix is an illustration of the extent to which a country might be exposed to international fuel shortages or transport interruptions as well as their level of exposure to carbon prices. Ireland's reliance on gas is increasing; from 37 percent in 2000 to 51 percent in 2004.

Group Ranking:  
(ranked by renewables) 11

4.2.3 ICT

Figure 4.34 ICT Expenditure per Capita (€), 2005<sup>39</sup>



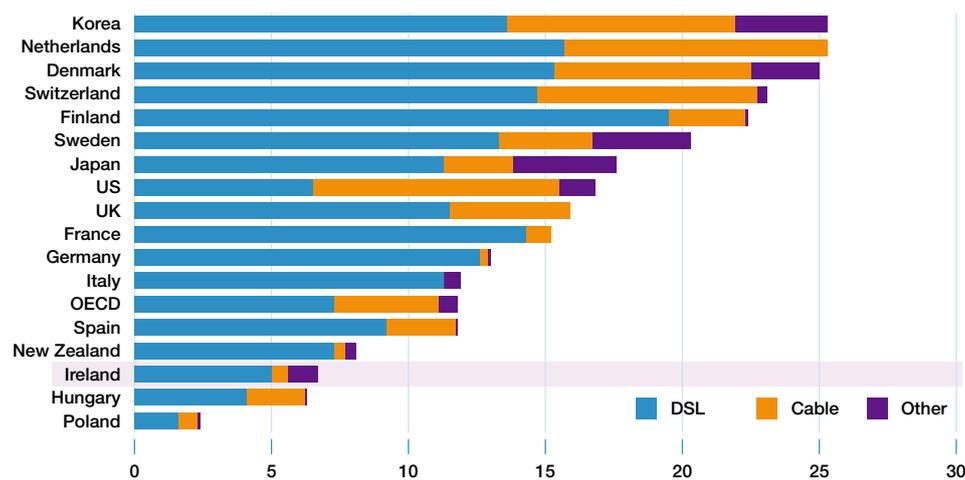
Source: European Information Technology Observatory (EITO), 2006



Ireland's expenditure per capita on ICT is slightly above the EU15 average. Better use of ICT has been identified as one of the key factors required to improve Ireland's productivity performance.

EU 15 Ranking:  
9

Figure 4.35 Broadband Subscribers per 100 Inhabitants, by Technology, Dec 2005<sup>40</sup>

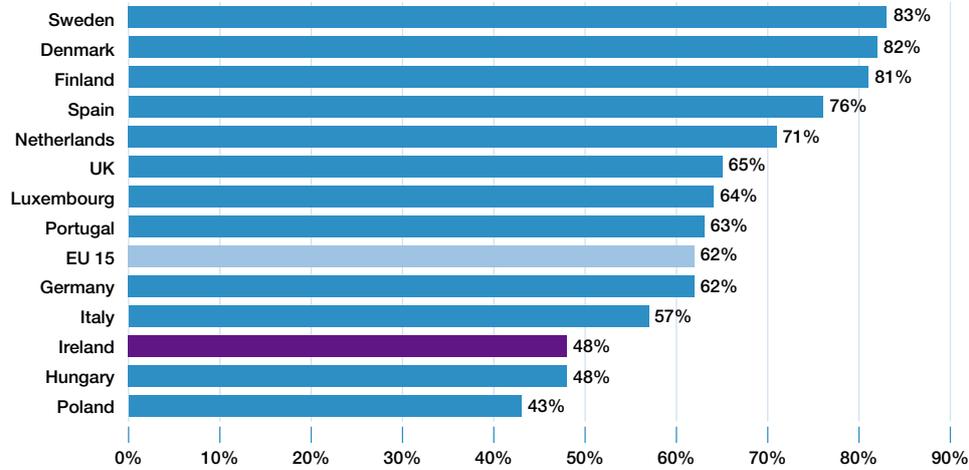


Source: OECD, ICT Indicators [online]



Broadband access can be provided by different means: digital subscriber line (DSL), wireless, cable, dedicated leased lines, satellite and optical fibre. In the EU (including Ireland), DSL is the predominant technology and represents approximately 80% of all broadband lines. However, usage of cable, wireless and other technologies is growing. However, Ireland's overall performance remains poor.

OECD Ranking:  
23 (-)

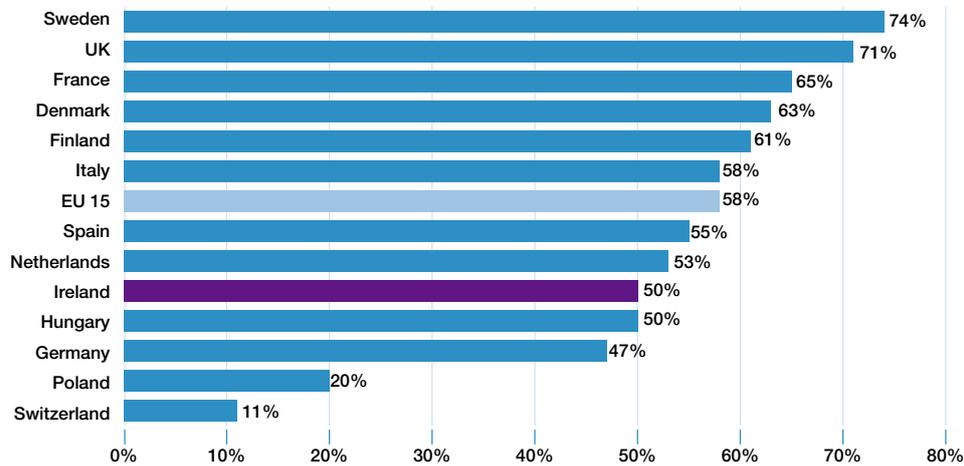
**Figure 4.36 Percentage of Enterprises with Broadband, 2005<sup>41</sup>**

Source: Eurostat, Information Society Indicators, 2006



This indicator shows the percentage of companies with a broadband connection who employ 10 or more people. Irish enterprise broadband take-up has increased from 19% in 2003 to 48% in 2005. Take-up rates vary by firm size with take up rates of 43%, 62% and 86% for small, medium and large firms respectively.

**EU 15 Ranking:**  
14 (--)

**Figure 4.37 Public Services Available Online, 2004<sup>42</sup>**

Source: Capgemini, Online Availability of Public Services: How is Europe Progressing, June 2006

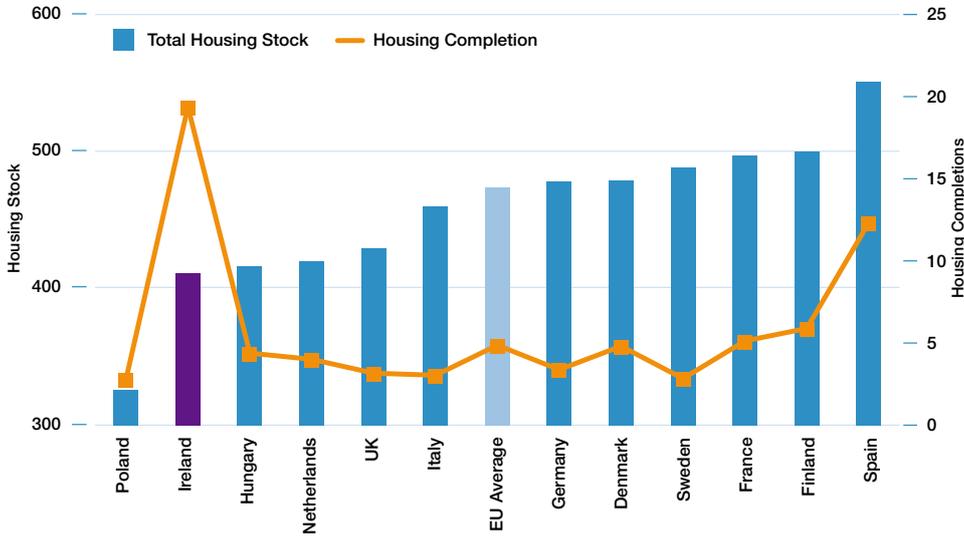


This indicator shows the percentage of 20 basic public services which are fully available online i.e. for which it is possible to carry out full electronic case handling. There has been a decline in Ireland's relative performance as other nations have advanced.

**EU 15 Ranking:**  
11 (↓3)

4.2.4 Housing

Figure 4.38 Total Housing Stock and Completions (Dwellings per 000 of Population), 2004<sup>43</sup>

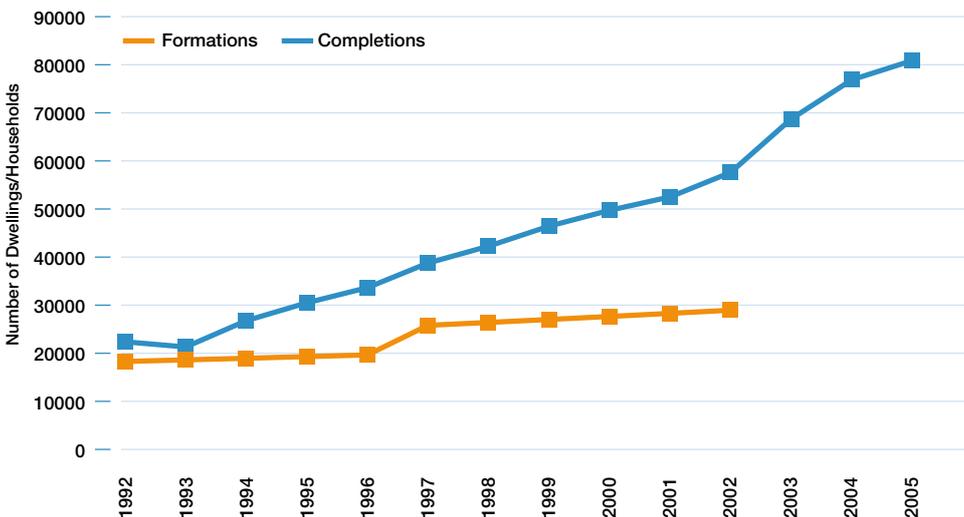


In 2004, Ireland's total housing stock remained below the EU-15 average of 467 dwellings per 1000 of population. Total house completions in 2005 were almost 81,000 and figures for the first two months of 2006 indicate continued increases in the amount of house completions.

EU 15 Ranking:  
Stock 14 (↑1)  
Completions 1 (--)

Source: European Mortgage Federation, Hypostat, 2004

Figure 4.39 Household Formation and Completions (Annual Averages), 1992-2005<sup>44</sup>

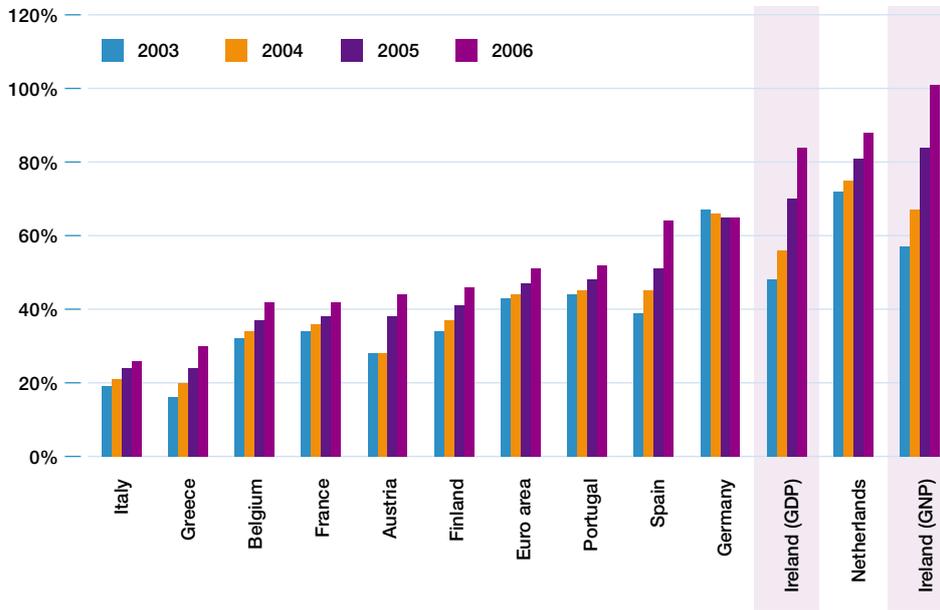


This chart displays a diverging pattern between the number of houses built and the number of new households formed. The data suggests that the number of household completions is far higher than the number of new households formed. Up-dated household formation data will be available upon the release of the Census 2006.

Ranking:  
N/A

Source: Forfás Calculations; Central Statistics Office, Housing and Households Statistics

**Figure 4.40 Household Borrowing as a % of GDP (2003-2006)**

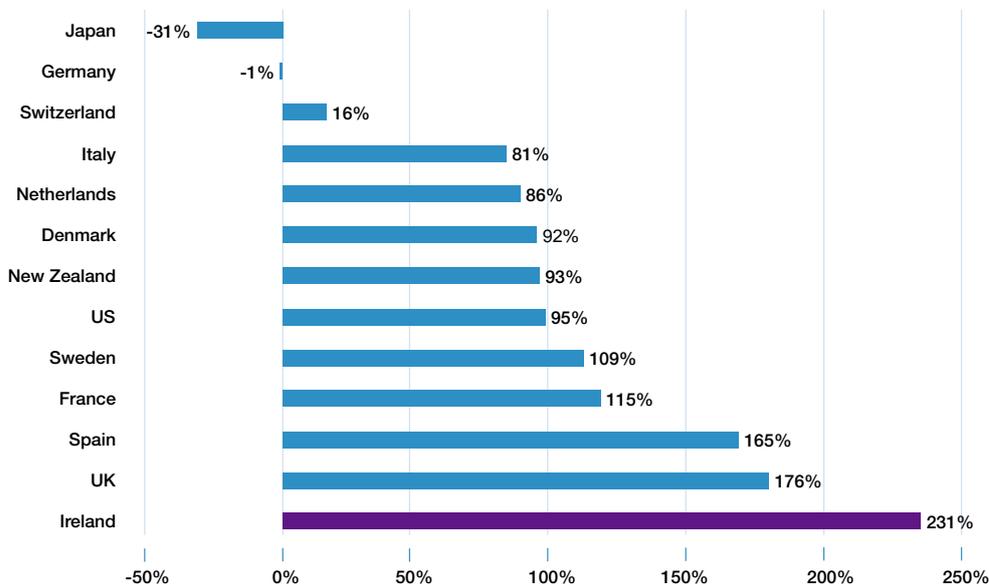


In 2006, Ireland (GNP) has the most indebted household sector among the benchmark countries. In addition, Ireland had the second highest growth rate over the last twelve months at 10.3 percent. At an aggregate level, mortgage debt and household borrowings can be offset against the value of Irish housing assets and personal deposits, which have also increased significantly.

**Ranking:**  
N/A

Source: European Central Bank, Aggregated Balance Sheet of Euro Area Monetary Financial Institutions

**Figure 4.41 National House Price Index Change (%), 1997-2006**



Between 1997 and 2005, the Economist Intelligence Unit estimates that Irish house prices have increased by 231%. Ireland's house price boom started in 1992, earlier than all but one other OECD economy, and average house price inflation per quarter has been higher in Ireland than anywhere else.

**OECD Ranking:**  
28

Source: Economist Intelligence Unit

## 4.3 Knowledge Infrastructure

Education, training and research and development form key parts of a nation's infrastructure for generating knowledge. This section assesses Ireland's performance in this area.

### 4.3.1 Education Overview

Education is becoming increasingly important to economic performance. Education increases individual incomes, and an increase in a country's average education level positively affects aggregate output.<sup>14</sup> High levels of investment in education lead to a number of other personal and social benefits, including increased social inclusion, lower crime, reduced welfare dependence and better health.<sup>15</sup> This section examines Ireland's relative performance and investment levels over the educational lifecycle (pre-primary, primary, secondary, tertiary and life long learning).

A relatively high number of people in Ireland of working age have a third level qualification (26%). However, a relatively large share of the working age population have only a lower secondary education or below (38%). At each level of education, pre-primary, primary, secondary and tertiary, Irish spending per student is below that of the OECD average, most notably for primary and secondary levels. Relative to other OECD countries, private expenditure accounts for a marginally lower proportion of tertiary funding, and a significantly higher proportion of pre-primary funding.

### 4.3.2 Pre-Primary and Primary Education

The number of students in pre-primary education remains low relative to other countries benchmarked. At primary level, the OECD average for the ratio of students to teaching staff in primary school is 16.0 compared with Ireland's 18.7.

### 4.3.3 Secondary Education

Ireland has made significant progress over time and relative to other countries in terms of increasing secondary school participation rates. Provisional data for 2005 suggests that Ireland (86.1%) now exceeds the Lisbon target of 85%. However, 38% of the overall working age population do not have an upper secondary school graduation. Irish children aged 15 perform better than the OECD average in terms of reading literacy and below the OECD average for scientific and mathematical literacy. The availability of computers in Irish secondary schools remains relatively low.

### 4.3.4 Tertiary Education & Life-Long Learning

While a relatively high proportion of the Irish population in the 25-34 age group has a third level education, the numbers in fourth level remains low. The performance of Irish third level institutions ranks far behind the leading institutions overseas.

Life long learning is defined as all learning activity undertaken throughout life, with the aim of improving knowledge, skills and competencies. Adult participation in life long learning remains relatively low in Ireland.

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

15 'European Economy No. 6 / 2003', *European Commission*.

#### 4.3.5 Research and Development (R&D)

The transition to a knowledge economy requires higher levels of expenditure in research and development, both in terms of capital infrastructure and softer supports and programmes. This section examines various measures of private and public expenditure in research and development and the outputs achieved.

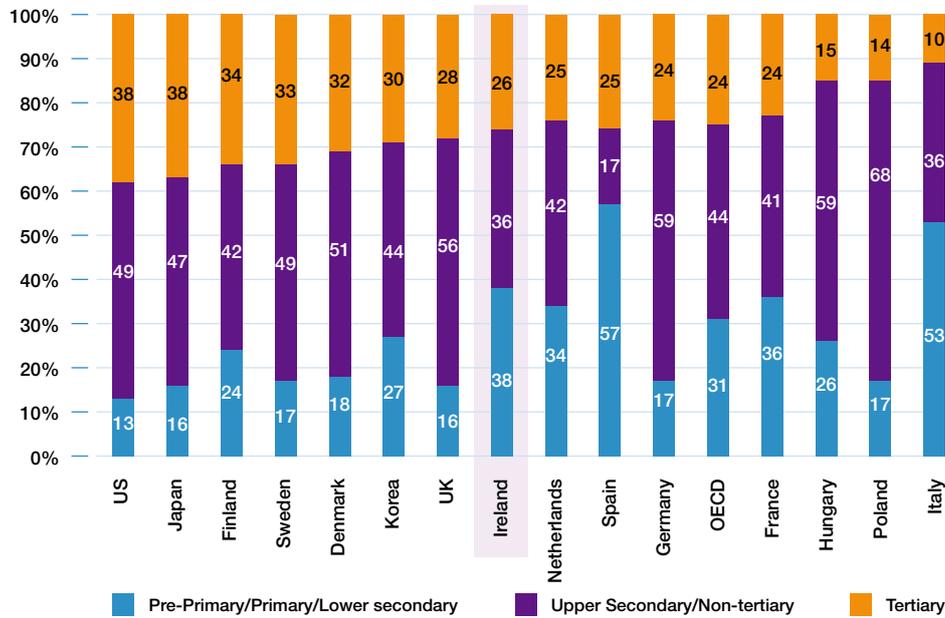
Despite a large increase in gross domestic expenditure on R&D, Ireland is making limited progress towards the Irish and the Lisbon target. Total R&D spending in Ireland increased from 1.35% of GNP in 2002 to 1.43% of GNP in 2004. This compares with an OECD average of 2.24%. Despite having one of the strongest growth rates in business R&D performance, business expenditure on R&D as a percentage of economic activity has remained static as the strong R&D gains only matched the strong economic growth posted in the period. Most business expenditure on R&D in Ireland is undertaken by foreign-owned companies.

The higher education sector has significantly increased its R&D spending from €322 million in 2002 to €492 million in 2004, a 53% increase supported by direct government funding through SFI and the Programme for Research in Third-Level Institutions. Linkages between the private sector and third-level education, however, as measured by industry-financed higher education R&D, remain poor. The R&D Action Plan for Promoting Investment in R&D has set a target of 9.3 researchers per 1000 of total employment by 2010. Some progress has been made, with the number of researchers growing from 5 per 1000 total employment in 2001 to 5.8 in 2004.

4.3.1 Education Overview



**Figure 4.42 Educational Attainment of Population Aged 25-64 by Highest Level of Education (%), 2003<sup>45</sup>**

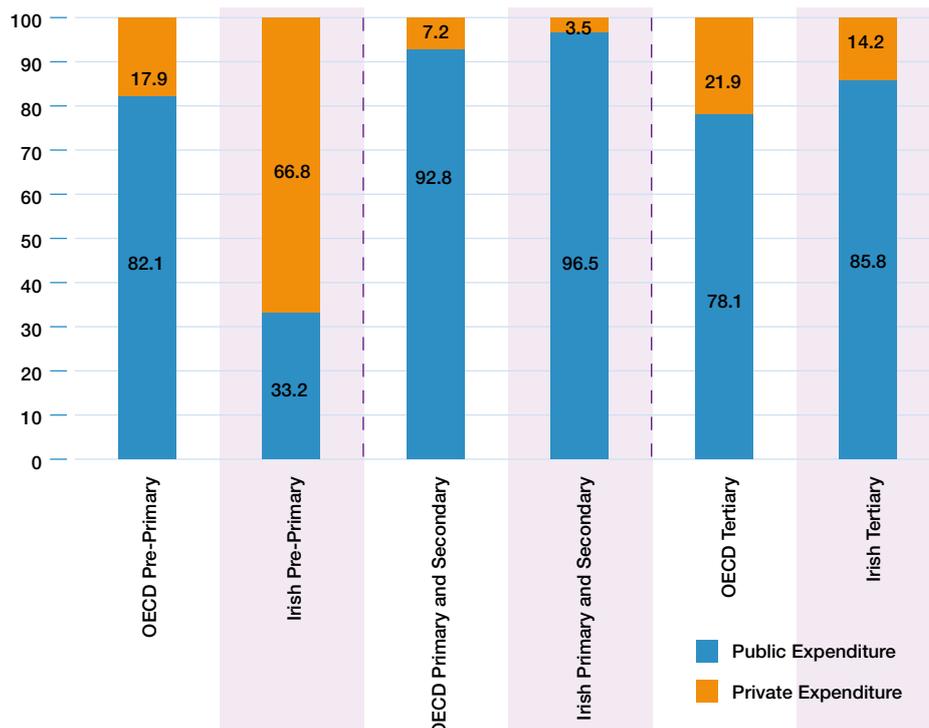


A relatively high number of people in Ireland of working age have a third level qualification (26%). However, a relatively large share of the working age population have only a lower secondary education or below (38%).

**OECD Ranking:**  
(Ranked by third level)  
13

Source: OECD, *Education at a Glance*, 2005

**Figure 4.43 Relative Public and Private Expenditure on Educational Institutions (%), 2002**

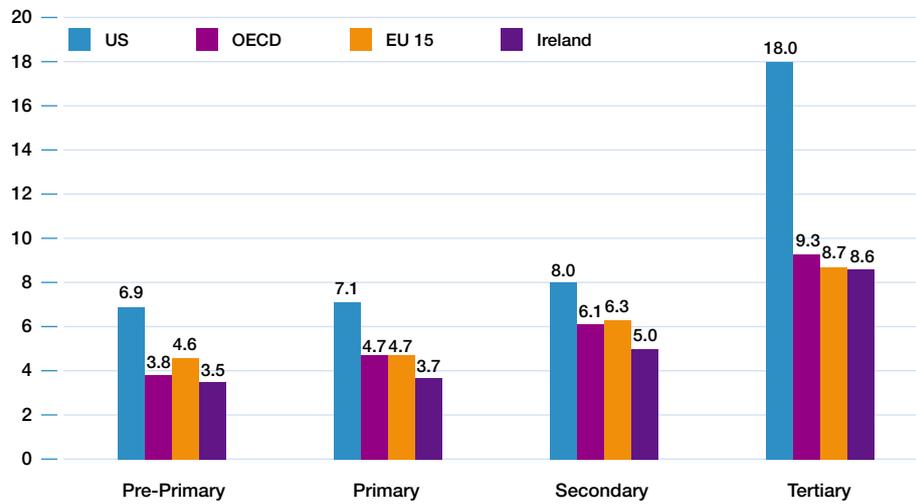


In the OECD, 84 per cent of funds for education come from public sources. Private funding is more dominant in Ireland in pre-primary education and plays a weaker role in tertiary education.

**Ranking:**  
N/A

Source: OECD, *Education at a Glance*, 2005

**Figure 4.44 Annual Expenditure on Educational Institutions – per Student (€'000s PPP), 2002<sup>46</sup>**

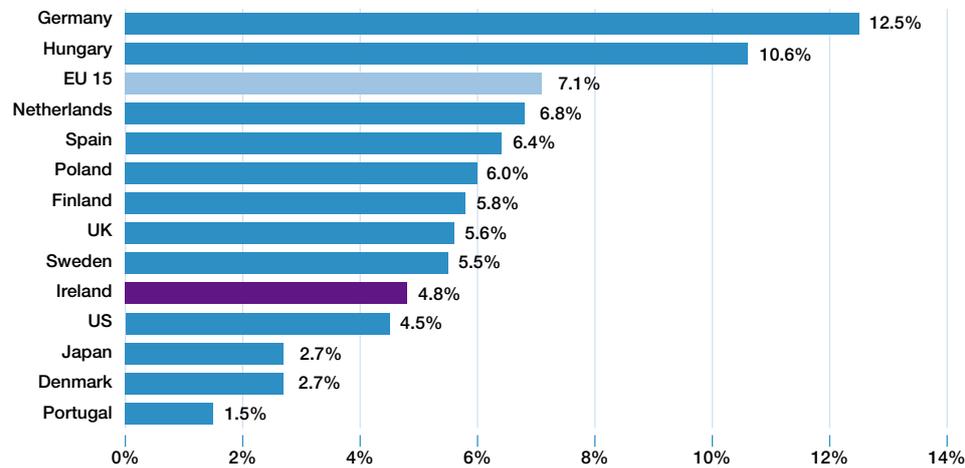


Source: OECD, *Education at a Glance*, 2005

At each level of education, pre-primary, primary, secondary and tertiary, Irish spending per student is below that of the OECD average, most notably at primary and secondary levels. The US spends more across all four levels, particularly for tertiary education.

**OECD Ranking:**  
 Pre-Primary 13 (↑4)  
 Primary 21 (↓2)  
 Secondary 21 (↓1)  
 Tertiary 11 (↓2)

**Figure 4.45 Share of University Expenditures Financed by the Business Sector, 2003<sup>47</sup>**



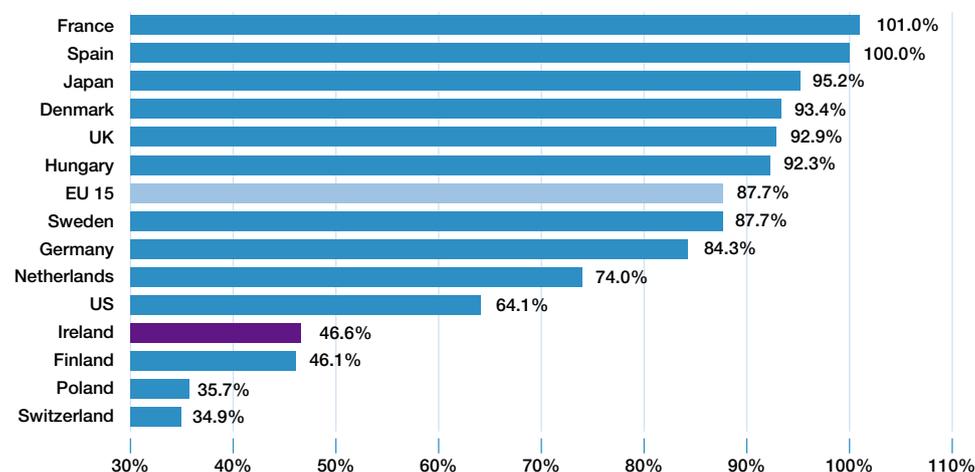
Source: European Commission, *European Innovation Scoreboard*, 2005

This chart measures the degree to which the business sector contributes to university funding. Ireland's performance is relatively weak and this ratio has fallen from 6.8% in 1998.

**EU 15 Ranking:**  
 8 (--)

### 4.3.2 Pre-Primary and Primary Education

**Figure 4.46 Participation of Four Year Olds in Education (%), 2004**



Source: Eurostat, *Population and Social Conditions*, 2006 [online]

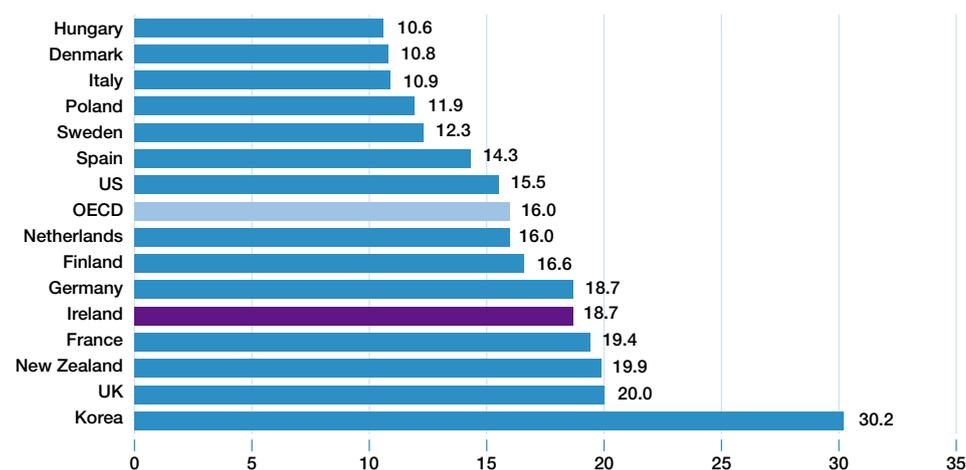


In 2004, almost half of all Irish 4 year olds were registered in either pre-primary or primary school. The vast majority of Irish 5 year olds are in formal education. Pre-primary education includes programmes which are designed for children at least three years old and not older than 6 years.

**EU 15 Ranking:**

14 (--)

**Figure 4.47 Ratio of Students to Teaching Staff in Primary Education, 2003<sup>48</sup>**



Source: OECD, *Education at a Glance*, 2005



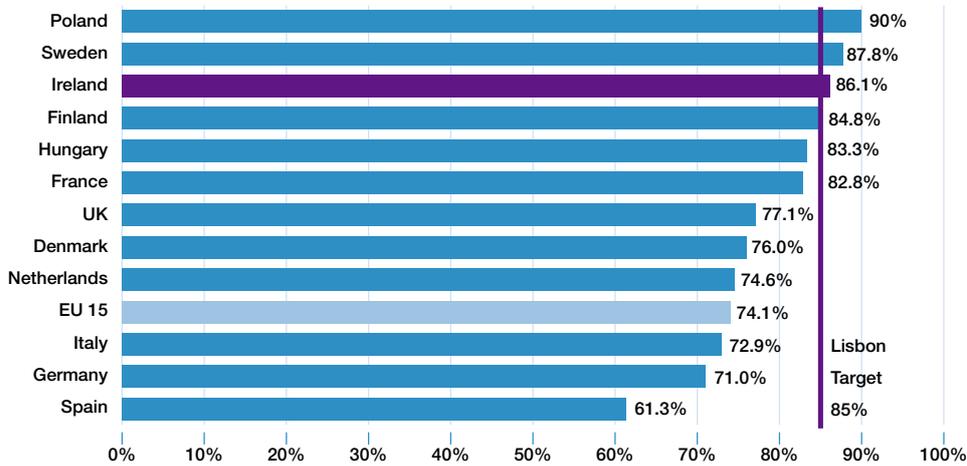
The OECD country average for the ratio of students to teaching staff in primary school is 16.0 compared with Ireland's 18.7. Most countries, including Ireland are improving under this indicator. However, over 111,000 of Ireland's 442,000 primary school students are in classes of over 30 or more.

**OECD Ranking:**

16 (↑4)

### 4.3.3 Secondary Education

**Figure 4.48** Percentage of the Population Aged 20 to 24 having Completed at Least Upper Secondary Education, 2005



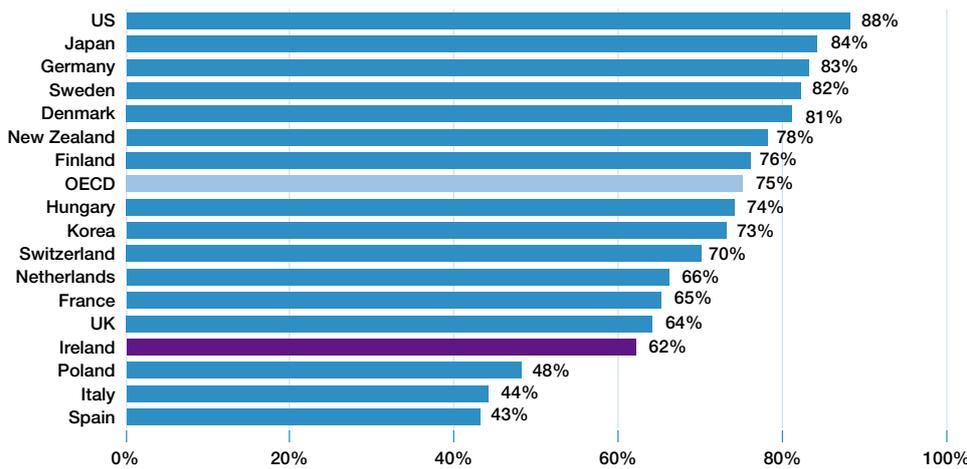
Source: Eurostat, Structural Indicators



This indicator forms a key metric in the Lisbon Agenda. It is defined as the percentage of young people aged 20-24 years having achieved at least an upper secondary education attainment level. Although this indicator is difficult to measure provisional data for 2005 suggests that Ireland (86.1%) now exceeds the EU Lisbon target of 85%, ranking reasonably well in the EU25.

**EU 25 Ranking:**  
6 (↑4)

**Figure 4.49** Percentage Aged 25-64 with at least Upper Secondary Level Education, 2003



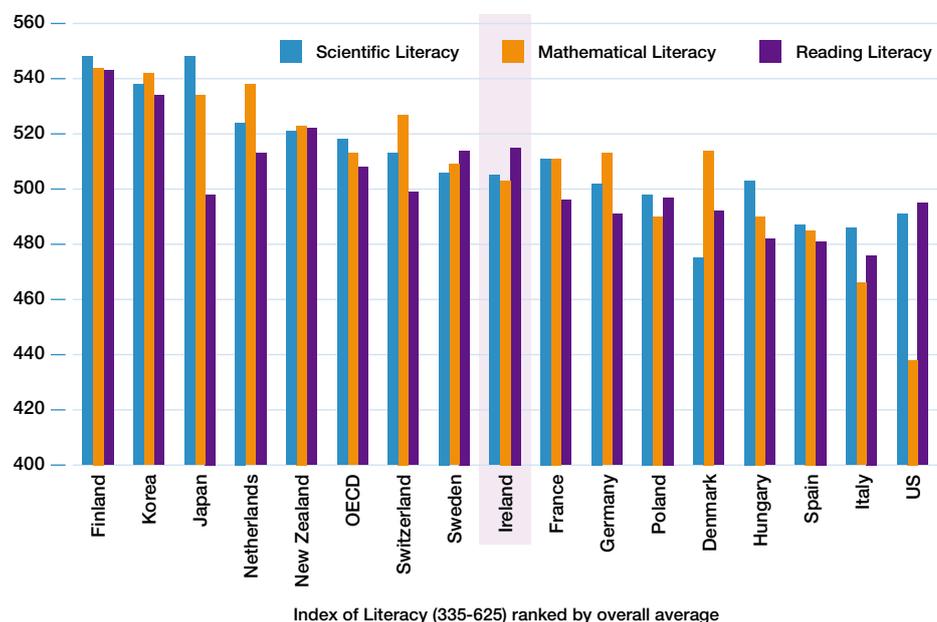
Source: OECD, Education at a Glance, 2005



Current secondary level completion rates take a long time to raise the overall level of qualifications. 62 per cent of the 25-64 age group in Ireland have attained at least upper secondary education, a rate significantly below the leading countries.

**OECD Ranking:**  
19 (↑2)

**Figure 4.50 Scientific, Mathematical and Reading literacy of 15 Year Olds, 2003**



Source: OECD, PISA Database, 2003

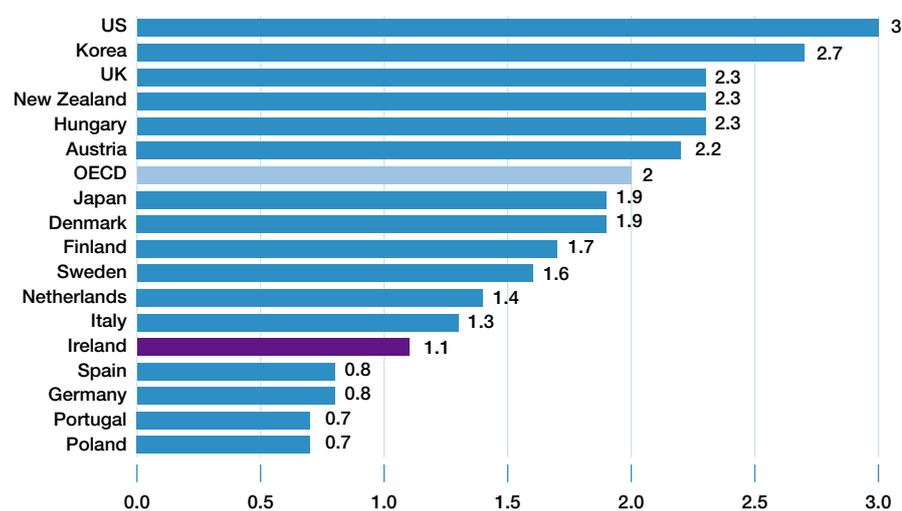


Irish children aged 15 perform better than the OECD average in terms of reading literacy and below the OECD average for scientific and mathematical literacy. It is important to note that the OECD expresses caution in interpreting small differences between countries.

**OECD Ranking:**

- Reading 6
- Science 13
- Maths 16

**Figure 4.51 Computers per 10 Students (mean), 2003<sup>49</sup>**



Source: OECD, *Are Students Ready for a Technology Rich World? What the PISA Studies Tell Us*, 2005

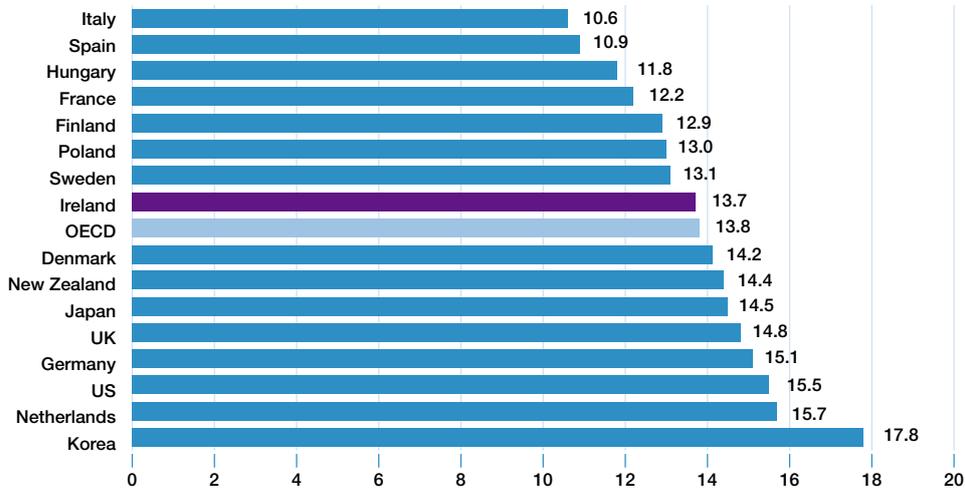


ICT has profound implications for education, both because ICT can facilitate new forms of learning and because it has become important for young people to master ICT in preparation for adult life. The chart indicates that among the benchmarked countries Ireland does not perform well in comparison to the OECD average with only half as many computers per students.

**OECD Ranking:**

20 (↑1)

**Figure 4.52 Ratio of Students to Teaching Staff in Secondary Education Institutions, 2003<sup>50</sup>**



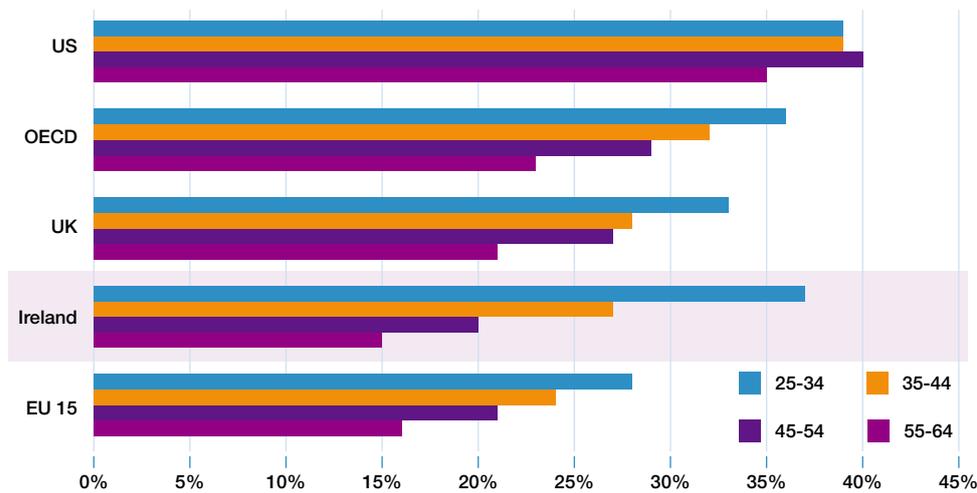
The OECD country average for the ratio of students to teaching staff in secondary school is 13.8 just above the Irish ratio of 13.7.

**OECD Ranking:**  
14 (↑6)

Source: OECD, *Education at a Glance*, 2005

### 4.3.4 Tertiary Education and Life Long Learning

**Figure 4.53 Population by Age Cohort that has at Least Third Level Education, 2003<sup>51</sup>**

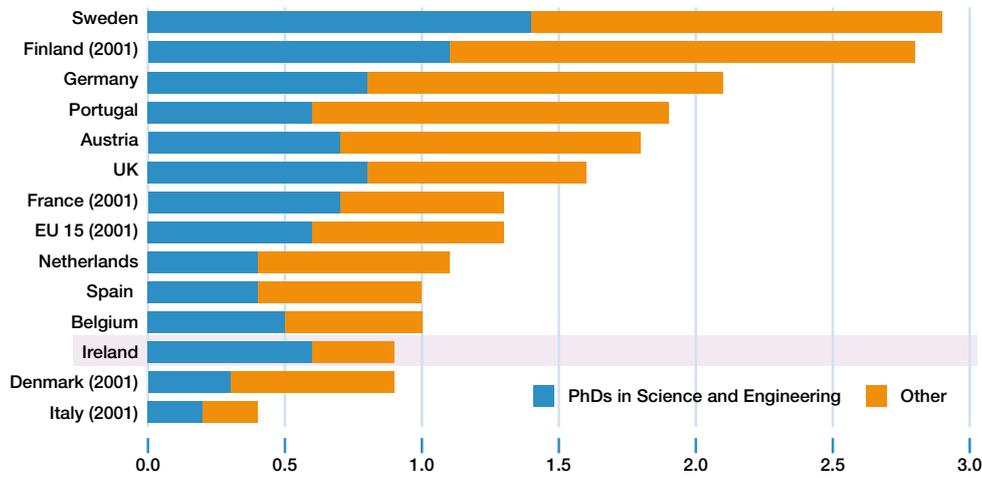


A breakdown of third-level graduates by age reveals that Ireland's educational attainment varies much more by age than other countries. While all cohorts over 35 – in particular the 55-64 age group – have lower attainment rates than the OECD average, Ireland's 25-34 year-olds are more qualified than their OECD counterparts.

**OECD Ranking:**  
Total 25-64 year olds: 14

Source: OECD, *Education at a Glance*, 2005

**Figure 4.54 PhD Graduation Rates per 1000 Population Aged 25-34, 2002<sup>52</sup>**



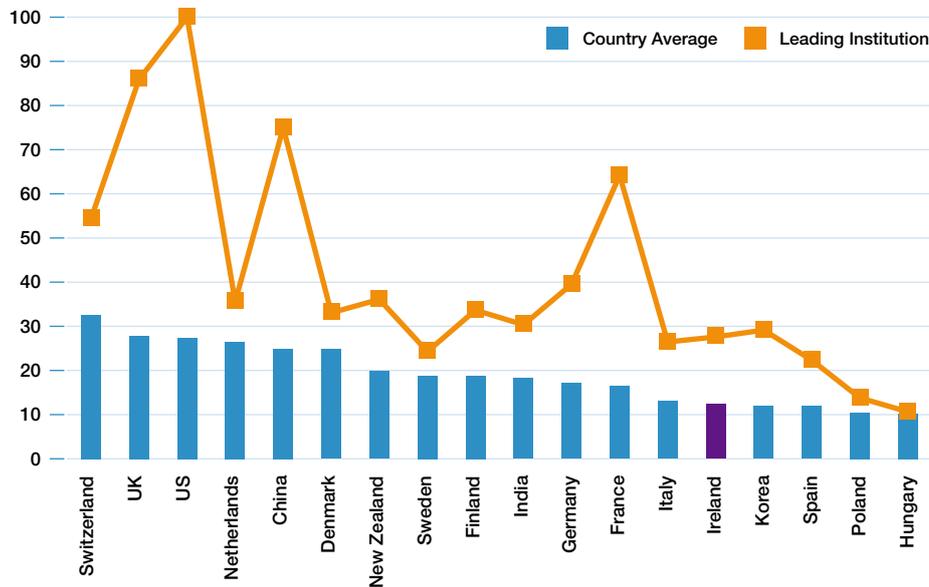
Source: Eurostat, *The EU-15's New Economy – A Statistical Portrait, Working Paper, 2005 Edition*



Ireland compares poorly relative to other developed economies in terms of PhD graduation rates per 1000 population. It is likely that Ireland's results will improve in future years given Ireland's current expenditure in this area.

**EU 15 Ranking:**  
11 (↓2)

**Figure 4.55 Performance of the Third Level Sector (Scale 0-100), 2005**



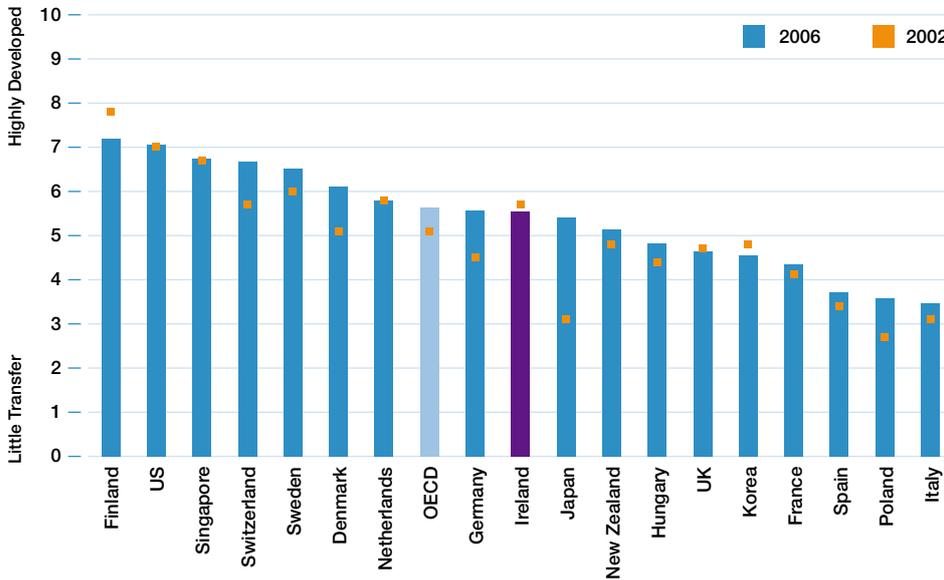
Source: *Financial Times, World University Rankings, 2005*



This chart benchmarks the performance of the third level sector based on the Times Higher World University ranking. The scores (100 = best) are based on peer review assessments, the amount of cited research produced, the ratio of faculty to student numbers and a university's success in attracting foreign students and internationally renowned academics.

**Ranking of Institution:**  
(out of 540)  
114 (TCD)

Figure 4.56 Knowledge Transfer Between Companies and Universities, 2006 (Scale 0-10)<sup>53</sup>

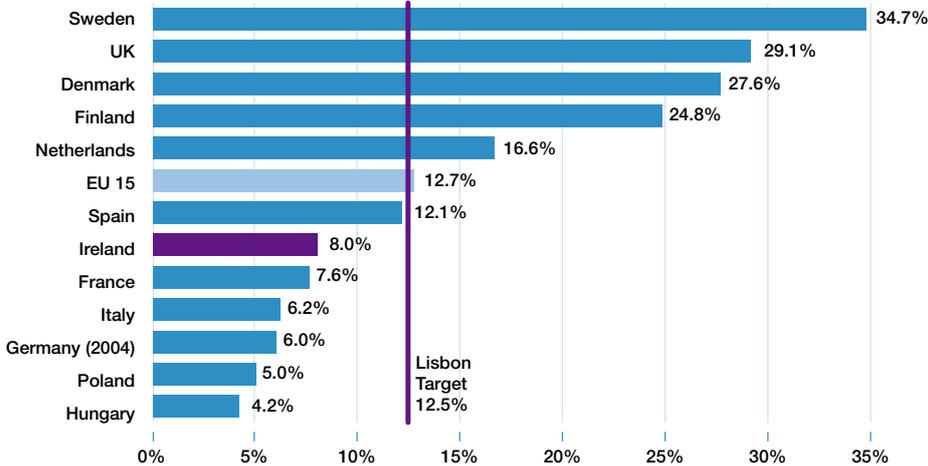


Source: IMD World Competitiveness Yearbook, 2006 [online]

The 2004 Forfás Innovation Networks Report identified several barriers to more effective knowledge transfer between academia and enterprise in Ireland including lack of widespread knowledge of third level research projects, difficulties in drawing up intellectual property rights contracts, gaps in technology time horizons, and differences between industrial and academic cultures.

OECD Ranking:  
13 (↓5)

Figure 4.57 Life Long Learning in EU Member States (% 25-64 year olds), 2005



Source: Eurostat, Population and Social Conditions, 2006 [online]

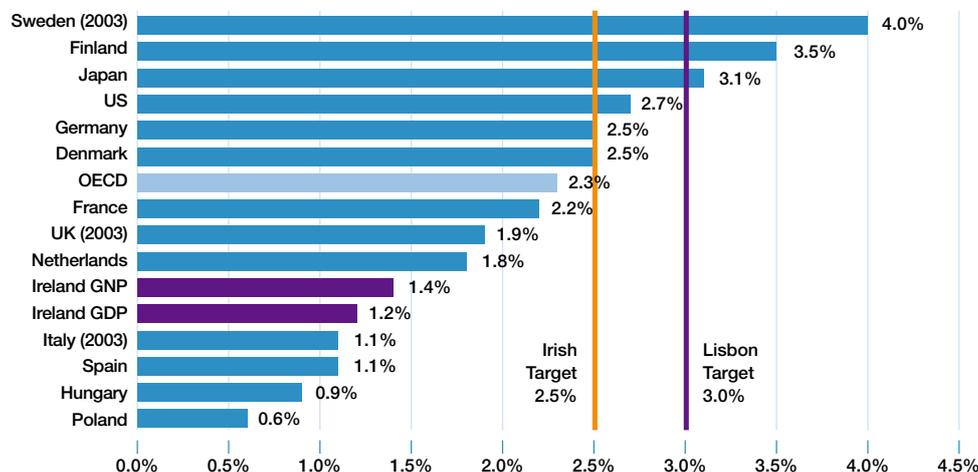
Life Long Learning is defined as all learning activity undertaken throughout life, with the aim of improving knowledge skills and competencies. This indicator measures the percentage of persons aged 25 to 64 in receipt of education in the four weeks prior to the survey and includes both formal and non formal education.

EU 15 Ranking:  
10 (↓3)

4.3.5 Investment in Research and Development



Figure 4.58 Gross Domestic Expenditure on R&D (GERD), % GDP, 2004<sup>54</sup>

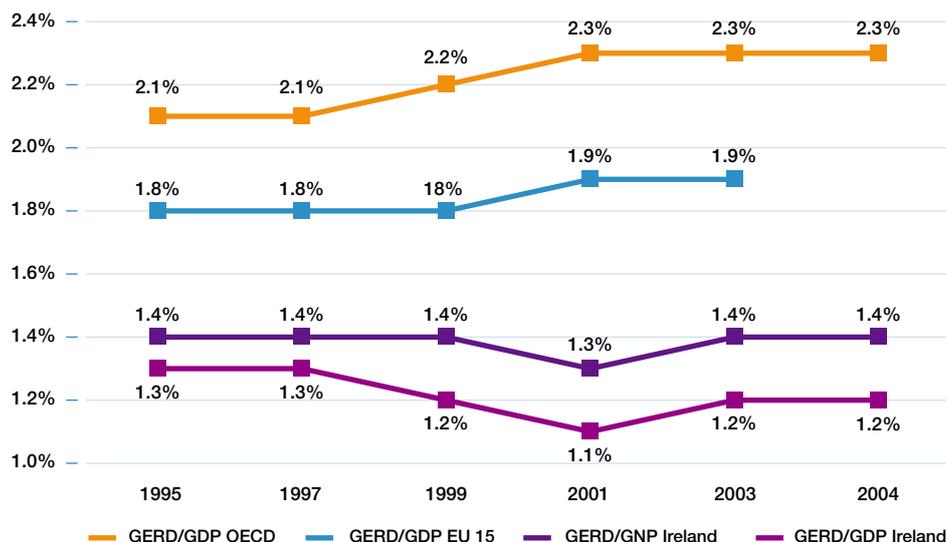


As part of the Lisbon Strategy, the European Council set a target that 3 per cent of EU GDP would be spent on R&D by 2010. The Irish Strategy for Science, Technology and Innovation, 2006–2013 envisages Ireland reaching 2.5 per cent of GNP expenditure on R&D by 2013.

OECD Ranking:  
GDP: 21 (--)  
GNP: 19 (--)

Source: OECD, *Main Science and Technology Indicators*, 2006/ issue 1

Figure 4.59 Gross Expenditure on R&D (GERD) (% GDP), 1995-2004<sup>55</sup>

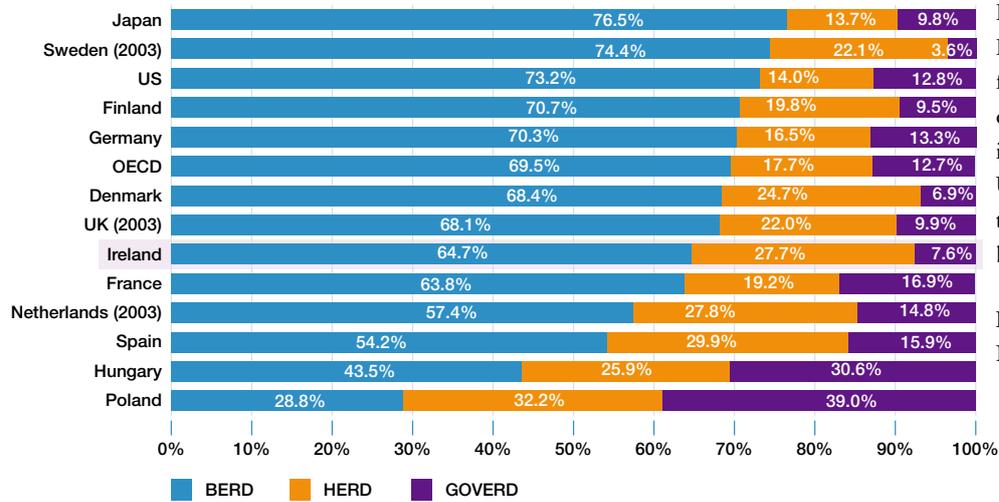


While there have been substantial increases in R&D expenditure in Ireland, limited progress has been made in narrowing the gap between Ireland and the EU/ OECD between 1995 and 2004 in terms of GERD as a percentage of GDP/GNP.

Ranking:  
N/A

Source: OECD, *Main Science and Technology Indicators*, 2006/ issue 1

**Figure 4.60 Breakdown of Gross Expenditure on R&D by Component, 2004**

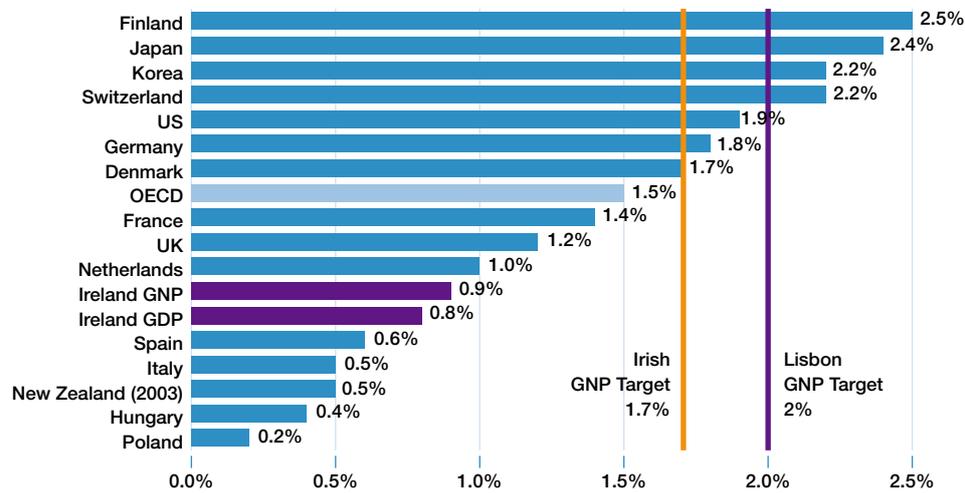


Source: OECD, Main Science and Technology Indicators, 2006/ issue 1

Business expenditure on R&D (BERD) accounts for the great majority of overall R&D expenditure in Ireland and the EU. Under the Lisbon Agenda, two thirds of R&D should be business financed.

Ranking:  
N/A

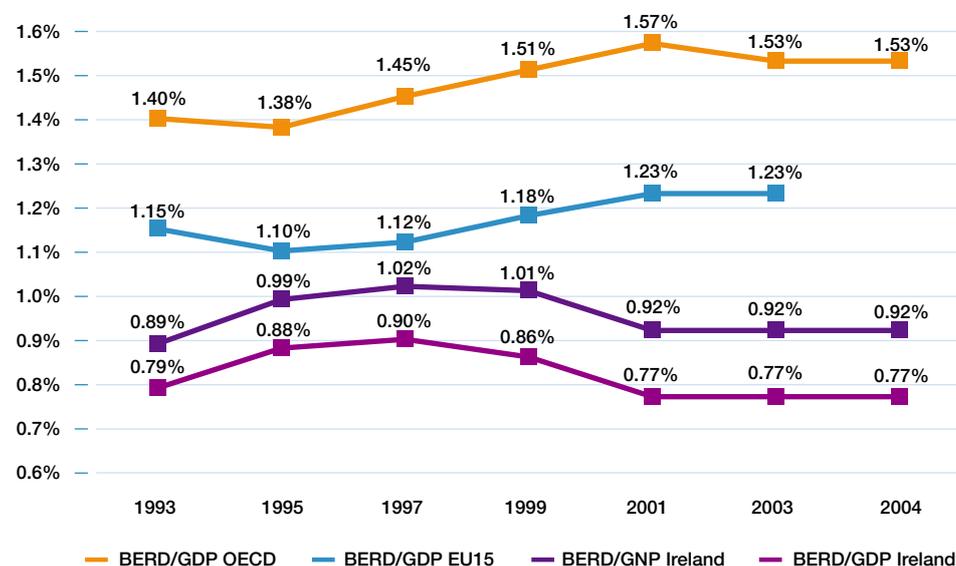
**Figure 4.61 Business Expenditure on R&D (BERD) % GDP, 2004<sup>56</sup>**



Source: OECD, Main Science and Technology Indicators, 2006/ issue 1

In 2003, business expenditure on R&D in Ireland stood at €1,075.6m. This represents a nominal average annual growth rate of 19.4 per cent over the previous two years. In 2003, the Government introduced R&D tax credits to encourage enterprises to invest in research and technological developments.

OECD Ranking:  
GDP: 20 (↓1)  
GNP: 17 (→)

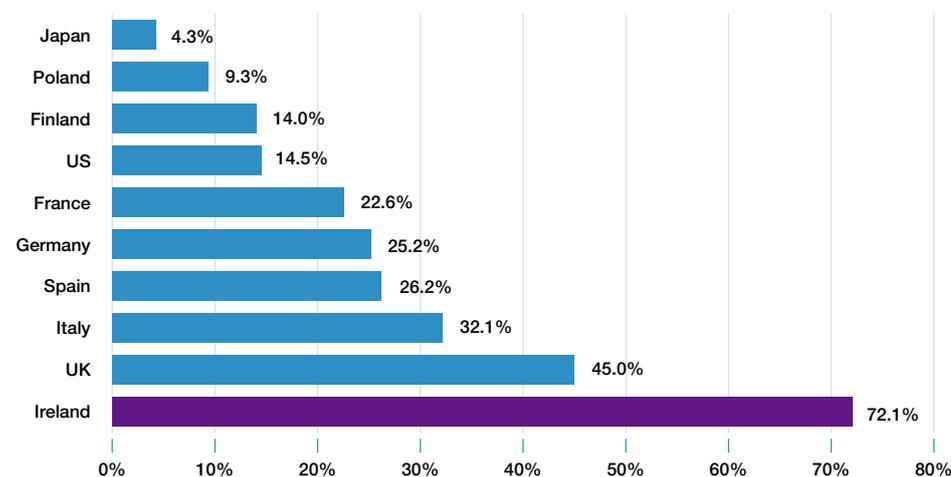
Figure 4.62 Business Expenditure on R&D as a % of GDP, 1993-2004<sup>57</sup>

Source: OECD, Main Science and Technology Indicators, 2006/ issue 1

Despite having one of the strongest growth rates in business expenditure on R&D, BERD as a percentage of economic activity has remained static as the strong R&D gains only matched the strong economic growth posted in the period. The Irish Strategy for Science, Technology and Innovation has set a target of €2.5 billion (constant prices) for business expenditure on R&D by 2013.

Ranking:  
N/A

Figure 4.63 R&amp;D Expenditure of Foreign Owned Companies as a % of National BERD, 2003

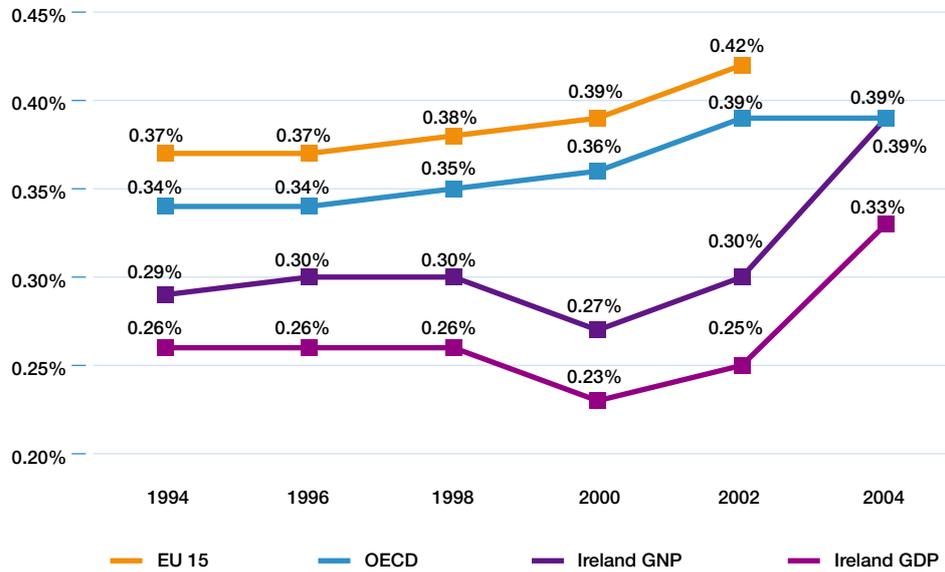


Source: OECD, Main Science and Technology Indicators, 2004

Most business expenditure on R&D in Ireland is undertaken by foreign-owned companies. The Irish Strategy for Science, Technology and Innovation, 2006 – 2013 has set a target that BERD in indigenous companies will grow to €825 million by 2013; 33 percent of total BERD.

Ranking:  
N/A

**Figure: 4.64 Higher Education Expenditure on R&D (HERD) as a % of GDP, 1994-2004<sup>58</sup>**



Source: OECD, Main Science and Technology Indicators, 2006/ issue 1



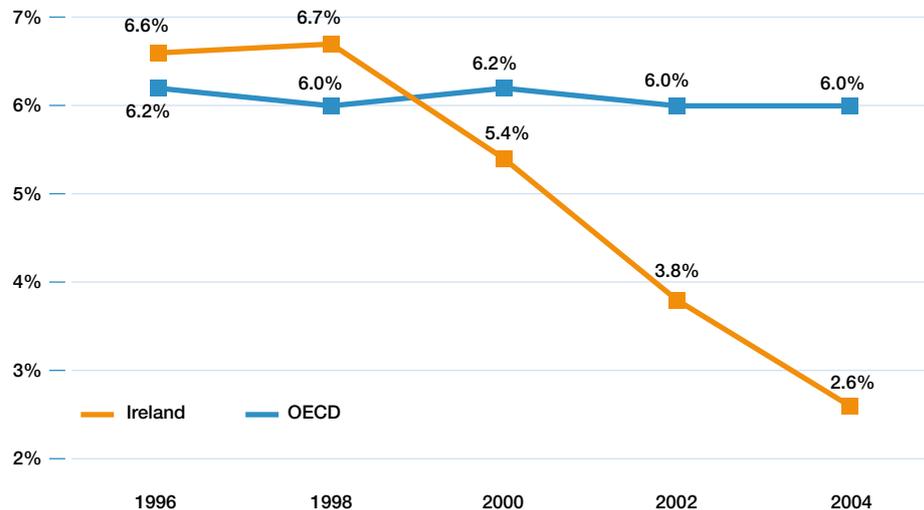
The higher education sector has significantly increased its R&D spending from €322 million in 2002 to €492 million in 2004, a 53% increase. These increases outpaced economic growth, pushing up relative intensity. Increasing higher education research and development has been driven by direct government funding through SFI and the HEA's Programme for Research in Third-Level Institutions.

**OECD Ranking:**

GDP: 19(↑5)

GNP: 16(↑7)

**Figure 4.65 Percentage of HERD Financed by Industry, 1996-2004**



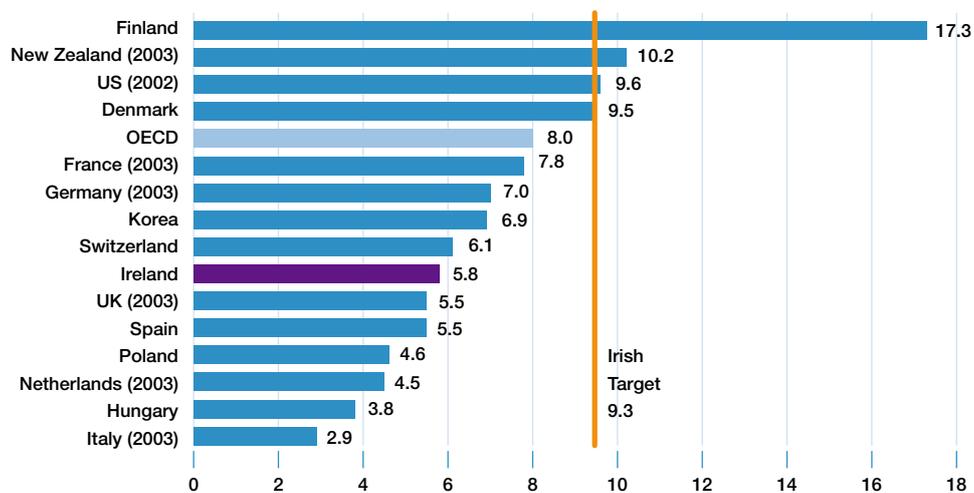
Source: Forfás, HERD Surveys



Linkages between the private sector in Ireland and third-level education remain poor. Since 2000 and the launch of government-sponsored PRTL and SFI funding, the level of HERD has increased dramatically. On the other hand, industry-financed HERD has remained static. Consequently, the percentage of HERD financed by industry has fallen considerably.

**Ranking:**

N/A

Figure 4.66 Total Researchers per 1000 Total Employment, 2004<sup>59</sup>

The R&D Action Plan for promoting Investment in R&D has set a target of 9.3 researchers per 1000 of total employment by 2010. Some progress has been made, with the number of researchers growing from 5 per 1000 total employment in 2001 to 5.8 in 2004.

OECD Ranking:  
16 (↑2)

Source: OECD, *Main Science and Technology Indicators, 2006/ issue 1*

## Notes to Graphs

- 1 Base year for ranking change is 2000-2004 period compared to 2005
- 2 Base years for ranking change are the mid 1990s compared to 2000  
Mid 1990s refer to 1995 for all countries except Austria (1993), Australia, Denmark, France, Germany, Greece, Ireland, Japan, Mexico, Turkey (1994), Czech Republic and New Zealand (1996)
- 3 Base year for ranking change is 1999 compared to 2005
- 4 Base year for ranking change is 1994-1999 survey compared to 1999-2004 survey
- 5 Base year for ranking change is 2002 compared to 2006
- 6 Base year for ranking change is 2002 compared to 2004
- 7 Base year for ranking change is the 1996-1999 period compared to 2000-2004 period
- 8 Base year for ranking change is the 1995-2000 period compared to 2000-2005 period
- 9 Merchandise dis-aggregated data refer to 2004 not 2005 due to a lack of data
- 10 Base year for ranking change is 2001 compared to 2005  
OECD ranking and average minus Austria, Czech Republic, Greece, Iceland, Korea, Luxembourg, Switzerland, Slovak Republic  
Ireland, New Zealand, and Hungary refer to 2001 in the chart not 2000
- 11 Forfás data are preliminary and cross country data will be available in late 2006.
- 12 Base year for ranking change is 2002 compared to 2004
- 13 Base year for ranking change is the 1995-2000 period compared to 2000-2005 period
- 14 Base year for ranking change is 2001 compared to 2005
- 15 EU 15 average minus Italy
- 16 Base year for ranking change is the 1990-2000 period compared to 2000-2005 period
- 17 EU 15 average minus Greece and Italy
- 18 Comparison in chart is 1990 to 2004 as 2000 figures show little variation due to the nature of the data
- 19 OECD average minus Iceland and Sweden
- 20 Base year for ranking change is 2004 compared to 2015 projections
- 21 In Ireland, companies in the manufacturing industry had a rate of 10% until the rate changed to 12.5% in 2003. In making international comparisons of corporate tax rates, it is important to take account of the impact of exemptions in the tax base.
- 22 OECD average minus USA
- 23 Base year for ranking change is 1995 compared to 2004
- 24 Base year for ranking change is 2001 compared to 2005
- 25 EU 15 average minus Luxembourg
- 26 Base year for ranking change is 2002 compared to 2003  
EU 15 average minus Denmark, Luxembourg and Portugal
- 27 Base year for ranking change is 2002 compared to 2006
- 28 Base year for ranking change is 1998

- 29 OECD minus Luxembourg  
EU 25 minus Luxembourg, Cyprus and Malta
- 30 EU 15 average minus Luxembourg and Portugal
- 31 EU 15 average minus Luxembourg
- 32 Ranking minus Luxembourg, New Zealand, Poland, Slovakia
- 33 OECD ranking minus Czech Republic, Hungary, Iceland, Korea, Luxembourg, Poland and the Slovak Republic
- 34 Base year for ranking change is 2001 compared to 2005
- 35 Base year for ranking change is 2002 compared to 2006
- 36 Base year for ranking change is 2001 compared to 2005
- 37 Base year for ranking change is 2002 compared to 2006
- 38 Data for Singapore 'other' category is 2002
- 39 EU 15 average minus Luxembourg
- 40 Base year for ranking change is 2003 compared to 2005
- 41 Base year for ranking change is 2003 compared to 2005
- 42 Base year for ranking change is 2001 compared to 2004
- 43 EU Average refers to EU-15 less Austria, Belgium, Luxembourg and Greece.  
France Completions refer to 2003
- 44 Formation data based on census years
- 45 Change in ranking is not possible due to a change in methodology used in the reports
- 46 Irish Pre-Primary data refer to 2001
- 47 EU 15 average minus Austria, Belgium, Italy and Luxembourg
- 48 OECD average minus Austria, Denmark, Portugal and Switzerland
- 49 OECD average minus France
- 50 OECD average minus Canada, Portugal and Denmark
- 51 Base year for ranking change is 2001 compared to 2003
- 52 EU 15 average minus Greece and Luxembourg
- 53 Base year for ranking change is 2002 compared to 2006
- 54 Rankings incorporate latest yearly data where current year is unavailable
- 55 Averages incorporate the latest available data for countries that are unavailable for 2004
- 56 Rankings incorporate nearest yearly data where current year is unavailable
- 57 Averages incorporate the latest available data for countries that are unavailable for 2004
- 58 Averages incorporate the latest available data for countries that are unavailable for 2004
- 59 OECD average minus UK  
OECD rankings and average includes the nearest available data where current data are unavailable



# 5 Appendices

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## Appendix 1: ACR Data Sources

### Organisation for Economic Cooperation and Development (OECD)

The OECD is an organisation of 30 member countries characterised by democratic government and adherence to the market economy. These countries are located primarily in Western Europe, but also in North America and in the Asia-Pacific region. Its work covers economic and social issues including macroeconomics, trade, education, development and science and innovation. The OECD provides statistical data for member countries on a wide range of economic and social indicators.

<http://www.oecd.org/statistics>

### Eurostat

Eurostat is part of the European Statistics System (ESS). The ESS comprises Eurostat and the statistical offices, ministries, agencies and central banks that collect official statistics in EU Member States, Iceland, Norway and Liechtenstein. Member States collect data and compile statistics for national and EU purposes. The ESS functions as a network, in which Eurostat's role is to facilitate the harmonization of statistics in cooperation with the national statistical authorities. The ESS also coordinates its work with international organisations such as OECD, the UN, the International Monetary Fund and the World Bank.

<http://www.europa.eu.int/comm/eurostat/>

### Central Statistics Office (CSO) Ireland

The Central Statistics Office serves as Ireland's national statistical agency. The Office exists primarily to meet the needs of Government for quality statistical information that is a vital input to the formation, implementation and monitoring of policy and programmes at national, regional and local levels in a rapidly changing economic and social environment. It also serves the needs of the wider national and international community (i.e. business, EU, international organisations, media, researchers, and the public generally) for impartial and relevant information on social and economic conditions.

<http://www.cso.ie>

### Groningen Growth and Development Centre

The Groningen Growth and Development Centre is a research group of economists and economic historians at the Economics Department of the University of Groningen. It was created in June 1992 within the Economics Department of the University. The group carries out research on comparative analysis of levels of economic performance and differences in growth rates in the world economy. Up-to-date GGDC data include: the Total Economy database (GDP, Population and Employment data), and the 60-Industry Database (Value added data and Employee data), which allow analysis of macroeconomic and productivity performance over time.

<http://www.ggdc.net/>

### **IMD World Competitiveness Yearbook (IMD WCY) (2006)**

The stated aim of the *World Competitiveness Yearbook* is to analyse and rank the ability of nations to create and maintain a competitive enterprise environment. It features 51 industrialised and emerging countries and provides 323 different competitiveness criteria grouped into four 'Competitiveness Factors' (Economic Performance, Government Efficiency, Business Efficiency, and Infrastructure). Indicators are derived from both hard data taken from international, national and regional organisations and private institutes, and survey data drawn from the annual Executive Opinion Survey (over 4,000 respondents). This report is published every summer, and the figures in the 2006 report generally relate to 2005 and 2006 data.

### **World Economic Forum Global Competitiveness Report (WEF GCR), (2005-2006)**

The *Global Competitiveness Report* measures the competitiveness of nations through two main indices developed by the WEF team, the Growth Competitiveness Index (GCI) and the Business Competitiveness Index (BCI). Both indices are derived from a combination of publicly available hard data, and information provided in the Forum's Executive Opinion Survey, which annually conveys information about the obstacles to growth in 103 countries. Through the survey, 8,695 business executives in these countries assess the importance of a broad range of factors central to the business environment. The response rate to the survey averages over 80 respondents per country. The ACR mainly uses WEF survey data to supplement statistical information about the innovation, enterprise and general business climates. This report is published every year and the figures in the 2006 report generally relate to 2005-2006.

### **Global Entrepreneurship Monitor (GEM) Report (2005)**

The GEM reports a set of harmonized measures of entrepreneurial activity. Specifically, GEM considers that national economic growth is the result of two parallel sets of interrelated activities, those associated with established firms, and those related directly to the entrepreneurial process. The GEM 2005 data set is based on the following types of data collection.

- Representative samples of randomly selected adults, groups ranging in size from 1,000 to almost 27,000 individuals.
- Standardized national data were obtained from international data sources such as World Bank, International Monetary Fund and United Nations.
- Each GEM national team conducted up to 50 face-to-face interviews with experts in their respective countries chosen to represent nine entrepreneurial framework conditions. The national experts also completed a standardized questionnaire in order for GEM to obtain a quantitative measure of their opinions concerning their country as a suitable context for entrepreneurial activity.

This report is published around April every year, and the figures in the 2005 (published in April 2006) report generally relate to 2005.

<http://www.gemconsortium.org>

### **UNCTAD World Investment Report (2005)**

Established in 1964, UNCTAD promotes the development-friendly integration of developing countries into the world economy. In performing its functions, the secretariat works together with member Governments and interacts with organizations of the United Nations system and regional commissions. Its World Investment Report focuses on global trends in foreign direct investment. This report is published annually.

<http://www.unctad.org>

### **The UK Office for National Statistics (ONS)**

The ONS is the government department that provides UK statistical and registration services. It is responsible for producing a wide range of economic and social statistics that are used by government to monitor performance. It also registers life events and holds the decennial census of the population.

<http://www.statistics.gov.uk/>

### **United Nations Human Development Report (UN HDR), (2005)**

This report presents two types of statistical information: statistics in the human development indicator tables, which provide a global assessment of country achievements in different areas of human development, and statistical evidence on the thematic analysis in the chapters. The Human Development Report Office is primarily a user, not a producer, of statistics. It therefore relies on international data agencies with the resources and expertise to collect and compile international data on specific statistical indicators. This report is published annually and the figures in the 2005 report generally relate to 2002-2003.

<http://hdr.undp.org/>

### **International Energy Agency**

The International Energy Agency is the energy forum for 26 industrialised countries. IEA Member governments have agreed to share energy information, to co-ordinate their energy policies and to co-operate in the development of rational energy programmes. These provisions are embodied in the Agreement on an International Energy Program, which established the Agency in 1974.

<http://www.iea.org/Textbase/subjectqueries/index.asp>

### **US Bureau of Economic Analysis (BEA)**

BEA is an agency of the Department of Commerce in the US. BEA produces economic accounts statistics. These consist of national accounts which provide a quantitative view of US domestic production and investment, of exports and imports, national and domestic income and saving, and regional accounts which provide detailed data on economic activity by region, state and county.

<http://www.bea.gov/>

## Appendix 2: Glossary of Terms

<b>BERD</b>	<b>Business Expenditure on Research and Development</b>
<b>CPI</b>	<b>Consumer Price Index</b> Index which measures the price that consumers pay for a representative basket of goods.
<b>DSL</b>	<b>Digital Subscriber Line</b> A family of similar technologies which allow ordinary telephone lines to be used for high speed broadband communications.
<b>ENTERPRISE IRELAND</b>	State agency with primary responsibility for the development of Irish-owned business in manufacturing and internationally-traded services.
<b>EPO</b>	<b>European Patent Office</b>
<b>ESRI</b>	<b>Economic and Social Research Institute</b> Ireland's national independent think-tank undertaking economic and social research, with the aim of informing policy formation and societal understanding.
<b>FDI</b>	<b>Foreign Direct Investment</b> Investment by a multinational company in establishing production, distribution or marketing facilities abroad.
<b>FORFÁS</b>	State agency responsible for providing policy advice on enterprise, trade, science, technology and innovation and for advising and co-ordinating the functions of IDA Ireland, Enterprise Ireland and Science Foundation Ireland.
<b>GDP</b>	<b>Gross Domestic Product</b> The total money value of all final goods and services produced in an economy over a defined period.
<b>GENERAL GOVERNMENT GROSS FIXED CAPITAL FORMATION</b>	This consists of resident producer's acquisitions, less disposals of fixed assets during a given period plus certain additions to the value of non-produced assets realized by the productive activity of government producer or units.
<b>GERD</b>	<b>Gross Expenditure on Research and Development</b> Total public and private expenditure on R&D
<b>GINI COEFFICIENT</b>	The Gini Coefficient is a measure of income distribution whereby a score of zero indicates perfect equality, and 100 indicates that all national income is enjoyed by one person.
<b>GNP</b>	<b>Gross National Product</b> The value of all final goods and services produced within a nation in a given year, plus income earned by its citizens abroad, minus income earned by foreigners from domestic production.
<b>GOVERD</b>	<b>Government Expenditure on Research and Development</b>
<b>GREENFIELD PROJECTS</b>	The setting up of a new activity as opposed to the acquisition of one that already exists.

<b>GROSS FIXED CAPITAL FORMATION BY THE PRIVATE SECTOR</b>	This consists of resident producer's acquisitions, less disposals of fixed assets plus certain additions to the value of non-produced assets realised by productive activity. The private sector consists of non-financial and financial corporations, households and non-profit organisations serving households.
<b>HEA</b>	<b>Higher Education Authority</b> The statutory body responsible for the funding of universities and designated third-level education institutions. Its functions include the development of third level education to meet the needs of the community and to advise in relation to all higher-level education.
<b>HERD</b>	<b>Higher Education Expenditure on Research and Development</b>
<b>HDI</b>	<b>Human Development Index</b> Composite index which combines measures of life expectancy, school enrolment, literacy and income.
<b>ICT</b>	<b>Information and Communications Technology</b>
<b>IDA IRELAND</b>	State agency responsible for attracting inward investment in manufacturing and internationally-traded services sectors.
<b>IP</b>	<b>Intellectual Property</b> The asset which arises where innovation or creative activities lead to an invention, design or process sufficiently unique or original to be considered confidential or valuable or both.
<b>LABOUR COSTS</b>	Labour costs cover all market economic activities except agriculture, fisheries, forestry, education, health, entertainment, information and personal services activities. Labour costs include gross wages and salaries, employer's social contributions and taxes net of subsidies connected to employment.
<b>LABOUR FORCE</b>	The total number of people, aged 15 years and over, employed and unemployed and seeking employment.
<b>NDP</b>	<b>National Development Plan</b> The NDP involves an investment of over €52 billion of public, private and EU funds over the period 2000-2006 in health services, social housing, education, roads, public transport, rural development, industry, water and waste services in Ireland.
<b>PPP</b>	<b>Purchasing Power Parity</b> PPP is a method of measuring the relative purchasing power of different countries' currencies over the same types of goods and services. Goods and services may cost more in one country than in another one, hence PPP allows us to make more accurate comparisons of standards of living across countries.
<b>PRODUCTIVITY</b>	The relationship between the output of an economic unit and the factor inputs that have gone into producing that output. Productivity is usually measured in terms of output per hour worked, also known as value added per hour worked.

<b>PRTLII</b>	<b>Programme for Research in Third Level Institutions</b> An initiative to boost research capabilities in the higher education sector, PRTLII supports research in humanities, science, technology and social sciences.
<b>R&amp;D</b>	<b>Research and Development</b> Creative work undertaken on a systematic basis in order to increase the stock of knowledge, including knowledge of man, culture and society, and the use of this stock of knowledge to devise new applications. (OECD)
<b>SFI</b>	<b>Science Foundation Ireland</b> Established by the Government in July 2003 to invest €648 million between 2000 and 2006 in academic researchers and research teams to generate knowledge, leading-edge technologies and competitive enterprises in the fields underpinning biotechnology and information and communications technology.
<b>SUSTAINABLE DEVELOPMENT</b>	Development that meets the needs of the present population without compromising the ability of future generations to meet their own needs (UN definition).
<b>ULC</b>	<b>Unit Labour Cost</b> Measures the cost of labour required to produce one unit of a good. Changes in unit labour costs occur due to changes in productivity (output per hour worked) or changes in earnings/wages.
<b>VAT</b>	<b>Value Added Tax</b> An indirect tax levied on the sale of goods and services.

## Appendix 3: NCC Publications

Publication	Date
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
Statement on Inflation	May 2003
The Competitiveness Challenge, 2003	November 2003
Annual Competitiveness Report, 2003	November 2003
Statement on Prices and Costs	September 2004
The Competitiveness Challenge, 2004	October 2004
Annual Competitiveness Report, 2004	October 2004
Annual Competitiveness Report, 2005	September 2005
The Competitiveness Challenge, 2005	November 2005

