

FUTURE IRISH GROWTH: OPPORTUNITIES, CATALYSTS, CONSTRAINTS

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1. Introduction

Economists remain divided over the precise importance of different factors in driving the “Celtic Tiger” boom. Honohan and Walsh (2002), for example, focus primarily on the resolution of macroeconomic instability and devote little attention to the growth in foreign direct investment. Fitz Gerald (1999, 2000) focuses on the increase in educational attainment, which Walsh (2005) argues could not have been critical since increased third-level educational throughput in the 1980s resulted primarily in an increase in the educational attainment of the emigrating cohort. These disagreements notwithstanding, all the above view the sustained boom as an episode of ‘delayed convergence’ on Western European living standards, making up for ground lost over previous decades primarily through macroeconomic mismanagement.

Barry (2002, 2004), by contrast, argues that the increased foreign direct investment (FDI) inflows of the period represented the *conditio sine qua non* accounting for the strength and resilience of the boom. If increased FDI inflows are indeed a crucial element of the story, the ‘delayed convergence’ perspective – whereby everything came right once Ireland stopped making mistakes relative to what other EU economies were doing – is unsustainable. Why? Because the country’s ability to attract such a high share of European FDI inflows is based on doing things differently from other EU

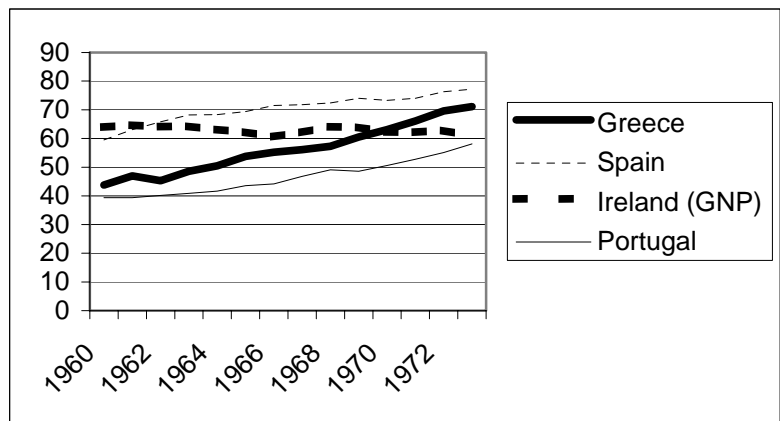
*An earlier draft of this paper was delivered as an invited address to the Board of Directors of Forfás in April, 2005. I thank John Bradley, Andrew McDowell, Philip O’Connell and the Board of Directors for helpful discussions.

countries – in areas such as corporation tax, the binary and scientific/technological nature of the third level education system and the operation of the IDA and its sister agencies.¹

The present paper briefly revisits this debate, showing first – in Section 2 below – how elements such as the education system and educational throughput, the Single Market, EU regional aid and the restoration of macroeconomic stability can all be incorporated into the “FDI-driven” perspective.

FDI assumes a particularly important role when Ireland is viewed as a regional EU economy, with labour highly mobile both into and out of the country. To take an extreme view, think of Ireland as having little or no control over its net-of-tax labour costs, because of the historic ease of emigration to the UK or elsewhere. This means that Ireland could not have industrialised through the development of low-wage consumer goods exports as each of the other traditionally less developed Western European economies – Portugal, Spain and Greece – did in the 1960s (see Figure 1).

Figure 1: Convergence Experiences of the Cohesion Countries, 1960-1973: GDP Per Head Adjusted for Purchasing Power (GNP for Ireland); EU15=100



Source: Eurostat.

It does mean however that when FDI inflows boomed – as over the course of the 1990s and beyond – Ireland’s very flexible labour supply meant that the country had the potential to grow much more rapidly than a non-regional economy (i.e., one with a relatively fixed

¹ Educationalists define a binary system as one in which the distinction between technical and traditional university education is maintained. Such a system, it is argued, serves to ensure that an adequate supply of technicians remains available to industry.

labour supply). Compared to some US *regional* as opposed to EU *national* economies, indeed, recent Irish growth has not been particularly dramatic. As Honohan and Walsh point out, if Ireland had been a US state its population growth in the 1990s would have ranked it twenty-third of the fifty US states, while no fewer than nine US metropolitan areas with populations of over 1 million grew faster than Greater Dublin.

The regional perspective suggests furthermore that Ireland's period of rapid growth need not necessarily come to a halt once convergence on average Western European living standards has been achieved, as the 'delayed convergence hypothesis' would suggest. This is borne out by the return to rapid growth even after some analysts such as Clinch, Convery and Walsh (2002) had declared the Celtic Tiger dead.

Formal models of regional booms do suggest though that all of the growth in real wages might be eaten up by increased property prices, increased commuting time, increased congestion etc., as property and infrastructure are the only factors in quasi-fixed supply.²

A regional boom will be associated with lower growth in living standards than if all the gains of the boom were to be distributed among a fixed labour force. Ireland is remarkable however in the overlap of *intensive* as well as *extensive* growth (i.e., growth in national income per head *and* in national income itself). If one is reluctant to accept the proposition that property prices and commuting times have swallowed up all the income gains from the boom, the assumption that labour and capital inflows are in perfectly elastic supply (i.e., available from abroad in essentially infinite supply at a constant inflation-adjusted price) can be relaxed. This would allow real income gains to occur alongside the boom.

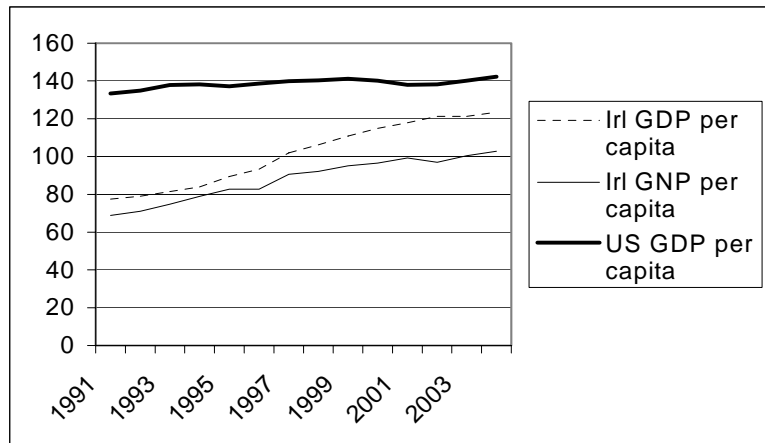
This allows the convergence proposition to re-enter the analysis. A focus on the role of US FDI in Ireland opens up the possibility however that even if eventual convergence is to sound the death knell of the rapid-growth phase, the relevant convergence could well be on US rather than Western European living standards.³ (See Figure 2.)

The pressing policy concerns of course revolve around how the momentum of the last 15 years or so can be sustained and more equitable growth achieved. These are the main topics with which the present paper is concerned. Accordingly, Section 3 seeks to identify the opportunities, catalysts and constraints impacting on future prospects.

² In Dascher (2000) this takes the form of a redistribution of wealth from new immigrants and labour-force entrants to initial owners of property.

³ Specifically, it could mean that Irish GDP per head will converge on US levels. Irish GNP per head would remain lower however, since profit repatriation can be regarded as the return to US innovation, as in Krugman (1979).

Figure 2: Per-Capita GDP and GNP Adjusted for Purchasing Power; EU15=100



Source: Eurostat; Central Bank of Ireland (for difference between GDP and GNP).

From the pure regional-economy perspective, property prices and infrastructural provision are key constraints, and possible policy options to alleviate these are considered in some detail. The paper also looks at remaining weaknesses in the Irish economy, particularly with respect to indigenous industry and second-level educational attainment. While the third-level educational system is developing rapidly and in an arguably appropriate direction – given the importance of the “national innovation system” for countries aiming to be close to the technological frontier – the significant problems remaining at secondary level need to be tackled more vigorously, for two reasons: first, because this is by far the most effective way to address the high levels of inequality prevailing in Irish society, and second, because successful completion of the secondary cycle is necessary if individuals are to be able to access and benefit from further and higher education and lifelong learning, the prerequisites of the much-invoked “knowledge economy” of the future. Section 3 also addresses some remaining problems in the area of governance, which is increasingly recognised to have an important impact on a country’s growth potential. The main points of the paper are summarised in the concluding section.

2. The Interaction of Education, FDI, the Single Market and EU Aid

The distinguishing feature of Ireland's development strategy since the 1960s has been the emphasis placed on FDI. The country had been remarkably successful in this regard, even before the Celtic Tiger era. Having stumbled upon the strategy, it turned out with hindsight to accord well with Ireland's advantages: its Atlantic location and English-speaking environment, relatively low labour costs by Western European standards, cultural connections with the US and a reasonably corruption-free business and public-administration environment.⁴

Given these conditions, Ireland was able to reap substantial benefits from the policy of levying low corporation tax rates on mobile businesses. Over the course of several decades, the Industrial Development Agency amassed valuable experience in its dealings with the business sector as well as substantial 'clout' within the Irish public administration system, both of which it put to good use in promoting infrastructural changes – e.g., in telecommunications and in education – that would assist it in fulfilling its development mandate.

Ireland at the time of EU accession exhibited serious deficiencies in several infrastructural areas which would have inhibited development. These then were the appropriate areas into which EU aid was to be ploughed.

Where Ireland differed from the other cohesion countries – Greece, Spain and Portugal – was in allocating a much higher proportion of this aid to human capital development. This was in part driven by the successful use of European Social Fund monies in the 1970s in developing the system of Regional Technical Colleges (later renamed the Institutes of Technology), a third-level system of technical education for which there was no UK model. The development of this arm of the 'binary system' of tertiary education has helped Ireland achieve a higher tertiary throughput than the OECD average, and a higher proportion of graduates with science, technology and engineering qualifications.

The university sector responded to engineering and technology manpower needs in response to the prompting of the Manpower Consultative Committee established in 1978 to provide a forum for dialogue between the IDA and the education system.⁵

White (2001), in his history of Irish higher education, refers to this as the period when "...the universities came in from the cold". By taking on board the need to bear manpower requirements in

⁴ The scandals which have buffeted Irish public life over the last decade or so have been confined to sectors other than those dominated by export-oriented foreign MNCs – property, retail banking, beef, domestic telecommunications, etc.

⁵ Concerned by the looming disparity between electronics graduate outflows and its own demand projections, the IDA convinced the government to fund a massive expansion in educational capacity in these areas. The output of engineering graduates, as a result, increased by 40 per cent between 1978 and 1983, while the output from computer science increased tenfold over this same short period.

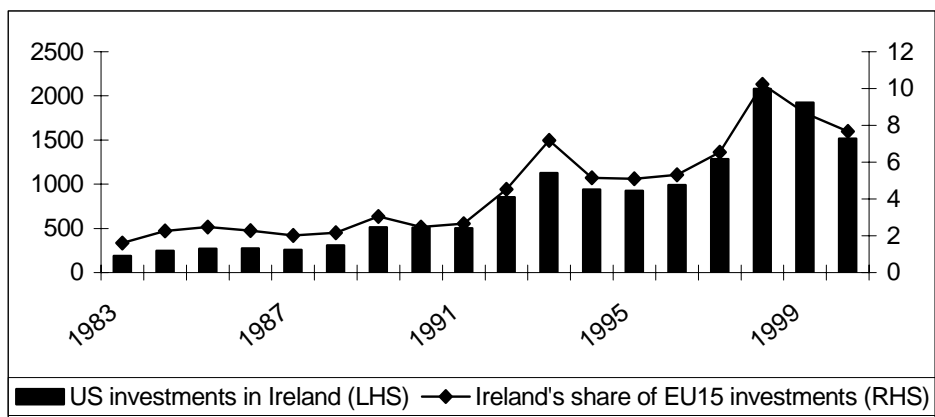
mind, they bridged the gap between the two strands of the binary system and ensured that the bulk of the Irish workforce on offer would have a broad educational background – though with a high degree of technical expertise – rather than a narrow vocational one.

These developments account for why Ireland scores so well on the education front in the annual surveys conducted by the International Institute for Management Development as part of its *World Competitiveness Yearbook*. In the 2005 edition, for example, global executives ranked Ireland number 2 out of a total of 60 OECD and medium-income developing countries in response to the statement “the educational system meets the needs of a competitive economy” and number 5 out of the same 60 countries in response to the statement “university education meets the needs of a competitive economy”. Gunnigle and McGuire (2001), in a survey of executives of 10 major US MNCs, find that education and skill levels rank second in importance to the corporation tax regime in drawing these firms to Ireland.

How does the education system fit into the regional-economy perspective on Ireland? Some analysts, as seen earlier, argue that education cannot have been key to the Irish boom since the increased third level throughput of the 1980s largely leaked out of the economy through emigration. Consider though the increased FDI inflows resulting from the establishment of the Single Market and the global high-tech boom of the 1990s.

This period saw a huge increase in intra-EU FDI flows as well as extra-EU inflows to Europe. Ireland would have benefited even if it had simply maintained a constant share. In fact though, its share of US investments in Europe increased substantially, as seen in Figure 3.

Figure 3: Investments by US Manufacturing Companies in Ireland (Millions of 1996 Dollars), and as a Share of US Manufacturing Investments in the EU-15



Source: US Bureau of Economic Analysis (Capital Expenditures in Manufacturing by Foreign Affiliates).

MacSharry and White (2000) explain the latter effect by describing how several larger EU countries, in the pre-Single Market era, "...had suggested to potential investors that publicly funded purchases of their products might be blacklisted if the new investment was located in Ireland" (rather than in the countries from which the threatening noises issued). With the outlawing of restrictive public procurement practices under the Single Market initiative, the attractiveness of Ireland as a destination for FDI increased. This effect would undoubtedly have been dampened without the restoration of macroeconomic stability.

The increasing share of high-tech sectors in European manufacturing over the 1990s also helped, as did the high profitability of the era, since both increase the attractiveness of a low corporation-tax environment.⁶ The Single Market and the global high-tech boom would not have raised Irish labour demand as much as they did – in the sense that MNCs would have found Ireland a much less attractive location in the 1990s – were it not for the availability of skilled labour, whether already present in Ireland or 'latent' as in the case of emigrants prepared to return from abroad.⁷

3. Current Issues

The 'regional economy' perspective, whether modified as above or not, holds out the possibility that Irish rapid growth need not grind to a halt now that convergence on average EU15 living standards has been achieved. Strong growth could be maintained if the economy continued to attract substantial FDI and the labour pool necessary to man it.⁸

⁶ Manipulation of transfer prices in order to shift profits to low-tax locations is easiest in R&D and advertising-intensive sectors because these factors make it difficult to locate the exact source of value added. Using Davies and Lyons's (1996) categorisation, advertising and R&D-intensive sectors accounted for over 65 per cent of foreign employment in Irish manufacturing in 2000, up from 45 per cent of a much smaller base in 1973.

⁷ One of MacSharry and White's anecdotes, concerning the battle to attract Intel to Ireland, is illustrative in this regard. At the final stage of the decision-making process the company was paralysed by fears that engineers with the requisite experience could not be found here. The IDA commissioned interviews with over 300 Irish engineers, working mainly in the US, who had the appropriate experience, and was able to report to Intel that over 80 per cent of them expressed a willingness to return to Ireland if offered a good career opportunity with a quality company.

⁸ FDI flows into Ireland (and into the EU15 and EU25) peaked in 2000, following years of sustained growth, and have yet to recover to the levels prevailing at that time (UNCTAD, World Investment Report, various years). Thus, much of Ireland's growth in the new millennium has been driven by debt-financed domestic demand rather than by continuing export buoyancy, as reflected in the shift from surplus to deficit in the balance-of-payments current account. This type of growth is not sustainable in the long run. Recently released employment numbers from the IDA, however, augur well for the future.

A further implication of this perspective, however, is that the situation could unravel quite rapidly if the country's competitiveness with respect to FDI were suddenly to deteriorate (e.g., in the event of a shift in US corporate strategy away from Europe or changes to the US tax code). Ireland might then be thrown back onto the resources of indigenous industry, which remain surprisingly weak.

WEAKNESS OF INDIGENOUS INDUSTRY

Indigenous industry has expanded over the course of the Celtic Tiger era, in both absolute terms and as a share of EU production and employment, and this has been true for most sectors as well as in total; O'Malley (2004). As a share of EU15 exports, however, indigenous exports declined for most sectors, indicating that much of the growth in EU production and employment shares derived from the buoyancy of the Irish home market.

The structural weaknesses of indigenous industry manifest themselves across numerous dimensions, suggesting that the sector would find it almost impossible to ramp up sufficiently rapidly to be able to replace foreign industry in the event of a sharp adverse shock to the latter.⁹

One weakness apparent from O'Malley's analysis is that Irish indigenous industry is a good deal more highly concentrated than EU15 industry in general in sectors that are growing relatively slowly at the European level. Though he notes that this is changing, since the more modern sectors of indigenous industry have been increasing their EU production and employment shares rapidly, other evidence suggests that this may be due to interactions with and spillovers from foreign-owned multinationals.¹⁰ This too could unravel then in the event of a shock to Ireland's FDI.

Indigenous manufacturing firms are not, in fact, as highly export-oriented as one might expect for an economy of Ireland's size. They export less than one-third of output, which is lower than the export-output ratios for the manufacturing sectors of seven of the eight EU countries for which data are presented in OECD (2001; Table C 2.2.1). They also remain heavily dependent on the UK market, which is the destination of some 40 per cent of their

⁹ The outcome, in the 'regional boom' perspective, would then see a return to emigration rather than a stabilising fall in real wages; Barry (2002).

¹⁰ Barrios, Görg and Strobl (2005), for example, provide evidence of within-sector spillovers from foreign industry, Görg and Strobl (2003) show that the presence of multinationals enhances the survival probabilities of domestic firms in the same sector, and Görg and Ruane (2000) show, for a sample of electronics firms, that their Irish-economy sourcing of services and materials – with many of the latter likely to come from within the sector – increases with their length of stay in Ireland.

exports. Admittedly, this figure has fallen by around 1 percentage point a year over the previous 15 year period, but the UK market is now a more volatile one given that Ireland can no longer respond through exchange-rate policy to fluctuations in sterling.

Ireland is often thought of as a high-tech economy, yet only 26 per cent of indigenous manufacturing employment is in medium- or high-tech sectors (16 per cent and 10 per cent respectively), compared to 76 per cent for the foreign-owned segment (with 20 per cent in medium-tech and 56 per cent in high-tech sectors).

The fact that R&D expenditures relative to GDP are now at the levels attained in other small European economies is laudable. This is driven by the high-tech sectoral location of Ireland's foreign industry, however, while on a sector-by-sector basis Ireland continues to look weak by EU15 standards.¹¹ Little of this R&D, furthermore, is done by indigenous firms – whose spend per job is even lower than for foreign firms in most sectors – and the indigenous sector has a very poor record in developing patentable processes or inventions.

The tendency for multinationals to concentrate R&D expenditures at their home locations might be taken to indicate that the Irish situation may be set to change, given the strong growth in outward FDI from Ireland over the course of the 1990s. These Irish-owned multinationals though are disproportionately located in non-traded sectors such as Construction and Paper and Packaging and do not exhibit the type of “created asset” intensity (derived from R&D and strong product differentiation) that has been found for Korean and Taiwanese multinationals, for example, by Dunning *et al.* (2001).

The indigenous software sector – which is not included in the manufacturing data – does not conform to this general pattern, but it remains the exception rather than the rule. If Ireland's foreign-owned sector were to be decimated for any reason, much of the economic progress made over the boom period could well disappear along with it.

The efforts of Enterprise Ireland are of course directed towards helping resolve these weaknesses. This process is likely to be assisted by the increased attention accorded in recent times to the upgrading of Ireland's national innovation system.

¹¹ Hines (2003) rejects the argument that low corporation taxes discourage R&D. Rather, he asserts, by raising the base (output, employment etc.) the corporation-tax regime reduces the standardised measures of R&D expenditures.

NATIONAL INNOVATION SYSTEMS

In an era of ‘globalisation’, when firms are able to offshore or outsource at will, how can high-wage countries maintain the activities or industries they want? Governments are compelled in this case to focus on ‘regional capabilities’ – locational advantages that are not equally accessible to firms outside the region. Low corporation tax rates played such a role in Ireland for decades, but are no longer a uniquely Irish attraction within the expanded EU.

Further movement up the value chain and possible convergence on US living standards requires that more knowledge-intensive processes – particularly research and development – be located in Ireland. Simply educating more high-level research workers may not be sufficient however, given their international mobility; Markusen (1988). For this reason, R&D-intensive foreign direct investment (FDI) – where the firm moves R&D facilities to a host location rather than having research workers drawn to the firm’s home base – is frequently technology-sourcing in nature. This means that firms are drawn to set up R&D facilities in locations in which local conditions are such that there is a high possibility of innovations emerging.

Traditional FDI was “home-base-exploiting”, with firms setting up overseas to exploit on a larger stage the advantages, such as brand names, that they had already accumulated. Technology-sourcing FDI on the other hand sees firms moving abroad in order to access high-level resources that are only available in the target destinations overseas and to capture the externalities available there. This is known as “home-base-augmenting” FDI. An example is the ubiquitous tendency of Irish software companies to open offices in Silicon Valley to access venture capital and local knowledge (with the subsidiaries acting as “listening posts”).

Technology-sourcing FDI arises because the international diffusion of knowledge is not easy. The remaining technological gaps, according to Verspagen (1991), are associated with international differences in economic performance.

MNCs have evolved so as to be able to co-ordinate geographically diversified activities and are increasingly developing location portfolios in diverse centres of excellence. This need for a portfolio of locations stems from the increasing complexity of technology, which makes it important for firms to be able to access ‘differentiated streams of new knowledge’ and complementary technological developments.

The location of these centres of excellence depends on the local ‘innovation system’ – the process by which public and private-sector institutions, firms and national policies interact and coalesce

in a way that influences the likelihood of innovations emerging. Different industrial structures give rise to different types of innovation systems.¹² Even for a given industrial structure, of course, innovation systems of differing degrees of quality and efficiency can be found. Mjoset (1992), who introduced the concept to a wider audience in Ireland, was scathing of the weakness of the national innovation system that he found to be in place in Ireland at that time. More generally, Clark, Feldman and Gertler (2000) suggest that the main reason for differences in performance across national systems is the degree of matching between structure and institutions.

Countries with efficiently-configured national innovation systems are likely to attract internationally-mobile R&D functions. According to Cantwell and Piscitello (2002), “MNC international networks (then) provide a linkage mechanism for all local companies (through their co-operation with local MNC affiliates) to innovation in other European areas, which allows each locality to become more specialised in the fields of its greatest potential, while better appreciating and responding to complementary technological developments elsewhere in Europe”. The absorptive capacity of indigenous firms will also depend on the local innovation system.

Overseas R&D facilities can also be of the home-base-exploiting or home-base-augmenting type, with the former typically undertaken to adapt products to local markets and to support local manufacturing units. Kuemmerle (1999a) surveyed 32 MNCs in the pharmaceutical and electronics industries which between them increased their overseas R&D staff from 6 per cent in 1965 to more than 25 per cent today, while the numbers of overseas R&D labs increased from 14 to 84. The proportion of R&D labs that Kuemmerle categorises as home-base-augmenting (or technology sourcing) rose from 7 per cent to 40 per cent over the period, with technology-sourcing sites found to be more likely to be located close to universities and home-base-exploiting sites more likely to be located close to existing factories and important markets.¹³

The 2005 UNCTAD World Investment Report provides much broader and more detailed evidence on the recent growth in global offshoring of R&D functions.¹⁴ This provides the context for recent developments in science, technology and innovation (STI) policy in Ireland.

¹² Archibugi and Pianta (1992) show that the trade and production specialisation of advanced countries reflect the accumulated knowledge base and point to the route of future learning and innovation.

¹³ He also finds that R&D labs rarely share both functions or experienced a major shift in character, because the two types of labs have different missions and different management requirements. See also Kuemmerle (1999b).

¹⁴ The sectors at the forefront of the globalisation of R&D include pharmaceuticals and electronics, food and beverages, and automotive industries.

RECENT DEVELOPMENTS IN INNOVATION POLICY IN IRELAND

Given Ireland's recent convergence on average Western European living standards – and perhaps also in response to the threat of increased corporation-tax competition from Central and Eastern Europe – science, technology and innovation policy has moved up the policy agenda.

This was heralded by the release in 1996 of the first-ever Irish Government White Paper on Science, Technology and Innovation. It is underlined by the five-fold increase in investment in these areas under the current National Development Plan, by the launch in 1998 of the Programme for Research in Third-Level Institutions (which established 24 major research centres as well as major programmes in human genomics and computational physics), by the funding by Science Foundation Ireland (SFI) of a number of joint partnerships between third level research institutions and industry, and by the introduction of a 20 per cent tax credit for incremental R&D in the Finance Act of 2004.¹⁵

Within ICT alone, the last few years have registered a number of significant developments under this new strategy. Bell Labs has announced its intention to set up a major R&D centre at Lucent Technologies' Dublin facility, linked with the establishment of a collaborative academic centre at one of the city's universities. Similarly, Hewlett-Packard announced the establishment of a world-class Technology Development Centre at its manufacturing facility outside Dublin, while its European Software Centre entered into collaboration with NUI-Galway in establishing the Digital Enterprise Research Institute. Intel has established an innovation centre at its main site outside Dublin and increased its investment in its research centre near Limerick. It has also partnered three Irish universities in an academic Centre for Research on Adaptive Nanostructures and Nanodevices. IBM over the same period announced significant investments in its R&D software facility in Dublin – a decision influenced, according to one of the company's directors, by the availability of the necessary skills, the strong support of the IDA and the increasing role of SFI.¹⁶

These successes notwithstanding, these new policies are expensive and it is to be hoped that the kind of continuous monitoring and evaluation that characterised Ireland's Structural

¹⁵ Several recent developments in higher education, including the promotion of partnerships with industry, are the subject of much controversy amongst my university colleagues in the social sciences and humanities.

¹⁶ Despite this huge increase in state spending on research, the R&D spend in higher education and the public sector remains below the EU15 average; Department of Enterprise, Trade and Employment (2004, p. 10).

Funds expenditures will come to be equally integral to these new schemes.¹⁷

Some may argue too that Ireland's newly-developed STI policy is too narrow in focus. It appears designed primarily to ensure that the country is adequately supplied with the kinds of skills and expertise required by MNCs newly engaged in the offshoring of R&D. In this it would appear to conform more closely to the agenda of the IDA than of Enterprise Ireland.

Ensuring the simultaneous upgrading of indigenous industry may require filling in an absent intermediate layer in knowledge commercialisation – the layer between the generation of scientific knowledge and its being brought to market. A relevant initiative saw the creation of the Centre for Innovation in Product Development at Massachusetts Institute of Technology. Funded by the US National Science Foundation and US multinationals such as Ford, General Motors, Polaroid, Xerox and IIT, the centre is focused on helping companies to achieve improved product development performance. A similar centre, developed with inputs from MIT, opened recently in Sweden.¹⁸

THE EDUCATION SYSTEM

Ireland has made great strides in recent decades in developing its tertiary-education system. Indeed, current spending on higher education has risen at an annual average rate of 15 per cent since 1997, compared with an inflation rate of only 3.5 per cent (Walsh, 2005) and further substantial increases were announced in the recent budget. As seen in Table 1, the country has now surpassed the OECD country mean in terms of both tertiary and post-secondary education, and has just matched the mean in terms of those with university qualifications.

Problems clearly remain within the second-level education system however, in which Ireland still lags behind the OECD. Indeed, a Department of Education and Science report issued in October 2005 revealed that 5 per cent of pupils leave school before Junior Certificate examinations while the proportion remaining until the Leaving Certificate remained unchanged – at around 80 per cent – for cohorts entering second-level education between 1991 and

¹⁷ For a discussion of these issues, see <http://www.forfas.ie/icsti/mayevent.html>

¹⁸ This idea is presented for discussion purposes only. Any such initiative should be based on careful analysis of the precise needs of indigenous firms and any market failures associated with the environment that they face.

Table 1: Educational Attainment of the Population Aged 25-34; Ireland and OECD

	Percentage of cohort aged 25-34 that has attained at least upper secondary	Percentage of cohort aged 25-34 that has attained at least tertiary level B	Percentage of cohort aged 25-34 that has attained at least tertiary level A	Post-secondary non-tertiary graduation rates
Ireland	67	13	16	25.8
OECD country mean	72	9	16	8.5

Source: OECD (2001a).

Note: Tertiary B refers to practically-oriented and occupation-specific tertiary programmes of at least 2 years full-time-equivalent duration, while tertiary A refers to university level programmes. The post-secondary graduation rate refers to the ratio of post-secondary graduates to total population at the typical age of graduation. In Ireland the whole cohort included here are categorised as ISCED4C, i.e., in possession of a qualification which prepares participants for direct entry into specific occupations. This will include part of the Institute of Technology cohort as well as some PLC (Post-Leaving Certificate) courses.

1996.¹⁹ This is again reflected in international competitiveness indicators. While the *World Competitiveness Report* (2005) ranked Ireland 12th out of 60 countries in terms of higher-educational achievement, it was ranked only 38th in terms of secondary-school enrolment.

Nickell and Bell (1996) – drawing on Prais (1995) – argue that the most important factor determining the contribution of the education system to economic success within developed countries is the strength of the emphasis it places on sustaining a high level of performance on the part of the bottom half of the ability range.

Prais (1995) suggests that successful systems provide a strong grounding in the basics of reading, writing and arithmetic to all pupils in the early years of compulsory schooling and devote greater attention to vocational education. He points out, for example, that in the successful systems (i) learning objectives during the period of full-time education are focused more on providing the majority with attainments suited for subsequent skilled vocational training rather than on the preparation of the minority entering academic university courses; (ii) for early school leavers, part-time attendance at vocational college is frequently mandatory, and (iii) intermediate vocational qualifications are much more prevalent than in the UK system. Furthermore, these are focused on industry-specific rather than firm-specific knowledge, with written tests an essential adjunct to workshop experience. These qualifications then represent “an open door” to higher qualification levels including university degrees.

¹⁹ Vocational schools recorded rates of only 90 per cent and 70 per cent at the Junior and Leaving Certificate examinations respectively, while more than half the pupils attending schools in poorer areas of Dublin left without sitting for the Leaving Certificate.

In many of these respects, the Irish pre-tertiary system is lacking. The 1995 *OECD Economic Survey of Ireland* notes that “the performance of Irish schools is much more uneven than in other countries”, and suggests that “the variability of school performance may be one explanation for the large differences in student performance according to the social status of their parents”.

Hannan *et al.* (1996) provide a comprehensive analysis of the performance of the second-level system in Ireland, with a focus on the factors determining how well pupils of different abilities do at school. Amongst their findings are that, even controlling for pupils' individual ability and individual family background, having a high proportion of peers from an unskilled manual background leads to significantly poorer examination results. Thus the fact that working class boys are over represented in the vocational schools system – which contains substantially greater proportions of children with numeracy and literacy problems – while middle class children are over represented in secondary schools, is of considerable significance. Smyth (1999) shows that pupils from working-class and unemployed families under-perform in state examinations relative to initial ability levels.

Hannan *et al.* (1996) comment also on the process of transition from school to work, training and further education, pointing out that the process has become increasingly dependent on academic grades to the neglect of alternative certification arrangements or appropriate subject specialisations. This further acts to the detriment of those with vocational or practical rather than academic skills.

Nor does the Irish training system appear to be successful in overcoming the obstacles facing early school leavers. Thus O’Connell (2002) finds that, amongst graduates of FÁS courses, those with educational qualifications find jobs more easily, and at higher rates of pay, than do those without second-level state examination qualifications.

It is not proposed to engage here in the debate over childcare provision in Ireland. However, on the topic of educational disadvantage, the results of well known US studies of the “Perry Pre-School Programme” bear wider consideration. The programme provided intensive pre-school treatment at ages 4 to 5 to disadvantaged subnormal-IQ children randomly assigned to the programme. The treatment was then discontinued and the peer group – both those randomly chosen and those not chosen for programme participation – were tracked over their lives. This group is now aged around 40. The programme is found to have generated no lasting effects on IQ but to have long-lasting effects on motivation. Programme participants have been found to be more likely to participate in regular schooling, to end up earning higher wages and to be less likely to commit crime. The reported cost-

benefit ratios for the programme are very substantial, with about 65 per cent of the return attributed to reductions in criminal behaviour.²⁰

GOVERNANCE

There has been a growing recognition in recent years that the quality of governance is a crucial determinant of a country's growth potential. The World Bank's 1997 *World Development Report*, for example, signified an important shift in thinking about the role of the state in economic development. It built on analyses of the positive role played by East Asian bureaucracies in the region's spectacular industrialisation and on a number of emerging studies that employed cross-national data sets to show how growth was related to various measures of quality of government.

While Ireland is very far in advance of most developing nations in this regard – with a well-developed interlocking system of parliamentary, judiciary and press scrutiny, clear lines of responsibility and accountability, EU oversight, an independent Competition Authority, a series of independent regulators and a meritocratic civil service – some elements of governance still leave room for improvement. The present paper focuses on three: the planning process, infrastructural development and the clientalist nature of the political system.

PLANNING, PROPERTY PRICES AND THE CONSTRUCTION INDUSTRY

We saw above that what brings growth to a halt in regional-economy models is congestion of quasi-fixed factors such as housing and infrastructure. Escalation of property prices reduces the supply of skilled labour willing to move or return to Ireland. Research on the UK, furthermore, shows that high house prices have knock-on effects on wages and on current and future competitiveness; Murphy (2004).

The measures taken to reduce house price inflation in Ireland over the boom period – such as those recommended by the various “Bacon Reports” – have been conservative in the extreme. In particular, they did nothing to rectify the structural flaws that give zoned land an artificial scarcity value and that continue to offer incentives for corruption. Over the boom period, according to Casey (2003), the proportion of the price of a house that is accounted for by the cost of the site rose from around 15 per cent –

²⁰ Discussion of the programme surfaces in much of the recent writing of Nobel laureate James Heckman; see e.g. Heckman and Lochner (1999).

a level that he suggests is normal by international standards, citing Denmark, Portugal and Holland as examples – to between 40 and 50 per cent today. As for corruption, while it is likely to remain at bay as long as the spotlight of the current Planning Tribunal remains trained on it, the incentives will remain under any system in which the rezoning decisions of public officials can create massive overnight profits for private individuals (a perfect example of what the penny catechism used to call “an occasion of sin”!).

As far back as the early 1970s, the Committee on the Price of Building Land, established under the chairmanship of Mr. Justice Kenny, was asked to consider ways in which increases in the value of development land attributable to the decisions or operations of public bodies could be secured for the benefit of the community rather than of the property developers concerned.²¹ That nothing has been done on this over the last three decades indicates a major failure of Irish governance.

Colm McCarthy, in his *QEC* paper of 2003, discusses a number of possible design solutions other than that proposed by the Kenny Commission, as does Anthony Murphy (2004) in a report to the National Competitiveness Council. As to why these significant design flaws have not been rectified, McCarthy (2003) points out that “...the resistance to measures which would minimise opportunities for corruption has its origins in the desire of politicians, and possibly bureaucrats, to retain the levers of patronage and to enable the pursuit of essentially political objectives through surrogate and opaque processes. To the degree that corruption in the narrow sense and run-of-the-mill political patronage are products joint in supply, the desire to retain patronage sustains also the opportunity for corruption”.

The unhealthy relationship between politicians and property developers remains manifest in the tax treatment of construction in Ireland. Murphy (2004) makes the point that “...at the microeconomic level, the very generous tax treatment of housing encourages over-investment in housing and generates large efficiency losses”. He also points out that there is no good case to be made for the retention of the myriad of special incentives and reliefs for investment in e.g., holiday homes. “These incentives and reliefs merely add to the already high level of housing demand and have large deadweight and displacement effects. The actual or

²¹ The main proposal – which may or may not have required constitutional change – was that local authorities should be enabled to acquire potential development land at existing use value plus 25 per cent. While Murphy (2004) argues that Kenny-type proposals are unfair because they discriminate between the owners of development land which is compulsorily purchased and adjoining development land which is not, he accepts that the carefully-designed auctioning of compulsorily purchased land will generally maximise the revenue raised and result in an efficient allocation of the land. He also points out that site value taxation of undeveloped zoned and serviced land is an effective way of reducing land hoarding.

supposed market failures used to justify these incentives no longer exist”.²²

Why then do these inefficient and detrimental systems and schemes remain in place? Since property developers do not comprise a very numerous group, the favourable treatment accorded them is offered in exchange for finance rather than votes. This governance issue, which has important economic consequences, has been addressed only half-heartedly in the measures adopted in recent years on the financing of politics in Ireland.

The speed with which the Financial Regulatory Authority was set up in the wake of public disquiet over certain financial sector practices contrasts sharply with the meagre structural changes introduced in response to the corruption and cronyism revealed in recent Tribunals of Inquiry.

INFRASTRUCTURAL PROVISION

The *World Competitiveness Yearbook* discussed earlier assesses some 60 countries with respect to various competitiveness factors, including quality of governance, human capital development, infrastructure and technological environment. Ireland ranks among the top quartile with regard to most of the criteria for government efficiency and human capital. This is not the case, however, in terms of the business community’s perceptions of the efficiency with which infrastructural problems are dealt with. Here Ireland is ranked only 47th in terms of the extent to which the “...maintenance and development of infrastructure are adequately planned and financed”. In line with this, the May 2003 report of the National Roads Authority recorded that the cost of the national roads programme had escalated by over 50 per cent since 1999 while the expected completion date had shifted to 2010 – four years behind target. The fact that these issues are only being addressed now, in late 2005, identifies a further substantial weakness in Irish governance.²³

²² The detrimental effects that holiday home villages have on the aesthetic environment is a further issue of concern. Many would argue the need for a Baron Haussmann, a Duke of Ormond or a Wide Streets Commission with the power to ensure integrated visual and aesthetic design in Irish streetscapes.

²³ In October 2005 the Minister for Finance announced that fixed price lump-sum contracts were to become the norm and that further measures would be instituted to minimise the probability of cost over-runs; *The Irish Times*, October 21, 2005.

LOCALISM AND THE IRISH POLITICAL SYSTEM

One further danger worth alluding to concerns the end to EU oversight of national investment policy when Ireland's right to EU regional aid ends in 2006. This oversight has been beneficial in a number of ways, as outlined by Fitz Gerald (1998). It required a commitment to multi-annual programming through the Community Support Frameworks, a commitment which could not be reneged upon even in the event of a change of government. This brought a change from previous practice where infrastructural investment projects stopped and started in line with short-term economic pressures. EU oversight also embodied continuous programme monitoring and evaluation with regard to relevance, efficiency and impact. Fitz Gerald also notes that while ultimate responsibility for spending decisions continued to rest with the Irish government the involvement of EU Commission officials helped nudge domestic decision makers towards measures which were desirable on economic criteria.

In the assessment of Hegarty and Fitz Gerald (2000), the development of such an evaluation culture and capacity will be one of the lasting benefits of the Structural Funds programmes to Ireland. Other observers, however, are fearful that governments, in the absence of EU oversight, may once again find themselves beholden to regional and interest-group pressures that national priorities are lost sight of.²⁴

An example of the benign effects of EU rules is provided by McAleese (2000), who notes that "an Irish government untrammelled by Brussels would have found difficulty in turning off the flow of subsidies to several economically weak but politically sensitive companies (Irish Steel, Aer Lingus and the beef processing industry for instance)." Garrett FitzGerald (2000) concurs, noting that "...democratic national governments tend to be subject to such strong pressure from vested interests within their own territories that many of their decisions operate against the interests of society as a whole".

With convergence on average EU-15 living standards now achieved in the country at large, there are pressures for a return to job dispersal policies, and there is the danger – given the structure of the Irish voting system – that governments may succumb to these and other localist pressures detrimental to the national interest.²⁵ The decentralisation programme for government departments and the relaxation of restrictions on one-off rural

²⁴ The government has already commissioned outside bodies to carry out an *ex ante* evaluation of the next National Development Plan. The question is whether such "good behaviour" can be expected to last into the future.

²⁵ Eurostat's refusal to allow Kerry and Clare to be included in the (Objective 1) Border, Midlands and West region provides an example of how localist-driven policies have been thwarted by the EU in the past.

housing (with its implications for the environment, the cost of infrastructural services, road traffic etc.) provide current examples of economically-detrimental policies driven by localist concerns. Continuing opposition to the rationalisation of local hospital services and battles over the placement of waste treatment facilities – with constituency politicians rejecting national party policy on these issues – represent further cases in point.

As Farrell (2001) notes, Ireland's single transferable vote (STV) electoral system is usually blamed for the brokerage style of politics practiced in Ireland. Political scientists have accorded it a key role in generating "...the heavy emphasis on constituency casework, faction-fighting between candidates from the same party (and) a focus on constituency and localist matters in election campaigns and parliamentary work". Though Farrell himself (page 146) argues that the relationship between brokerage politics and STV may be coincidental, others – such as Katz (1980) – point out that "...as predicted by the theory of electorally determined parliamentary behaviour, the matters of real importance to (Irish) deputies are constituency service, and on these matters deputies who must electioneer independently continue to act independently". The current system certainly appears frequently to lock Irish politicians, competing against each other within the same constituency, into a type of prisoners' dilemma.²⁶

A number of countries, and not just those new to parliamentary democracy, have changed their electoral systems in recent times. Most – including Italy, Japan and New Zealand for example – have switched to "mixed systems" of the German type, which combine national lists (where political parties offer lists of the most capable people willing to serve) alongside constituency representation. This would dilute the stranglehold of localism on the system and allow governments to devote more attention to difficult longer-term issues.²⁷

The final report of the Constitution Review Group (1996) chaired by Dr T.K. Whitaker cautioned that the present PR-STV

²⁶ The dilemma, a concept deriving from game theory, refers to a situation in which a group whose members pursue rational self-interest may all end up worse off than a group whose members act contrary to rational self-interest.

²⁷ This position has also been espoused recently by Ed Walsh, president emeritus of the University of Limerick, who suggests implementing a list system for the Seanad first, to give the electorate an opportunity to observe its merits before considering its possible adoption for Dáil elections; see <http://archives.tcm.ie/businesspost/2005/02/27/story2677.asp>. The fact that Germany and some of the other list-system countries are not currently strong growth performers does not negate the point being made. Growth performance depends on many variables. The question to be asked is whether such a change would improve Irish outcomes or not.

has had popular support and should not be changed without careful advance assessment of the possible effects. If a change were to be made, it went on however, "...the introduction of a PR-list or AMS (the additional member system, referred to above as the mixed system) would satisfy more of the relevant criteria than a move to a non-PR system" such as that of the UK, an option already rejected by the Irish electorate in the referendums of 1959 and 1968.

4. Conclusions

It is suggested here that if Ireland can continue to attract substantial FDI and the labour pool necessary to man it, further convergence on US income per head – which remains well above that of the EU-15 – should be achievable.²⁸

The country's recently-developed science, technology and innovation (STI) policy will help ensure that Ireland is adequately supplied with the kinds of skills and expertise required by MNCs engaged in the offshoring of R&D. This type of high-level FDI has risen substantially in recent years and this trend seems likely to continue over coming decades.

If Ireland's ability to attract FDI were to deteriorate for any reason however (e.g., through a shift in US corporate strategy or a change in US tax laws), the country could be thrown back onto the resources of indigenous industry. As the paper shows, these remain quite weak.

It is to be hoped that nascent STI developments in Ireland may represent the genesis of a process out of which will emerge "our own Michael Dell or Bill Gates".²⁹ It was pointed out however that the upgrading of indigenous industry may require a different variant of STI policy: one that is more focused on product and process development rather than pure knowledge generation.

The STI initiatives have helped to maintain the pace of advance in Irish tertiary education. Substantial problems remain at secondary level however. Five per cent of pupils continue to leave school before Junior Certificate examinations while the proportion remaining until the Leaving Certificate, at around 80 per cent, is far lower than average for the developed world. Much of the problem has to do with the highly uneven performance of Irish schools serving different social classes. Influential UK work (itself highly critical of the UK system) suggests that the contribution of education to economic success in developed countries is greatest when emphasis is placed on sustaining a high level of performance on the part of the bottom half of the academic ability range. Pre-school initiatives could play a role in correcting some of these

²⁸ This presupposes that there are increasing returns associated with the FDI that Ireland can capture. Increasing the labour pool might otherwise reduce income per head.

²⁹ The words are those of Mary Harney, from her time as Minister for Enterprise, Trade and Employment; *The Irish Times*, April 2, 2004.

imbalances. Ireland's poor performance in these respects represents a major impediment to both growth and equity.

The remaining factors focused upon in the paper revolve around governance issues, specifically to do with property prices and the planning process, infrastructural development, and localism and clientalism in the political process.

Escalation of property prices reduces the supply of skilled labour and adversely affects current and future competitiveness. The measures taken to reduce house price inflation in Ireland over the boom period have done nothing to rectify the structural flaws that give zoned land an artificial scarcity value and that continue to offer strong incentives for corruption. The failure to tackle these issues seems ascribable, in part at least, to the failure to introduce international best-practice measures with respect to the financing of the political process. The failure to address cost and time overruns in infrastructural provision over the boom period represents a further weakness in Irish governance.

Finally, the paper pointed to the detrimental effects of the localist and clientalist nature of the Irish political system. The shelving of the Buchanan Report of the 1960s, for example – in response to localist pressures – is now widely recognised to have had highly adverse consequences for the country as a whole.³⁰ The imminent end to EU supervision of national investment policy will strengthen the scope for localist pressures. A move from the present national electoral system towards the kind of list system frequently encountered elsewhere in the developed world would help insulate against such pressures and would also serve to raise the quality of Irish political representation.

³⁰ See e.g. speech by the then Minister for the Environment and Local Government, Noel Dempsey, in 2001:

http://www.irishspatialstrategy.ie/docs/ministers_speech.doc

REFERENCES

- ARCHIBUGI, D., and M. PIANTA, 1992. *The Technological Specialisation of Advanced Countries*, Dordrecht: Kluwer.
- BARRIOS, S., H. GORG and E. STROBL, 2005. Foreign direct investment, competition and industrial development in the host country, *European Economic Review*, Vol. 49, No. 7, pp. 1761-1784.
- BARRY, F., 2002. "The Celtic Tiger Era: Delayed Convergence or Regional Boom", *ESRI Quarterly Economic Commentary*, Summer, Dublin: The Economic and Social Research Institute.
- BARRY, F., 2004. "Export Platform FDI: the Irish Experience", *EIB Papers*, Vol. 9, No. 2, pp. 8-37. Luxembourg: European Investment Bank.
- CANTWELL, J., and L. PISCITELLO, 2002. "Corporate Diversification, Internationalization and Location of Technological Activities by MNCs in Europe" in H. Kierzkowski (ed.), *Europe and Globalization*, London: Palgrave-Macmillan.
- CASEY, J., 2003. "An Analysis of Economic and Marketing Influences on the Construction Industry", *Building Industry Bulletin*, July.
- CLARK, G.L., M. FELDMAN and M. GERTLER, 2000. *The Oxford Handbook of Economic Geography*, Oxford: OUP.
- CLINCH, P., F. CONVERY and B. WALSH, 2002. *After the Celtic Tiger: Challenges Ahead*, Dublin: O'Brien Press.
- CONSTITUTION REVIEW GROUP, 1996. *Final Report*, Dublin: Stationery Office.
- DASCHER, K., 2000. "Trade, FDI and Congestion: The Small and Very Open Economy", CEPR Working Paper No. 2526.
- DAVIES, S. and B. LYONS, 1996. *Industrial Organisation in the EU*, Oxford, UK: Clarendon Press.
- DEPARTMENT OF EDUCATION and SCIENCE, 2005. *Retention Rates of Pupils in Second-Level Schools: 1996 Cohort*, available at: <http://www.education.ie>
- DEPARTMENT OF ENTERPRISE, TRADE AND EMPLOYMENT, 2004. *Building Ireland's Knowledge Economy: the Irish action plan for promoting investment in R&D to 2010*; Dublin: Government Publications.
- DUNNING, J.H., C.S. KIM and J.D. LIN, 2001. "Incorporating Trade into the Industrial Development Path", *Oxford Development Studies*, Vol. 29, pp. 145-154.
- FARRELL, D., 2001. *Electoral Systems: A Comparative Introduction*, Basingstoke: Palgrave.
- FITZGERALD, G., 2000. "Diluting Lobbies and Unleashing Growth" in R. O'Donnell (ed.), *Europe: The Irish Experience*, Dublin: Institute of European Affairs.
- FITZ GERALD, J., 1998. "An Irish Perspective on the Structural Funds", *European Planning Studies*, Vol. 6, No. 6, pp. 677-694.
- FITZ GERALD, J., 1999. "Wage Formation and the Labour Market", in F. Barry (ed.), *Understanding Ireland's Economic Growth*, London: Macmillan Press.
- FITZ GERALD, J., 2000. "The Story of Ireland's Failure and Belated Success" in B. Nolan, P. O'Connell and C. Whelan (eds.), *Bust to Boom: the Irish Experience of Growth and Inequality*, Dublin: IPA.
- GÖRG, H., and STROBL, E., 2003. Multinational companies, technology spillovers and plant survival, *Scandinavian Journal of Economics*, Vol. 105, pp. 581-595.
- GÖRG, H., and F. RUANE, 2000. An Analysis of Backward Linkages in the Irish Electronics Sector, *The Economic and Social Review*, Vol. 31, No. 3, pp. 215-235.
- GUNNIGLE, P., and D. McGUIRE, 2001. "Why Ireland? A Qualitative Review of the Factors Influencing the Location of US Multinationals in Ireland with Particular

- Reference to the Impact of Labour Issues,” *The Economic and Social Review*, Vol. 32, No. 1, pp. 43-67.
- HANNAN, D., E. SMYTH, J. McCULLAGH, R. O’LEARY, D. McMAHON, 1996. *Coeducation and Gender Equality: Exam Performance, Stress and Personal Development*, Dublin: Oak Tree Press in association with the Economic and Social Research Institute.
- HECKMAN, J., and L. LOCHNER, 1999. “Rethinking Education and Training Policy: Understanding the Sources of Skill Formation in a Modern Economy”, available at: <http://www.econ.rochester.edu/lochner/rethinking.pdf>
- HEGARTY, D., and J. FITZ GERALD, 2000. “Ex Ante Evaluation Process for the 2000-2006 Period in Ireland”, unpublished ms.
- HINES Jr., J., 2003. “Sensible Tax Policies in Open Economies”, *Journal of the Statistical and Social Inquiry Society of Ireland*, forthcoming.
- HONOHAN, P., and B. WALSH, 2002. “Catching up with the Leaders: the Irish Hare”, *Brookings Papers on Economic Activity*, (1), pp. 1-57.
- INSTITUTE FOR MANAGEMENT DEVELOPMENT, 2005. *World Competitiveness Yearbook*, Lausanne: IMD.
- KATZ, R.S., 1980. *A Theory of Parties and Electoral Systems*, Baltimore: Johns Hopkins University Press.
- KRUGMAN, P., 1979. “A Model of Innovation, Technology Transfer and the World Distribution of Income”, *Journal of Political Economy*, Vol. 87, pp. 253-266.
- KUEMMERLE, W., 1999a. “Foreign direct investment in industrial research in the pharmaceuticals and electronics industries – results of a survey of multinational firms”, *Research Policy*, Vol. 28, pp. 179-193.
- KUEMMERLE, W., 1999b. “The drivers of foreign direct investment into research and development: an empirical investigation”, *Journal of International Business Studies*, Vol. 30 No. 1, pp. 1-24.
- MacSHARRY, R. and P. WHITE, 2000. *The making of the Celtic tiger: the inside story of Ireland’s booming economy*, Dublin, Ireland: Mercier Press.
- MARKUSEN, J., 1988. “Production, Trade and Migration with Differentiated, Skilled Workers”, *Canadian Journal of Economics*, Vol. 21, No. 3, pp. 492-506.
- McALEESE, D., 2000. “Twenty-Five Years a Growing”, in R. O’Donnell (ed.), *Europe: The Irish Experience*, Dublin: Institute of European Affairs.
- McCARTHY, C., 2003. Corruption in Public Office in Ireland: Policy Design as a Countermeasure, *ESRI Quarterly Economic Commentary*, Autumn, pp. 59-73. Dublin: The Economic and Social Research Institute.
- MJOSET, L., 1992. *The Irish Economy in a Comparative Institutional Perspective*, NESC Report No.93, Dublin: National Economic and Social Council.
- MURPHY, A., 2004. “Housing and National Competitiveness”, Report to the National Competitiveness Council, unpublished.
- NICKELL, S., and B. BELL, 1996. “Changes in the Distribution of Wages and Unemployment in OECD Countries”, *American Economic Review, Papers and Proceedings*, Vol. 86, No. 2, pp. 302-308.
- O’CONNELL, P., 2002. “Are They Working? Market Orientation and the Effectiveness of Active Labour Market Programmes in Ireland”, *European Sociological Review*, Vol. 18, No. 1, pp. 65-83.
- OECD, 1995. *Economic Survey of Ireland*, Paris: OECD.
- OECD, 2001. *Science, Technology and Industry Scoreboard: Towards a Knowledge-Based Economy*, Paris: OECD.
- OECD, 2001a. *Education at a Glance*, Paris: OECD.

- O'MALLEY, E., 2004. "Competitive Performance in Irish Industry", *ESRI Quarterly Economic Commentary*, Winter, Dublin: The Economic and Social Research Institute, pp. 66-101.
- PRAIS, S.J., 1995. *Productivity, Education and Training*, Cambridge: Cambridge University Press.
- SMYTH, E., 1999. *Do Schools Differ? Academic and Personal Development among Pupils in the Second-Level Sector*. Dublin: Oak Tree Press in association with The Economic and Social Research Institute.
- UNCTAD, 2005. *World Investment Report: Transnational Corporations and the Internationalization of R&D*, UN: New York and Geneva.
- VERSPAGEN, B., 1991. "A new empirical approach to catching up or falling behind", *Structural Change and Economic Dynamics*, Vol. 2, No. 2.
- WALSH, B., 2005. The University and Civil Society, speech delivered to Faculty of Human Sciences as part of UCD 150 celebrations, Feb. 11.
- WHITE, T., 2001. *Investing in People: Higher Education in Ireland from 1960 to 2000*, Dublin: Institute of Public Administration.
- WORLD BANK, 1997. *World Development Report: The State in a Changing World*, New York: Oxford University Press.