

Barry, Frank

Working Paper

Foreign direct investment and institutional co-evolution in Ireland

UCD Centre for Economic Research Working Paper Series, No. WP06/03

Provided in Cooperation with:

UCD School of Economics, University College Dublin (UCD)

Suggested Citation: Barry, Frank (2006) : Foreign direct investment and institutional co-evolution in Ireland, UCD Centre for Economic Research Working Paper Series, No. WP06/03, University College Dublin, UCD School of Economics, Dublin, <https://hdl.handle.net/10197/1269>

This Version is available at:

<https://hdl.handle.net/10419/72361>

Standard-Nutzungsbedingungen:

Die Dokumente auf EconStor dürfen zu eigenen wissenschaftlichen Zwecken und zum Privatgebrauch gespeichert und kopiert werden.

Sie dürfen die Dokumente nicht für öffentliche oder kommerzielle Zwecke vervielfältigen, öffentlich ausstellen, öffentlich zugänglich machen, vertreiben oder anderweitig nutzen.

Sofern die Verfasser die Dokumente unter Open-Content-Lizenzen (insbesondere CC-Lizenzen) zur Verfügung gestellt haben sollten, gelten abweichend von diesen Nutzungsbedingungen die in der dort genannten Lizenz gewährten Nutzungsrechte.

Terms of use:

Documents in EconStor may be saved and copied for your personal and scholarly purposes.

You are not to copy documents for public or commercial purposes, to exhibit the documents publicly, to make them publicly available on the internet, or to distribute or otherwise use the documents in public.

If the documents have been made available under an Open Content Licence (especially Creative Commons Licences), you may exercise further usage rights as specified in the indicated licence.

UCD CENTRE FOR ECONOMIC RESEARCH

WORKING PAPER SERIES

2006

Foreign Direct Investment and Institutional Co-Evolution in Ireland

Frank Barry, University College Dublin

WP06/03

February 2006

**UCD SCHOOL OF ECONOMICS
UNIVERSITY COLLEGE DUBLIN
BELFIELD DUBLIN 4**

Foreign Direct Investment and Institutional Co-Evolution in Ireland

Frank Barry
University College Dublin
February 2006

Abstract

Ireland was one of the first countries in the world to adopt an FDI-oriented development strategy. It remains to this day the most FDI-intensive economy in Europe. These factors have helped configure the institutional structure of the economy to be able to respond rapidly to changes in the nature and requirements of the type of global FDI that an economy with Ireland's advantages (and disadvantages) could reasonably hope to attract. This paper analyses the changing characteristics of European-bound FDI since the 1960s and the co-evolution of Irish development strategy.

Introduction

Ireland remained protectionist for about a decade after most of the rest of Western Europe had moved towards freer trade. The post-war boom of the 1950s saw Western Europe achieving growth rates of almost 6 percent per annum while protectionist Ireland stagnated with a growth rate of less than 2 percent, an employment growth rate of less than 1 percent, and a balance of payments crisis precipitated by the need to import the more sophisticated capital and consumer goods that the country could not produce for itself. Over the course of the 1950s, more than 400,000 Irish people emigrated (out of a total population of less than 3 million).

By the end of the 1950s it was clear that economic policy needed to be completely overhauled. The First Programme for Economic Expansion, introduced in 1958, heralded the demise of protectionism. The move towards openness was accompanied by the introduction of a zero tax rate on profits derived from manufactured exports and a liberalisation of the law on foreign ownership of companies. The Industrial Development Agency, which had been set up in 1949 to stimulate, support and develop export-led business, began to take on a more proactive promotional function. Indeed, it stands out as one of the world's first investment promotion agencies.¹ British, US and German MNCs responded rapidly to these new opportunities and incentives, helping to establish Ireland as an export platform for European-bound manufactures.

The FDI-oriented strategy having largely been stumbled upon, it turned out with hindsight to accord well with Ireland's advantages: an Atlantic location and English-speaking environment, relatively low labour costs by Western European standards,² cultural connections with the US, and Western European standards of governance.²

Over the next few decades Ireland became, and remains to this day, the most FDI-intensive economy in Europe. As seen in Table 1, foreign-owned firms account for almost 50 percent of Irish manufacturing employment. This compares to an average figure of 23 percent for the Western European EU member states and 33 percent for the three largest Central and Eastern European economies. Of the 17 EU countries plus the US and Norway for which OECD (2005, E7) provides data, Ireland also records the highest share of services-sector employment in foreign-owned firms. These figures are reflected in the value of the stock of foreign direct investment

¹ Singapore is another FDI-dependent economy that moved early to attract FDI, with the establishment of the Economic Development Board as a quasi-governmental agency in 1961 (Schein, 1996).

² Standards of public-sector governance are widely recognised to be a crucial determinant of a country's investment climate. Western European standards are based on an 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; Barry (2005b). Governance standards are particularly important in the areas of privatisation and natural resource-seeking FDI if a country is to be able to maximise the benefits of FDI attracted into these areas.

(FDI). Per head of population, the Irish inward FDI stock is a multiple of the EU average.³

Table 1: FDI-Intensity of the Irish Economy

	Share of foreign affiliates in manufacturing employment	Share of foreign affiliates in services employment	FDI inward stock (USD) per head of population (2004)
Ireland	49	22	57372
EU15	23	10	9796
CEE	33	16	2403

Notes: affiliate employment shares (2002 or closest date) come from OECD (2005, tables E6 and E7) Science, Technology and Industry Scoreboard. CEE refers to the country average for Hungary, Poland and the Czech Republic. FDI Inward Stock data come from the UNCTAD (2005) World Investment Report.

These two factors – the long-established orientation of policy towards attracting FDI and the resulting FDI-intensity of the economy – have helped configure the institutional structure of the economy to be able to respond rapidly to changes in the nature and the requirements of the type of global FDI that an economy with Ireland’s characteristics can hope to attract.

The paper seeks to chart first the changing characteristics of the type of FDI drawn to Ireland. To do this, Irish outward orientation is divided into four distinct phases. The first phase began with the move away from protectionism in the late 1950s and lasted until Ireland’s accession to the EU in 1973. The second, which was characterised by a shift into higher-technology sectors as educational throughput soared, lasted until the late 1980s when FDI flows into and within Europe expanded in anticipation of the Single European Market. The third phase spans the global high-tech boom of the 1990s and the acceleration of services offshoring, while the fourth phase, lasting into the future, is characterised by the substantial offshoring of R&D functions by multinational corporations. These various phases are charted in Section 2 of the paper.

Section 3 discusses how the characteristics of European-bound FDI have changed over the decades. It also looks at the changing economic geography of Europe in an attempt to isolate the types of FDI that Ireland could reasonably have hoped to target.

Section 4 analyses how the institutional environment in Ireland has evolved and adjusted in line with the opportunities emerging over each of these phases. Four key institutional areas are studied: (i) corporation tax policy and the regulatory

³ Luxembourg records a higher FDI stock per head of population than Ireland but this is largely concentrated in financial services and is much less employment-intensive.

environment, (ii) governance and the structure and modus operandi of the Irish development agencies, (iii) educational policy and (iv) policies towards science, technology and innovation.

2. Characteristics of FDI over Four Phases of Irish Trade Integration

Phase 1: from Protectionism to EU Accession (late 1950s-1973)

There were five key elements in the shift towards outward orientation in the late 1950s. The first saw Ireland join the IMF in 1957 and apply for a World Bank loan in 1958. As Daly (1981) notes, contact with international agencies increased from this point onwards and a more outward-looking attitude developed. The consequences of these contacts with international agencies would prove to be particularly important in the field of education, with the implementation of policies advocated in a 1965 report commissioned from the OECD.

The second was the removal of restrictions on the foreign ownership of industry. The Control of Manufactures Acts of 1932 and 1934, which were designed to ensure that the industries established under protectionist barriers would be Irish-controlled, were partially repealed in 1956 and completely removed the following year.

The third element was the introduction of Export Profits Tax Relief. The initial Act of 1956 gave 50 percent tax remission on profits derived from manufactured exports and this was increased to 100 percent two years later. This move was relatively painless in that it led to little diminution in the tax base, given that the vast bulk of the country's exports at the time were agricultural in nature.

The fourth element saw the adoption of a more proactive role in investment promotion on the part of the Industrial Development Authority (later renamed the Industrial Development Agency). This had been set up within the civil service in 1949 with the responsibility of attracting foreign industries to Ireland. It lacked the power to grant incentives in furtherance of its mandate until 1956 however, from which time substantial industrial grants began to be made available.⁴

Trade liberalisation was the final element in the shift towards openness was. Ireland reduced tariffs on imports unilaterally in both 1963 and 1964. The Anglo-Irish Free Trade Agreement – which aimed to completely liberalise trade with the country's major trading partner of the time, the United Kingdom, by 1975 – came into force in 1966.⁵ Irish industrial goods were guaranteed immediate tariff-free access to the UK

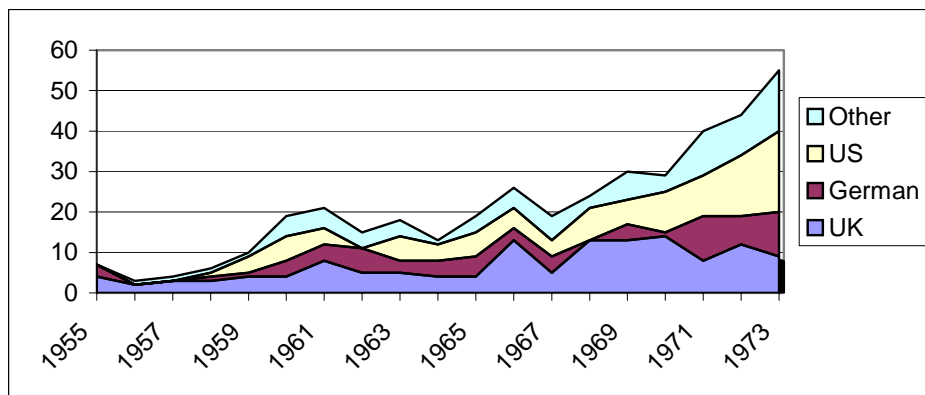
⁴ “In its heyday in the early 1980s “, according to Ó Gráda (1997), “the IDA accounted for 12 percent of all public investment and absorbed 2 percent of GDP. A decade later these shares had dropped to 8 percent and 0.6 percent respectively.”

⁵ The degree of protection is illustrated by the fact that the average effective tariff level before the Anglo-Irish Free Trade Agreement was almost four times that prevailing in the country's trading partners. This had declined to around twice the average level in the run up to EEC entry in 1973.

market and, in return, Ireland committed itself to an annual reduction of 10 percent in tariff barriers on British imports.

British, US and German MNCs responded rapidly to these new opportunities and incentives, helping to establish Ireland as an export platform for European-bound manufactures.⁶

Figure 1: New Foreign Companies Locating in Ireland each year: 1955-73



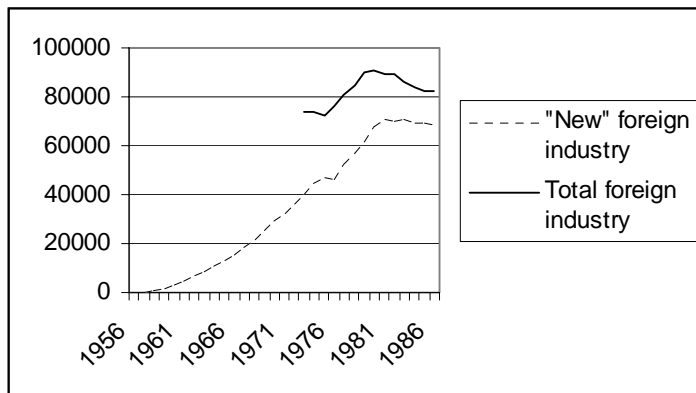
Source: Author's calculations from IDA (1973)

Although comprehensive employment data are not available for the period, O'Hearn (1987) provides estimates of likely employment levels associated with this growth in company formation.⁷ These are graphed in Figure 2. By the time of EU entry in 1973, firms which had entered to avail of export-profits tax relief accounted for slightly more than half of all foreign-firm employment in manufacturing, with the remainder accounted for by the mainly UK firms that had entered Ireland to serve the home market, whether under protectionism or in the outward-oriented era.

⁶ The total stock of US FDI in Ireland was USD 6 million in 1958, with over 80 percent of it located in the petroleum sector and none in manufacturing. By the date of EU accession in 1973, the stock had risen to USD 269 million (in nominal terms), of which 90 percent was in manufacturing, with the bulk of foreign-industry output exported (Lipsey, 2003).

⁷ Black (1977) shows that the *job targets* negotiated with grant-aided firms accelerated from 1968. No such acceleration is apparent in O'Hearn's figures. See also Moore, Rhodes and Tarling (1978).

Figure 2: Employment in “new” foreign industry (attracted under outward orientation) and total foreign industry



Source: O’Hearn (1987)

As Table 2 reveals, most of the growth prior to EU entry was in traditional or low-tech sectors such as Textiles and Clothing, Metals Industries (such as aluminium extrusions, shipbuilding, cranes, metal nuts), Pulp and Paper, and Rubber and Plastics.

Table 2: Sectoral Share of Employment in New Foreign Industry

	1960	1965	1969	1973	1986
Food and Drink	2.8	3.4	9.0	10.8	8.6
Textiles and Clothing	10.2	16.4	19.2	21.1	15.9
Wood and Furniture	0.0	1.6	1.6	1.5	1.2
Pulp, Paper and Printing	11.3	5.9	3.6	2.9	2.1
Clay, glass and cement	0.0	1.9	2.3	2.4	2.6
Chemicals (excl. pharma)	7.1	7.9	6.0	5.4	3.9
Pharmaceuticals	0.0	3.3	2.9	2.3	5.7
Metal prods (excl. electronics)	49.6	40.0	29.6	27.4	15.1
Electronics	6.4	8.5	12.1	10.9	25.9
Other manuf (excl. med and opt)	12.6	9.4	8.7	8.4	8.9
Medical and optical	0.0	1.5	4.8	6.9	10.0

Source: O’Hearn (1987)

The FDI inflows of this period saw Ireland developing a revealed comparative advantage (at the SITC-1 level) in Chemicals (whose share of exports grew from less than one half of 1 percent at the end of the 1950s to 6 percent at the time of EU entry) and in “manufactured goods classified by material” and “miscellaneous manufactured articles”.

The growth in foreign industry also contributed to a substantial diversification of Irish exports away from the UK market. Most new foreign companies are thought to have exported primarily into Continental Europe (as opposed to the UK, which remains to this day the dominant export destination of most domestically-owned firms) even

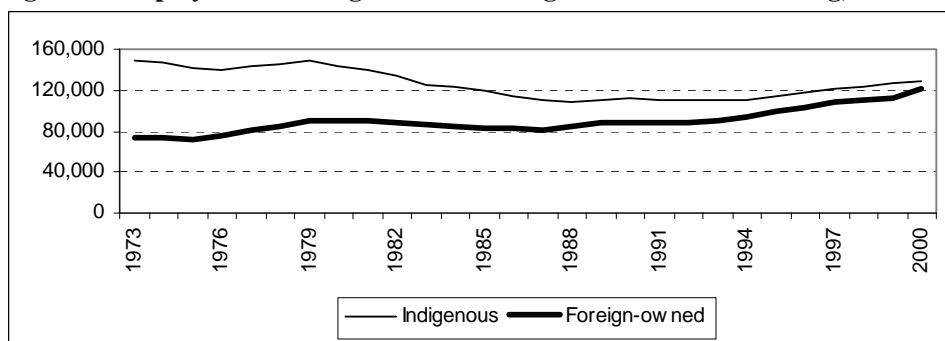
though substantial tariff barriers remained against Irish-produced goods. Thus the then 6-country EU share of manufacturing exports rose by 10 percentage points between the late 1950s and the early 1970s.

As will be discussed later in Section 4 of the paper, the increased openness of the period fuelled a growing recognition of education as a crucial form of investment. Furthermore, it was recognised that, in contrast to the UK— whose early industrialisation had ensured the evolution of a well-developed system to provide an intermediate layer of technicians – the Irish education system would need to provide this intermediate layer from scratch. This led to the development of a third-level education system for which there was no UK model. Throughput expanded rapidly in the wake of the introduction of publicly-funded second-level education in 1967, following publication of the OECD report mentioned earlier.

Phase 2: From EU Accession to the Single Market Era (1973-87)

Ireland joined the then European Economic Community (EEC) along with the UK and Denmark in 1973. By 1977 all tariffs between Ireland and the eight other member states were removed. Although Ireland was already relatively FDI-intensive, the number of jobs in foreign-owned manufacturing industry grew by 23 percent between 1973 and 1980, before declining subsequently as a consequence of macroeconomic instability, as illustrated in Figure 3.

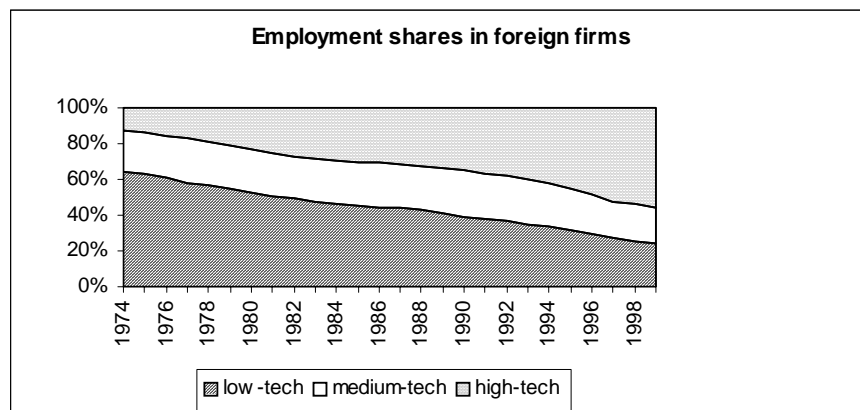
Figure 3: Employment in indigenous and foreign-owned manufacturing, 1973-2000



Source: Annual reports of the Irish state agency Forfás.

The foreign-owned sector however, fuelled by the upgrading of the Irish educational system, became progressively more technology-intensive over the entire period, as shown in Figure 4.

Figure 4: Technology mix of foreign firms.



Note: This figure employs the standard OECD sectoral classifications.

Although Ireland's low corporation-tax environment is particularly attractive to high-technology firms because of transfer-pricing practices, the increasing technological intensity shown here (along with a continuous rise in R&D expenditures per employee) would hardly have been possible without the educational advances analysed in detail in Section 4 below.

The major expansions in foreign-owned manufacturing were in computing equipment and electronic components, pharmaceuticals and medical and optical devices, and these expansions continued also into the following "Celtic Tiger" era, as seen in Table 3.⁸

Table 3: Sectoral allocation of manufacturing-sector foreign-firm employment

	1973	1987	2000
Food, Beverages and Tobacco	24	18	11
Textiles, Clothing and Footwear	19	14	3
Chemicals (excl. pharma)	6	7	5
Pharmaceuticals	2	6	11
Machinery and Equipment	4	6	5
Office and Data Processing Equipment	1	7	19
Electrical and electronic components	4	10	14
Medical and Optical Instruments	4	8	11
Transport Equipment	11	7	7
Remainder	24	17	12

Note: Remainder comprises Wood, Pulp, Paper and Printing; Rubber and Plastics; Non-Metallic Materials; Basic and Fabricated Metals; Coke and Refined Fuels, and Miscellaneous Manufactures

⁸ Note that this table is based on a different data set than that for Table 2. The present table refers to *all* foreign industry, which includes protectionist-era foreign firms and those set up to cater to the domestic market. Comparison of the two tables shows that the latter groups included a large coterie in the Food, Drink and Tobacco sector.

Phase 3: The Single Market, Services Offshoring and the Celtic Tiger (1987-present)

The “Celtic Tiger” era refers to the dramatic growth phase of the 1990s which saw Irish GNP per head (evaluated in terms of purchasing power) rise from a little over 60 percent of average Western European income per capita in 1987 to achieve parity by the early years of the new millennium. The various factors behind the Irish performance are discussed in detail elsewhere, e.g. in Barry (2004). Here the focus is solely on the contribution of FDI.

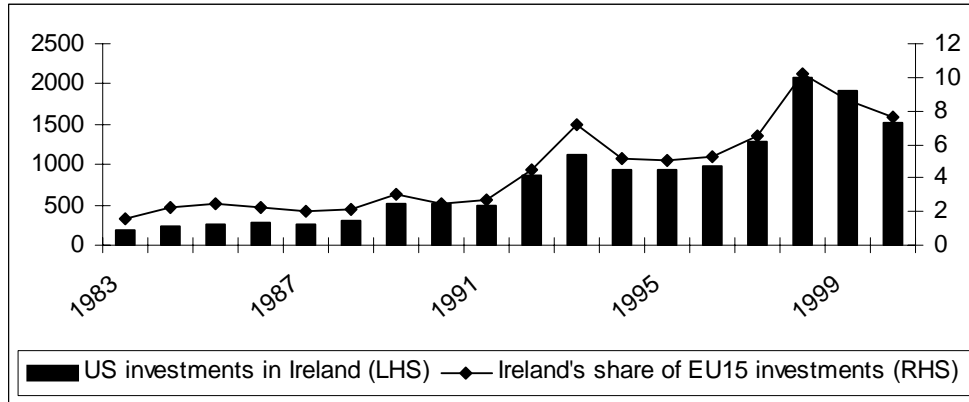
Manufacturing FDI into and within Europe expanded in the late 1980s. Figure 9 shows developments in US manufacturing investments in Europe over this period and beyond. Much of the increase in the late 1980s is attributed by the US Department of Commerce *Survey of Current Business* (March 1991) to the lead up to the introduction of the Single European Market in 1992. The figure also shows that Ireland captured a growing share of US investments in Europe over this period. MacSharry and White (2000) explain this increase in Ireland’s share 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 threats emanated). The outlawing of restrictive public procurement practices under the Single Market initiative enhanced Ireland’s attractiveness as an FDI location. This effect would undoubtedly have been dampened had not Ireland concurrently achieved a restoration of macroeconomic stability.

The increasing share of high-tech sectors in European manufacturing over the 1990s – as will be seen later in Table 7 – also boosted Ireland’s share, as did the high profitability of the era, since both increase the attractiveness of a low corporation-tax environment.⁹ Altshuler, Grubert and Newlon (2001) argue, furthermore, that US foreign investment has become more sensitive to differences in host country taxes in recent years, which would also have acted in Ireland’s favour. The Single Market programme may also have allowed Ireland to achieve a critical mass of US firms in certain sectors, allowing agglomeration and demonstration effects to come into play (Barry, Görg and Strobl, 2003).

Thus the number of jobs in foreign-owned manufacturing in Ireland expanded by almost 50 percent between 1987 and 2000.

⁹ Manipulation of transfer prices in order to shift profits to low-tax locations is easiest in R&D and advertising-intensive sectors since these factors make it more difficult to locate the exact source of value added. Employing Davies and Lyons’ (1996) categorisation, advertising and R&D-intensive sectors accounted for over 65 percent of foreign employment in Irish manufacturing in 2000, up from 45 percent of a much smaller base in 1973.

Figure 5: Investments by US Manufacturing Companies in Ireland (millions of 1996 dollars), and as a share of US Manufacturing Investments in the EU15.



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

Combined with this increase in manufacturing FDI, Ireland also began to attract increasing services-sector FDI inflows (Grimes and White, 2005). Starting from a base close to zero in the late 1980s, by the new millennium foreign-firm employment in each of Ireland’s FDI-intensive manufacturing sectors was matched by equivalent employment levels in several foreign-owned offshore services sectors: the international financial services segment now matches pharmaceuticals, other business-process offshored (BPO) activities match instrument engineering, and computer software employment is now close to that in hardware.¹⁰

It is well known that the share of services in international FDI flows has been increasing over recent decades (UNCTAD 2004). Ireland’s ability to attract an increased share of services was facilitated by substantial reductions in the rate of corporation tax on services over the course of the 1980s and 1990s, as discussed later in Section 4.

All indicators point to Ireland’s strong success in attracting offshore services. McKinsey Global Institute (2003), for example, identify Ireland and India as the most popular destinations for offshored business services (BPO and IT). More recent indicators are presented in Table 4. Ireland, with only 1 percent of the EU15 population, attracted 50 percent of new shared services projects in the EU15 and 8 percent of regional headquarters projects in the period to which the data refer.

¹⁰ Barry and Van Egeraat (2005) describe how computer hardware firms upgraded their Irish operations into services activities as they shifted their manufacturing facilities to Asia and Central and Eastern Europe.

Table 4: Number of Services-Sector FDI Projects by Destination Countries, 2002-2003

	Call centres	Shared services	IT services	Regional HQ
EU15	169	38	198	185
Ireland	29 (17%)	19 (50%)	14 (7%)	15 (8%)

Source: UNCTAD (2004, p 162).

Phase 4: Science, Technology and Innovation Policy and the Offshoring of R&D Functions

The fourth phase of our analysis refers to the current trends towards the offshoring of R&D facilities. Kuemmerle (1999a) provides an early indication of this. Overseas R&D staff in the 32 pharmaceuticals and electronics MNCs that he tracked increased from 6 percent in 1965 to more than 25 percent by the late 1990s, while the number of overseas R&D labs increased from 14 to 84.

US Bureau of Economic Analysis data reveal a rise in European R&D employment in US affiliates from 66,500 workers (2.9 percent of the total affiliate workforce) in 1989 to 73,100 (3.1 percent) in 1994, rising to 83,100 in 1999 (2.4 percent).¹¹ A recent National Science Foundation report, Moris (2004), furthermore, points out that between 1994 and 1999 overseas R&D employment in US MNC affiliates grew at an average annual rate of 3.9 percent compared with just 0.7 percent in the parent companies, “an indication of the increasing globalization of innovation and knowledge-based competition”.

The 2005 UNCTAD World Investment Report provides broader and more detailed evidence on the recent growth in global offshoring of R&D functions. It points out that for the largest Swedish MNCs the share of R&D carried out overseas rose from 22 percent in 1995 to 43 percent in 2003, and, for Japanese MNCs, from 2 percent to 4 percent over the same period. These trends are further confirmed by survey evidence cited in the UNCTAD report.

Kuemmerle (1999a) distinguishes between “home-base-exploiting” R&D sites (which are associated with traditional FDI, where firms set up overseas to exploit on a larger stage the advantages, such as brand names, that they have already accumulated) and “home-base-augmenting” or technology-sourcing sites.¹² The proportion of technology-sourcing R&D labs in his study rose from 7 percent to 40 percent over the period analysed.

¹¹ The decline in share in 1999 is perhaps ascribable to the emergence of Central and Eastern Europe as a new location for less technology-intensive segments of the production process.

¹² The former are more likely to be located close to existing factories and important markets, while the latter are more likely to locate close to universities. See also Kuemmerle (1999b).

Considerations arising from Ireland’s low-corporation-tax regime make it difficult to evaluate precisely how well Ireland is currently faring in the R&D-outsourcing stakes. One reason is that, since R&D expenditures are typically measured relative to output, the profit-shifting transfer pricing behaviour of MNCs artificially deflate these measures for Ireland. Barry (2005a) shows that correcting for this by measuring Business Enterprise R&D expenditures *per employee* rather than as a share of output reduces Finland’s R&D intensity from 340 percent of Ireland’s to just over 200 percent, while Ireland’s lead over Spain is substantially increased. The conventional measure would have suggested a Spanish R&D intensity about four-fifths of the Irish level, while the corrected measure suggests that Ireland’s is more than three times greater.

A second complicating factor arises over the issue of whether a low corporation tax regime reduces the incentive of MNCs to locate R&D in the jurisdiction. A report to the Irish state agency Forfás, quoted by Barry (2005a), asserts that “the tax incentives for manufacturing in Ireland...inhibit the performance of R&D, since R&D costs can be written off at higher tax rates in the home country”. Hines (2003) rejects the argument that R&D is discouraged, but suggests that the R&D intensity ratios may nevertheless be lowered because employment and output may be stimulated more than R&D.^{13,14}

These complications notwithstanding, there has been a clear increase in Ireland’s share of gross R&D expenditures in both the EU15 and the OECD over the recent period, as seen in Table 5.¹⁵

Table 5: Gross Expenditures on R&D (GERD): Ireland, EU15 and OECD

	1991	1997	2000	2002
Ireland as share of EU15	0.35	0.69	0.70	0.73
Ireland as share of OECD	0.11	0.20	0.20	0.22

Source: OECD (2005) Science, Technology and Industry Scoreboard; Table A.2.2

In part, this is driven by the increased funding available from government and delivered primarily through third-level educational institutions. Business expenditures on R&D have also increased more rapidly than in the case of the EU or OECD however, and the vast bulk of this (some 70 percent) in Ireland is accounted for by foreign-owned multinational corporations.¹⁶

Ireland has indeed scored some notable successes in attracting offshore R&D projects in recent years. The Science Foundation Ireland Centres for Science, Engineering and Technology, established in partnership with leading international firms such as Intel,

¹³ Indeed, it is likely, he suggests, that low tax rates indirectly encourage local R&D activities on the part of multinational corporations eager to defend themselves against the charge that rents should not be attributed to their operations in low-tax locations.

¹⁴ US BEA data reveal that R&D workers comprised 1.5 percent of the US affiliate workforce in Ireland in 1999. No equivalent data were available for the earlier benchmark years 1989 or 1994.

¹⁵ The Irish data, unfortunately, are as yet available only up to 2002.

¹⁶ OECD (2005): Sections A2, A5 and C.5.1.

Bell Labs and Hewlett-Packard, are discussed in a later section of the paper. Besides these industry-academia collaborations, Intel has established an innovation centre at its main site outside Dublin and increased its investment in its research centre near Limerick; Bell Labs has announced its intention to set up a major R&D centre at Lucent Technologies' Dublin facility, and Hewlett-Packard has announced the establishment of a world-class Technology Development Centre at its manufacturing facility outside Dublin. Microsoft also recently announced the establishment of a new R&D facility at its European Product Development Centre in Dublin while IBM has 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 Industrial Development Agency and the increasing role of Science Foundation Ireland.

In July 2005 alone, 5 major new R&D investments were announced by IDA-supported companies in the ICT (Xilinx), Biopharmaceuticals (Bristol-Myers Squibb, Pfizer, Genzyme) and Services (Citigroup) sectors. The latter is the first dedicated R&D Centre established by Citigroup worldwide and will be the first ever R&D investment by a financial services company in Ireland. A number of these projects also involve significant collaborations with Irish academic institutions.¹⁷

All the indications are then that, as is already the case with services, Ireland is becoming an increasingly important location for offshore R&D. How the institutional environment in Ireland has evolved to facilitate and promote this process is the topic of section 4 of the paper. We first look in more detail however at the changing sectoral pattern of the type of FDI that Ireland could reasonably have hoped to attract

3. The Changing Sectoral Pattern of FDI Stocks

Table 6 shows how the pattern of world FDI in developed countries changed over the course of the 1990s. The bulk of manufacturing-sector FDI is in Chemicals, Electric and Electronic Equipment and Transport Equipment, all of which increased their share of manufacturing FDI over the period.

¹⁷ <http://www.idaireland.com/home/index.aspx?id=65>

Table 6: Sectoral Disaggregation of World FDI Inward Stock in Manufacturing in Developed Countries

	1990	2002
Manufacturing		
Food, Beverages, Tobacco	11.2	9.0
Textiles, Clothing, Leather	3.7	2.6
Wood and Wood Products	3.2	3.3
Publishing and recorded media	2.4	4.4
Coke and fuels	8.6	2.1
Chemicals	19.4	21.1
Rubber and Plastics	2.1	1.6
Non-Metallic Minerals	2.7	3.1
Metals	8.0	7.5
Machinery and Equipment	7.5	6.1
Electrical and Electronic	11.5	13.5
Precision Instruments	1.9	1.6
Transport Equipment	7.6	13.4
Other Manuf. and unspecified	10.1	10.7

Source: UNCTAD (2004, Table A.1.18)

Bearing in mind that US MNCs account for around half of the employment in foreign-owned manufacturing firms and of the manufacturing-sector FDI stock in Ireland, Table 7 charts the equivalent data for US MNCs in Europe over a somewhat longer time period.¹⁸ This table reveals a broadly similar pattern. While the bulk of US investments in the 1970s went to the industrial machinery and equipment sector, by the late 1980s chemicals and related products has become the dominant sector. Over the course of the 1990s, furthermore, computers and electronic products surpassed transportation equipment as the second largest sector.

¹⁸ The sectoral classification system for the US data changed in 1999.

Table 7: Sectoral Shares of US Direct Investment Position in European Manufacturing

	Food	Chemicals	Primary and fabricated metals	Machinery	Computers and electronic products	Electrical equipment, appliances, and components	Transportation equipment	Misc Manuf
2004	6.5	31.0	5.4	6.0	12.5	3.3	9.1	26.2
2003	6.7	31.7	5.6	6.3	12.6	3.6	9.5	24.1
2002	5.0	30.6	5.9	6.4	13.6	4.0	9.1	25.4
2001	7.1	30.5	6.7	6.1	13.0	3.8	9.7	23.2
2000	7.1	26.1	5.4	8.0	14.2	3.8	12.4	23.0
1999	6.9	30.3	6.0	7.8	9.9	3.1	12.6	23.3
				Industrial machinery and equipment	Electronic and other electric equipment			Other manufacturing
1998	10.9	34.0	7.4	12.0	8.0		8.8	18.9
1997	10.8	34.3	6.4	13.3	8.1		9.3	17.9
1996	10.5	35.4	6.0	12.8	8.9		8.7	17.7
1995	11.2	30.2	4.3	14.7	8.7		11.1	19.7
1994	11.5	27.9	4.9	14.5	7.0		11.3	22.8
1989	7.8	24.4	4.9	23.1	6.3		12.6	20.8
1982	9.0	19.8	5.7	21.5	8.3		11.1	24.7
1977	7.6	21.1	5.4	33.1	0.0		16.1	16.8
1973	7.6	18.4	6.6	32.5			16.9	18.1

Source: US BEA (various years).

Table 8 reveals the growing importance of FDI in services relative to manufacturing for developed countries over the course of the 1990s.¹⁹

Table 8: Inward FDI stock in Developed Countries

	1990	2002
Manufacturing	45.3	33.9
Services	54.7	66.1

Source: UNCTAD (2004, Table A.1.18)

Table 9 shows that Finance accounts for the bulk of services FDI, with Business Activities overtaking Trade as the sector largest sector over this period.

¹⁹ The changes to the US sectoral classifications make it difficult to perform an equivalent analysis for US FDI stocks.

Table 9: Sectoral Disaggregation of World FDI Inward Stock in Services in Developed Countries

Services	1990	2002
Electricity, Gas, Water	0.9	2.9
Construction	2.2	1.1
Trade	26.7	19.7
Hotels and Restaurants	2.8	1.7
Transport, Storage, Communications	2.1	10.8
Finance	36.9	30.8
Business Activities	15.0	22.5
Public Administration, Defence	0.0	0.2
Education	0.0	0.0
Health and Social Services	0.1	0.3
Community, Social and Personal	1.8	2.0
Other Services and unspecified	11.5	8.0

Source: UNCTAD (2004, Table A.1.18)

Not all of these sectors would have found Ireland an equivalently suitable location however, given the country's geographic peripherality, which in economic terms is typically measured as "distance from purchasing power" (Schürmann and Talaat, 2000).

Midelfart *et al.* (2000) provide a way of identifying the sectors that are more amenable to location in peripheral regions. They isolate the 12 industries (out of a total of 36) that were most concentrated in the EU 'core' in the early 1970s (C) and the 12 industries that were most dispersed (D) across the entire EU at that time. They then divide the concentrated sectors into those that retained their concentrated status into the mid-1990s (CC) and those which had become more dispersed (CD), and equivalently divide the dispersed sectors into those that remained amongst the most dispersed in the mid-1990s (DD) and those that had become more concentrated (DC).

The sectors that have remained amongst the most concentrated (CC) include ones that are characterised by strong plant-level economies of scale, such as motor vehicles and aircraft production. The dispersed industries that have become more concentrated (DC) tend to be low-skill-intensity sectors such as textiles, clothing and footwear, which have tended to concentrate in the poorer EU cohesion countries.

The main sectors of interest for present purposes are those which had been concentrated in the EU core in the early 1970s but have become more dispersed since then – the CD group. These industries (which include office and computing machinery; professional instruments; radio, TV and communications; and machinery and equipment) all have relatively high skill intensities, medium as opposed to high economies of scale, and relatively low transport costs. These characteristics make them suitable for relocation to high-skill peripheral regions.

Ireland has developed particularly successfully into all of these sectors, as seen in Table 10.²⁰ Between the early 1970s and the year 2000, the manufacturing-employment share of these sectors in Ireland grew from 11 percent to almost 30 percent, by which time they accounted for almost half the jobs in foreign-owned manufacturing firms in the country.

Table 10: Shares of Irish manufacturing employment, by group of sectors (in %)

Sector group	Employment share of group in total manufacturing employment		Proportion of total foreign-firm manufacturing jobs (2000)	Proportion of foreign-firm manufacturing jobs in each group (2000)
	<u>1973-76</u>	<u>2000</u>		
CC	9.5	13.5	18.9	67.5
CD	11.1	29.5	47.3	77.5
DC	19.3	6.7	3.9	27.9

Notes: CC = manufacturing industries that were geographically concentrated in the 1970s and remain so today; CD = manufacturing industries that were concentrated in the 1970s but are dispersed today; DC = manufacturing industries that were geographically dispersed in the 1970s but are concentrated today.

Source: Barry (2004).

Midelfart *et al.* (2000) also devote some attention to services, though the data are more patchy in this area. They identify five major services sectors: Finance, Insurance, Real Estate and Business Services (FIRE); Wholesale and Retail; Restaurants and Hotels; Transport; and Communications. Since many services remain largely non-tradable internationally, it comes as little surprise that all five services groups are less concentrated than manufacturing production as a whole. Of these services sectors, FIRE is the most concentrated, and has remained so over the period studied, from 1985 to 1996. This is consistent with the view that FIRE services are more tradable than the other services segments. Here also however, as suggested earlier, Ireland has made major inroads, particularly over the period since 1996. This is corroborated by the data on Ireland's share of the US FDI stock in Europe, as reported in Table 11.

²⁰ Peripheral Finland has had a broadly similar experience. Note that while chemicals other than pharmaceuticals remain concentrated in Europe, pharmaceuticals themselves are in a residual category, remaining neither highly concentrated nor highly dispersed.

Table 11: US Direct Investment Position in Ireland as a share of European total in each sector (%)

	1973	1982	1989	1998	1999	2004
Total Manufacturing	1.5	4.1	4.3	5.3	4.5	9.8
.. Food	3.5*	4.6	3.0	3.5	n.a.	1.7
..Chemicals	4.5	3.7	5.9	6.1	6.4	14.9
..Primary and Fab Metals	1.2	2.3	3.9	1.6	1.2	0.4
..Industrial Machinery and Equipment		3.6	3.7	1.4		
.....Machinery					0.9	0.2
..Electronic and other electric equipment			8.6	9.9		
.....Computers and Electronic Products					5.8	20.5
.....Electrical Equipment and Components					4.3	6.8
..Transportation Equipment		0.2	0.3	0.1	0.8	1.4
..Other Manufacturing			4.7	9.5		
Services						
Non-financial Services				14.8		
.....Information						48.9
.....Profession and Technical Services					10.4	9.0
Finance, Banking and Insurance			2.0	3.3	1.9	5.5

Source: US BEA.

Notes: * refers to 1977. Blank cells reflect (i) changes in sectoral classification, or (ii) suppression of the data on Ireland in BEA publications.

The table shows that Ireland – with 0.6 percent of the population of Europe, 0.9 percent of the 25 current EU member states, or a little over 1 percent of the Western European EU15 – accounts for almost 10 percent of the total US FDI stock in European manufacturing and services. It has furthermore established substantial positions in all the manufacturing and offshoring services sectors potentially open to geographically peripheral economies.

4. FDI and Institutional Co-Evolution in Ireland

The present section analyses the response of the Irish system to the changing characteristics of the FDI flows potentially available to Ireland, and how the institutional capacity to respond rapidly and flexibly to such changes developed.

Taxation and Regulation

The importance of Ireland's low corporation tax regime in kick-starting FDI inflows in the late 1950s has been discussed above. The country's corporation tax regime has remained amongst the most generous in Europe, though some of the new Central and Eastern European EU member states have begun to emulate Ireland's strategy in this regard.

Of course, it is the effective rather than the nominal tax rate that matters. Table 12 reports a measure of the average effective corporation tax rates on US overseas investments for 1997 as well as recent standard rates of tax, where the effective rate

measure the ratio of the sum of profit taxes of foreign-owned firms to the sum of net income and profit taxes of foreign-owned firms in each country. Rates are constructed in this way, rather than as a percent of taxable income, in order to capture the effects of differences in tax base definitions, special investment incentives such as accelerated depreciation and other important aspects of tax systems that are not reflected in statutory tax rate differences. Ireland's effective rate comes out at a little over 9 percent, compared to an average rate of over 20 percent for the other EU countries shown.

Table 12: Effective and standard corporate tax rates in selected EU countries (in%)

	Effective tax rate on US TNCs (1997)	Standard corporate tax rate (2003)
Ireland	9.1	12.5
Netherlands	17.2	29.0
Sweden	20.6	28.0
Spain	24.6	35.0
UK	24.9	30.0
France	29.0	34.3
Germany	33.7	39.6

Sources: Effective tax rates from Desai *et al.* (2002), standard rates from National Competitiveness Council (2003).

Since the US accounts for a plurality of foreign investments in Ireland, it is worthwhile to explain why, though the US authorities levy taxes on the global profits of US firms (irrespective of where in the world they are generated), low-tax environments are nevertheless attractive. This arises for two reasons. The first is because US firms are not eligible for a tax rebate from the US authorities when foreign taxes in excess of the US tax rate are levied. Since all foreign income and foreign taxes paid are added together in the computation of the foreign tax credit issued by the US authorities, low-tax environments allow US firms to operate in other foreign high-tax environments without penalty. The second reason arises because foreign profits are taxed in the United States only when repatriated. Firms with tax-haven profits can therefore earn interest on their residual US tax liability for as long as they defer repatriation of these profits (Hines and Rice, 1994).

Empirical evidence on the importance of corporation taxes in determining FDI flows is presented by Gropp and Kostial (2000), who focus on total FDI inflows and outflows, and Altshuler *et al.* (2001) and Slaughter (2003) who concentrate on the location decisions of US firms.²¹ Ireland has hence found it important to resist EU efforts towards corporation tax harmonisation. The tax regime has nevertheless undergone occasional changes over the years in response to EU Commission demands. Export Profits Tax Relief, for example, had to be phased out, beginning in 1978, when it was identified as a distortionary measure. Ireland responded by replacing it with a very low 10 percent profits-tax rate for manufacturing industry.

²¹ De Mooij and Ederveen (2003) provide a survey of the literature on taxation and FDI.

Mindful of the benefits of a low tax rate in stimulating FDI inflows (when combined with other necessary institutional features), the authorities extended this low rate to qualifying activities carried out at the newly opened International Financial Services Centre in Dublin in 1987. Most other market services meanwhile continued to be subject to the standard 32 percent rate prevailing at that time.

In the face of further European Commission pressure, this time to harmonise rates across sectors (with the Commission implicitly hoping that Ireland's rate would be pushed much closer to the Western European average), the Irish government instead decided in 1998 to levy a low rate of 12.5 percent, to be instituted from 2003, across all sectors.

Though the coalition-government Finance Minister of the time was a member of the trade-union-aligned Labour Party, whose economic advisers were pushing for a substantially higher rate, the Minister was ultimately persuaded not by them but by the advice and recommendations of the industrial development agencies and the relevant civil service departments. Though the less mobile services sectors such as retail banking made windfall gains from the decision (which is what aroused the antagonism of the Minister's advisers), the move facilitated Ireland in establishing itself as the pre-eminent location in Europe for offshored services.

The Finance Act 2004, furthermore, established a new headquarters regime aimed at attracting international corporations to establish their regional HQ in Dublin. This would have served to attract other activities also, including shared services and treasury management (Finance Dublin Yearbook, 2004).

This willingness and ability to use the tax system to respond to emerging FDI opportunities is also reflected in the field of regulation. A particularly important example of this arises with respect to the UCITS Directive (Undertakings for Collective Investment in Transferable Securities) issued by the EU in 1985. The directive allowed financial services companies, once established and registered with the regulatory authorities of one EU member state, to operate in any other member state, thus freeing up firms to locate wherever they found the regulations to be most favourable. Ireland was the second country after Luxembourg to implement the directive, in 1989. In addition the authorities decided to forego VAT and inheritance taxes on certain investment fund activities, and two further items of legislation were enacted the following year to facilitate the development of the investment funds sector. Activity expanded dramatically in response and by 2005 the country had become one of the world's leading locations for the domicile and administration of investment funds (Barry, Thebault and Wojcik, 2006).

Governance and the Evolution of the Industrial Development Agency

Ireland's Industrial Development Agency (IDA) was set up within the Department of Industry & Commerce in 1949 to stimulate, support and develop export-led business. After the shift away from protectionism, as noted earlier, it began to take on a more proactive promotional role. Through an embedded process of external review, it has

been transformed over the years into a widely-referenced example, along with Singapore's Economic Development Board, of best-practice in the investment promotion field.²²

One external review, conducted in the 1960s by the consulting firm Arthur D. Little, Inc., recommended that it be incorporated as an autonomous state-sponsored body with its own Board of Directors and with responsibility for all aspects of industrial development. These changes were enacted in 1969, when the agency was granted the authority to identify and promote FDI and to target specific industries. It was also allocated responsibility for the provision of support to local firms.

The autonomy of the IDA from the civil service allowed it to recruit a different type of employee, many with extensive industry and international experience and with an interest in living and working overseas. The fact that agency employees did not have the employment guarantees that automatically came with long-term civil service employment, and the likelihood that staff would have to spend a period of service in one of the agency's foreign offices, may have attracted a more entrepreneurial type of personality. Effective investment promotion agencies (IPAs) are agreed to require a private-sector rather than bureaucratic orientation: "a willingness to take risks, to make quick decisions, to engage in a style of negotiation alien to many civil service temperaments." The prestige attached to work with these agencies also contributes to the strong *esprit de corps* reportedly shared by staff.

Autonomy was also important because it insulated the agency from pressures to locate industry on political grounds, and because it allowed the agency to build on its successes to achieve a high rank in the government hierarchy. This is also found internationally to be a condition for effectiveness in fulfilling an agency's development mandate. Reporting directly to the upper echelons of government strengthens the government's commitment, reinforces the agency's credibility in the eyes of business and allows the agency to develop sufficient bureaucratic, administrative and political "clout" to ensure that it can effectively deliver on its promises. The Irish and Singaporean IPAs were effectively put in charge of development strategy, and could coordinate factor market changes to attract the technology-intensive FDI that both countries have targeted in recent decades.

Because such agencies tend to retain key staff longer than civil service departments, they also act as repositories of 'organisational learning' – the ability of a body to extract, accumulate and use effectively the insights that become available to it.

Further external reviews of the operations of Ireland's development agencies included the Telesis Report of 1982 and the Culliton Report of 1992. The former emphasised

²² See e.g. Loewendahl (2001), Wells and Wint (2000) and Morisset and Andrews-Johnson (2004). The strongest evidence of this is that the IDA is frequently commissioned to assist developing countries in establishing their own industrial promotion agencies. See Clark (1997) and Wells and Wint (2000), for example, on the contribution of the IDA to the development of Costa Rica's successful investment promotion programme CINDE.

the needs of indigenous firms, calling for the promotion of linkages with foreign firms and the need to further develop local-firm capabilities. The Culliton Report advocated a restructuring of the IDA into separate agencies with different responsibilities, a move implemented in 1994 when IDA-Ireland was allocated the task of FDI promotion, Forfás was instituted to take charge of overall strategy, and a separate agency, renamed Enterprise Ireland in 1998, was tasked with the promotion of indigenous-firm development.²³

Other aspects of agency structures – such as meritocratic recruitment, salary levels that keep pace with those in the private sector, and predictable career ladders – also accord with international best-practice standards, because they help structure the incentives of individual bureaucrats in a way that enhances the ability of the organisations they manage to effectively pursue long-term goals (Evans and Rauch, 1999).²⁴ Crucially, these characteristics are found to increase the likelihood of new policy initiatives emerging from within the agencies themselves.

Ó Riain (2004) evaluates the Irish civil service and the industrial development bodies on the Evans and Rauch 14-point “Weberianness” scale. His assessment gives Ireland a score of 12.5, which compares favorably to the highest scoring of the 35 “developing countries” in the original analysis – Singapore at 13.5, Korea at 13 and Taiwan at 12.

Evans (1995) argues furthermore that the corporate coherence provided by Weberian characteristics needs to be combined with a dense systematic set of ties to the entrepreneurial class if policy innovations are to be effective. Ó Riain (2004) presents evidence to suggest that the IDA and its sister organisations are characterised by such “embedded autonomy”. These and related issues of governance are now widely recognised by the World Bank and similar organisations as crucial determinants of a country’s overall investment climate.

Nelson (2004) ascribes the ability of the IDA and its sister organisations to constantly adapt to changing Irish circumstances and global business trends to their highly internationalised staff and their “transnational strategic networks”, the networks of individuals, business associations etc. – both domestic and international – that assist a government in understanding the needs and concerns of prospective foreign firms and the potential benefits they can offer to the country.

The IDA’s transnational strategic network consists of two main components: (i) its overseas offices and (ii) its relations with investors already in Ireland. The IDA

²³ Enterprise Ireland was created in two steps. In 1994, the domestic-industry wing of the IDA was combined with the technology agency Eolas to form Forbairt. In 1998, new legislation was enacted which created Enterprise Ireland through a merger of Forbairt and the Irish Trade Board to provide one-stop-shop assistance for domestic firms.

²⁴ Working with a sample of 35 developing countries for the 1970-1990 period, Evans and Rauch (1999) confirm that these characteristics of “Weberian bureaucracies” significantly enhance prospects for economic growth, even when initial levels of GDP per capita and human capital are controlled for.

opened its first overseas offices in the 1960s in London, Paris, Cologne, New York, San Francisco and Chicago. Since then, these operations have expanded, particularly in the United States. IDA-Ireland currently has 13 foreign offices: 5 in the US, 5 in the Asia-Pacific region and 3 in Europe. All offices are tasked with identifying prospective investors in the region and meeting with prospective investors from targeted industries.

The overseas offices thus gather information about trends in targeted sectors and about new emerging sectors that warrant the agency's attention. The resulting feedback to headquarters not only influences the industries or subsectors targeted by the IDA. It also guides efforts to inform and persuade the government about required legislative changes, necessary additions to infrastructure, and specific training programs to serve the needs of targeted sectors. The contribution of the other component of the IDA's transnational strategic network – its relations with investors already in Ireland – is illustrated in the discussion later in the paper of recent developments in Irish science, technology and innovation policy.

The modus operandi of the IDA is explained by MacSharry and White (2000) – the former an erstwhile government Minister of Finance and EU Commissioner and the latter a long-term Managing Director of the IDA. The first step, as they describe it, is the identification of sectors and sub-sectors experiencing international growth and that are thought to provide a good fit for Ireland's resources and development aims.

In some cases, the identification of niche targets clearly demonstrates the prescience of the policy-makers. In the late 1980s, a policy paper argued that a combination of factors – including global deregulation of financial services and the emergence of an electronic marketplace thanks to improvements in telecommunications – had created an opportunity for a regional location like Ireland to become a player in the international financial services industry. The national advantages were identified as location, language, education and technology. Though the commercial development officer of the Isle of Man, which had created a well-established niche for itself in this sector, cautioned that “Dublin would be better building on its own resources, which do not particularly include financial services”, a little over a decade later Dublin's International Financial Services Centre had grown to become one of Europe's largest off-shore financial centres, employing around 16,000 people and managing funds worth over USD 150 billion.

More frequently however the process of identification of targeted sectors is interactive. Having attracted several computer and components firms in the 1970s, for example, and being favourably impressed by their performance in situ, the IDA added electronics and computer software to their list of targeted sectors in the early 1980s.

After the identification of target niches, the next step in the IDA process involves identifying the strongest companies in these sub-sectors and approaching them with a view to persuading them to locate in Ireland. Intel, for example, was pursued by the

IDA for over a decade before it decided in 1989 to open a plant in Europe, with Ireland ultimately emerging as the chosen location. Moreover, IBM strategists had traditionally shied away from export-platform locations. The IDA, after maintaining contacts with the company for more than two decades, eventually persuaded them that such a move could be beneficial through the success of the Software Development Centre that the company had set up in Ireland to meet its in-house development needs.

The agency of course learns more about an industrial sector once some constituent firms have located in Ireland. It then assesses whether further processes might be successfully targeted or linkages developed. IDA assistance was instrumental for example in having the key players in the packaged computer software sector (including Microsoft, Lotus, Oracle etc.) add higher-skill localisation to the low-skill software manufacturing operations they had first established in Ireland in the mid-1980s, and these companies ultimately chose Ireland as their European distribution hub.

The efficiency of the IDA helped Ireland capture the geographically-dispersing (CD) sectors discussed in Table 8 above rather than having them locate elsewhere. The agency played a crucial role in advertising Ireland's advantages, in convincing potential investors that apparent difficulties could be overcome, and in capturing the important "flagship projects" that are of importance in cluster development. Had the agency instead tried to target sectors such as aerospace and motor vehicles – sectors found not to have become more mobile across Europe – the chances of success would have been very much poorer.

The development agencies – Forfás, IDA-Ireland and Enterprise Ireland – also, through the strong position they have attained in the policymaking hierarchy, have had an impact in areas not traditionally recognised as lying within the industrial policy remit. They played a major role, for example, in forcing through the modernisation of the country's telecommunications infrastructure in the late 1970s and early 1980s and, as discussed below, in the development and upgrading of the human capital necessary to facilitate the country in ascending the ladder of comparative advantage.

Interestingly, MacSharry and White (2000) speculate as to why the powerful position of the Irish development agencies within the state bureaucracy may not be easily replicable elsewhere. Amongst the factors they identify are (i) institutional resistance on the part of Foreign Ministries to allowing other agencies establish such a strong foreign presence, (ii) difficulties in securing the right caliber of pro-active people to run such agencies, and (iii) the fact that governments rarely provide investment agencies with a clear development mandate, or the funds to carry out this mandate. "Very few countries", they conclude, "have been able to create the combination of circumstances and people to forge an effective national investment promotion agency".

FDI and the Structure of the Irish Education System

One of the key elements in the shift towards outward orientation in the late 1950s, as discussed earlier, was the increased contact with international development agencies. The consequences of these contacts were particularly important in the field of education.

An international policy conference on “Economic Growth and Investment in Education” held in Washington in 1961 proposed that the OECD should conduct a survey of the entire educational systems of two European countries. White (2000), in his history of higher education in Ireland, notes that “most representatives balked at the idea of exposing their country’s shortcomings to the world’s gaze”.

Ireland’s increasing intellectual openness however, combined with a recognition that the changing occupational structure would place significant demands on education and training systems, saw it (and later Austria) volunteer for the experiment. The subsequent report, *Investment in Education*, issued in 1965, was informed throughout by the perspective that education was a means by which society invested in its own future. The report’s two central propositions were that a non-meritocratic education system was wasteful of natural talent, and that investment in the education of that talent had contributed significantly to European postwar economic growth. An important feature of the report was that – almost for the first time – technocratic expertise was now to be heard alongside the party political and denominational interests which had previously dominated ministerial councils (Logan, 1999).

Investment in Education was scathing in its assessment of the Irish education system of the time. It reported that over half of Irish children left school at or before the age of thirteen, a finding that generated newspaper headlines and that presaged the introduction of ‘free’ (taxpayer-funded) second-level education and free access to special transport networks for all second-level school pupils in 1967. These measures sparked a dramatic educational expansion over the course of the 1970s and beyond.

The post-secondary education system that emerged in Ireland to cater to the demands of this new secondary outflow was based on a realisation that Ireland would need to provide a substantial intermediate layer of technicians to sustain the industrial expansion that followed on from Ireland’s relatively late industrialisation.

The main components of the technical-education system developed in Ireland over the course of the 1970s were the Regional Technical Colleges (later rebranded as Institutes of Technology), for which there was no UK model. These offered sub-degree programmes of shorter duration than those at universities and concentrated in the fields of engineering and business studies, with practically-oriented curricula designed to be responsive to the needs of local industry and business.²⁵

²⁵ Wickham and Boucher (2004) decry this as the cheap ‘volume production of technical graduates’, undertaken without incurring the costs of tackling educational disadvantage or developing a research-

From having had a tiny short-cycle third-level sector before 1970, by 1981 Ireland had internationally, after the Netherlands, the highest proportion of third-level students taking sub-degree courses.

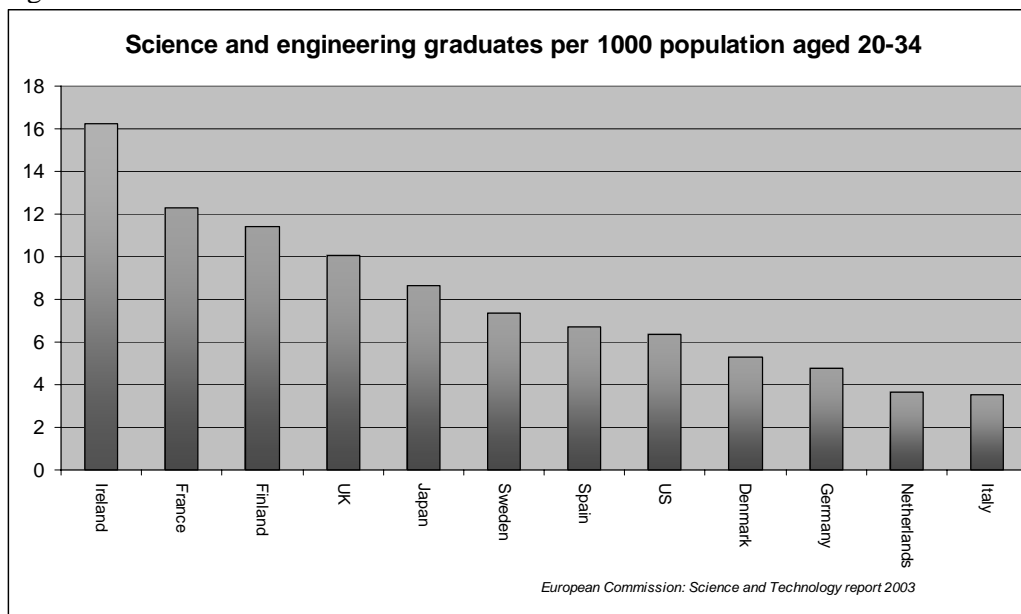
Since the late 1970s, furthermore, the universities themselves – at the behest of the IDA – had begun to accept increased responsibility for meeting manpower needs. The Manpower Consultative Committee was established in 1978 to provide a forum for dialogue between the IDA and the educational institutions. The state agency, concerned by the looming disparity between electronics graduate outflows and its own demand projections, convinced the government to fund a massive expansion in educational capacity in these areas.²⁶ The output of engineering graduates, as a result, increased by 40 percent between 1978 and 1983, while the output from computer science increased tenfold over the same short period. As MacSharry and White (2000) point out, the Industrial Development Agency was in turn able to use the rapidity of this response – exemplified by the immediate introduction of a range of one-year conversion courses to furnish science graduates with electronics qualifications – as a further selling point to foreign investors

The structure of the Irish education system that emerged in the wake of the OECD report is unusual in that while Ireland just matches the OECD mean in terms of those with university qualifications, it has far higher proportions than the average OECD country with specific *post-secondary* and *sub-degree tertiary* educational qualifications. Furthermore, the post-secondary-level system – driven by the country's FDI-focussed strategy – has produced one of the highest proportions of young people with science and engineering qualifications in the world; Figure 6.

based innovation system. It could be argued however that the system adopted may have been appropriate for the relatively poor Irish economy of the time.

²⁶ The Irish system offers a finite number of places in most third-level courses. These numbers are decided within the universities but are subject to government influence since the state provides the bulk of university funding. Ó Riain (2004) points out that this system gives the state a much greater capacity to mould the labour market for specific economic sectors than is the case in many other countries.

Figure 6:



These features of the Irish education system arguably 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, while Ferreira and Vanhoudt (2004) conclude that “higher education, especially the vocational/technical slant of educational provision, and the sectoral composition of FDI in favour of high-tech industries, were self-reinforcing factors” behind the Irish boom of the 1990s and beyond.

Recent Developments in Science, Technology and Innovation Policy in Ireland

Given the growth in offshoring of R&D, along with Ireland’s convergence on average Western European living standards by the early years of the new millennium – and perhaps also in response to the threat of increased corporation-tax competition from Central and Eastern Europe – science, technology and innovation policy has recently moved to the heart of the Irish 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 (2000-06), 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 establishment of Science Foundation Ireland (SFI) in 2000, and by the introduction of a 20 percent tax credit for incremental R&D in the Finance Act of 2004.

The Programme for Research in Third Level Institutions (PRTLTI) is an initiative to support high quality basic research in third level institutions in Ireland.²⁷ Amongst the needs that the programme was designed to address were:

- the strengthening of institutional capacity for advanced research and assisting institutions to establish selected world class centres of research excellence, consistent with their institutional strengths and capabilities, and
- the strengthening of the synergies between research and education in the formation of human capital and in the development of a world class ‘4th level’ in Ireland.

Funding allocations support the national sectoral priorities in biosciences, biomedicine and ICT as well as providing opportunities for the development of basic sciences and of new platform technologies (such as nanotechnology) and to address issues related to the physical environment. The PRTLTI has also invested heavily in two research libraries.²⁸

To date, the disciplinary breakdown of programmes funding has been as shown in Table 13.

Table 13: Disciplinary Breakdown of Programmes Funded under PRTLTI

Discipline	Allocation (%)
Bioscience/Biomedicine	48.8
Environment & Marine	10.2
Chemical & Physical Science	9.9
Libraries	9.1
ICT	8.6
Platform Technologies	5.8
Social Sciences	5.0
Humanities	2.6

The origins of Science Foundation Ireland lay in a Technology Foresight Exercise organised by the state agency Forfás with the very substantial participation of executives from foreign MNCs located in Ireland as well as indigenous firms – the second pillar of the development agencies’ transnational strategic network. The executives were asked where they saw their companies headed over the coming

²⁷ <http://www.hea.ie/uploads/pdf/HEA%20Impact%20Vol%20I%20Final%20Report1.pdf>

²⁸ <http://www.hea.ie/uploads/pdf/prtli1.pdf>

decades and what the Irish government could do to respond to those changes. The essence of the response was that as Ireland was no longer a low-cost manufacturing location it would have to develop more highly trained engineers and research scientists in order to become a center for innovation, research, design and development.

The exercise proposed the establishment of a Technology Foresight Fund to promote and finance new basic and applied scientific and technological research in Ireland, and Science Foundation Ireland was established to administer this fund. The net result was a 5-fold increase (to €2.5 bn) in science, technology and innovation funding, the establishment of a host of joint partnerships between third level research institutions and industry, and a US National Science Foundation-type system to support scientists and engineers working in designated fields, principally in ICT and the biosciences.

Amongst the campus-industry partnerships established thus far are:²⁹

- The Centre for Research on Adaptive Nanostructures and Nanodevices, with funding shared by three universities and with Intel as principal industry partner
- The Digital Enterprise Research Institute based at the Galway campus of the National University of Ireland and with Hewlett Packard as industrial partner
- The Centre for Telecommunications Value-Chain-Driven Research, headquartered at Trinity College Dublin and with Bell Labs as industry partner, and
- The Regenerative Medicine Institute, based at National University of Ireland-Galway and with industry partners including Medtronic Vascular.

Conclusions

Ireland's success in attracting FDI can be ascribed to a range of factors, including:

- EU membership, macroeconomic stability, Western European governance standards, an English-speaking environment and a legal and business system that will be familiar to US corporations³⁰
- a low corporation tax rate
- the skills and experience of the Industrial Development Agency (IDA)
- the quality of the telecommunications infrastructure
- an educational system that is integrated to a large extent with the country's FDI-oriented development strategy, and
- an institutional system configured to respond rapidly to changes in the global FDI environment.

²⁹ See: http://www.sfi.ie/content/content.asp?section_id=419&language_id=1

³⁰ Thus Kraemer and Dedrick (2002) point out that when Dell Computers first moved into Europe, the company was attracted by locations that were similar to the US in terms of language and business culture. Ireland also shares a common law system with both the US and the UK.

The present paper has concentrated on detailing this last factor. As one of the first countries in the world to adopt an FDI-focused development strategy (in the late 1950s), the country has had an extensive period of time to fine tune its policies and institutions in line with the requirements of international FDI. This has allowed it to continue to succeed as FDI flows into Europe have shifted progressively from traditional to higher-tech manufacturing sectors, through services offshoring and more recently into the offshoring of R&D functions.

Though a late starter – by Western European standards – in increasing educational throughput, Ireland by 1981 had, after the Netherlands, the highest proportion of third-level students taking sub-degree courses. This was a relatively inexpensive option for the country to follow, a strategy arguably justified for a relatively poor European country. By international standards tertiary enrolments have been heavily biased towards science and engineering, which accord with the requirements of the MNCs that the country was attempting to attract. As convergence on Western European living standards was achieved and offshoring of R&D began to grow, the emphasis has increasingly switched towards university and post-graduate education and the establishment of university-industry partnerships.

The IDA has also functioned effectively as a learning organisation through its transnational strategic networks. The strong focus on the importance of FDI in Ireland, the procedures developed by the IDA – which have now come to be recognised as exemplars of best-practice in the investment promotion field – and the position of the IDA in the policymaking hierarchy have helped configure the Irish institutional system to be able to respond rapidly and flexibly to emerging market opportunities in FDI and changing factor-market conditions in Ireland.

References

- Altshuler, R., H. Grubert and T. S. Newlon. (2001) "Has US Investment Abroad become more Sensitive to Tax Rates?" In James R. Hines, Jr. (ed.), *International Taxation and Multinational Activity*. Chicago, IL: University of Chicago Press.
- Barry, F. (2004) "Export Platform FDI: the Irish Experience", *EIB Papers*, 9, 2, 8-37, 2004. Luxembourg: European Investment Bank.
- Barry, F. (2005a) "FDI, Transfer Pricing and the Measurement of R&D Intensity", *Research Policy*, 34 (2005) 673–681
- Barry, F. (2005b) "Structures and Institutions of Good Governance: Lessons for Indonesia", paper delivered to World Bank/ Bank Negara Malaysia conference on *Investment Climate and Competitiveness in East Asia: From Diagnostics to Action*, Kuala Lumpur, November.
- Barry, F., Görg, H. and Strobl, E. (2003). "Foreign direct investment, agglomerations and demonstration effects: an empirical investigation". *Weltwirtschaftliches Archiv*, (139:4), pp. 583-600.
- Barry, F., L. Thebault and D. Wojcik (2006) "The Geography of Offshore Financial Services in Europe and the Emergence of Ireland's IFSC", unpubl. ms., University College Dublin.
- Barry, F., and C. Van Egeraat (2005) "The Eastward Shift of Computer Hardware Production: How Ireland Adjusted", WP 27, National Institute for Regional and Spatial Analysis, National University of Ireland-Maynooth.
- Black, W. (1977) Industrial Development and Regional Policy, in N. Gibson and J.E. Spencer (eds.) *Economic Activity in Ireland*, Dublin: Gill and Macmillan.
- Clark, M. (1997) "Transnational Alliances and Development Policy in Latin America: Non-traditional Export Promotion in Costa Rica", *Latin America Research Review*, 32, 2, 71-97.
- Daly, M. (1981) *Social and Economic History of Ireland since 1800*, Dublin: The Educational Company.
- Davies, S. and B. Lyons (1996). *Industrial organisation in the EU*, Clarendon Press, Oxford, UK.
- De Mooij, R., and S. Ederveen (2003) "Taxation and Foreign Direct Investment: A Synthesis of Empirical Research", *International Tax and Public Finance*, 10, 673–693, 2003.
- Desai, M.A., Foley, C. F. and Hines Jnr., J. (2002). Chains of ownership, regional tax competition and foreign direct investment. NBER Working Paper No. 9224.

Rev. 18 Nov 05

Evans, P. (1995) *Embedded Autonomy: States and Industrial Transformation*. Princeton, NJ: Princeton University Press.

Evans, P., and J. Rauch (1999) "Bureaucracy and Growth: A cross-national analysis of the effects of "Weberian" state structures on economic growth", *American Sociological Review*, 64, 5, 748- 7654.

Ferreira, L., and P. Vanhoudt (2004) Catching the Celtic Tiger by Its Tail, *European Journal of Education*, Volume 39 Issue 2

Grimes, S., and M. White (2005) "The transition to internationally traded services and Ireland's emergence as a successful European region", *Environment and Planning A*, 37, 2169 – 2188.

Gropp, R. and Kostial, K. (2000) "The disappearing tax base: is foreign direct investment eroding corporate income taxes?", European Central Bank Working Paper No. 31.

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," *Economic and Social Review*, 32, 1, 43-67.

Hines Jr., J.R. (2003) "Sensible Tax Policies in Open Economies", *Journal of the Statistical and Social Inquiry Society of Ireland*.

Hines Jr., J.R. and Rice E.M. (1994). "Fiscal paradise: foreign tax havens and American business". *Quarterly Journal of Economics*, (109:1), pp. 149-82.

IDA (1973) *Ireland: Industrial Handbook*; Dublin: Industrial Development Authority.

Institute for Management Development (2005) *World Competitiveness Yearbook*, Lausanne: IMD.

Kraemer, K. and J. Dedrick (2002), 'Dell Computer: Organization of a Global Production Network', Center for Research on Information Technology and Organizations, University of California, Irvine (www.crito.uci.edu).

Kuemmerle, W. (1999a) "Foreign direct investment in industrial research in the pharmaceuticals and electronics industries – results of a survey of multinational firms", *Research Policy*, 28, 179-93.

Kuemmerle, W. (1999b) "The drivers of foreign direct investment into research and development: an empirical investigation", *Journal of International Business Studies*, 30(1), 1-24

- Lipsey, R. (2003). "Discussion of 'EU Accession and Prospective FDI Flows to CEE Countries'", in Herrmann, H. and Lipsey, R. (eds.), *Foreign direct investment in the real and financial sector of industrial countries*. Springer, Berlin, Germany.
- Loewendahl, H. (2001) 'A framework for FDI promotion', *Transnational Corporations*, 10, 1, 1-42.
- Logan, J. (1999) All the Children: the Vocational School and Education Reform 1930-1990, in J. Logan (ed.) *Teachers' Union: the TUI and its Forerunners 1899-1994*, Dublin: A.&A. Farmar.
- MacSharry, R. and White, P. (2000). *The making of the Celtic tiger: the inside story of Ireland's booming economy*, Mercier Press, Dublin, Ireland.
- McKinsey Global Institute (2003) *Offshoring: Is it a Win-Win Game?*, San Francisco: McKinsey and Company.
- Midelfart, K-H., Overman, H., Redding, S. and Venables, A. (2000). "The location of European industry". European Commission Economic Papers No. 142.
- Moore, B. J. Rhodes and R. Tarling (1978) Industrial Policy and Economic Development: the experience of Northern Ireland and the Republic, *Cambridge Journal of Economics*, 2, 99-114.
- Moris, F. (2004) *Industrial R&D Employment in the United States and in US Multinational Corporations*, InfoBrief 05-302, National Science Foundation.
- Morisset, J., and K. Andrews-Johnson (2004) The Effectiveness of Promotion Agencies at Attracting Foreign Direct Investment, Occasional Paper 16, Foreign Investment Advisory Service.
- National Competitiveness Council (2003). *Annual Competitiveness Report*, Forfás, Dublin, Ireland.
- Nelson, R.C. (2004) "Moving up the Value Chain: A Good Approach for Ireland?", Management Case Study, Thunderbird: Garvin School of International Management, Arizona.
- OECD (2005) *Science, Technology and Industry Scoreboard*, Paris: OECD.
- Ó Gráda, C. (1997) *A Rocky Road: the Irish Economy since the 1920s*, Manchester and New York: Manchester University Press.
- O'Hearn, D. (1987) Estimates of New Foreign Manufacturing Employment in Ireland, 1956-72, *Economic and Social Review*, 18, 3, 173-188.
- Ó Riain, S. (2004) *The Politics of High-Tech Growth: Developmental Network States in the Global Economy*, Cambridge: Cambridge University Press.

Schein, E. (1996) *Strategic Pragmatism: the Culture of Singapore's Economic Development Board*, Cambridge, Mass.: MIT Press.

Schürmann, C. and A. Talaat (2000), *Towards a European Peripherality Index*, Report for European Commission DGXVI Regional Policy, available at: http://irpud.raumplanung.uni-dortmund.de/irpud/pro/peri/ber53_gesamt.pdf

Slaughter, M. (2003). "Host-country determinants of US foreign direct investment into Europe", in Herrmann, H. and Lipsey, R. (eds.), *Foreign direct investment in the real and financial sector of industrial countries*. Springer, Berlin, Germany.

UNCTAD (2004). *World Investment Report: The Shift towards Services*, UNCTAD, Geneva, Switzerland.

UNCTAD (2005) *World Investment Report: Transnational Corporations and the Internationalization of R&D*, UN: New York and Geneva.

Wells, L.T., and A.G.Wint (2000) *Marketing a Country: Promotion as a Tool for Attracting Foreign Investment* (revised edition), Occasional Paper 13, Foreign Investment Advisory Service, Washington, DC

White, T. (2001) *Investing in People: Higher Education in Ireland from 1960 to 2000*, Dublin: Institute of Public Administration.

Wickham, J., and G. Boucher (2004) "Training cubs for the Celtic Tiger: The volume production of technical graduates in the Irish educational system", *Journal of Education and Work*, 17, 4, 377-395.