CREATING THE CELTIC TIGER AND SUSTAINING ECONOMIC GROWTH: A BUSINESS PERSPECTIVE

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1. Introduction

Identifying the causes of the transformation in the Irish economy is a recent preoccupation among academics, media and policy-makers alike. Various explanations have been proposed mostly emphasising conventional macroeconomic approaches concerning issues such as fiscal rectitude, wage moderation and export growth (see, for example, Baker, 1999).

This paper[1] explores the transformation of the Irish economy from an alternative perspective by using Porter's Diamond method of examining the microfoundations of national competitiveness (Porter, 1990). This business approach integrates analysis from the level of firms, through the industry or sectoral level to the level of national competitiveness. This allows for the identification of the microeconomic foundations of Ireland's economic success and where future policy needs to be directed to ensure that Ireland sustains its competitive position.

Given the nature of the Irish economy, attention will be given to the role of investments by *Foreign Owned* firms in the *Electronics, Pharmaceutical* and *Financial Services* industries. We also consider the importance of government policy and the labour supply conditions in allowing these firms to play the driving role in the Irish success story.

The paper is structured as follows. The next section identifies Ireland's internationally competitive industries and firms as being primarily foreign owned. Section III outlines the role of Irish industrial policy in attracting multinationals. Section IV presents a Porter type analysis of the microeconomic foundations of the competitiveness of the Irish economy. Section V presents an overall assessment of the microfoundations of competitiveness. A final section outlines future policies necessary to sustain Irish competitiveness.

[1] This paper is based on work presented in Doyle *et al.* (2001).

2. Internationally Competitive Industries and Firms

Declining importance of agricultural exports in favour of manufactured exports, and the UK in favour of other EU markets, represent the most noticeable reorientation in Irish trading experience over recent decades. This reorientation of product and geographical markets coincides with the increasing penetration of Irish-based industries on foreign markets.[2] This raises the question, which Irish industries have become internationally competitive? To this end, we explore Irish industries that demonstrate an international comparative advantage.

TRADE IN MANUFACTURES

Ireland's share of world trade in manufactures increased from 1.3 per cent in 1993 to 1.9 per cent by 1998. Irish industries with trade shares greater than 1.9 per cent in 1998 may be said to display a Revealed Comparative Advantage.[3] These industries, which include foreign owned and indigenous firms, are *Pharmaceuticals*, *Food and Live Animals*, *Electronics* and *Music Equipment*.[4]

Table 1 shows the considerable exposure of manufacturing industry to international trade as evidenced in the high share of exported output across a range of industries. Indeed, classification by nationality of ownership indicates the dual nature of the Irish economy with the clear distinction between the roles of foreign owned and Irish owned firms. Foreign owned industry treats Ireland as an export platform, generating 74 per cent of total Irish exports in 1998. On the other hand, while 85 per cent of local plants are Irish owned and 53 per cent of manufacturing employment is generated in these plants, they produce just 28 per cent of gross output.

Ireland's main exporting industries – *Pharmaceuticals* (and other chemicals) and *Electronics* (including computers) – are not in areas that would traditionally have been associated with Irish comparative advantages, but rather have emerged in the last two decades stemming from foreign direct investment (FDI) in high- technology firms where increasing returns are possible (Barry *et al.*, 1999). Production in these sectors is predominantly driven by Ireland's main exporting industries – *Pharmaceuticals* (and other chemicals) and *Electronics* (including computers) – are not in areas that would traditionally have been associated with Irish comparative advantages, but rather have emerged in the last two decades stemming from foreign direct investment (FDI) in high-technology firms where increasing returns are possible (Barry *et al.*, 1999). Production in

[2]Exporting has not always been such an important component of the Irish economy as evidenced by the statistic that in 1950 only 11 per cent of Irish manufacturing output was exported. This rose to 23 per cent in 1970, 33 per cent in 1980, 53 per cent in 1990 and to over 80 per cent today.

[3] The method of computation of Revealed Comparative Advantage is presented in Balassa (1965).

[4] Calculations are based on *COMTRADE* statistics for the period 1993 to 1998.

these sectors is predominantly driven by foreign owned firms and the 80 per cent of all Irish FDI flows that stem from the US is largely focused on these sectors. These firms are well positioned to be at the leading edge in the recent changes in information technology and biotechnology.

Table 1: Output, Employment and Export Shares of Manufacturing Industries, 1998: Classified by Ownership

Sector[1]	Exports as Per Cent of Output			Output Share (Per Cent)			Employment Share (Per Cent)		
	Tot[2]	For	Ir	Tot	For	Ir	Tot	For	Ir
Electrical Equipment	93	95	67	28.5	26.5	2	25	20	5
Chemicals	97	99	48	24	23	1	9	7	2
Food Products	59	73	48	21	8	13	19	5	14
Pulp, Paper	81	93	24	10	7	3	10	3	7
Basic Metals	68	89	43	3	1.5	1.5	6	1.5	4.5
Machinery & Equipment	80	95	54	2.5	1.4	1.1	6	3	3
Other	76	Na[3]	Na	2.5	Na	Na	5	Na	Na
Rubber	62	79	41	2	1	1	4	2	2
Other Non-Metal Mineral Prods	35	60	27	2	0.5	1.5	4	1	3
Transport Equipment	79	Na	Na	1.5	Na	Na	4	Na	Na
Wood	42	71	18	1	0.3	0.6	2	1.3	1.7
Textiles	73	90	55	1.5	0.7	0.8	6	2	4
Average	83	93	47						
Totals				100%	70%[4]	26%	100%	46%	49%

Source: Authors' calculations from the *Census of Industrial Production*, *1998*, Central Statistics Office, Dublin.

Notes: [1] Sectors are classified according to the European NACE classification system.

[2] Tot denotes total, For denotes foreign owned firms and Ir denotes Irish owned firms as defined by the Irish CSO.

[3] Na denotes that data are not available classified by ownership due to confidentiality requirements.

[4] Output and employment shares do not sum to 100 per cent due to rounding and the lack of a foreign owned/Irish owned breakdown for some sectors.

The exporting strength in *Food and Live Animals* (including beverages and tobacco) could be argued to be more in keeping with the traditional Irish industrial structure. However, one of the main exporting divisions in this industry stem increasingly from the non-traditional "miscellaneous food" industries, which is dominated by US owned cola concentrate producers, rather than the traditionally strong food and live animal industries.

The significant role of foreign owned industry is also evident from Table 2 which presents the top thirty Irish companies, ranked by turnover. All of these main players in the Irish economy (with the exception of Eircom and the Electricity Supply Board) can be identified as the most important internationally competitive firms operating in Ireland.

TRADE IN SERVICES

International services make an increasingly important contribution to the Irish economy with over 23 per cent of employment in foreign owned enterprises in service jobs (O'Sullivan, 2000). Ireland's internationally competitive service industries include *Financial Services*, *Software* and *Tourism*. Unfortunately, traded services have been neglected until recently and no comprehensive data are available for Irish (as for many other countries) traded services. However, both traded and non-traded *Finance and Business Services* (which includes information technology, professional and technical services) can be identified as one of the fastest growing sectors in the Irish

economy experiencing employment growth of 7.5 per cent annually from 1986 to 1999 (Deegan and Dineen, 2000).[5]

Table 2: Ireland's Top 30 Companies: Ranked by Turnover

Company	OS[1]	Activity	Turnover €m	Employees
CRH Building	I	Materials manufacturer and supplier	8,864.6	36,665
Intel Ireland	F	Computer chip manufacturer	5,803.9[e]	4,500
Dell Products Europe (BV)	F	PC manufacturer and sales	5,391.2	4,525
Jefferson Smurfit Group	I	Print and Packaging	4,572.0	6,000
Microsoft Euro Ops Centre	F	Software manufacturer and distributor	4,489.5	1,592
Kerry Group	I	Food processing	2,603.5	14,000
Glanbia	I	Dairy/meat producer	2,401.6	7,500
Dunnes Stores	I	Retail chain	2,095.5[e]	18,000
Eircom	I(G)	Telecommunications	1,955.8	12,606
Fyffes	I	Fruit & veg. Importer & distributor	1,886.0	3,595
EMC (Benelux) BV	F	Computer data storage	1,821.2	1,100
The Irish Dairy Board	I	Exporters of dairy produce	1,809.8	2,633
Oracle	F	Europe Software manufacturer & sales	1,778.0	800
Musgrave	I	Wholesale distribution	1,731.0	2,600
Electricity Supply Board	G	Electricity supplier	1,720.9	9,319
Elan Corporation	I	Discovery/Drug Delivery/Sales & Mkt.	1,651.0	1,600
Irish Distillers Group	F(I)	Distillers	1,612.9[e]	2,000
DCC	I	Industrial holding company	1,527.8	2,933
Guinness Ireland	I	Brewing	1,251.0	2,200
Tesco Ireland	F(I)	Supermarket retail	1,212.9[e]	10,000
Independent Newspapers	I	Print and publishing	1,168.4	10,806
Aer Lingus	G	Air transportation	1,157.0	5,500
Janssen Pharmaceutical (Irl)	F	Pharmaceutical intermediaries	1,149.4	780
Waterford Wedgwood	I	Crystal and Ceramic Manufacturer	1,084.6	9,116
3Com Ireland	F	PC Adaptor Card Mfr	1,009.7	1,800
IAWS Group	I	Agribusiness	981.7	950
Irish Food Processors	I	Meat process and export	914.4	3,350
Greencore	I	Food Processing Distribution	906.8	3,682
Glen Dimplex	I	Small domestic appliance manufacturer	889.0[e]	6,000
Swords Laboratories	I	Pharmaceutical manufacturer	889.0[e]	360

Source: Business & Finance Magazine, February 2001.

Notes: 1: Ownership status: Foreign Owned Multinationals (F), Indigenous (I), Government owned (G); brackets signify former ownership status.

e: Estimated.

[5] The measure of employment growth in Services is itself problematic. The IDA estimates that 32 per cent of jobs classified as manufacturing in the top 16 foreign electronics firms in Ireland would be better classified as services, since they consist of software development and technical support activities (O' Sullivan, 2000).

The expansion of employment in traded services can be attributed largely to the development of the Irish Financial Services Centre (IFSC) established in Dublin's Docklands in 1987. The relaxation of exchange controls in the 1990s greatly facilitated this development. The IFSC is the fastest growing centre of its kind in Europe providing a range of back office projects supporting international financial service companies including Banking and Asset Financing, Corporate Treasury Management, Fund Management, Custody and Administration, Futures and Options Trading, and Life Insurance and Reinsurance. Many of the world's top banks and financial institutions now have operations in the IFSC. Their activities must be carried out on behalf of non-Irish residents. IFSC companies benefit from a corporation tax rate of 10 per cent, as well as other fiscal benefits.

The Irish software sector, consisting of both foreign and domestically owned firms, has become one of the top three industries in terms of employment and exports. Together with electronics, software now accounts for 40 per cent of all exports from Ireland.[6] Data from Ireland's National Software Directorate show that the commercial software sector comprises almost 600 companies, employing 15,000 people and generating US$5 billion in export revenue annually – making Ireland the largest exporter of software in the world. Ireland is the prime localisation centre for US software companies serving the European market with offshore facilities. Over 40 per cent of all PC package software (including 60 per cent of business software) sold in Europe is produced in Ireland. Over 110 foreign software companies use their operations in Ireland to develop, customise, manufacture and market their products and services internationally. An increasing number also use Ireland to provide technical support to customers world-wide via support centres located in Ireland as shown in Table 3. Indigenous firms such as Smartforce (formerly CBT), Iona Technologies, Trintech and Baltimore Technologies have grown from start-up to medium size businesses on the basis of success on international software markets. The need to position activities higher up the value chain has been identified as a goal of Irish industrial policy in order to maintain and improve the competitiveness of Irish businesses. Evidence from the *Census of Industrial Production* on the relative skills (and wages) of workers in foreign-dominated sectors implies that skills are at higher levels and have been upgraded more rapidly in the foreign owned sector.

Table 3: International Companies with Software Operations Located in Ireland

Andersen Consulting	Apple Computer	Accucobol	Claris
Computer Associates	Cambridge Technology	Continuum	Digital
EDS	Ericsson	IBM	ICL
Isocor	Informix	JBA	Lotus
Microsoft	Mysis-Kindle	Motorola	Novell
Oracle	Point Info Systems	Philips	Platinum
Quarterdeck	SAP	Syllogic	Symantec

[6] This is based on data from IDA Ireland; chemicals and related products and food and live animals account for 23 per cent and 15 per cent of Irish exports respectively. See annual reports of the IDA at http://www.idaireland.com.

Source: IDA Ireland.

Considerable expansion in the tourism sector also underlies employment growth in services as indicated by the increase in tourists from 1.95 million in 1985 to 5.5 million in 1998 (Deegan and Dineen, 2000). Growth in tourist numbers has mainly stemmed from Britain and mainland Europe. Ireland's market share of the world tourist market declined from the 1960s to the mid-1980s but has improved since. In fact, in the face of declining tourist numbers in Europe between 1985 and 1998, the Irish performance was strong as Ireland's share of world and European tourism arrivals increased to 1.54 per cent and 0.9 per cent respectively in 1997. The World Tourism Organisation's initial estimates of arrivals for 1998 show a growth of 3 per cent across Europe compared to 11 per cent for Ireland.

International competitiveness, therefore, has been achieved in certain foreign owned and indigenous manufacturing and services industries. Porter (1990) identifies that such industries (and companies that make up these industries) achieve a competitive advantage through acts of innovation.[7] The innovation capacities of a country's companies directly impact on the companies' productivity performance which, in turn, feed into a nation's capacity to increase its average productivity and living standards. Thus, the microeconomic company-based foundations underlying a country's economic development are revealed.

3. Irish Industrial Policy

The role of government in Porter's view of the microfoundations of competitiveness consists of acting as a catalyst for innovation by accelerating or increasing the likelihood of firms' creating competitive advantages. This is achieved through policies directed at industrial, firm and consumers.[8] Bradley (2001a) and others have provided an assessment of alternative frameworks, including Porter's Diamond, to investigate national industrial policy.

Irish industrial policy has played a key role in encouraging foreign owned enterprises to locate in Ireland. Using grant aid and a 10 per cent corporation tax rate, the Industrial Development Authority (IDA) has been particularly successful in attracting established firms in the *Electronics, Pharmaceutical* and *Financial Services* industries. Typically, these multi-national enterprises have used Ireland as an export platform for the lucrative European market, and more recently for the US market also. Ireland's share of foreign direct investment flowing from OECD countries in the 1990s was eleven times greater than for the late 1980s (O'Sullivan, 2000). Significantly, the US has dominated increased inflows, so that by 1998, 70 per cent of Irish manufactured exports were by US owned firms.

The IDA's success in attracting foreign industry has, to some extent, been self-reinforcing. Impressive performance by firms who were first to locate in Ireland may have encouraged other firms, often in the same industry and/or country to follow suit, as the uncertainty attached to the

[7] Innovation is broadly defined to include not only products and process innovations that affect the efficiency of production but also the types of products produced and the price at which they can be sold, i.e., whether in market segments characterised by stable, rising or falling prices.

[8] See Bradley (2001a) for an assessment of alternative frameworks, including Porter's Diamond, to investigate national industrial policy in a small open economy.

location decision may have been reduced. These demonstration and cascade effects may partly explain the growing concentration of US firms in high technology sectors in the 1990s (Krugman, 1997). However, the boom in the US in the latter half of the 1990s has also clearly played a role. The result is that, while the IDA has been clearly successful, Ireland's foreign industrial base is exposed to downturns in the performance of these US based industries. Indeed, it has recently been suggested that while "Ireland has become more integrated with the EU in macroeconomic terms, the micro-economic structure of its industrial economy has evolved to more closely resemble a region of the US" (O'Sullivan, 2000, p. 283).

4. Key to Competitiveness

While industrial policy has been important, it only supplies part of the story. As important is the extent to which the success enjoyed by Ireland's internationally competitive industries has been affected by the micro-economic environment. In other words, has the microeconomic environment supported rising productivity growth through improvement and innovation? Porter's Diamond framework attributes a nation's capacity to innovate to four broad attributes, or determinations of competitive advantage namely, factor conditions, demand conditions, related and supporting industries and the context of firm strategy, structure and rivalry. These represent the key to competitiveness. We consider each of these in turn.[9]

FACTOR CONDITIONS

In terms of the labour market, the increased availability of a young, highly skilled, English speaking labour force has been crucial for explaining the Irish growth performance. Over the last twenty years the Irish population had greater numbers at or around school leaving age than other EU members, principally due to relatively high birth, marriage and fertility rates continuing into the 1970s. In addition, participation rates, especially among women, were relatively low up to the 1990s. Thus, Ireland has experienced a "demographic dividend" resulting in an estimated increase of 2 per cent per annum in the quantity of labour supply during the first half of the 1990s (Bradley, *et al.*, 1997). Employment growth has been even stronger during the late 1990s, as the demographic dividend has been further boosted by strong immigration of young educated workers, many of whom emigrated during the 1980s. The result is that in 1999, 37 per cent more people were at work in Ireland than in 1990.

The quality of the Irish labour force has also been improving. Irish second level education has been free since 1966, while tuition fees for third level education were abolished in the mid-1990s. Third level institutions have been putting greater emphasis on the training of graduates for the knowledge intensive high technology industries. These favourable conditions have resulted in growing participation in third level

[9] In applying the Diamond to consider the determinants of national competitive advantage, it is often difficult to identify cause and effect relationships as the interplay between the four determinants create a system – interactions between determinants as well as individual determinants affect the likelihood and speed of improvement and innovation. Hence, while we examine each determinant in turn, the net effect on the Irish microeconomic environment also depends on how each determinant impacts the others.

education, with the result that the level of educational attainment in the Irish labour force has risen markedly during the 1990s. In 1981, 12 per cent of those in employment had third level education. By 1996, this was 23 per cent, and is projected to increase to 32 per cent over the next five years. However, investment in training by government and the private sector has not been particularly high. A continual increase in the level of educational attainment of the workforce and greater emphasis on in-company training are vital for sustained growth.

The improvement in human capital, which has occurred later in Ireland than in other Northern European EU countries, is estimated to have contributed 0.6 per cent per annum to the growth of the effective labour force during the first half of the 1990s (Bradley *et al.*, 1997). Thus, over the last two decades a young skilled workforce has contributed to the success of Ireland's internationally competitive industries. Indeed, a recent survey of leaders of foreign owned firms in Ireland shows that favourable labour force conditions occupied three of the top four factors influencing the competitive performance of these firms (Hannigan, 1998). However, the emergence of the Celtic Tiger in the 1990s suggests that the supply of labour was a necessary but not sufficient condition for the explanation.

The Irish investment share averaged 21 per cent during the 1980s and 1990s, which was not significantly greater than the EU average.[10] This suggests that Ireland's industrial success has not been particularly capital intensive. However, the composition and quality of the capital accumulation undertaken may have been important. The share of foreign direct investment in aggregate investment has risen markedly from approximately 6 per cent in the late 1980s to 19 per cent in 1997. This growth has been increasingly sourced in US owned firms in the *Pharmaceutical* and *Electronics* sectors, which accounted for 80 per cent of flows into Ireland during the mid-1990s (O'Sullivan, 2000). By 1999, although the investment share of GNP increased to 27 per cent, this was due to significant residential investment growth in the booming property market. Greater investment in high technology sectors is required to boost productivity in the long run.

During the 1990s there has also been substantial increases in investment in physical and human infrastructure financed by EU Structural Funds. As a share of Irish GNP, EU Structural Funds increased from an average of 2 per cent in the 1980s to reach a peak of 3.5 per cent in the early 1990s. The recent success of the economy has meant that the scale of this investment has been gradually reduced since then. In addition to the significant scale of this funding, the structural fund process has also resulted in the introduction of better investment planning by public bodies (Bradley *et al.*, 1997). To date much of the investment in physical infrastructure has been placed in transport infrastructure and the telecommunications network.

However, despite the scale of infrastructural investment already undertaken up to now, the very high growth achieved during the 1990s has resulted in the emergence of infrastructural bottlenecks, especially in terms of the quality of the transport, telecommunications and

[10] Gross investment as a percentage of GDP averaged 18 per cent between 1991 and 1998 compared to 22 per cent for the 1980s. However, since Irish GDP is overstated due to transfer pricing, it is preferable to take investment as a share of GNP. This share averaged 21 per cent during the 1990s (Ó Gráda and O'Rourke, 2000).

environmental infrastructure. These bottlenecks are partly caused by the uneven nature of regional development within the country, which has resulted in diverging living standards and productivity among Irish regions due to the urban centres of Dublin and Cork growing faster than other regions (O'Leary, 2001). Future policies aim to address these shortfalls under the National Development Plan. Further issues of growing concern are the need for deregulation, which will allow for greater internal competition in the sectors involved. Many of these sectors are dominated by public monopolies.

Growth accounting exercises for Ireland point to a key role for technological progress, as total factor productivity contributed approximately 55 per cent of GNP growth between 1993 and 2000, which is very high by international standards (see Kennedy, 2001).[11] Clearly, technology has improved in Ireland, largely brought about by the multi-nationals in the high technology industries. Thus, in attracting foreign owned high technology firms, Ireland has acquired state of the art capital equipment, production processes and managerial know-how, which partly explains a significant part of the contribution from total factor productivity.

While it may be tempting to assert that Irish industry as a whole has embarked on a process of self-reinforcing technological change, the objective evidence to support this claim is very tentative. Although R&D expenditure as a percentage of gross output has improved since the 1980s, the 1997 figures of 1.1 per cent for indigenous and 1.2 per cent for foreign owned firms, still compares unfavourably to the average of 2.4 per cent for the OECD or 3.5 per cent for lead countries. Per capita patenting performance by Irish based industry has improved, but still falls short of that achieved by comparable countries with a particular focus on high technology (O'Sullivan, 2000). A more precise judgement is inhibited here by the lack of detailed Irish case studies. Notwithstanding this, there is a need to target significant resources at supporting in-company R&D and to encourage greater collaboration between industry and third level educational institutions, in order to develop a world class R&D capability.

Overall, factor conditions have been particularly favourable to the growth of Ireland's industrial base especially in terms of the quantity, but also the quality of the labour supply available. Capital accumulation has not been notably strong, but has improved in quality and focus. The strong technological progress that is underway is attributable to the multi-nationals. There is little evidence currently available to support a claim of a strong self-reinforcing process of improvement and innovation in Irish industry.

RELATED AND SUPPORTING INDUSTRIES

There is limited evidence at an aggregate level to suggest that foreign owned firms have developed backward linkages in the Irish economy. The preferred measure here is the number of jobs generated in input producing sectors per direct job. Between 1983 and 1991 the degree of linkage for foreign manufacturing increased from 52 to 62 jobs, while for indigenous manufacturing, linkages decreased from 55 to 51 jobs

[11] GNP is used rather than GDP, in order to adjust for the overstatement of the latter due to transfer pricing. The figure of 55 per cent includes the contribution from human capital.

(O'Malley, 1995).[12] During the 1990s, the evidence suggests that the degree of linkage by both foreign and indigenous manufacturing stabilised.[13]

However, there are some doubts over whether the linkages that do exist actually result in an upgrading of indigenous capabilities. For example, when Intel located in Ireland, they brought their supplier companies with them. Thus, purchases by Intel from these companies may do little to build on indigenous capabilities, other than employing Irish labour. In addition, in sub-sectors like software and computers, where domestic sourcing is high, it seems as if the activities involved are at the lower end of the value chain (O'Sullivan, 2000). In the *Pharmaceutical* sector, which is concentrated in the Cork area, there is very little evidence of linkages with the local economy (Garhart *et al.*, 1997). From a policy perspective there is an awareness that the level of embeddedness of foreign owned firms in the local economy could be improved. Therefore, there is a need to build opportunities for sub-supply and to improve the capability of Irish owned enterprises to avail of them.

In terms of internationally competitive indigenous industry, the Irish software industry has attracted much attention, by virtue of its recent impressive export performance. However, it should be noted that as yet firm size in this industry is small, as only 27 of the 500 firms in the sector have greater than 50 employees (O'Sullivan, 2000). There is evidence to suggest that the foreign owned software, electronics and telecommunications equipment industries have helped to develop the type of labour skills used by the indigenous software industry. In this sense, they are important as related industries. The fact that these industries are concentrated in the Dublin area is an advantage here (O'Gorman *et al.*, 1997). During the 1990s, there has also been strong export growth, from a small base, by indigenous firms in the foreign dominated high technology computer and electronics industries. While this may be suggestive of an emerging cluster containing both foreign owned and indigenous firms, it is probably too early to judge (O'Malley and Van Egeraat, 2000). Bradley (2001b) provides an excellent account of the computer sector.

There is some evidence of a cluster in indigenous meat and dairy products. However, this cluster is very concentrated in primary goods with relatively little connection to the machinery, speciality inputs and service industries. Moreover, due to the importance of the EU's Common Agricultural Policy these industries operate in a regulated and supported environment, which makes it difficult to assess their real competitive position (O'Malley and Van Egeraat, 2000). The tourism industry is, by definition, a cluster of related and supporting service industries. Two Operational Programmes supported by EU Structural Funds, have strengthened this industry (Deegan and Dineen, 2000). However, no evidence is available on the role of this cluster in influencing the growing export share of this industry.

[12] The linkage measures are produced using the national input-output table for 1985. Therefore, changes in the underlying structure of the economy since then are not taken into account.

[13] This is based on purchases of materials and services as a percentage of sales (Forfás, *Irish Economy Expenditure Survey*, Dublin, 1990 and 1998). However, these data are less reliable due to the overstatement of foreign sales due to transfer pricing.

To conclude, there is limited evidence of strong clusters through backward linkages from foreign manufacturing. There may be a cluster of related and supporting industries emerging between the indigenous software industry and the foreign owned software, electronics and telecommunications equipment industries. There is evidence of a weak cluster in the indigenous meat and dairy industries.

DEMAND CONDITIONS

There is consensus that the quantity and sophistication of domestic demanders play a limited role in explaining the success of Ireland's internationally competitive industries. It could be argued that this is due to the relatively small size of the domestic market and to the necessity for indigenous industry to become export orientated at an early stage in their evolution (Clancy *et al.*, 1998). However, Finland is a world leader in wireless technology and innovation, driven by sophisticated demanders in the Finnish economy and Nokia's response to their needs. Moreover, in the case of Ireland, overly protected industries do not provide an environment in which sophisticated demanders will flourish.

There is limited evidence that the indigenous software industry sells to foreign industry based in Ireland. By acting as a sophisticated and challenging buyer, foreign industry may have improved the capability of indigenous firms on international markets (O'Gorman *et al.*, 1997).

FIRM STRATEGY, STRUCTURE, RIVALRY

The chief issue concerning the quantity and quality of Irish entrepreneurship, is not that there has been a dearth of entrepreneurs, but rather why so few of them have survived to build large profitable enterprises. It may be that a proliferation of tax breaks and grant assistance for new indigenous industry has enticed budding entrepreneurs to engage in rent-seeking rather than serving the market. However, other factors, including the disadvantages facing late industrialising countries from barriers to entry in international markets, may also have played a role. The result is that most Irish owned enterprises are small or medium sized.

Successful indigenous industry "learned the hard way" on international markets. Indeed, the shake out of indigenous industry during the prolonged stagnation and decline prior to 1987, in which only the strongest and most resilient firms survived, may partly explain the growing success of the indigenous sector on export markets in the 1990s (O'Malley, 1998; and Gorg, 2000).[14] However, there is still scope for indigenous industry to develop strategies to deliver high value added, in order to compete successfully on international markets. The development of such strategies would also position them to benefit more from knowledge transfer from the multi-nationals. However, although there are some indications of progress, there is awareness that multinationals will have to locate more R&D activities in their Irish plants, in order to facilitate knowledge transfer.

Irish management practices are not particularly unique, being traditionally modelled on UK practices, with more recent emphasis on US

[14] Other factors include the substantial devaluations of the Irish pound in 1986 and 1992.

practices. The power of trade unions in Irish private industry has also diminished over time. Up to the mid-1980s union militancy, styled on UK counterparts, was widespread. In the wake of huge losses in employment and membership in the 1980s, recent years have witnessed trade unions playing a more supportive role in industry. However, most foreign owned industry is not unionised. In addition, domestic rivalry is largely unimportant for Ireland's internationally competitive industries due to the absence of local rivals in the international market niches in which these firms compete. Only in tourism might local rivalry play a role. However, there is no evidence as to the strength of this factor.

GOVERNMENT POLICY

The role of government in Porter's view consists of acting as a catalyst for innovation by accelerating or increasing the likelihood of firms' creating competitive advantages. The preceding assessment includes analysis of the role of government policy in shaping the microeconomic environment. This section assesses government macroeconomic policies. Due to the extreme openness of the Irish economy, the credibility of Irish macroeconomic policy plays a crucial role in, among other things, the decision of foreign owned firms to locate production in Ireland. Hence, the need for an explicit analysis of Irish fiscal, monetary and incomes policies.

PUBLIC FINANCES

The correction in Irish government finances has been impressive by international standards. From a position of near unstable and spiralling government debt in the 1980s, the government implemented corrective fiscal policy to lower the debt to GNP ratio from 127 per cent in 1988 to 38.6 per cent at present. Associated with this fall is a substantial reduction in the average exchequer borrowing requirement as a percentage of GNP, from 15 per cent in the early 1980s to lower than 3 per cent each year from 1989 onwards. The Irish government now has a surplus of over 0.67 per cent of GNP on its current budget account.[15]

The corrective fiscal measures introduced has brought market credibility to Irish monetary and exchange rate policies, which has also introduced stability into the macroeconomic environment. However, from the second half of 2001 onwards, there has been a gradual deterioration in the exchequer figures. From an exchequer surplus of €3,178 million (3.6 per cent of GNP) in 2000, to a deficit of €67 million for the first two months of 2002. The deterioration is driven by double-digit increases in government supply services.

MONEY AND EXCHANGE RATES

Given that Ireland is a small open economy, the exchange rate policy that the Irish government pursues has important implications for inflation,

[15] One hypothesis consistent with the data is that the fiscal contraction pursued in the late 1980s signalled an implied reduction in the future tax burden to the private sector. This led to an expansion in private sector activity that was large enough to counterbalance the public sector contraction. However, this period is also consistent with falling interest rates, thus reducing cost of debt servicing, large tax cuts in the UK and unexpected positive external shocks, including strong world growth.

competitiveness, and trade. Ireland's exchange rate history is one of managed fixed exchange rates. In March 1979, the decision to join the European Monetary System (EMS) effectively ended the exchange rate parity with sterling that had existed since 1922.[16, 17]

The government policies pursued in the initial years of the EMS were deemed not credible by the money markets. This is evident from the large (680 basis points, on average) interest rate differential between Ireland and Germany (see Table 3) and the devaluation of the Irish pound on two occasions, March 1983 and August 1986. The driving force behind these devaluations was the loss of competitiveness *vis-à-vis* the UK, induced by the depreciation of the Deutschmark/Sterling exchange rate. Irish macroeconomic experience in this period is one of instability and lack of market credibility. The high and persistent inflation rate, coupled with high interest rates and a lack of credibility in government and incomes policy resulted in falling employment levels, high emigration of high quality labour, and stagnant trade. Confidence in Irish monetary and exchange rate policies was weak.[18]

It is only since 1987 that membership of the EMS yielded positive rewards, in the form of a lowering of interest rates from 11 per cent in 1987 to 2.9 per cent in 1999. By 1994, the interest rate differential with Germany narrowed to 50 basis points. Irish inflation also converged to the low German rate, staying below 3 per cent over the post-1987 period. This period, especially since 1994, has seen a period of stable and credible monetary policies.[19]

Rising oil prices, the weakness of the Euro, higher excise duties, higher house mortgage repayments (through rising interest rates) have all contributed to the consumer price index increasing to over 5 per cent in 2000 and remained over 4 per cent this year (compared to a 1.6 per cent increase in 1999).

COMPETITIVENESS

Ireland's short-run international competitive position is affected to a large extent by its relative wage inflation and its real exchange rate. The credibility bonus of the government's commitment to the ERM exchange

[16] The sterling-link period saw Ireland effectively importing the high UK inflation, especially in the 1970s. The historical reason for the sterling-link is evident from the high trade dependence on the UK.

[17] The perceived advantages at the time of joining the EMS in 1979 included: lower price inflation as a result of adherence to a harder currency regime (that is, the Deutschmark); commitment to a major European initiative; European Community support in the form of a significant transfer of resources; and diversification of the economy away from the slow growing UK economy, which had not been a model of sustainable growth (Kavanagh *et al.*, 1998).

[18] The level of capital flight is an indicator of the market's confidence in the government's management of the economy. In 1986, the residual in the balance of payments rose to nearly £1 billion (equivalent to 6 per cent of GNP) largely because of capital flight. This was even when capital controls were in place. In contrast, for the post-1987 period, capital flight subsided and, in fact, there were capital inflows. Moreover, as exchange controls were relaxed in the 1990s there was no rush to move money out of Ireland.

[19] The "currency crises" from September 1992 to early 1993 affected all members of the ERM.

rate target, from 1987 onwards,[20] has reduced the adjustment costs of lowering wage and price inflation. The success of the national wage agreements in lowering wage inflation is based on the government's ability to deliver tax cuts and stable low price inflation. To this end, centralised wage bargaining in the post-1987 period has been successful, especially compared to the unsustainable pay rewards of earlier wage agreements. However, it should be noted that centralised wage bargaining agreements are less successful in low tax, low unemployment economies.

The fall in the real trade-weighted exchange rate index between 1979 and 1992 resulted in Ireland losing competitiveness relative to the main trading partners over the period. Since 1992, however, there has been a substantial depreciation, indicating a gain in competitiveness for the Irish economy.[21] The improved competitive position was helped by the depreciation of the Irish pound, while a member of the ERM, in 1983, 1986, and 1993, and more recently by the decline in the value of the euro.

5. Overall Assessment of Ireland's Microfoundations of Competitiveness

The recent success of the Irish economy has not been built on the strength of its national system of innovation and improvement. Rather, the remarkable turnaround in its fortunes has been driven to a large extent by foreign owned firms in the *Electronics* (including computers), *Pharmaceutical* and *Financial Services* industries. Domestically, government policy and favourable labour supply conditions allowed firms in these industries to play the driving role in the Irish success story.

US owned firms have earned an average rate of return of 25 per cent on their Irish investment in the 1990s, which is more than ten percentage points higher than that achieved by them in other EU countries. Ireland has been established as a transatlantic trading hub for US multinationals that use Ireland as an export platform into Europe and more recently into the US.

Ireland has done well in industries that are exposed to international competition. In order to do well in the face of increased international competition, Ireland must have had key strengths that flourished in a competitive market. The key strengths to its competitive position are associated with (i) factor conditions, in particular labour; (ii) related and supporting industries, there is evidence of strong clusters, mainly through backward linkages from foreign manufacturing, in the case of software, electronics, telecommunications equipment, computers, pharmaceuticals, food and tourism; (iii) multi-national entrepreneurship; (iv) industrial policy and a stable fiscal and monetary stance.

The stability and credibility resulting from Irish macroeconomic policy has provided a necessary, if insufficient, condition for the success in attracting multinationals. Irish industrial policy is at least partially responsible for the presence of the multinationals. However, particular features of the Irish microeconomic environment have contributed to the success of the multinationals. These include favourable factor conditions

[20] Between 1987 and 1992 there were no realignments of the Irish pound and the margin of fluctuation between the Irish pound and other currencies of the ERM narrowed to a *de facto* 1 per cent.

[21] The Irish pound real exchange rate has depreciated in value against its three major currencies – the Deutschmark, Sterling, and the US dollar – which indicates a gain in competitiveness against Germany, the UK and the US.

especially concerning the quantity, but also the quality of the Irish labour supply and improved infrastructural investment. As yet, there is little evidence to detect mutually reinforcing contributions in Ireland from the other microeconomic drivers of competitiveness.

6. Sustaining the Celtic Tiger

It is widely forecast that, while Irish GDP growth cannot continue at the 7.5 per cent per annum experienced during the 1990s, an average rate of 5 per cent may be sustainable up to 2005 due to expected growth in productivity and employment. This downward adjustment is due to a number of factors. The demographic dividend of the 1990s was a once off phenomenon, as growth in the labour supply over the next ten years is set to decrease. This tightening in the labour supply is occurring at the same time as labour shortages are emerging in many sectors. Infrastructural bottlenecks are becoming evident, especially in urban areas. Also, the threat of higher inflation has the potential, through its effect on expectations, of causing a loss of competitiveness, industrial unrest and jeopardising the already fragile national wage round.

The Celtic Tiger, helped by the demographic dividend, has taken place in the presence of some weak determinants of competitiveness. In particular, the Irish economy is weak on capital investment, especially R&D; lacking sophisticated demanders; exhibits poor linkages and clusters in some indigenous industries, especially the meat and dairy industries; lacking indigenous entrepreneurial activity; and overly protects many industries. Sustaining growth performance will hinge on deepening these and other features of the microfoundations for economic growth. The most important of these are:

a. Further improvements in the quality of the labour force, especially relating to the level of educational attainment and on-the-job training.
b. Increases in both the volume and quality of investment, especially in relation to physical infrastructure.
c. Greater emphasis on R&D and on innovation in activities (marketing, design, production and customer care) generating greater value added.
d. The emergence of strong clusters of related and supporting industries to compete internationally.
e. Encourage emergence of sophisticated demanders through policies directed to improving the rights of consumers, for example increasing the scope and presence of the Office of the Director of Consumer Affairs and reversing the policies that overly protect competition within a market.
f. Improvement through education and training of the quantity and quality of Irish entrepreneurship.
g. Reversal of government protection of many indigenous industries.

Government's priority should be given to policies targeted at these areas. The government's proposal to commit IR£40.5 billion between 2000-06 under the National Development Plan (Forfás, 2000) is a significant investment, representing 9.8 per cent of GNP per annum. Physical infrastructure will account for 52 per cent of the expenditure which is a major increase compared to earlier plans. The priority being given to physical infrastructure reflects the government's response to the emergence of bottlenecks which threaten to constrain growth. However,

there is a danger that such substantial investment may attract resources away from other more productive uses.

Investment in education and training, R&D and industry support will account for 36 per cent of National Development Plan. This may reflect the government's recognition of the importance of these microfoundations of Irish competitiveness. In order to achieve satisfactory returns on such public investments, a higher degree of collaboration between the public and private sectors is required.

Even if a combination of events and policies results in a Celtic Tiger phenomenon continuing, it is likely, however, that future growth will also be more volatile as a result of greater exposure to external shocks in a more open environment, with limited scope for intervention by the Irish government. Remaining attractive to multinationals is clearly not entirely within domestic control. Ireland is particularly exposed to industry specific shocks because of its limited industrial diversification and increased global interdependencies. This is especially relevant in the case of the sudden downturn in US based high technology industry. Furthermore, the fact that the Irish business cycle has been out of line with the rest of the Euro zone implies ECB interventions may not be accommodating or, worse still, may be counterproductive (Gallagher, 2000).

In summary, to sustain the Celtic Tiger it is necessary that measures be put in place that address the weak links in Irish competitiveness. The strong positive determinants of Irish competitiveness in the past, for example, the demographic dividend, have helped create the Celtic Tiger but it will not sustain it.

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