

***Sustainability of Development***

**A Discussion Paper**

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**by**

**Goodbody Economic Consultants**

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# 1. Introduction

Consideration of the question of economic sustainability of development has to date focussed primarily on short term capacity constraints affecting the Irish economy at the present time, most notably skills shortages and transport bottlenecks. The National Competitiveness Council commissioned this paper to examine the sustainability of Ireland's competitiveness and economic performance from a longer term and more structural perspective. In this context, the Council is concerned to identify both the economic and non-economic factors that promote sustainable economic development.

This paper explores these structural factors, by reference to the international economic literature on this subject. It concentrates on identifying the economic, social, cultural, and environmental factors that support sustainable development. The purpose of paper is to identify issues that might be subject to further analysis by the Council.

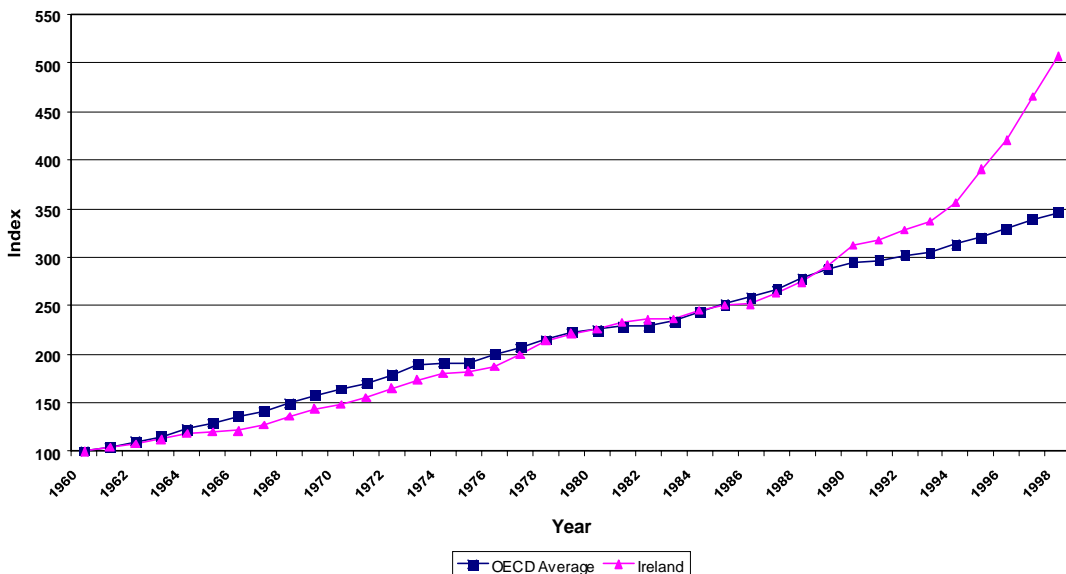
The paper is organised as follows. Section 2 considers the macro and micro economic factors that contribute to sustainable economic development. Non-economic factors such as demography and social and cultural development are examined in Section 3. Section 4 considers the role of environmental factors in sustaining development. Section 5 presents the conclusions and raises issues for further analysis and discussion.

## 2. Economic Sustainability

### 2.1 Economic Growth Performance

The figure below presents trends in GDP for Ireland and the OECD economy as a whole since 1960. It is clear that over the period as a whole, the Irish economic performance more than matched that of OECD countries generally. However, three different phases can be identified. In the first phase up to 1980, Irish growth rates lagged somewhat behind other countries. During the 1980s, the Irish performance came into line with the OECD average, while the 1990s have seen the Irish economy significantly outperform the average.

GDP (Constant Market Prices 1960=100)



The reasons for this strong growth performance in the 1990s are reasonably well known. <sup>1</sup>These include enhanced productivity growth driven by inward investment, falling unit labour costs, favourable trends in the economic dependency ratio, and increases in the labour force. The latter two factors will not have the same impact going forward, so that GDP growth rates will inevitably decline from the current high level. The next section of the paper discusses the economic factors underpinning economic growth.

## **2.2 Economic Factors and Sustainable Economic Growth**

### **2.2.1 Neo-classical Growth Theory**

Neo-classical growth theory has dominated economic thinking for much of the last forty years. The theory is driven by microeconomic considerations rather than the macroeconomic concerns associated with the Keynesian approach. It can be regarded as the modern interpretation of theories established by Adam Smith, Ricardo and Marshall. Neo-classical economics suggests that economic benefits flow from decisions made by individual consumers and firms. Macroeconomic results are determined by the aggregate of the decisions reached by such individual entities. Little scope is allowed for the role of government as a supporter of growth. Under the neo-classical theory, equilibrium is achieved at full employment by changes in factor prices. Consequently inflationary developments have a critical role in determining economic success.

#### ***Convergence***

Relatively poor economies will initially have a high ratio of labour to capital resources, which implies that the benefits to productivity of an additional investment in capital will be greater than in a relatively wealthy country. Over time, returns to human and physical capital will diminish to the point where income levels converge. Using the (unrealistic) assumptions that domestic savings ratios, the pace of labour force growth and the level of technical progress are equal across countries, productivity growth in poor countries will outstrip that of wealthier countries. As a result, the poorer countries will enjoy a convergence of capital/labour and capital/output ratios as well as income levels over the long run. As this process of convergence proceeds, the growth rates enjoyed by the poorer economies will be relatively large.

One of the predictions of the theory is that policy is inert except over the near-term. The prescriptions of neo-classical economics took their most obvious form in the economic strategy pursued occasionally by the Thatcher and Reagan governments in the 1980s with their emphases on a reduced role for government and the primacy of the fight against inflationary pressures and expectations.

Like most theoretical economic models, neo-classicism is based on unrealistic assumptions such as perfect competition. However, the model is most vulnerable to criticism because of its central prediction that long-run changes in price levels will lead to convergence in growth and income levels. As an explanation of growth fundamentals, the model has clearly failed with growth and income levels continuing to diverge in the world economy.

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<sup>1</sup> See for example, Medium Term Review 1999-2005. ESRI 1999

### ***Need for Alternative Theory***

Output expansion has outpaced population growth in the 200 years since the industrial revolution while different countries have remained on seemingly divergent growth paths. This has encouraged academic economists to develop economic models that were more parsimonious in their assumptions and more realistic in terms of their projections, while building on the basics of neo-classical theory. The most significant advance in this regard has occurred with the development of endogenous growth theory, which has attracted increasing attention since the mid-1980s. However, it should be noted that, while the neo-classical theory in its purest form has been discredited, its basic tenets form the basis of the endogenous growth school.

### **2.2.2 The Endogenous Growth Revolution**

Endogenous growth theory suggests that growth or at least relative growth is an outcome generated primarily by the internal characteristics of the economic system rather than the result of the external forces to which it is exposed. It relies on uncovering the public and private sector choices that cause the growth rate to vary across countries. The theory implies the possibility of sustained differences in the levels and growth rates of national income. Because of externalities, mainly productivity gains obtained from specialised research-driven inputs, diminishing returns to human and physical capital do not occur and neither do countries converge in income terms.

Endogenous growth theory is more realistic in its core assumptions than neo-classicism with imperfect competition, increasing returns to scale and international interdependence all playing roles. Since the mid-1980s, we have seen a structural change in how economists think about international trade and development with a progression being made from unrealistic perfect competition assumptions towards more rational explicit models of imperfect competition. The real value of endogenous growth theory emerges from its attempt to model the contribution of technological progress to theory of economic growth.

### ***Research and Development***

The critical values in explaining economic out-performance are Research and Development spending (R&D) specifically and general investment in physical and human capital. Capital accumulation, both physical and human, is the prime driver of growth. Boosts to productivity of capital through new accumulation generate positive spillover effects, known as external economies, and growth can be sustained by continuing accumulation of the inputs that generate these externalities. Investment in technological advance through R&D expenditure is treated in modern growth theory as the most important determinant of long-term growth in per capita incomes. Given the importance ascribed to the value of R&D expenditure, its impact on the economy is examined separately in Section 2.3.

Endogenous growth theory expands on the neo-classical model's stylised facts about growth to include the observations that technological advances are delivered by people and can be endogenous and that individuals and firms can earn monopoly rents on discoveries of technological advances. This is a key feature of the theory and it recognises the factual position that investors in risky endeavours such as research and development must be offered the prospect of substantial financial rewards.

Against this background, it must be recognised that temporary monopoly power is a central motivating factor for technological advances. Under the endogenous theory, output is a function of the stock of labour, capital and the stock of results from expenditure on R&D. In a key departure from the neo-classical theory, advances in technology can increase the productivity of labour at a constant rather than a

diminishing rate. As a result, an economy that invests significantly in technological development can be expected to have an increasing growth potential and should enjoy relatively superior growth performances.

### ***Human Capital***

There is a substantial body of theoretical and empirical work to support the contention that a significant proportion of economic growth is determined by innovation and the commercial application of technological/knowledge advances. Investment in human capital, i.e. the knowledge, skills, competencies and other attributes embodied in individuals that are relevant to economic activity (OECD), now takes a pivotal role in the economic development strategies of OECD countries. Human capital is an intangible asset with the capacity to enhance an economy's productive ability, the inventiveness of local industry and the attractions of a particular investment by raising work-related skills. In its 1994 jobs Survey, the OECD placed a considerable emphasis on human capital with particular reference being made to the importance of lifelong learning. Human capital studies highlight the importance of market-related skills rather than formal, traditional education. The issue of obsolescence is also increasingly important in human capital studies with the view that educational qualifications do not lead to permanent economic gains gaining substantial levels of support. Rather than educating for education's sake, human capital research prioritises not only the development of skills but also examines the use of and the value of these skills from the viewpoint of the marketplace.

### ***Overview***

The endogenous theory is also clearly more realistic than the neo-classical theory in that the role of government is given significant weighting as a potential driver of economic progress. The endogenous growth theory suggests that national and regional growth rates are correlated with a variety of economic, social and policy parameters including many that are affected by government policy. Long-run economic performance reflects the various economic and environmental features of the local and global economy. The truism that policy matters is recognised.

Bringing the theory to a blueprint for economic success involves recognising that no one factor alone can produce superior growth rates. Capital, both of the human and physical varieties, and the quality of the institutional framework must be regarded as necessary pre-conditions for growth. Government policy has an obvious role to play in supporting the development of these features. However, these factors can only lead to sustainable growth when accompanied by a supportive environment. In essence this demands the presence and expectation of macroeconomic stability in the form of coherent and credible monetary and fiscal policies. Budgetary stability and low inflation in terms of general price and wage levels are key indicators in this regard.

Given our experience of divergent economic performances even within the developed world, the endogenous theory has considerable appeal as an analytical framework. Essentially, according to the theory, a country will have higher per capita income;

- the more productive its workers are initially;
- the faster its technological progress;
- the higher its savings rate; and
- the lower its rates of depreciation and population growth.<sup>2</sup>

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<sup>2</sup> This view of the role of population is increasingly being regarded as a simplistic one. See Section 3.2 below.

## **2.3 The Role of Research & Development as a Driver of Growth**

While the endogenous growth theory places a general emphasis on the importance of technological investment as a factor underlying economic out-performance, the most valuable R&D expenditure leads to sustained growth in per capita incomes because the quality of intermediate goods is continually being improved, thus raising productivity in the final assembly of output. This growth in productivity feeds through to the macroeconomy by raising the potential non-inflationary GDP growth rate and creates the potential for economic divergence. High productivity growth is a necessary condition for sustainable economic growth.

Traditionally, policy makers have used a narrow interpretation of research and development expenditure with an emphasis being placed on product invention. R&D expenditures, in terms of popular conceptions, include only a portion of the resources spent on learning to produce new goods and services. In measuring R&D expenditure, we have tended to lean more towards the inclusion of original research at the expense of equally valuable developmental expenditure. Japan's long-term economic success for instance has been influenced heavily by the developmental rather than invention side of R&D.

### **2.3.1 Cumulative Effect of Research and Development**

R&D expenditure is the most potent type of capital investment in terms of its potential to improve long-term growth prospects. It is unique within investment classes because knowledge is cumulative with each new idea building on the last. Each addition to knowledge cannot be eroded by time or through excessive exploitation. In contrast, physical capital, such as investment in transport networks or buildings, deteriorates and requires replacement.

A substantial proportion of physical capital investment is used merely to replenish existing assets and as such does not make a positive contribution to a country's economy capacity. Of course, this should not be regarded as a suggestion that physical capital investment is not worthwhile. In the absence of repairs and maintenance to an economy's existing infrastructure, both productive capacity and the non-inflationary, sustainable rate of growth would be reduced.

Every knowledge-oriented, effectively R&D-linked, unit of expenditure makes a marginal contribution to productivity even if the expenditure itself does not lead to the launch of a new product or the enhancement of existing goods and services. Through spillover effects, all R&D spending is seen as positive for growth. While R&D expenditure may not always achieve its intended result in specific product terms, it does open up new avenues for examination that may result in successful innovation. This is particularly the case when profit rather than academic reward is the motivating factor underlying the R&D expenditure. As a result, the resources spent on commercial research are regarded as especially productive in generating new output.

A country's stock of natural resources is finite and places an ultimate limit on potential economic expansion. This phenomenon has attracted substantial research particularly in regard to the exploitation of hydrocarbon resources. The economic dislocation caused by the prioritisation of industries associated with natural resources is known in economics as the Dutch disease. This phenomenon refers to the economic damage, particularly in the realm of competitiveness, suffered as a result of the Netherlands' discovery and development of its natural gas resources. In contrast to investment in natural resource exploitation, improvements to technology push the limits to growth out with technology advances raising the quality and/or quantity of output without increasing the physical inputs. The potential addition to productivity offered by continuing investment in technology is infinite and raises the sustainable growth rate of an economy in perpetuity.

With the development of the endogenous growth theory, increased research resources have been committed to the practical evaluation of the benefits of technological investment in recent years. On the basis of such studies it is accepted that, within the OECD at the very least, the level of domestic and foreign knowledge capital stocks helps to explain the growth in total factor productivity. It is important to emphasise that it is not only the volume of R&D expenditure that is important as a determinant of sustainable growth.

In particular, there is substantial empirical evidence to support the observation that the number of national scientists and engineers as well as the overall level of R&D spend are significant determinants of a country's income level. The probability of research success is proportional to the level of labour employed in research. The profitability and cost of research determines the rate of productivity increase and prevents the marginal productivity of capital from falling to the point where investment ceases to be worthwhile from a financial viewpoint. By offering financial benefits, the process of pursuing innovation helps to sustain capital accumulation and growth across the economy.

### **2.3.2 Supporting Investment in New Technologies**

The assumption of imperfect competition, a key refinement to the neo-classical growth theory, is central to measuring and appreciating the value of R&D expenditure in an economy. Again, there is an increasing body of empirical evidence to support the contention that the most effective technological progress is profit-driven and firms should enjoy some level of imperfect competition in product markets to support private investment in new technologies. The profits of R&D must supersede the costs.

The returns on R&D are likely to be most significant in an industry with oligopolistic competition and in order to entice funds into the search for technological advances, the benefits of R&D must accrue to the investor. Of course, the pressure to innovate and the costs associated with research and development represent considerable barriers to entry. R&D expenditure tends to be most significant in industries such as chemicals, pharmaceuticals and information technology where future profit streams are protected by patent arrangements. By protecting the value of intellectual capital, these industries are allowed to make supernormal profits for their successful innovations and the magnitude of these returns incentivise companies and individuals to continually invest in research and development in the search for new, protected profit streams.

### **2.3.4 Trade and Technological Development**

Globalisation is an increasingly important characteristic of economies with the trade of goods and ideas leading to a growing interdependence of countries' technological and long-term growth performances. Residents of an economy that is integrated into world markets are likely to enjoy access to a relatively larger technological knowledge and consequently have a comparably greater growth potential. There are solid reasons to believe that free trade may help the process of technological dissemination since competition forces countries to generate new ideas. Moreover, the expanded customer base offered by free access to external markets and the potential demand contained therein raises the oligopolistic benefits of research.

### **2.3.5 Human Capital and Technology**

The endogenous growth theory suggests that a country with the greatest relative supply of skilled labour (human-capital abundant) will specialise relatively in human-capital intensive activity such as R&D. Over time, the human-capital rich country will lead in many high-tech industries and will export those goods. The long-term pattern



of trade will be determined by relative factor endowments in terms of both physical and human capital. Through innovation, a country can be on the right side of dynamic comparative advantage and can trade high value-added goods and services in return for products that require considerable inputs of relatively unskilled labour.

The importance of human capital leads to a recognition that high-tech industries tend to be concentrated geographically. It is intuitively appealing to argue that some benefit exists be it through sharing or through competitive pressures from proximity to other researchers. Moreover, R&D-reliant industries tend to be established near or be attracted by academic institutions that prioritise the advancement of technology. This phenomenon is most obviously observed in the development of Silicon Valley and the research priorities of Caltech and Berkeley in California. While the evidence suggests that commercial research is more important as a driver of long-term growth, centres of educational excellence raise the level of human capital in a region and provide industry with graduates of a calibre capable of making commercially driven technological advances.

## **2.4 Ireland's Economic Growth Experience**

Endogenous growth theory would suggest that Ireland should have been a clear economic out-performer over the course of the past three decades rather than merely in the past six years. As a direct consequence of the introduction of free second-level education in the 1960s and the cultural emphasis, perhaps driven by a scarcity of lucrative employment opportunities, on the pursuit of third-level qualifications, Ireland must be regarded as an economy that is rich in human capital. This view is vindicated by the decisions of multinational industries that are reliant on high skilled labour inputs to establish their European presence in this country.

Ireland has had, despite the structural bottlenecks that have arisen of late on the back of rapid economic growth, a solid physical capital endowment. Moreover, it has a tradition of an investment/enterprise supportive institutional framework. This has taken its most obvious manifestation in the low rate of corporate taxation that is levied on manufacturing profits. Given the well-established presence of these critical growth drivers, it is somewhat surprising that marked economic out-performance is a relatively recent arrival in this country. It is misleading to assert, however, that Ireland's economic performance on an extended time horizon has been relatively poor. Since the early 1980s, Ireland has managed to enjoy trend GDP growth rates that compare favourably with the more highly developed members of the OECD.

### **2.4.1 Macroeconomic Stability**

While Ireland has had the key pre-conditions for high yet sustainable growth for some decades, the macroeconomic environment was not supportive of out-performance in terms of income growth until the late 1980s. Up until 1987, Ireland did not have a creditable record in relation to macroeconomic stability. However, the programme of fiscal rectitude launched that year provided the foundations for the commendable structural stability that now characterises the Irish economy. While budgetary responsibility had obvious benefits in the form of reduced bond yields and interest rates and some crowding in of the private sector as the government cut back on public spending and lower income tax burdens, it had a less obvious but equally important impact on economic activity in the form of higher confidence readings.

The economy's improved macroeconomic indicators raised both domestic and international confidence in the ability of Ireland to manage its own affairs successfully and greatly enhanced the attractions of establishing a manufacturing presence in this country. The influx of foreign direct investment in high-value added industries has allowed Ireland to boost its relative factor endowment significantly and has had a direct impact on both productivity and the rate of potential growth.

It is noteworthy that FDI into Ireland is most pronounced in oligopolistic industries such as pharmaceuticals/chemicals and software that enjoy high returns on R&D. The profit benefits of research and development are further enhanced in this economy by the higher effective returns made possible by a low corporate taxation regime. As a laboratory study, the recent economic experience of Ireland offers considerable support to the endogenous growth theory.

#### **2.4.2 Free Trade**

Ireland's recent economic performance is also supportive of the emphasis of endogenous growth theory on the additional benefits that accrue to investors in technological advances from access to a large free market area. The European Single Market, established in almost all respects by the 31st December 1992, allows for the free movement of capital, goods and services among the member states of the EU. At the launch of the single market, considerable concerns were expressed domestically about the consequences for the peripheral countries of trade liberalisation. Substantial fears existed that the single market development could lead to a concentration of economic activity in the core continental economies at the expense of the prosperity of the peripheral member states.

From Ireland's viewpoint, these fears have proved to be groundless. As a small open economy with a considerable human capital endowment, any measure that leads to greater trade flows should theoretically have raised growth. In empirical terms, one of the most obvious effects of the single market was that it greatly enhanced the attractions for US multinationals of establishing a manufacturing presence in the European Union. The advent of the single market in the late 1980s was accompanied by a dramatic increase in US foreign direct investment inflows into the EU. Ireland's share of this bounty, enhanced by the rapidly improving fiscal situation, the availability and quality of labour resources and the incentive of low corporation tax rates, increased substantially in the 1990s. In 1973, Ireland attracted some 1.1 per cent of US FDI into the EU. By 1997, this share had increased to 7.5 per cent with remarkable out-performance being reported in the manufacturing sector with over 15 per cent of all inflows coming to Ireland.

Ireland can attest to the value of technological investment. However, given our reliance on foreign direct investment as the key driver of R&D, the economy is unnecessarily exposed to the risks of a reduction in either general multinational involvement or specific FDI-funded R&D activity. While substantial progress has been recorded in the development of indigenous high-tech industry in recent years, many of these new companies have developed in support of existing FDI manufacturing/research activities and are not yet self-sustaining. As an imperative of policy, the Council should examine ways to encourage indigenous industry to devote more resources to research and development. Moreover, with full employment now a reality, there should be shift in policy away from growth maximisation and towards capacity enhancement. While we generally take capacity enhancement to refer to physical infrastructure, in Ireland's case there must be an increased emphasis on training in order to upgrade the quality of available human capital.

#### **2.5 The Role of Competitiveness Policy**

Paul Krugman of MIT has described international competitiveness as a popular concept as a dangerous obsession, with economic misfortune being ascribed to the unfair practices of foreign companies and governments. Economic theory and empirical researches demonstrate however that domestic welfare ultimately depends on national economic performance rather than the environment in which an economy operates. 'Beggars thy neighbour' currency devaluations and unfair tax practices will not guarantee an economy's competitiveness over the longer term.

The traditional emphasis in international competitiveness on relative unit costs/prices is undermined by a substantial body of empirical evidence. The so-called Kaldor paradox demonstrates that export market shares and relative unit costs are positively correlated. Moreover, the growth rate of market share for exports is strongly correlated with productivity growth and R&D expenditures. The empirical research suggests unambiguously that innovative ability and adaptive capacity determine the growth of exports.

Technology competition rather than price competition is the driver of export growth. In popular understanding, international competitiveness is a zero-sum game. This is a distortion. International competitiveness reflects the ability of a country to secure a high standard of living for its citizens relative to other citizens now and in the future rather than an ability to produce more output at lower cost. Cost competitiveness is not a strategic driver of growth. International trade in value-added goods and services is driven more by technological superiority rather than tightening margins and/or reduced cost bases.

However, cost competitiveness does impact on economic growth because:

- A cost competitive economy is more likely to have a high level of investment in physical capital; and
- Although the economy's growth potential is more a reflection of investment in physical and human capital and R&D, a wanton approach to cost control will lead to a failure to achieve that potential.

The empirical evidence on the trade front is again supportive of endogenous growth theory in that it highlights that long-run growth is explained by private incentives to investment in activities that lead to innovation and by the spill-over effects of this process on future investment of a similar kind. In empirical studies, only one industry (petroleum refining) exists for which there is no evidence whatsoever of a positive impact of technology on export performance while price competition tends to be significant along with technological investment in the chemicals sector. The evidence for price competition as a key driver in manufacturing and transport excluding electrical machinery and semiconductors is rather weak. Price competition is important in low-tech industries such as textiles and clothing.

Given labour market constraints and the obvious economic benefits of exporting high-value added goods and services, policy should pay more attention to technological advances through research and development expenditure than rather than attempt to generate output at a lower cost than competing economies. That said, there is now an increasing recognition that Ireland cannot and should not compete with countries such as Morocco and Tunisia in low-value-added industries. With labour market tightness becoming a defining feature of the Irish economy, the principle of jobs at any cost is no longer a realistic or desirable policy option.

The emphasis on high-tech industry, despite Ireland's relative population scarcity is supported by further empirical studies. Scale factors are important in only a few industries such as aircraft, computers and motor vehicles where access to a large domestic market is a key advantage. Ireland has established itself in light industrial sectors that can be competitively exported to a large trading entity such as the European Union.

Traditionally, Ireland has taken a mercantilist approach to trade with the purpose of trade being regarded as the need to generate exports that create jobs. This viewpoint implies that free trade is a necessary evil that gives countries access to other export markets and emphasises the need to compete on the basis of cost. The vast majority of people ascribe to this particular interpretation.

Modern theory, well underpinned by empirical evidence, suggests that the exploitation of comparative advantage should guide trade policy. From the point of view of long-term growth, policy should be designed to promote industries reliant on R&D and human capital investment. A movement away from mercantilism has been observed in recent years with high labour input industries being replaced by high value added industries. This is an indication and driver of economic success but also a symptom of increased economic confidence. Ireland is becoming increasingly specialised in its exporting industries.

## **2.6 Ireland and Endogenous Growth**

While the endogenous growth theory, with its emphasis on the importance of investment particularly on research and development, has not gained universal acceptance, a review of Irish industrial policy suggests that this country's development has been in line with its precepts in recent years. Capital investment of both the physical and human types has been prioritised to varying degrees, with the latter managing to avoid the effects of fiscal retrenchment in the 1980s. Within the education sector, substantial Exchequer resources have been dedicated to the development of courses in new technologies be they of an earth science, biotech or computer nature. While traditional academic subjects have not suffered in absolute terms, policy has successfully directed both financial resources and students towards study relevant to the new, technology-driven courses. This has borne obvious economic benefits in raising the attractions of Ireland as a location for high-tech, multinational investment. Simultaneously, a new importance has been attached to adult education with third level institutions devoting considerably increased resources and prestige to life-long learning. Given Ireland's demographic profile, it is clear that additional financial resources will be made available over the coming years to adult education and mature students will comprise a larger section of the third-level population.

Over the course of the 1990s, spending on R&D has expanded by an estimated trend rate of 15 per cent per annum. This has allowed the level of commercial R&D to move to the EU average in terms of share of GDP. While this development is to be welcomed, Ireland's R&D growth is driven primarily by the multinational sector. Much research effort in Ireland has been driven by the commercial considerations of multinational companies operating in the chemicals and pharmaceuticals and IT sectors. It is estimated that indigenous industry and the public sector account for as little as 30 per cent of total R&D spending. Given the clearly demonstrated role of R&D in accounting for super-normal long-term growth performances, there are obvious industrial development issues that need to be addressed. In particular, additional consideration must be given to the following:

- Is the Irish economy overly reliant on FDI as the prime driver of R&D spending?
- Can policy have a significant impact on raising the efficacy and attractions of R&D investment by indigenous industries?
- Is existing public sector/ indigenous R&D sufficiently commercially-focused?
- Has the Irish policy framework attached an excessive priority to cost rather than technological competitiveness?

### **3. Non-economic Factors and Sustainable Development**

#### **3.1 Introduction**

In discussing the role of non-economic factors, clarity as to the distinction between economic and non-economic factors is required. For the purposes of this exercise, we define non-economic factors as those outside of the physical resources normally explicitly included in growth theory models viz. labour and capital, and their associated features such as human capital and technology. This is a wide definition of non-economic.

In World Bank and development literature, there are at least four categories of non-economic factors that have received attention. These are:

- Population Level and Structure
- Income and Wealth Equality
- Social Development; and
- Social Capital.

The last two factors require some explanation. Analysis of the relationship between social development and economic growth is concerned with determining whether and to what extent provision of social services, such as health, housing and education, enhance productivity and growth. The usual rationale is that the provision of basic social needs enhances human capital, thereby increasing productivity.

Social capital is a concept borrowed from sociology, which lays emphasis on the role of culture in influencing economic growth. It embraces a large number of factors, which are held to influence growth. Culture is viewed as impacting either directly through economic variables, such as the rate of saving, or indirectly through social factors such as social cohesion and trust, social mobility, and entrepreneurial attitudes. These in turn may be reflected in legislation and institutional structures. With regard to the latter, culture is seen to operate through a legislative and institutional framework that is meritocratic and favours creativity.

In practice, however, the distinction between social development and social capital is often blurred. This is especially the case where the empirical relationship between these factors and growth is evaluated.

#### **3.2 Population and Sustainable Economic Growth**

The role of labour supply in constraining growth has become an issue of some debate, given the tightness of the labour market. On the one hand, many economists have emphasised the need to expand the labour supply in order to promote growth. Other commentators have suggested that because per capita incomes are now at a high level, we should avoid growth policies that have detrimental side effects. Immigration is seen as one such policy in that the strain put on infrastructure and housing by further immigration should be avoided. Implicit in such a view is the notion that increases in the population while perhaps adding to GNP do not contribute to per capita GNP. That is, a proportionate increase in the population is not offset by a similar proportionate increase in GNP, thereby reducing GNP per capita.

Interest in the role of population in economic growth has a very old lineage stretching back to the time of Malthus. The Malthusian view was that without restraint population would increase geometrically while food production would increase only arithmetically. Since survival requires a minimum level of consumption, population growth would eventually be checked by growth in food production, and per capita

consumption would fall to abysmally low levels. Thus, population growth inevitably led to economic decline. The obvious flaw in the Malthusian view was that the role of technology and industrialisation in increasing food production was ignored. Similarly, the assumption of geometrically increasing population has not been borne out in practice. Typically, it has been found that on foot of scientific progress and its application, mortality rates initially fall, giving rise to population growth. Eventually, however, falling mortality is associated with falling fertility, so that population growth slows. The pattern is called the 'demographic transition'. Several factors may be at work in reducing fertility including the reduction in child mortality, increasing opportunity cost of childcare, and the increasing return on human capital and consequent need to use scarce resources to educate fewer children to a higher standard.

Even though it was demonstrated that a geometrically increasing population growth pattern is not inevitable, the Malthusian conclusion remained that, where population growth occurs, it has negative implications for growth. This negative impact was viewed as impacting through an increased dependency burden and lower savings and investment rates. This view was not overturned by neo-classical growth theory, which failed to consider the role of population in determining growth, but simply stated that the returns to physical and human capital and technological change were sufficient to raise the rate of growth of production above that of population levels.

The more modern view of the role of population would see it as endogenous to the economy. In undeveloped economies with poor or no pension provision, children are seen as a source of family labour and security for old age. As the economy grows and social insurance systems develop, the need for large families diminishes, with consequent impacts on fertility. In developed countries, the emphasis then shifts from using children as a family resource to that of providing for children through bequest and enhancing their human capital. Since the costs of children are raised in this process, fertility further declines and ultimately there is an ageing of the population. Thus, human fertility is influenced by a quantity-quality trade-off and the demographic transition represents a process in which quality becomes paramount.

Does a declining and ageing population inhibit or encourage growth? The traditional view that population growth inhibited economic development and that birth control was necessary has been increasingly questioned by empirical analysis, which indicates that in the long run moderate population growth produces a better economic performance than slower growth. Two reasons may be put forward for this:

- In a larger population, there is a higher probability of useful innovations; and
- Labour force growth promotes labour market flexibility.

These impacts are sufficient to offset the negative impact of an ageing population. A recent empirical analysis reached important conclusions in this regard.<sup>3</sup> This study explored the relationship between per capita growth rates and family size, income distribution, and other factors. The key empirical findings were:

- Population growth per se does not reduce economic performance;
- Increasing family size is a major inhibitor of growth, so that where this is the stimulus to population growth, economic performance suffers; and
- For a given family size, labour force growth is positively correlated with economic growth.

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<sup>3</sup> Fertility, Income Distribution and Economic Growth: Theory and Cross Country Evidence. Oded Galor and Hyungsoo Zang. *Japan and the World Economy*, 9, 1997.

- Thus, during the demographic transition when fertility declines and the population (labour force) increases (because of reduced mortality) per capita output grows strongly.
- These findings suggest that contrary to opinions currently being expressed, population growth may impact positively on per capita output.

Viewed against the above evidence, how large a role has the population level and structures played in Ireland's economic performance? The high fertility and birth rates, which persisted until the early 1980s, can be seen as a factor that inhibited growth. Since that time, rapidly falling birth rates and family sizes have enhanced human capital development and encouraged growth. The high dependency ratio may also be seen as a negative factor until the 1990s, when dependency rates began to fall. This fall in dependency ratios was the result of the falling birth rates and significant immigration. Labour force growth may be seen as a particularly positive factor in the 1990s as participation rates and immigration rose.

Looking forward, the demographic impact on growth is less benign. Birth rates have stabilised, so that further reductions in family size on the scale of the recent past will not occur. The natural growth in the labour force is diminishing. These trends raise issues of both population and immigration policy. For example, given the high rate of human capital endowment that the country enjoys and the fact that increasing fertility rates may not therefore be the negative factor that it is in developing countries, should a pro-natalist population policy be developed to encourage continuing labour force growth? Additionally, immigration may be seen as a means of boosting per capita output over the long term, without diminishing the average stock of human capital. There is thus a pressing need to develop a coherent economic immigration policy.

### 3.3 Inequality and Sustainable Economic Growth

The traditional view of this issue is that inequality is good for growth.<sup>4</sup> Three reasons are generally proposed for this.

The first relates to the view that, at the margin, the rich save proportionately more than the poor do. If GNP growth is directly related to the proportion of national income that is saved, more unequal economies are bound to grow faster.

A second reason is to do with the 'lumpiness' of investment. This view argues that the setting up of new industries or the implementations of innovations often involve large capital costs. In the absence of efficient financial markets, considerable wealth is required to finance such investments.

The third reason is that if greater equality is promoted by a progressive income tax system, then the after tax rate of interest is smaller, reducing the return to saving and the level of capital accumulation.

Thus the traditional view is that based on these factors there is a trade off between growth and social justice. However, the empirical evidence does not support this view. A number of studies investigate this issue by regressing economic growth over a significant period (usually 15 years or more) on a range of variables including the distribution of income or wealth at the beginning of the period. These empirical studies virtually unanimously support the view that those countries with unequal income and wealth distributions experience lower growth rates.<sup>5</sup> Most commentators view the distribution of wealth as the determining factor, but use

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<sup>4</sup> This discussion in this section relies considerably on Inequality and Economic Growth: the Perspective of the New Growth Theories. Philippe Aghion et al. (forthcoming).

<sup>5</sup> See for example A. Allison and D. Roderick (1994); R. Perth (1996); T. Person and G. Tabling (1994) and K. Denier and L. Squire (1997)

income as a proxy for wealth differences across countries. A few studies assess the impact of wealth more directly by using land distribution as a proxy.

If the empirical findings are true, then what is the explanation for the negative impact of inequality on growth? Three explanations have been put forward:

- Inequality reduces investment opportunities;
- Inequality worsens borrowers incentives; and
- Inequality generates macro-economic volatility.

The notion that inequality reduces investment opportunities rests on the view that where there are decreasing returns to capital and capital markets are imperfect, individual wealth will not converge to a common level, and the aggregate level of output may be affected by its distribution. Where capital markets are imperfect, redistributing wealth from the rich to the poor (whose marginal productivity of investment is relatively high, but whose capacity to invest is low) would enhance productivity and growth.

Inequality may worsen borrower incentives through the presence of limited liability. Where the latter operates, a borrower's repayments to his lenders cannot be greater than his wealth. Where wealth levels are low, the amount a borrower stands to lose if a project fails is small. In contrast, if the project is a success, the amount gained is reduced by the amount borrowed. Consequently, the optimum amount of work effort that a borrower may exert will be less than the amount that lenders would like. Where an individual is relatively wealthy, the marginal return on work effort will be higher as the need to borrow and repay will be less. Redistribution of wealth towards borrowers will have a positive effect on their incentives. This will be growth enhancing where this positive effect outweighs the negative effect on lenders.

Cross-country comparisons show that the volatility in the growth rate reduces the average rate of growth. A number of explanations have been put forward for this including the view that inequality leads to political instability which in turn results in macro-economic volatility. However, a direct impact of inequality on growth may also be postulated. Only a fraction of the active population may have access to high yield investment opportunities. There may be many reasons for this: particular skills may be required or crucial information may be available only to those already in business. As a result, those who save and those who invest in high yield projects are different people. During booms investors increase their debt levels to invest in high yield projects. Eventually, however, the increase in debt repayment obligations squeezes the borrowing capacity of investors in high yield projects. This results in a fraction of savings becoming idle, as savers have no outlet. An economic slump follows which ultimately causes interest rates to drop, eventually leading to recovery. However, in the interim the level of investment in high yield projects has suffered, and the long run growth rate will be less than it might have been. The corollary is that by increasing the proportion of savers that have access to high yield projects, the instability in growth may be avoided. Structural reforms such as investing in human capital or reducing the bureaucratic obstacles that entrepreneurs face would reduce entry barriers and promote growth.

The principal conclusion is that where there are capital market imperfections, redistributive policies may be growth enhancing. Such market imperfections are likely to be more pronounced in but not exclusive to developing countries. Support to provide lower income groups with access to education and to facilitate business start-ups are two obvious mechanisms for increasing opportunities and social mobility. Economic analysis suggests that such redistributive policies should be sustained. In other words, there is no evidence that economic growth automatically reduces inequality,



so that a once-off redistributive change would create a virtuous circle of growth and reducing inequality.

These research findings raise some interesting issues for sustainable development. Is the Irish income tax system sufficiently progressive? Perhaps more importantly, does the low level of taxation of wealth inhibit social mobility and entrepreneurial activity?

### **3.4 Social Development and Sustainable Economic Growth**

Social development embraces the provision of social services, such as health, housing and education. It is widely accepted that these factors impact on growth through increasing labour inputs in both quantity and quality terms. Good housing and healthcare increase the health of the population, ensuring a greater availability of the workforce and reduced absenteeism. They also enhance worker productivity directly through increased physical and mental well being. Indirectly, good housing and healthcare help the development of human capital, as an individual's capacity to achieve higher educational attainment is conditioned by his personal circumstances and well being.

However, investment in education is widely perceived as the most effective means of combining social development and growth. The key role of human capital in creating sustainable growth was highlighted in section above. Given imperfect capital markets, state support for education is a key element in the development of a country's human capital.

While the above view of social development is widely held, there is a relatively little empirical research in this area. Most economic development research either ignores the social dimension or assumes that social development is a by-product of economic growth.

The research that is available essentially tests the relationship between provision of basic education and health services and economic development. With some exceptions, the findings support the view that social development, thus measured, is an important determinant of economic growth, but has a lower order effect than economic factors.<sup>6</sup>

The most widely cited study investigated the relationship between per capita GDP and an indicator of social development for 46 developing countries for the years 1960, 1970 and 1980.<sup>7</sup> Social development was measured by a Physical Quality of Life Indicator (PQLI), which combines measures of infant mortality, life expectancy and educational levels. The findings suggest that economic growth is a function of both earlier economic and social development. The analysis provided no support for the 'trickle down' hypothesis, whereby economic development is assumed eventually to lead to social development.

There is also some evidence in the literature that the positive impact of social development on growth diminishes as development occurs. That is, that it is the provision of basic social services that is important. For example, one study evaluated the link between per capital GDP and social development for high, middle and low-income countries separately. The analysis comprised 92 countries and covered the years 1960, 1970, 1980 and 1990. Social development was characterised by an indicator, which comprised components reflecting health, education, communications and urbanisation factors. The results indicated that for low and medium income

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<sup>6</sup> It should be noted that research in this area is not well advanced and some of the research that is available could be criticised because of partial model specification in particular.

<sup>7</sup> Economic Growth and Social Development: A Longitudinal Analysis of Causal Priority. World Development Vol. 17, No. 4 1989.

countries, social development preceded and stimulated economic growth, but that this relationship disappears when high-income countries are considered.

However, it is noteworthy that few of these studies evaluate the pathways between social development and growth. In particular, the impact through enhancement of human capital has not been studied comprehensively. This may lead to an underestimate of the impact of social development on economic growth. In fact, it follows from the analysis of the role of human capital that state support for education remains a key factor in determining long term economic growth, even for highly developed countries.

In our view, a full picture of the relationship between social development and economic growth has yet to emerge from the literature. However, the above discussion serves to highlight the contribution that social services in general and education in particular can make to human capital development and thus economic growth. Given that Ireland has long since achieved a basic level of social development, the greatest contribution to growth may come from educational services, particularly those aimed at the poorer sections of the community.

### **3.5 Social Capital and Sustainable Economic Growth**

In this context, the concept of social capital refers to a wide range of non-economic factors that are thought to impact on growth. Some researchers include social development, as identified above, within the notion of social capital. However, for most, social capital excludes these elements and refers to the cultural, legal and institutional framework within which economic activity takes place.

Cultural forces are held to manifest themselves through the following channels:

- the radius of trust or sense of community
- the underlying ethical system
- the way authority is exercised; and
- attitudes to work, innovation, saving and profit.

Where trust and identification are low, political polarisation confrontation and autocratic government are likely to emerge. Low trust economies are characterised by centralisation and checking procedures to ensure conformity and control dishonesty. These controls stifle governmental creativity and private entrepreneurship, and lend themselves to corruption. In most poor countries the radius of trust is confined to the family. These countries are characterised by nepotism, tax evasion, and aversion to organisation and co-operation for common purposes and causes.

Particularly important with respect to economic policies affecting economic growth is the power of incumbent policy makers to impose policies that favour future as opposed to current benefits and or to create trust in the electorate that the benefits of future growth would be shared. This requires a consensus on societal goals – a type of social consensus

Authoritarianism implies a hierarchical view of the world. One that nurtures paternalism, patron client relationships, and social rigidity. This inhibits both creativity and social mobility. In modern industrialised countries, on the other hand, roles are open and based on achievement rather than social status, thereby encouraging social mobility, entrepreneurial activity and innovation.

Positives attitudes towards work; a belief that rationality presents a tool with which the World can be manipulated; and orientation towards a future that encourages planning and saving, are all important.

The impact of cultural forces is held to be most easily seen in the diverging economic performance of the Centre-North of Italy on the one hand and the South on the other. The norms of behaviour in the Centre-North stress the acceptance of the part of citizens of the positive role played by collective action in pursuing collective goods related to economic growth and social protection. This manifests itself in stronger local and regional institutions, which have the ability to experiment with policies and set their own priorities.

Thus, it may be seen that social capital embraces notions of trust and social cohesion on the one hand, and creativity, social mobility and entrepreneurial spirit on the other. The role of social capital is captured in an oft-cited remark '....a country's potential for rapid growth is strong not when it is backward without qualification, but rather when it is technologically backward but socially advanced'.<sup>8</sup> However, the empirical evidence for the role of social capital in growth is relatively scant. This undoubtedly reflects the problems of specifying statistical models that embrace all or most of the elements contained in the concept, some of which are purely attitudinal.

Studies have generally analysed the role of social capital in a partial way. For example, one empirically sophisticated study, while embracing a wide definition of social capital based on the Adelman-Morris Index, focused on the capacity of social institutions to assist in the adoption of foreign technology.<sup>9</sup> Even so, the results indicate that social capital is a significant factor in determining economic growth. The authors illustrate the impact as follows: ...'if India had achieved the same level of social development as South Korea by 1960, at least as measured by Adelman and Morris, then its income per capita would have grown at 2.3 per cent a year instead of 1.3 per cent for the next twenty five years. Over the period, the higher growth rate from India would have generated a 1985 income per capita almost 30 per cent higher than the actual value.'

Another important finding of this study is that the relative importance of investments in physical capital and education varies with the extent of social capital. Education is important at low levels of social capital, but physical capital is more important at high levels.

Another strand of studies has focussed more directly on cultural variables such as a racial and religious freedom. A recent example of an empirical study of this nature also considered the role of economic organisation (i.e. free versus mixed market economies) on growth.<sup>10</sup> The study showed that racial and religious freedom and a free market organisation are powerful factors promoting growth. Interestingly, the study finds that both a free market and mixed market organisation will promote growth, once racial and religious freedom is high. However, when racial and religious freedom is low, a free market structure is necessary for growth. In this context, racial and religious freedom may well be acting as a proxy for a range of variables including social mobility and entrepreneurial attitudes.

It may be seen from the nature of the two studies cited above that analysis of the role of social capital in economic growth is in its infancy. In particular, the use of composite indices of social capital means that it is not possible to establish which of the various aspects of social capital are really important, and which are merely associated with economic growth.

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<sup>8</sup> Caching up, Forging Ahead, and Falling Behind. M. Abramovitz. Journal of Economic History. 1986

<sup>9</sup> Social Capability and Economic Development. Jonathan Temple and Paul Johnson. Mimeo. 1996

<sup>10</sup> Cultural and Institutional Determinants of Economic Growth: A Cross Section Analysis. B.A. Abrams and K A Lewis. Public Choice. 83, 1995.

That said there are some issues that emerge more strongly, These revolve around:

- Social mobility;
- Entrepreneurial attitudes;
- Creativity; and
- Social consensus.

## **4. Environmental Factors and Sustainable Economic Growth**

### **4.1 Introduction**

Economic growth places increased pressure on scarce environmental resources. Environmental policies, when designed and implemented correctly, have the potential to protect these resources, and through promoting sustainable economic activity, contribute to increasing overall economic welfare.

The introduction of environmental policies has been hindered by concerns that their impact on industrial output and on the competitiveness of firms is negative, under certain conditions. However, it has also been argued that environmental policies can encourage long-term economic growth, innovation and competitiveness in so-called win-win scenarios.

This Section sets out the theoretical and empirical evidence to support these views. Following on from this discussion, some implications of the findings for future Irish environmental policy and sustainable economic growth are explored.

### **4.2 Environmental Policy and Economic Welfare**

#### **4.2.1 Introduction**

In a free market, the demand and supply of goods determines prices and the prices reflect the valuation of the goods in question. Environmental resources, such as air, are usually not priced in the market place. When goods are free, economic agents tend to overuse them. The overuse of environmental resources in production and consumption leads to their long-term deterioration. The cost of this damage has implications for overall economic welfare, because the market fails to reflect the scarcity of these resources.

Policies are required to address this market failure, thereby preventing environmental damage and promoting a more sustainable use of resources. Environmental policies counteract market failure by ensuring that both consumers and producers change their behaviour and act in a more sustainable way. These policies, if designed and implemented correctly, will impact positively on economic welfare generally, i.e. they will raise the aggregate consumption of both economic and environmental goods and services.

Thus, in a very basic sense, environmental policies are essential to provision of a sustainable level of economic welfare.

However, two fundamental issues arise:

- To what extent is the positive impact of environmental policies in ensuring sustainable levels of economic welfare dependent on the nature of the policies adopted? and
- Even where environmental policies do promote economic welfare generally, will this be at the expense of consumption of economic goods and services. That is, do environmental policies, by impacting on company costs, trade off consumption of economic goods and services in order to enhance consumption of environmental goods and services, such as clean air and water?

#### 4.2.2 Environmental Policies

In the absence of robust estimates of the environmental costs associated with pollution, the appropriate scale of interventions to correct market failure must be a matter of judgement. However, some guidance is available on the *type* of environmental policies that would best promote economic welfare.

Four broad categories of environmental policy instrument have evolved over the past two decades:

- **Regulatory instruments:** public authorities mandate the environmental performance to be achieved, or the technologies to be used by firms. Non-compliance results in penalties such as fines or legal action. In the 1970s and 1980s the emphasis of environmental policy was on this approach, known, as 'command and control'.
- **Economic instruments:** in the late 1980s and 1990s policy makers became interested in market-based approaches, which use the price mechanism to encourage firms and consumers to act in a way that benefits the environment. The 'polluter pays principle' works by imposing the costs of environmental use on those consumers or producers that use the resources.
- **Voluntary approaches:** firms make commitments to improve their environmental performance beyond the strict legal requirement. This approach has increased in popularity as a complement to other environmental policies and is favoured by firms, particularly in environmentally sensitive sectors. This tends to be used where environmental policy is mature and there is a tradition of consensus building, negotiation, and decentralisation.
- **Information:** Information, education and training can alter the perceptions and priorities of economic agents, thereby promoting more beneficial behaviour. Companies may address the environmental impact of their production because it benefits them in terms of image, and thus market position. A 'green image' can be especially valuable in marketing products, particularly in the tourism and food industries.

The above categories of environmental policy are not mutually exclusive. A mix of policy instruments may be appropriate, depending on the nature of the environmental problems involved and the non-environmental benefits associated with the instrument.

In the 1970s and 1980s, the emphasis in environmental policy design was on imposing regulations to achieve environmental standards. In recent times, however, market-based environmental policies have been judged to be generally superior because:

- In the short-run, market-based approaches ensure that a given environmental standard is achieved in a more cost efficient manner. Regulations have traditionally created rights to pollute by setting limits in terms of pollution per emitter. In contrast, market-based approaches impose costs on economic agents, which are then factored into the costs of producing goods or delivering services, creating an incentive to reduce pollution. Each firm, faced with a charge per unit of emission, will reduce emissions as long as the cost of doing so is less than the level of the charge. As a result, emissions reductions take place first at firms where it is cheapest to abate and a given environmental standard is therefore achieved in a more cost efficient manner.

- Market based instruments create incentives for firms to continue to reduce pollution below the standard. This contrasts with regulation where each company pollutes the same amount and there is no incentive to emit fewer pollutants.
- The continuing incentive to reduce costs through reducing emissions can encourage economic agents to take a long run view by adopting cost-effective ways to reduce pollution or by devising or innovative cleaner production technologies.
- Market-based approaches can also reveal important information about pollution as the use of economic instruments makes the costs of environmental damage explicit as they are considered by firms and consumers when making production and consumption decisions.

### **4.3. Environmental Policies and Competitiveness**

#### **4.3.1 Introduction**

The issue, which remains to be explored, is whether environmental policies have the potential to adversely affect the production and consumption of market goods and services through impacts on a firms cost base and competitiveness.

There remain considerable differences of opinion about the costs and benefits for industry of environmental policy measures. The theoretical and empirical evidence on the overall impact of environmental policies on industrial output and firm competitiveness is investigated below under the following headings.

- Are the costs imposed on firms by more stringent environmental policies sufficiently large to have adverse impacts on competitiveness?
- Does the impact of stringent environmental policies on environmentally sensitive industries (ESIs) result in industrial flight?
- Will a more stringent environmental regime adversely impact on certain sectors?
- Is there evidence that environmental policies have induced cost savings at firm level?
- Is there evidence that environmental policies have, in the long-term generated benefits for industry in terms of promoting the development of clean technology and promotion of those industries or sectors which require a good environmental image?
- What can we conclude about the overall impact of more stringent environmental policies on industrial output and firm competitiveness?

The impact of increased costs on competitiveness will depend on the following factors (OECD 1993).

- The size of the increase in production costs arising from compliance;
- The scale of compliance costs relative to the firms total costs;
- The differential costs penalty relative to domestic and foreign competitors;
- The greater the degree of price competitiveness between firms; and,
- The greater the sensitivity of overall demand to price changes.

### 4.3.2 Compliance Costs and Competition

Compliance costs are the direct costs imposed on a firm as a result of environmental policy. Compliance costs redirect the resources of the firm away from other profitable opportunities, and this can potentially lead to a rise in costs and prices (Simpson and Bradford 1996). Environmental policy can have an impact on competitiveness, if it imposes costs on some firms that are not imposed on their competitors. If the firm's products are then traded, the environmental policy may disadvantage it internationally as well as domestically.

The potential impact on firm competitiveness of an increase in these costs depends on their importance as a percentage of overall costs incurred by a firm.

There is evidence to show that, to date, in general terms, environmental compliance costs<sup>1</sup> have been small. Across manufacturing industry they amount to well under 1 per cent of the value of gross output, but this varies across particular industries. It would appear that environmental policies have negligible effects on firm competitiveness generally because the cost of complying with regulation is only a fraction of the total firm costs and sufficiently small enough to be overridden by differences in labour costs, exchange rate variations and other factors (OECD 1993). In addition, while environmental standards do differ between countries, the differential in compliance costs between major trading partners is unlikely to be large (OECD 1993).

Despite the above, there is considerable variation in compliance costs across industries. The highest environmental costs are incurred by environmentally sensitive industries (ESIs) – including primary metals non-metallic mineral products, chemicals, paper and food industries (US Department of Commerce 1993, DOE 1996, Sprenger 1996). There is evidence that policies, which raise the environmental performance of ESIs can induce compliance costs which are sufficiently large to impact negatively on the productivity of these industries. Research undertaken by Gray and Shadbegian (1995) into pulp/paper/oil refineries and steel mills in the US found that raising environmental performance did not induce productivity benefits which were large enough to outweigh the measured compliance costs. A negative relationship existed between plants' pollution abatement costs (extent of regulation) and productivity.

To summarise, there is little evidence in the literature to date that environmental policies have had adverse impacts on firm competitiveness generally. However, this may be due to the small scale of the environmental compliance costs imposed on certain firms to date, compared to the overall costs they face. Evidence has also shown that the overall impact of environmental regulation on compliance costs in certain heavily polluting industries have been sufficiently large to have a negative impact on productivity.

As concerns about sustainability have increased, international environmental obligations are becoming more restrictive. This trend is set to continue and the Kyoto Protocol recently set strict limits on the allowable country emissions of greenhouse gases. Very stringent environmental policies will be required to ensure compliance with the agreement in the future. This may result in environmental compliance costs in some sectors of a scale sufficient to impact adversely on the competitiveness of these sectors. However, these costs will be offset by the extent to which our trading partners take comparable or, indeed, more demanding action.

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<sup>1</sup>Costs estimates exclude costs arising from investment in clean technologies and changes to production process and end products which are driven by regulation because they are difficult to identify, administrative and legal costs are also not usually counted. Measured costs only include increased operating costs and investment following regulation.



### 4.3.3 Compliance costs and firm location

Environmental compliance costs are larger for ESIs and therefore have the potential to have a greater impact on these types of firms.

The literature has explored whether the costs of complying with environmental policy has resulted in industries which are more environmentally sensitive moving production moving abroad 'pollution haven hypothesis' (Leonard 1988, Lowe and Yeats 1992, Lucas et al 1992, Olewiler 1994, Repetto 1995).

The result of the studies into 'industrial flight' due to stringent environmental policies have largely been inconclusive and failed to find a significant relation between environmental regulations and trade performance. There are often conflicting explanations for changes in trade patterns and it is difficult to conclude that the migration of 'dirty industries' is due to environmental policy (Leonard 1988).

### 4.3.4 Benefits to the firm of compliance with environmental policy measures

#### *Innovation effects and first mover advantage*

Porter (1990) argues that environmental policy may be good for competitiveness because the costs of complying with policies may be more than offset by innovations. These innovations may produce competitive benefits in themselves and or allow firms to gain a first mover advantage in the growing green products or technologies markets.

#### *Innovation effects*

Porter believes that innovation is stimulated because environmental policies highlight resource inefficiencies in firms, as they become more informed about the discharges throughout their production process.

Porter and Van Der Linde (1995) also emphasise that environmental economic instruments give firms the incentive to overcome various obstacles to corporate innovation and technological change, including lack of information and organisational inertia.

This Porter 'win-win' hypothesis of the economic as well as environmental benefits of environmental regulation runs counter to the normal assumption made by economists that markets are efficient and competitive. Some economists would argue that although innovation effects are possible they are likely to be small and that the incentive not to engage in research among firms is the cause. They also doubt that management forego opportunities to discover significant cost reducing research and development. If management inefficiencies exist, environmental policies may not be the most efficient means of eliminating them.

#### *First-mover advantage*

There are differences of opinion as to the scope for first mover advantages in the environmental technology field. Furthermore, there is uncertainty as to whether first mover advantage gains in this industry have already been exhausted by countries that already have in place stricter environmental policy regimes. On the one hand, there is strong empirical evidence of a relationship between pollution abatement expenditures and the patenting of environmental technologies in developed countries (Lanjouw and Mody 1996). In contrast, some argue that because the green products and technology industry is not producing standardised products and importing firms have to adapt the technology to their domestic circumstances, the size of this 'green' technology market is limited (Palmer and Simpson 1993, Palmer et al 1995, OECD 1996).

### *Evidence on the existence of the Porter win-win hypothesis*

Jaffe et al. (1995) do not accept that market failure can generally permit 'win-win' outcomes from environmental policy making. They argue that there is little statistical support for the Porter view that environmental policies improve competitiveness and therefore should be tightened.

The substantial case study evidence of 'win-win' outcomes remains. Stringent restrictions on airport noise in the UK created a market in the UK for aeroengines developed by Rolls Royce as they were significantly quieter than those of their rivals. However, examples such as this may not be representative.

Repetto (1995) concluded that there was no evidence that a superior environmental performance put firms at a market advantage or adversely affected market performance. While, the case study evidence exists to support the Porter view of the innovation effects of environmental policy, there is a lack of systematic evidence to support the assertion that these innovation effects offset environmental compliance costs.

The first mover advantage and innovation offsets suggested by Porter to lead to competitive benefits at firm level would, if realised at a substantial scale, result in gains in national competitiveness. The environmental protection industry is now a major growing sector in its own right. Countries, which are major net exporters in this sector, may be considered to have gained national competitiveness from it, they are also countries which have had high environmental standards for years. Can countries who have not yet introduced stringent environmental policies exploit innovation offsets or capture market share in the environmental protection industry as discussed by Porter?

#### **4.3.5 Other benefits of environmental policy**

Environmental policy should if designed and implemented appropriately improve environmental quality. Within the literature environmental quality has also been examined as an element of competitiveness. In an advanced industrial society environmental quality is highly valued and can affect a firm's location decision and contribute to quality of life. Meyer (1992) found that two US states where one had high environmental regulations and environmental quality and also had better economic performance. He concluded that this was due to superior living environment in the environmentally superior state.

Consumer preferences are also shifting in favour of green products and cleaner production with positive impacts for those who have invested in pollution abatement technologies. In the future ability to meet countries environmental standards may be a condition of access to certain markets. Sectors including food, tourism and agriculture also depend on a good quality external environment to compete.

#### **4.3.6 Conclusions**

The conclusions, which emerge from the examination of the literature, are as follows:

- Environmental policies are essential to the provision of a sustainable level of economic welfare.
- In recent times, however, market-based environmental policies have been judged to be a superior policy instrument to environmental regulation for achieving environmental objectives more efficiently.

- Examination of the literature to date, suggests that, in general, environmental policies do not result in an adverse impact on a firm's competitiveness. This may be due to the small scale of the compliance costs imposed on certain firms to date. Very stringent environmental policies will be required to ensure compliance with the international environmental agreements including the Kyoto Protocol in the future. This may result in environmental compliance costs in some sectors of a scale sufficient to impact adversely on the competitiveness of these sectors. . However, these costs will be offset by the extent to which our trading partners take comparable or, indeed, more demanding action.
- Evidence exists which shows that the impact of environmental policy on compliance costs in environmentally sensitive industries has been sufficiently large to have a negative impact on productivity.
- The result of the studies into industrial flight due to stringent environmental policies have largely been inconclusive and failed to find a significant relationship between environmental regulation and trade performance.
- The Porter 'win-win' hypothesis suggests that there are the economic as well as the environmental benefits which emerge from the implementation of environmental policies in terms of innovation which is stimulated by environmental policies highlighting resource inefficiencies in firms. This runs counter to the normal assumption made by economists that markets are efficient and competitive.
- Differences of opinion exist on the scope for first mover advantage in the environmental technology and green product development field and whether this has been exhausted by countries who already have in place stricter environmental regimes.
- There is a lack of systematic evidence to support the assertion that the innovation effects and first mover advantages from environmental policies offsets environmental compliance costs.
- Environmental quality in itself is an element of competitiveness for sectors including the food, tourism and agricultural sectors and indeed can affect firms location decisions as it is an element of the overall quality of life.

## **5. Conclusions**

### **5.1 Overview**

The above analysis suggests that the prime economic factors promoting long term sustainable development are:

- Investment in physical capital;
- Investment in human capital; and
- Acquisition of technological know-how.

Cost competitiveness and macro-economic stability are key factors in realising the economic growth potential of the economy deriving from these factors.

While the role of non-economic factors in promoting economic growth is less well established. There is significant evidence that the following factors are important:

- Measures to ensure social mobility, including;
- Redistribution of income and wealth;
- Provision of education targeted at the less well off;
- Promoting entrepreneurial attitudes and creativity; and
- A measure of social consensus.

Consideration of environmental factors indicates that

- Environmental policies are essential to the provision of a sustainable level of economic welfare.
- In general, environmental policies have not resulted in an adverse impact on a firm's competitiveness.
- However, the impact of environmental policy on compliance costs in certain environmentally sensitive industries has been sufficiently large to have a negative impact on productivity.
- There is a lack of systematic evidence to support the assertion that the innovation effects and first mover advantages from environmental policies offsets these environmental compliance costs.
- Environmental quality in itself is an element of competitiveness for sectors including the food, tourism and agricultural sectors and indeed can affect firms location decisions as it is an element of the overall quality of life.

## **5.2 The National Competitiveness Council's Priorities**

The Council wishes to foster competitive strengths that will promote sustainable development, and identifies human capital, science and technology, economic and social infrastructure, the regulatory environment and public administration as the foci for attention.

Viewed against our analysis, the Council's focus embraces the key factors crucial to long-term sustainable development.

In this context, the Council might give further consideration to the following issues

### *Science and Technology*

R&D has traditionally been seen as a desirable but ultimately academic activity. The findings of economic theory and empirical analysis suggest that commercial R&D provides a greater boost to long-term growth. Are we doing enough in this regard? Is the focus in the National Development Plan on third level R & D right?

FDI has been a major conduit by which technology has been acquired. Can we rely on FDI in the future in this regard, especially as other countries will be compete harder for FDI? Is the Council addressing this issue? Do we need to look more closely at the barriers to indigenous industry investing in R&D?

### *Human Capital*

Is in-company training receiving sufficient attention? In the current positive economic environment, could employers not take on a greater share of the training burden?

What mechanisms would promote this? Should employer-training commitments form a part of the social partnership approach?

The link between social development and human capital requires further analysis.

#### *Taxation Policy*

Taxation policy is crucial in maintaining social consensus. There is a need to reduce the tax on labour. Has there been too much emphasis on income taxation in this regard? Should the focus shift to taxation of wealth? Would a more even distribution of wealth encourage more business start-ups?

#### *Institutional Structures*

Do we not need radical reform of local government structures? At present, we have toothless regional authorities and local authorities with limited powers. Do we not need to promote local and regional competition to foster innovation and creativity?

Deregulation is not the only means of reform. Should there not be greater emphasis on contracting out some core Government services?

#### *Long Term Planning*

We have no long term planning in Ireland. The first National Development Plan was simply an aggregation of proposals for sectors for which there were prospects of EU funding. The new Plan similarly lacks coherence in what it contains and in its failure to set out a long-term context for development. Much of the content of the Plan was largely influenced by the ESRI. Should government not have the capacity to engage directly in long-term planning?

#### *Social Consensus*

Social partnership has developed as a response to economic crisis. There is a need to recast it by establishing a long-term perspective within which short term trade-offs can be made.

#### *Population and Immigration Policies*

Social consensus in Ireland will become more difficult to achieve in the future, as society will not be so homogeneous. Integration of immigrants into Irish society is necessary both to maintain social cohesion and promote creativity. Should the Council take an interest in immigration policy in its widest context?

Does Ireland need a population policy as well as an immigration policy?

#### *Economic Instruments*

Are existing environmental policies making sufficient use of market based approaches?

#### *Environmental Protection Policies*

In light of the need for increasingly stringent environmental policies in the future, there will be greater need to ensure that these do not adversely impact on firm competitiveness and industrial output. Given the export dependency of the Irish economy, the competitiveness of firms might best be safeguarded by an approach that introduces environmental policies in tandem with those of our trading partners.

However, early action to address environmental concerns may allow Irish industry make the necessary structural adjustments to required future environmental policies. Is there a danger though in Ireland leading from the front in environmental policy development, with more ambitious environmental policies than our trading partners?

The advantages of this above approach could include:

- Better quality environment encouraging inward investment
- Maintenance of comparative advantage in industries which depend on a high quality external environment including the food and tourism sectors
- Possibility of beneficial innovation impacts for firms through environmental policies increasing efficiencies in production process
- Development of early mover advantages in the clean technology and green product industries

The disadvantages for Ireland of a relatively stricter environmental regime than our trading partners could include:

- A loss of competitiveness generally with,
- Severe impacts on certain sectors.

The literature concludes that the potential benefits for firms from environmental policies in terms of innovation effects and first mover advantage, are uncertain.

The question therefore for Ireland is whether the advantages which emerge for certain 'green' sectors and for industry generally through having a good quality external environment combined with the benefits which may emerge from early adjustment to the impacts of future stringent environmental policies justify a stricter environmental policy regime given the disadvantages associated with this which have been outlined above.

To answer this question, requires further research including research into existing environmental policies in operation in Ireland and the sensitivity of certain Irish sectors to a stricter environmental regime

### **5.3 Social Indicators**

In light of the role of non-economic factors in economic growth, the Council should give consideration to monitoring the following indicators:

- An income distribution indicator;
- A wealth distribution indicator;
- Poverty escape rates; and
- Secondary and Tertiary educational participation rates of children of low income families

A possible source for these indicators is the ESRI's 1987 Survey of Income Distribution, Poverty and Use of State Services and its successor surveys.



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#### **Footnotes:**

<sup>1</sup> See for example, Medium Term Review 1999-2005. ESRI 1999

<sup>2</sup> This view of the role of population is increasingly being regarded as a simplistic one. See Section 3.2 below.

<sup>3</sup> Fertility, Income Distribution and Economic Growth: Theory and Cross Country Evidence. Oded Galor and Hyoungsoo Zang. *Japan and the World Economy*, 9, 1997.

<sup>4</sup> The discussion in this section relies considerable on Inequality and Economic Growth: the Perspective of the New Growth Theories. Philippe Aghion at al. (forthcoming).

<sup>5</sup> See for example A. Allison and D. Roderick (1994); R. Perth (1996); T. Person and G. Tabling (1994) and K. Denier and L. Squire (1997)

<sup>6</sup> It should be noted that research in this area is not well advanced and some of the research that is available could be criticised because of partial model specification in particular.

<sup>7</sup> Economic Growth and Social Development: A Longitudinal Analysis of Causal Priority. *World Development* Vol. 17, No. 4 1989.

<sup>8</sup> Caching up, Forging Ahead, and Falling Behind. M. Abramovitz. *Journal of Economic History.* 1986

<sup>9</sup> Social Capability and Economic Development. Jonathan Temple and Paul Johnson. Mimeo. 1996

<sup>10</sup> Cultural and Institutional Determinants of Economic Growth: A Cross Section Analysis. B.A. Abrams and K A Lewis. *Public Choice.* 83, 1995.

<sup>11</sup> Costs estimates exclude costs arising from investment in clean technologies and changes to production process and end products which are driven by regulation because they are difficult to identify, administrative and legal costs are also not usually counted. Measured costs only include increased operating costs and investment following regulation.

