1. INTRODUCTION

1.1 Objectives

As an input for the preparation of the next National Development Plan (NDP) for the period 2007 to 2013, the Department of Finance commissioned this study to identify investment priorities.

In accordance with the terms of reference the primary focus of this study is on the priorities for investment in the areas of transport, environment services, housing, education, health, childcare and R&D and for investment in human resources in the education and training fields. However, the study takes a wider view of investment and, therefore, also considers investment areas not covered by the NDP, such as energy, communications, and the productive sector.

As the choice of investment priorities crucially depends on the objectives that are to be achieved by the NDP, these form a central reference point for the analysis contained in this report. The key objective is to maintain national competitiveness within a sustainable economic and budgetary framework. The investment priorities should also reflect the aims of Government policy in relation to:

- The EU Lisbon Process.
- The National Spatial Strategy.
- The All-Island Dimension.
- Environmental Sustainability.
- Social Inclusion.

Ring fencing a small proportion of resources to investment specifically for the individual horizontal principals is unlikely to be successful. Rather, these goals can only be achieved if all investments are appropriately targeted. While this mainstreaming will go a long way in achieving the goals, some specific interventions may nevertheless be warranted.

The aims of the NDP could be achieved through individual unconnected sectoral investment programmes. However, such an uncoordinated approach is unlikely to yield the best return due to the inability of this approach to consider the complex trade-offs between the numerous policy alternatives that are available to policy-makers. The approach followed by successive Irish Governments in preparing comprehensive National Development Plans therefore has the advantage of incorporating investments in different sectoral areas that complement each other.

In determining the "appropriate" level of investment to facilitate economic growth the objective should be to maximise income (GNP) per head rather than merely maximising the level of GNP. This presents real issues for policy. More rapid growth in the absolute size of the economy would require significantly higher

immigration than would otherwise be the case. Accommodating such a higher population would, in turn, require more infrastructural investment.

While the overall budgetary situation may not give rise to significant concern, resources available for continued investment are not unlimited. The next National Development Plan will need to make best possible use of these scarce resources in providing for the needs of the economy and society well into the 21st century. The main aim of this study is to identify the priorities for investment over the period 2007 to 2013. An important aspect of this is to advise on the optimal way to achieve value for money, given that there has been some concern over inflation in the construction sector.

In contrast to previous plans the bulk of the funding for investment under the NDP will come from domestic sources, both public and private, with only a fraction coming from the EU Community Support Framework (CSF). While this might reduce the bureaucratic burden involved in drawing up and monitoring the next NDP it should not change the general approach to investment planning that was required for CSF. The central aim of the Structural Funds is to improve the economic structure of the recipient country or region, rather than providing funding for conventional demand side stabilisation programmes. In an ever-changing world this focus continues to be relevant.

The CSF introduced a number of innovations in the process of investment planning and implementation, which constitute an added benefit apart from the investment. For example, the long-term approach to planning investment has led to the introduction of multi-annual budgeting through the public capital programme. The commitment of successive governments to the NDP process reflects the extent to which this approach to investment has become part of the Irish policy framework. Other important process innovations such as the requirement for comprehensive monitoring and evaluation should also be continued in order to ensure that the public resources are put to the best possible use.

1.2 Progress

Very substantial resources both private and public have been allocated to investment in Ireland over recent years. A significantly larger proportion of Irish national income has been devoted to investment than in other countries that enjoy a similar living standard, and was therefore not available for consumption. The current NDP has contributed significantly to addressing the infrastructure deficits, which had become apparent in the course of the 1990s. The NDP has also had a substantial positive impact on the Irish economy through non-infrastructural investments, particularly in human resources and research and development (R&D), which have expanded the capacity of the economy. Given the very substantial investment to-date, and the changing domestic and international conditions, it is important to consider carefully the investment priorities for the forthcoming planning period.

Ireland has achieved exceptionally high economic growth rates for more than a decade. The highest annual growth rates of the 1990s are unlikely to be reached again as both domestic and international conditions are no longer as favourable as they were. EU enlargement and increasing globalisation mean that Ireland faces strong competitive pressures. In order to face up to this challenge, inflationary tendencies must be reduced and infrastructure gaps filled. Furthermore, in order to boost the competitive position, continued investments in education and research and development (R&D) are required.

The medium-term prospects for the Irish economy are likely to involve significant differences in the prospects for growth across the different sectors of the economy. The major contributor to growth in employment, including skilled employment, will be the market services sector. The high-technology manufacturing sector, while growing more slowly than over the last decade, will still make an important contribution. However, the prospects for output growth in the agriculture, fishing and the food processing sectors will be limited. This shift in the sectoral structure will increase the need for investment in human capital and R&D.

Along with the economic success, the demographic situation has also changed substantially. While Ireland experienced significant net emigration during the 1980s, this trend was reversed in the 1990s so that there is now substantial net immigration into the country. Indeed, continued population growth is projected for the foreseeable future. Population growth and increased prosperity have resulted in exceptional demand for housing, which has initiated a building boom, so that Ireland is currently experiencing the highest rate of construction of dwellings (per head) of the EU. This in turn is putting major strain on environmental services and urban infrastructure.

The very favourable age structure of the 1990s will gradually be eroded as the population ages, implying increasing age dependence over time. The size of the adult population has grown, allowing for an increase of employment, but also resulting in demand for housing and transport. Due to the size of the female population of child-bearing age, the number of young children will increase over the coming years, implying increased demand for childcare and education.

Employment has grown substantially, by 860,000 since 1990, and the unemployment rates remain at historically low levels. The rapid growth in the economy is leading to capacity constraints for example in the energy and water supply sectors, while the changing nature of employment and lifestyles also require major new investment in communications. The increased priority being attached to environmental objectives in Ireland and in the EU, such as global warming, will further accelerate the investment needs of the energy sector.

Significant improvements in the educational system have resulted in increasing educational attainment rates. Despite this increase in average attainment rates, the proportion of pupils leaving school

without any formal qualifications has persisted at a constant level for more than a decade. There also remain a large number of men and women in the mid-30 to 50s age group, who have not acquired the skills needed for a modern economy. This group of individuals is particularly disadvantaged in the modern labour market and they account for a disproportionate share of the long-term unemployed. Furthermore, the changing nature of a modern economy requires a flexible labour force that continues to up-skill through lifelong learning.

1.3 Outline of this Report

The approach chosen for this study is reflected in the layout of this report. First, in order to identify the economic rationale for public investment a substantial body of literature is reviewed in Chapter 2. This review highlights the role of investments that increase human capital, knowledge and the stock of infrastructure as key drivers of economic growth. Furthermore, the economic literature suggests that public investment is only warranted in areas where, if left to the private sector, the level of investment would be sub-optimal. Chapter 3 briefly outlines that methodology employed in this study.

A central aspect of this study is the analysis of the overall impact of the proposed investment package at the macroeconomic level. Chapter 4 considers the macroeconomic background including the medium-term outlook for the Irish economy including the external environment and demographic projections. Since the next NDP will build on previous NDP's it is also important to assess the appropriateness of previous plans. This analysis is carried out in Chapter 5, which also considers the macroeconomic impact of the proposed investment package.

While the public objectives such as implementing the National Spatial Strategy (NSS), environmental sustainability, social inclusion, implementing the Lisbon Strategy and enhancing North-South co-operation are considered where appropriate in the individual microeconomic chapters, their importance and overarching nature required a special analysis which helped inform the wider analysis contained in this report (Chapters 6 to 10).

While this report is centrally concerned with public investment is has to be recognised that a desired outcome can often be achieved at no costs through the implementation of other measures, which are considered in Chapter 11. For example, the efficient use of infrastructure is only guaranteed if the correct price signals are there to guide consumers. In many cases the appropriate pricing mechanisms are not in place, which results in excess usage (e.g. congestion), which could be solved through the provision of additional infrastructure or by putting the correct pricing mechanisms in place. Thus, such accompanying measures are important in that they free up resources that can be used elsewhere while simultaneously tackling the inefficient use of resources.

Finally, a detailed analysis of investment priorities at the micro-level is contained in Chapters 12 to 23. These consider investments

at a more detailed programme or measure level, drawing significantly on the analysis contained in previous evaluations and considering new micro-level evidence. Specifically the following investment areas are considered:

Chapter 12. Transport Infrastructure
Chapter 13. Housing
Chapter 14. Water and Waste Water Infrastructure
Chapter 15. Waste Infrastructure
Chapter 16. Energy
Chapter 17. Telecommunications
Chapter 18. Human Resources
Chapter 19. Research and Development
Chapter 20. Productive Sector
Chapter 21. Health
Chapter 22. Childcare
Chapter 23. Sports and Arts

2. BACKGROUND ANALYSIS

This study draws on a range of research, and is informed by changes in the economic environment and major policy development. It is, therefore, important to review this literature before progressing to the detailed macroeconomic and microeconomic analysis that was conducted to consider investment priorities.

2.1 The Role of Government

To start with it is useful to consider what the functions of Government are. In doing so the relevance of public intervention in investment programmes can be identified. The role of Government has been subject to substantial philosophical and political discourse. However, the brief discussion here is not aimed at deciding the best economic system but takes as given the fact that Ireland is a modern open market economy. In this context there is little debate about the functions of Government in general, but considerable debate about the importance of the different functions of Government and the most appropriate policies to fulfil these functions.

Musgrave (1959), identified stabilisation, allocation and redistribution as the functions of Government. Stabilisation refers to the fact that economies are subject to cycles and thus are unlikely to have stable and high levels of output, employment and stable prices at all time. At either extreme of a cycle the economy is subject to inefficiencies through the under- or over-utilisation of resources. Thus, Musgrave (1959) argued that Government should intervene and stabilise the economy to reduce the amplitude of the economic cycle. This function, which is of course central to Keynesian economics, is relevant to national development planning in that large investment plans due to the size of expenditure can have a significant effect on the economy and thereby smooth out a cycle or exaggerate it.

Markets may not allocate resources efficiently due to market failures and externalities. If mechanisms for private agents to rectify these market failures or to internalise the externalities do not exist, which is usually the case, Government should intervene in order to achieve an efficient allocation of resources.

Externalities are particularly associated with public goods. A pure public good is a good or service, which if supplied to one person is

still available to another person.[1] Many infrastructures are public goods even if they may not be pure public good as their consumption could be prevented. For example, public road infrastructure allows all road users access. One feature of public goods that is particularly relevant is that the market is unlikely to supply the optimal level of public goods, because the benefits of their provision will typically be underestimated. Only Government intervention will ensure the optimal outcome. This is particularly important for productive infrastructures and other investments that have a strong influence on national performance.

Apart from public goods, the actions of agents in the course of their activities, can also have externalities. For example, the use of motor vehicles causes emissions, which have a negative impact on air quality. Since air is needed not only by motor vehicle users these impose the externality of poor air quality on others. While, such externalities could be mediated through the courts as argued by Coase (1960), such mediation may be difficult, requiring Government intervention. However, once a mechanism for internalising the externalities exists there is no reason for Government to get involved, other than to ensure that these mechanisms are indeed used.

Clearly there are two types of actions that Government can use to ensure the efficient allocation of resources. First, Government can provide the public goods directly, thereby ensuring that the optimal amount of public goods is available. Second, Government can enact laws or impose regulations, which force the market to produce an efficient outcome. For example, river quality can be protected by publicly provided sewerage facilities, or laws to prevent effluent discharges can be enacted and enforced requiring industry and households to pay for the provision of such infrastructures. The latter is preferable, since public provision has to be financed through taxes and, *ceteris paribus*, higher taxes impact negatively on growth.

Another area where Government intervention in the allocation of resources may be warranted is in the area of merit goods. Merit goods are goods that are seen to be beneficial to society and should therefore be consumed by everyone. If consumers are not willing to purchase the merit good then they should be compelled or encouraged to do so. In general low consumption of a merit good is due to information gaps, which may be usefully addressed by Government.

Finally, the redistribution function refers to the possibility that without Government there is unlikely to be an equitable distribution of income and resources. The distribution of income is likely to be inequitable since this depends on the ownership of resources as well as the structure of the economy and these will only yield an equitable outcome by chance. Again, inequalities can be tackled in a number of ways. The conventional approach is to redistribute some

[1] This implies that a public good is non-rival in consumption and non-excludable, i.e. the provision of the public good means it is available to everyone (see Cornes and Sandler, 1996).

resources through the social welfare system from the rich to the poor. This approach while dealing with the symptoms of inequity by reducing it through social welfare payments does not deal with the root causes of inequity. To deal with these, direct measures are necessary. Since such measures have long-run benefits they can be considered an important investment and their inclusion in a National Development Plan (NDP) is therefore justified. In this respect measures that foster equality of opportunity and enable individuals to take the available opportunities are particularly warranted. On the other hand redistributive schemes, which do not tackle the root causes of inequity should not be part of an NDP but rather left to the social welfare system.

2.2 Growth Theory

While the main findings of the international literature on growth and development are well known, it is useful to briefly review this literature, since growth in this literature tends to be related to the accumulation of capital, both physical e.g. infrastructure and intellectual human capital, knowledge and innovation. Furthermore, the literature highlights the role of factors that determine the ease with which capital accumulation can take place e.g. availability of finance, social capital and factors that affect the return to capital such as trade openness. The brief review provides some guidance on the relative importance of different mechanisms in the growth process.

The factors that determine the growth of an economy have been amongst the most central research topics in economics. While economists have put forward theories of growth for at least two hundred years most advances have occurred in two more recent periods. In the immediate period following World War II neo-classical models were formalised into mathematical models, while over the 1980s and 1990s new more advanced models were developed that have become known as endogenous growth models.

The Solow-Swan growth model (see Solow, 1956) is a model where technological progress is exogenous and where returns to capital are diminishing. A key result of the model is that all economies will grow at the same "steady-state" rate in the long run where investment is just sufficient to maintain the existing capital stock. If countries have similar rates of technical progress, a lack of capital in under-developed regions or states implies higher returns in the short run. Thus, the model predicts convergence: the further a region is from its steady state, the faster it grows. Government policy can facilitate convergence by raising the stock of public capital. This increases productivity of private capital, pushes out the steady state potential output, and raises the growth rate (see, e.g. Arrow and Kurz, 1970). However, under this model policy does not have long-run impacts; it only speeds the convergence process.

The major shortcoming of this older literature on economic growth is the fact that technical progress, which is the ultimate source of growth, could not be modelled and was therefore taken to be exogenous. Thus, the long-run growth rate in these models

depends just on the rate of exogenous technical progress and/or population growth, which is also exogenous.

The recent endogenous growth theory has addressed the shortcomings of the earlier pioneering literature. In particular it has focused on how the limitations of diminishing returns could be overcome. These models have investigated how the accumulation of reproducible factors can affect growth (e.g. infrastructure, human capital or knowledge/innovation, specialisation, trade, financial intermediation and social capital). Clearly, it is these factors together that account for differences in growth rates between countries and there are important complementarities between them.

R&D/INNOVATION

The key driver of growth is technical progress that is to a large extent driven by research and development (R&D) activities. One approach to incorporating R&D into an economic growth model is to assume that innovations that result in new investment in plant and machinery increase the knowledge of the workforce as they 'learn by doing' (see Romer, 1986). Thus, the knowledge of the workforce is a function of the capital stock. Since the state of knowledge is embodied in capital, which can be reproduced many times and is therefore available to all possible producers, it is in effect a public good. Thus, investment by individual producers generates an externality through an increase in this public good, which gives rise to increasing returns at the aggregate economy wide level. An alternative approach with similar results is to assume that R&D results in improvements in the quality of intermediate inputs (e.g. Aghion and Howitt, 1992; 1998).

Romer (1990) derived a further model where R&D is subject to fixed costs and where the market structure is characterised by monopolistic competition. This model predicts that the rate of technical change is sensitive to the interest rate since research needs to be carried out now in order to yield technical progress in the future so the benefits of research do not accrue immediately. In this model research is carried out by individuals with high human capital and the stock of human capital generates growth, but in equilibrium there is not enough human capital, suggesting Government intervention is required.

In another model (Ben-David and Loewy, 2000), the level of human capital in a country is determined by knowledge accumulation in that country and by knowledge accumulation in other countries. The impact of 'foreign' knowledge accumulation on the domestic economy depends on the ability of the domestic economy to access this knowledge, which is determined by trade. Higher levels of trade result in higher growth rates since this increases the spillover (externality) from foreign knowledge. Thus, investment in human capital has a higher return if the country is open to trade, which facilitates knowledge spillovers. This mechanism may be particularly appropriate in explaining the recent exceptional performance of the Irish economy.

HUMAN CAPITAL

The role of human capital in stimulating growth has been studied widely. Human capital is of particular importance to growth and competitiveness since this type of capital can be viewed as an essential prerequisite to the adoption of the types of change induced by globalisation and new technologies and, therefore, is a key determinant of productivity. Two approaches of modelling the impact of human capital on growth have been utilised, which have very distinct implications for policy.

Human capital can be acquired through education, learning-by-doing or passed on between generations. If one considers a model where human capital has a direct effect on productivity and where the marginal product of human capital, that is the extra output produced by adding just one unit of human capital, does not diminish. In this situation the return to human capital remains positive regardless of the state of technology, then the growth of the stock of human capital turns out to be the key driver of growth and should therefore be pursued by policymakers This approach which was put forward by Lucas (1988) does not stand up to closer analysis as some of the assumptions made are unrealistic. This is most readily seen if one considers a manufacturing firm that uses particular machines to produce a product. If the workers in that firm are well trained so that they get the best out of the machinery they work with, acquiring additional skills is unlikely to result in more output being produced. Rather, the skills development would need to be complemented by changes in the machinery.

A different approach is taken by Aghion and Howitt, (1992) who argue that human capital has an indirect impact by determining the ability to perform R&D, which results in technical progress. The more human capital is available the higher the level of technical progress and, therefore, the faster the growth rate. Thus, this approach results in scale effects so that large countries should grow faster since; other things being equal large countries possess a larger stock of human capital. This result would imply that a relatively small country like Ireland could not sustain high growth rates due to human capital development. Given the recent growth experience in Ireland and other smaller countries it is not surprising that this prediction is not supported by empirical research (see Jones, 1995; Cannon, 2000).

While these approaches are quite different and have significantly different policy implications, they both provide a strong rationale for public intervention since in both cases the accumulation in human capital results in externalities.

Despite the strong policy focus on the development of human capital, the empirical evidence at the macro level is not conclusive regarding the growth effects of human capital. Thus, while studies by Benhabib and Spiegel (1994) and Pritchett (2001) find little evidence that human capital growth positively affects output growth, other studies (e.g. Temple, 1999 and Bassanini and Scarpetta, 2001) do find a correlation between the two. At least to some extent these conflicting results can be attributed to the difficulty in measuring

human capital (Hanushek and Kimko, 2000). In the empirical literature human capital has been proxied by the percentage of the population of school going age which takes part in second level education, the average years of schooling of the population, the pupil teacher ratio, expenditure in education and average test results. In contrast to the empirical macroeconomic literature there is a broad consensus in the empirical microeconomic literature that education has a positive and significant effect on individual earnings (see Ashenfelter, Harmon and Oosterbeek, 1999).

At the micro-level there are a number of papers, which consider the return to education in Ireland.[2] For example, Callan and Harmon (1999) found that an extra year of education increased earning by approximately 10 per cent. *The Mid-Term Evaluation of the NDP* (Fitz Gerald, McCarthy, Morgenroth and O'Connell, 2003) updated the results of Barrett, Fitz Gerald and Nolan (2002) who considered the return to different qualifications rather than years of schooling. Their results suggest that holding a university degree yields an 80 per cent increase in earnings compared to no qualifications, which clearly constitutes a significant return. Interestingly, this return has decreased from 100 per cent in 1994, which appears to be related to high-skilled immigration resulting in increased supply of skilled labour.

This issue has also been investigated in a macroeconomic context by Bergin and Kearney (2004). They found that investment in human capital over the 1990s appears to have resulted in lower skilled wage rates than might otherwise have been the case since these investments increased the supply of skilled labour. Despite the dampening effect on high-skilled wages the rapidly rising demand for skilled labour meant that skilled wage rates did not fall and that they were still sufficient to attract high-skilled individuals through immigration, further increasing high-skilled labour supply. This improved the competitiveness of the economy. In addition, by reducing the supply of low skilled labour, low skilled wage rates were supported and the unemployment rate was greatly reduced. By turning unskilled labour into productive skilled labour the potential growth rate of the economy was enhanced.

An interesting finding of this literature is that the dampening of high-skilled wages along with the introduction of the minimum wage has resulted in a reduction in earnings inequality and has, therefore, supported the equality and social inclusion horizontal principle of the NDP.

INFRASTRUCTURE

Despite the obvious excludability characteristic, public infrastructure is often put forward as the classic public good. If in addition to labour, capital, intermediate products and energy, public infrastructure is required for the production process, then the non-

[2] See. Callan and Harmon (1999); Barrett, Callan and Nolan (1999a); Barrett, Callan and Nolan (1999b); Barrett, Fitz Gerald and Nolan (2002).

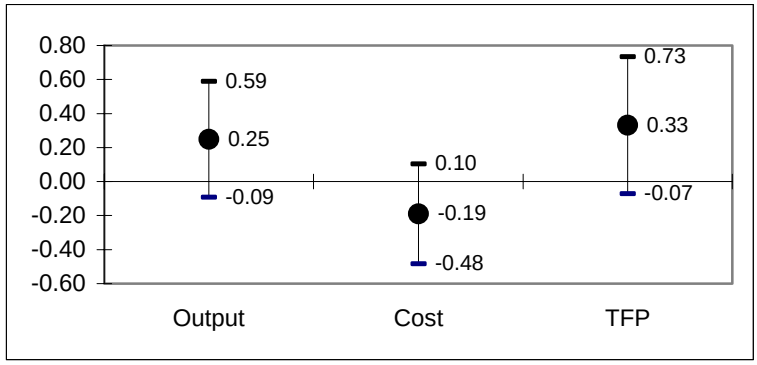
rival nature of infrastructure can result in constant or even increasing returns to scale in all inputs (Barro, 1990; Futagami *et al.,* 1993). The same unit of public infrastructure raises the marginal product of all private capital thus sustaining growth. However, as infrastructure is only non-rival to a degree, excess use, which results in congestion, reduces the overall growth stimulus provided by infrastructure.

The most obvious way in which transport infrastructure impacts on the economy is by facilitating trade. Thus, infrastructure allows a firm to serve a larger market. This expansion of markets results in increased specialisation, which improves efficiency. Thus infrastructure can generate growth through these returns to specialisation (see Kelly, 1997). In this model growth is subject to threshold effects, requiring sufficient infrastructure before the benefits of the investment accrue. Transport infrastructure can reduce the cost of intermediate inputs into the production, which results in increased specialisation (Bougheas, Demetriades and Mamuneas, 2000). This model yields a non-monotonic relationship between infrastructure and long-run growth. An important finding of this model is that infrastructure accumulation is very productive if the tax rate is low and counter-productive if the tax rate is too high.

Much of the recent literature on the effects of infrastructure on growth has focused on the estimation of the rate of return to infrastructure. A consensus is emerging that infrastructure has a positive impact on growth, but that this impact is more modest than had been put forward in early studies such as that by Aschauer (1989). Provided the infrastructure serves some productive purpose, the gross return should be positive. However, if one considers the alternative use to which the resources devoted to infrastructure could have been put the net return may be negative. This suggests that project selection is particularly important.

The next NDP will comprise a substantial investment in infrastructure. Consequently, it is useful to summarise the substantial body of empirical research identifying the return to infrastructure. As the stock of infrastructure in Ireland is relatively low it is most useful to restrict the review of impacts to countries with lagging infrastructure which, given the above discussion, should have a higher return to network infrastructure. The empirical results for Ireland, Greece, Portugal, Spain and Italy utilising three different approaches are summarised in Figure 2.1. The impact of infrastructure on output and total factor productivity (TFP) would be expected to be positive, while infrastructure should decrease costs. The results support these theoretical predictions. For example, on average a 1 per cent increase in the stock of infrastructure raises output by 0.25 per cent. Alternatively a 1 per cent increase in infrastructure reduces costs by 0.19 per cent. The bands around the average elasticity suggest that the output elasticities are likely to range between zero and 0.6, while the cost elasticities tend to be smaller, not exceeding 0.5.

Figure 2.1: Physical Infrastructure: Average Elasticities and Confidence Intervals



Source: Bradley, Mitze, Morgenroth and Untiedt (2005).

This crude meta-analysis supports the findings that were reported in the *Mid-Term Evaluation of the NDP* (see Fitz Gerald, Mc Carthy, Morgenroth and O'Connell, 2003). However, those findings distinguished different types of infrastructure and found that for some types of infrastructure, such as environmental infrastructure, the returns as measured through a production function were not significantly different from zero while those for roads infrastructure were positive and increasing.

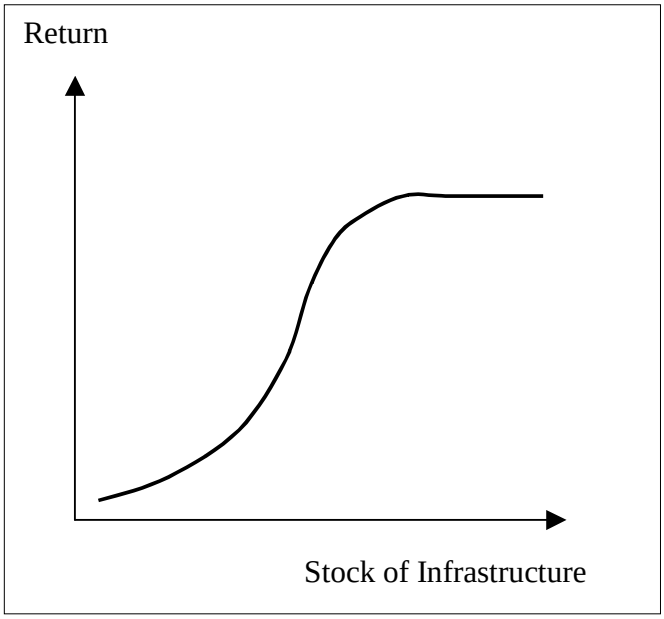
The return of infrastructure has almost exclusively been modelled in a conventional way where, as the stock of infrastructure increases, the return as measured by the marginal product declines.[3] This ignores the network aspect particularly of transport and telecommunications infrastructures. It is well known that in a network the piece of infrastructure that completes the network has the highest return because it improves the usefulness of all other infrastructure already in place.[4] This would suggest that if one starts in a hypothetical situation where there is no network, the initial investment has a relatively low return since it cannot generate the full network externalities (Figure 2.2). On the other hand, the last piece of infrastructure that completes a network has a very high return. Once the network is complete adding additional infrastructure carries no return – only one well functioning network is needed (see also Fernald, 1999). This is particularly relevant to Ireland where, due to low levels of investment over a longer period, key network infrastructures such as a motorway network are underdeveloped. With substantial progress in the current NDP, investments that will be part of the next NDP are likely to largely complete the motorway network, so that this investment will have a particularly high return while subsequent investment in motorways

[3] An exception is the paper by Duggal, Saltzmann and Klein (1999) which allows for an S-shaped production function that is capable of representing not only long-run production but also short-run production.

[4] This argument also points to the returns from integration of different transport modes.

is likely to have a lower return. This suggests that with regards to motorways at least investment should be scaled back after the network has been completed.

Figure 2.2: Relationship Between Network Infrastructure Stock and Return of Adding to the Stock



FINANCE

If firms do not have access to finance they may be unable to invest as accumulating the resources to invest requires the investment to be in place. Thus, an important factor in the development of firms, and particularly start-up firms, is the role of financial intermediation (see the review by Pagano, 1993). Even if finance is available to firms, high interest rates can have a negative impact on investment in R&D and thus reduce growth. Government policy through the imposition of high reserve requirements, taxes or other regulation can also significantly reduce the fraction of savings that is funnelled into investment.

Through their lending activities financial intermediaries play an important role in the allocation of capital. If they allocate resources to inefficient companies then growth is likely to be lower than if they allocated the capital to highly efficient firms. Risk plays an important role in the decision making of financial intermediaries. While the investments with the higher potential return also are often those with the higher risk, the presence of this high risk might result in an activity not securing funding. In general financial intermediaries through their portfolio can hedge the risk better than individuals, which implies that the more risky but potentially more productive investment is more likely to be undertaken by financial intermediaries thereby stimulating growth (Greenwood and Jovanovich, 1990; King and Levine, 1993a).

Empirically there is some support for the theoretical models. For example, King and Levine (1993b) find support for the link between financial development and growth in cross-country regressions using a range of indicators. However, one needs to be careful in interpreting such results since they ignore the peculiarities of the financial sectors of the individual countries (see Arestis and Demetriades, 1997). Furthermore, the causation is not always from finance to growth as pointed out in the work of Demetriades and Hussein (1996).

TRADE

As was outlined above, accumulation of transport infrastructure opens markets and the benefits of human capital are increased through knowledge transfers as a result of trade. Clearly, trade allows firms access to larger markets than their own domestic market and this may also, therefore, drive growth. Rivera-Batiz and Romer (1991) show in a simple model that if the mechanism that generates growth, e.g. R&D, is subject to increasing returns to scale then integration, by increasing the extent of the market, will lead to growth. Along similar lines, trade allows for a transfer of technology, which should lead to higher growth in countries that lag behind in terms of technological development. However, in models where such spillovers are limited geographically the general result is that the trade pattern after integration will be determined by initial conditions. Thus, countries that are ahead in their technological development end up dominating the market in these high-tech sectors and will grow faster, despite the fact that trade is welfare-improving in all countries. A further implication of being locked into the low-tech sectors is that the returns to education drop and therefore the incentives for individuals to gain higher levels of education decline thus reinforcing the lagging nature of that economy (Saarenheimo, 1993). However, Government policy in the form of R&D subsidies can help change this outcome and allow a lagging country to become dominant in the high-tech sector (Grossman and Helpman, 1991). Of course, trade will also lead to increasing competition, which should reduce prices and improve efficiency.

There is empirical evidence to support some of these models. For example, a study by Coe and Moghadam (1993) finds that a large proportion of the growth of the French economy was derived from the benefits of increasing integration and trade in the EU. However, one needs to interpret some of the empirical evidence carefully since the causation may also run from growth to trade and particularly exports.

SOCIAL CAPITAL

The context in which individuals make decisions is an important determinant of the type of investment decision that will be made. The institutional framework, the rule of law, absence of corruption, the existence of trust among individuals etc., which might be

summarised by the term social capital, are also important. Zak and Knack (2001) show that in an environment where there is little trust investment will be lower, which will reduce growth. In this literature social capital affects the development of all other types of capital mentioned above. Overall, there appears to be empirical support for the notion that social capital matters (see, Knack and Keefer, 1997; Zak and Knack, 2001; Hall and Jones, 1999). Consequently, Government can play an important role by ensuring that the aspects of social capital, which are under its control such as the rule of law and absence of corruption are promoted.

2.3 Economic Geography

While the role of location and space had not been a central theme of economic research, it has become a popular research area over the last decade and a half. Economic geography models are not only relevant for regional development within Ireland but also for Ireland as a whole since the country could be seen as a region of Europe.

The advances in economic geography, as elaborated by economists, show that there are forces that foster agglomeration and those that foster dispersion. In the basic new economic geography models (e.g. Krugman 1980 and Brander and Krugman, 1983) increasing returns arise out of the increase in the variety of goods rather than due to spillovers. Other than having a two region structure, geography is introduced into the model through transport costs. These have the effect that countries/regions will export the goods for which there is a large domestic demand. A larger domestic market allows firms to produce at a lower cost, which means that their exports are also cheaper after transport costs have been added than when domestic demand is low. Thus, the assumption of increasing returns in conjunction with transport costs gives rise to a 'home market effect'.

With labour mobility between countries/regions an interesting result emerges. If there are just two types of workers, agricultural workers and manufacturing workers then, agricultural workers are immobile, as they cannot move their land. Manufacturing workers choose to live in the region where their real wage is highest, which in turn depends on the transport costs, the initial share of manufacturing, and returns to scale. For example, if transport costs are low, a region with a slightly higher starting population will attract manufacturing firms due to increasing returns provided these are sufficient to outweigh the transport costs incurred in serving the smaller market. This will also result in lower prices for consumption goods in that region which will attract more workers which further reinforces the agglomeration process in manufacturing. Thus these models can explain a core-periphery distribution of economic activity and point to a process of cumulative causation (vicious/virtuous circle), which locks regions into a particular development pattern in the absence of effective policies.

A phenomenon that has been observed in a number of countries including Ireland is a pattern of divergence between regions within a country while the country as a whole is converging. Giannetti (2002)

in an interesting paper seeks to explain this phenomenon. In this model of two countries, each with two regions and two sectors, the high-tech sector is subject to endogenous productivity growth. This productivity growth arises through 'learning by doing' and this process benefits from international knowledge spillovers. The initial sectoral composition of regional economies determines the performance of the regions and thus the convergence performance. If high-tech firms have a greater tendency to agglomerate, regions, which have a higher initial concentration in the high-tech sector or factors that are conducive to this sector will grow faster. This leads to divergence between the regions within a country. With productivity driven by international knowledge spillovers the high-tech sector grows faster than the traditional sector and thereby accounts for a growing share of the economy. Through knowledge spillovers the sector becomes more similar across the countries, which together with growing shares will result in convergence across countries. Again a process of cumulative causation means that regions can be trapped in a vicious circle.

While these results suggest that peripheral regions with initial development gaps are doomed to perform poorly due to agglomeration economies, these forces can also work in favour of lagging regions in that excessive agglomeration in the core will result in diseconomies associated with congestion and excess demand. If congestion and excess demand result in excessive production costs then peripheral regions that have lower costs may attract firms from the agglomeration.

Williamson (1965) argued that promoting national growth might require concentration of economic activity in the core region at the expense of the lagging periphery. At the earlier stages of economic integration, inter-regional linkages, factor movements and central Government policies are selective in favour of the more developed centres, while this tendency is reversed as integration proceeds and the income levels become higher. Thus, during rapid development countries tend to develop a core-periphery pattern. However, as development proceeds, the benefits of growth spread to all regions reducing the regional differences. This so called "Williamson Hypothesis" has been largely ignored by researchers except for a small number of recent contributions (e.g. Hallet, 1997; 2002). Some empirical evidence has supported the existence of the trade-off between equity and efficiency (e.g. Barrios and Strobl, 2005, De la Fuente, 1996, Morgenroth, 2002).

Dluhosh (2000) analysed the relationship between the integration process in the EU spatial division of labour, encompassing not only the new economic geography models but also the role of factors such as communications costs, cost competition and technology. The main conclusion of this study is that while transport costs and the monopolistic competition of the Krugman type models have some role to play, cost competition due to the integration yields a more fragmented economic geography.

In general the empirical evidence on the existence and dynamics of agglomerations is quite strong (e.g. Ciccone and Hall, 1996;

Ciccone, 2002; Ellison and Glaser, 1997). In the Irish context the relationship between urbanisation and regional growth has been highlighted by Bradley and Morgenroth (2000) and Boyle, McCarthy and Walsh (1999). However, a key result of the New Economic Geography literature, that increasing returns industries should agglomerate, appears not to be supported by empirical analysis. Recent evidence both for Ireland (Morgenroth, 2006) and in a range of European countries (Morgenroth, 2005), shows that increasing returns industries are actually becoming less agglomerated. Thus, while agglomeration forces appear strong the new theories may not have found the correct mechanism through which these agglomeration economies arise.

The role of diversified industrial structure rather than specialisation has been investigated in a study of innovation in urban centres (Duranton and Puga, 2001), which picks up ideas first outlined by Jakobs (1969). Their analysis suggests that innovation flourishes better in diversified cities as the diversity fosters the cross fertilisation of ideas. However, production appears to favour specialised cities where production costs are lower. Thus, this paper also suggests a rationale for FDI, where firms innovate in their headquarters in diversified cities but produce the products elsewhere.

Apart from the economic geography models outlined so far, substantial research effort has gone into analysing the determinants of firm location. In this respect the classic paper (by Coughlin, Terza and Arromdee, 1991), which shows that the factors discussed above in the context of growth models will be key drivers of firm location. The precise requirements of the firm will determine which of the factors is more important. Industries that are resource intensive tend to locate where their key resources can be found. Traditionally, therefore, the abundance of natural resources was a key driver of firm location. However, with a gradual shift towards high-tech and services activities the role of natural resources is declining and instead the key resource now is high-skilled individuals. These are particularly important in knowledge intensive activities. Apart from the availability of skilled workers, countries can compete for mobile firms by offering a lower cost structure, which may include better infrastructure (see Taylor, 1992) or lower taxes (see Bayindir-Uppman, 1998). Firm location is also closely related to the concept of competitiveness, which is discussed below.

2.4 Competitiveness

With increasing globalisation and therefore global competition, competitiveness, has become a central focus of policy. At the EU level the Lisbon Strategy sets out the target for Europe …*to become the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion* (Presidency Conclusions, Lisbon European Council, 23 and 24 March, 2000).

While competitiveness is at the forefront of public policy, the basic concept that appears to be behind this public concern does not

emerge from economic theory. As Krugman (1996) notes, countries do not compete like firms and the underlying assumption of a zero sum game in world trade is false.[5] Nevertheless, competitiveness can be analysed with economic models provided the concept is properly defined and the false premises are discounted.

Policy concerns about competitiveness concentrate on two issues: international trade shares and cost differences. A vast literature dealing with both issues exists and it is beyond the scope of this chapter to review this literature thoroughly.

With regard to trade shares, trade theories yield a range of useful results that predict trade patterns and changes thereof due to changes in the underlying economy (technology, endowments etc.) and trade barriers. These models predict that countries will specialise in industries in which they have a comparative advantage. It is important to note that it is comparative advantage and not absolute advantage that determines trade patterns which means that even if one country is more efficient at producing all goods, it will only trade those goods at which it is most efficient.

Since economies are not static, their comparative advantage changes over time as various factors such as exchange rates, wages and productivity evolve. Furthermore, innovation can induce substantial change in the comparative advantage of a country. In the empirical literature on changing trade shares and comparative advantage the following factors have been considered. These include:

- Relative productivity (Lee and Tang, 2000, Choudri and Schembri, 2002).
- Trade barriers.
- Resource endowments (Gustavson *et al.*, 1999).
- R&D/technology (Kravis and Lipsey, 1992, Fageberg, 1996, Carlin *et al.*, 2001).
- Fixed capital (Oughton, 1997).
- Labour market flexibility (Saint-Paul, 1997).
- Industrial strategy (El Agra, 1997).
- Exchange rate volatility (Cote, 1994).
- Relative taxation (Bovenberg, 1989, Salvatore, 2002).
- Market power (Pieretti and Bourgain, 2003).

With increasing integration and globalisation it is also reasonable to expect these developments to impact on the sensitivity of export share to relative costs.

A paper by Carlin *et al.* (2001) provides a quantification of likely effects of changes in relative costs on national export shares. The key focus is on the impact of changes in relative unit labour costs on competitiveness, which is measured as the share that each country has of the global export markets. Furthermore, since sensitivity of competitiveness to changes in relative unit labour costs differs

[5] With growing world trade a declining trade share can still mean increasing trade volumes.

between countries they also investigate the factors that determine these differences.

Finally, the general tax environment, which is closely linked to public expenditure, can impose a substantial burden. Interestingly, at the aggregate level Carlin *et al.*, did not find a negative relationship between relative unit labour costs and export market share, which would be expected. However, once individual sectors are considered, a very strong and stable connection emerges between relative unit labour costs and export market shares

Further investigation revealed that relative R&D and relative patent performance play little or no role in explaining shifts in export market share. On the other hand, the relative investment share, which might proxy embodied technological change, was found to have a modest positive but highly significant impact on export market share. Other factors that were found to be significant were human capital, trend growth in total factor productivity across the entire business sector, and the structure of corporate ownership. An important conclusion from that study was that policy should be directed at improving the conditions for innovation rather than promoting R&D activities *per se* or of promoting specific industries.

Ultimately, trade shares are driven by price competitiveness i.e. relative prices – the real exchange rate. The determination of prices has been analysed extensively in the context of the related literature on open economy macroeconomics. This literature highlights the role of transaction costs, nominal exchange rate fluctuations and the degree of competition/market power as key factors in determining persistent deviations of the real exchange rate from unity. Other factors that have more transitory effects on the real exchange rate but more permanent effects on the real economy include wage inflation in excess of productivity growth or changes in demand for domestically produced goods.

Excessive wage inflation perhaps due to an over-estimate of future productivity growth will lead to lower profitability and consequently firm relocation or investment in labour-saving technology, which will ultimately reduce the demand for labour and lead to a downward adjustment of relative wages. If demand for domestically produced goods increases profits rise in the short term but some of these will be captured through higher wages in those sectors where the demand has increased, leading to resource reallocation across sectors. Of course, the reallocation of labour across sectors is only feasible if the skills set is transferable. This highlights the role of human capital in industrial restructuring and the possible transition costs inherent in restructuring.

3. METHODOLOGY

Analysing a large and complex programme of public investment, such as the NDP, is not a simple task and there is no "correct" prioritisation of investment needs. Rather, the best that can be achieved is to determine an appropriate investment programme. The difficulty lies in defining the most appropriate prioritisation results from the vast range of alternative investments that could be chosen even within a particular area. For example, in the area of education one could prioritise investment in the primary, the secondary or third level education. Within secondary education investment could be prioritised towards early school leavers or developing the science curriculum etc. Clearly, public intervention is warranted in many different areas and deciding between these is not straightforward.

The range of information available on the large number of possible projects is not always ideal and the time and resources available to analyse them is limited. This process is made more difficult since the NDP will aim to achieve a number of objectives, which in some cases may even be contradictory. Thus, for example the aim to maintain national competitiveness might undermine the aim of achieving environmental sustainability.

Given these limitations it is important to apply a methodology that can satisfy the demands of deciding between the wide range of possible investments while still being tractable. The textbook approach to welfare analysis is not suitable for the analysis of such a wide-ranging investment programme as the NDP. However, some of the lessons of the literature can be built into the approach. In this chapter the approach and more detailed methodology adopted in this study is outlined.

3.1 Overall Approach

The usual approach to evaluating public investment is to conduct a cost-benefit analysis for each project. While this micro-level analysis is very useful in deciding between individual projects within a particular investment area, on its own it cannot be used to determine the content of the NDP. This methodology is primarily applicable and appropriate in situations where the policy decision being examined is a well demarcated and a priori precisely defined project, which does not generate many un-priced externalities. As only some of the investments considered here are precisely defined, and even these are likely to be subject to substantial externalities, cost-benefit analysis (CBA) on its own cannot provide a prioritisation across all the projects potentially included in the NDP. This is a serious limitation for the task of this study since it is concerned with a more general policy programme of which the

details and even sometimes the major features are unknown. Furthermore, it is impossible to carrying out cost-benefit analysis of thousands of projects which would be beyond the scope of a single study. Nevertheless, where CBA undertaken in line with the appropriate guidelines (Department of Finance, 1999) is available use is made of them in this report.

Consequently, rather than utilising CBA, here we utilise an approach that has been developed by ESRI researchers in a range of NDP and CSF evaluations in Ireland and internationally combining macroeconomic with a microeconomic analysis. The benefit of the macroeconomic analysis is that it is able to capture the supply side externalities of many investments, and can be used to ensure that the chosen overall investment programme is consistent with the broad macroeconomic aims. Since the macroeconomic modelling can only investigate the macroeconomic impacts of quite aggregated investment areas, it is important to also conduct a micro-level analysis that considers the detailed investment projects within the more aggregated categories used by the macro model. Thus, productive investments within a particular micro-area can still be chosen even if the particular micro-area is of low importance in the overall recommendations. Furthermore, the micro-level analysis has the benefit of allowing all micro-investment areas to be considered using a common set of criteria, which allows for a proper ranking of investments. The advice received from the consultation with Government Departments, Regional Assemblies and the Social Partners, forms an important aspect of the micro-evaluation. Apart from identifying the appropriate investment priorities and the level of financial resources needed in each micro-area, the microeconomic analysis is also likely to identify issues regarding project management and non-financial constraints that need to be addressed.

It is important to note that the macroeconomic and microeconomic evaluations are not conducted in isolation of each other. Rather, an initial macroeconomic projection is used to determine the appropriate overall funding envelope that fits within the macroeconomic criteria such as the borrowing requirement and the need to maintain the competitiveness of the tradable sector of the economy. The microeconomic evaluation is used to decide on an initial set of priorities, which are aggregated and again evaluated within the framework of the macroeconomic model.

The macroeconomic framework provides a quantified assessment of where intervention by the public sector can enhance the growth potential of the economy and will identify potential constraints and bottlenecks.

3.2 Macroeconomic Evaluation

A central issue in framing investment priorities is to ensure the sustainability of the recent economic and employment growth. This can only be accomplished through the development of a framework or model in which the factors driving Irish economic growth can be considered. A full analysis of the external environment facing the Irish economy needs to be undertaken in this respect, which will

consider how it has changed since the current NDP was drawn up. This analysis is carried out using the ESRI *HERMES* macroeconomic model in conjunction with the *NiGEM* world model that was developed by the UK National Institute of Economic and Social Research (NIESR). These two models are used together to prepare medium-term forecasts for the Irish and world economy. The use of these models ensures that there is a consistent basis for these forecasts and it also allows for the sensitivity of these forecasts to be tested for alternative assumptions on key external variables. Conditional on the external environment, a full set of medium-term forecasts for the Irish economy is prepared.

Because of the uncertainty inherent in any forecasts it is important to ensure that the choice of NDP priorities is robust in the face of a range of possible economic outcomes. The *HERMES* model provides a suitable framework for considering the inflationary pressures facing the economy, especially the inflationary pressures in certain key sectors such as building and construction. The model has also been augmented so that forecasts for energy demand and for greenhouse gas emissions can be made consistent with the range of underlying economic scenarios.

An important starting point is to consider the prospects for the Irish economy over the next decade. This takes into account the major changes in the external environment facing the Irish economy. Factors such as the enlargement of the EU and increasing energy costs also have implications for the future prospects and needs of the economy. This process identifies how the changing structure of the economy (and demography) will impact on policy.

Finally, the review of economic prospects provides crucial information on the scope for public financing of future infrastructural investment. In this respect the *Growth and Stability Pact* is a binding constraint that will have to be adhered to. This analysis frames the overall investment priorities that are chosen with the microeconomic analysis described below. Once microeconomic priorities are chosen their impact is evaluated within the macroeconomic model.

3.3 Microeconomic Evaluation

The broad priorities derived from the macroanalysis need to be supplemented by microanalysis in order to derive a detailed set of quantified investment programmes for specific types of investment. This process of identifying individual priorities has to take account of the integrated nature of the process of economic development. Many of the different priority areas will interact with one another so that the process of selection is not unidimensional.

The key consideration in deciding on investment priorities is to decide on areas where government investment is warranted. The rationale for government intervention and the key investment areas where the economic literature suggests a role for Government intervention were outlined in Chapter 2 and these form the basis for the microeconomic analysis. In a second step the areas where

Government intervention is warranted are accorded a priority ranking. This analysis needs to consider both the progress that has been achieved in previous investment plans and the impact of changed conditions. Thus, if significant physical progress in an area has been made, the analysis needs to question whether further investment is still needed.

Ideally, the social rate of return should be calculated for each project and that project should only be funded if the rate of return is greater than the social cost of financing the project, but this is rarely possible given the available information. Allowance should also be made for the risks inherent in any project. The forecasts for future revenue or social returns on any project are necessarily uncertain, as is also often the forecast for the cost of the investment. Where projects are particularly risky or where the rate of return is very uncertain it is necessary to take this into account before deciding on whether to invest. Risky investments, even if promising a high return, will be less attractive than more reliable projects with more limited returns. For example, the riskiness of investment in R&D must be balanced against the expected high returns, while investment in non-national roads may offer a lower but more certain return. While in many cases it is difficult to undertake these calculations in a formal way, it is important in any project selection process to take them into account at least in a more qualitative fashion.

A further issue, which must be considered in any process of project selection, is the optimal timing for undertaking the investment. If, for example, roads or metro systems could be bought in supermarkets in unlimited quantities then there would be no need to buy them over a period of many years. The optimal answer would be to borrow and to buy and deploy all the roads needed immediately. However, reality is very different. Most of the investment in physical or human capital or R&D can only be undertaken gradually. The roads have to be built which takes time and likewise no amount of money will overnight convert someone with a Leaving Certificate into a university graduate, with all the attendant skills and expertise.

In the analysis of economic welfare the rationale for public investment spending involves issues of both *efficiency* and *equity/distribution* as outlined above as part of the literature review. The *1997 Mid-Term Evaluation of the CSF* defined efficiency as follows: "[T]he economy is functioning efficiently if it is producing as much as possible with the resources available, and investing enough to generate sustained growth of capacity subject to respecting the needs of current consumption and environmental protection." (Honohan, 1997, p.75.) Where the economy fails to function efficiently because of what is termed "market failure" or "distortions", then there is a basis for justifying public intervention. This approach limits the scope for public interventions to just those areas where market failures and distortions exist. This is particularly important when considering potential 'investment' in productive sector activities. These are often either not warranted as they do not

address market failures or distortions, or where such problems exist they can more effectively be dealt with through regulation. The fact that an industry is important is not a justification for public intervention. Furthermore, subsidies for declining industries that do not deal with the underlying problem that makes these industries declining industries should not be considered an investment. Evidence shows that propping up sunset industries not only has a low return but it also slows down the required restructuring and reorientation of resources. Similarly, most redistributive measures only have a role in an investment plan if they deal with the underlying problems that require redistribution.

In order to formalise the microeconomic analysis multi-criteria decision analysis (MCDA) has been used in previous evaluations in the form of a scoring model (e.g. Honohan, 1997 and Fitz Gerald *et al.*, 2003). This tool is particularly useful in situations where investments have already been put in place so that these can be assessed.[6] As the precise projects that are going to be funded in the next NDP are not known at this point (except perhaps some of the larger projects) applying the MCDA is somewhat more difficult. However, as the current NDP is taken as the point of departure for the microeconomic analysis of future investment priorities, significant insights can be gained from the *Mid-Term Evaluation* of the current NDP (Fitz Gerald *et al.*, 2003), which carried out a detailed MCDA analysis.

Specifically the *MTE*, following Honohan (1997) categorised all measures into four categories, namely:

1. Public Goods.
2. Corrective Pricing.
3. Corrective Subsidy.
4. Redistribution.

Category 1: Public Goods

The basis for public sector involvement in the provision of services or facilities that have public good characteristics arises from the difficulty or impossibility of charging the users of the facilities directly for the benefit, which they receive (difficulties with operating exclusionary pricing). Public goods measures can be classified into three types: *information, infrastructure and cultural*. 'Information type' public goods involve a number of different activities such as research and evaluation/technical assistance. 'Infrastructure' covers spending on roads, environmental services, and basic education (the training of all people to some minimum standard). 'Cultural spending' (e.g. monuments, parks etc.) is a classic example of a 'merit good'.[7]

[6] See Roy (2005), Belton and Stewart (2002) or Dyer *et al.* (1992) for a wider review of MCDA. A thorough review of the methods involved in MCDA in the context of identifying investment priorities is also provided in Bradley *et al.* (2005).

[7] A 'merit good' is either a good or a service that 'society' believes should be made available for consumption to all.

It is important to note that since most public goods are not pure public goods in the sense that consumers can be excluded from using the infrastructure (excludable) or in the sense that the use of the public good by one consumer does have an impact on the utility other consumers can derive from the public good (non-rival). For example, the drinking water supply because it requires a network of pipes it has public good qualities. However, it is trivial to exclude individuals from the network and additional users on a network may have a negative impact on water pressures. Consequently, it is not surprising that drinking water supply has been organised by individuals working together, for example, through group water schemes. In such cases it may be more appropriate to consider the investment under the next category.

Category 2: Corrective Pricing

The most pervasive examples of a need for corrective pricing arise in relation to certain infrastructure projects. In many cases the price for using the infrastructure does not reflect the full cost to society. Alternatively, there may be cases where the cost to the private sector of investing takes no account of wider societal benefits from the investment.

An example of such a distortion could be where the cost of clean technologies for generating electricity does not take account of the environmental benefits that they confer. A subsidy for renewable energy falls within this category as it could provide the correct price signals to potential investors.[8] This category of intervention opens up possibilities for innovative forms of public and private sector partnerships. The crucial point is that there needs to be a "truer" pricing of infrastructural usage. Where such corrective pricing is implemented through a subsidy, it is generally appropriate that the subsidy be fixed at an appropriate rate and the volume of demand will determine the level of expenditure. This makes budgeting more complex than where the total expenditure is specified in advance.

Category 3: Targeted Interventions

Expenditure in this category is warranted principally where private agents lack information or are too risk averse to undertake (potentially) profitable activities. For example, they may lack the information necessary to make the optimal level of investment in energy saving in their homes. If such information is provided (either directly or indirectly) through Government support they may as a result, be able to overcome the problem, and subsequently such supports can, and should be, phased out. Key areas of investment, identified as predominantly targeted interventions, are training, energy efficiency and R&D support for business.

[8] As discussed in Chapter 14, a better way of incentivising appropriate investment in clean technologies is to tax the dirtier technologies.

In effect, these interventions are aimed at reducing or eliminating distortions that would otherwise impair the economy from performing optimally, both in terms of efficiency criteria and distributional consequences. In these cases it is probably appropriate to specify the size of the budget needed to trigger appropriate private sector action and then allocate that budget through some competitive mechanism as described above.

Category 4: Redistribution

Redistribution is generally best tackled through the tax and social welfare systems. Nevertheless, there are still some aspects of investment programmes that have a redistributive function. The most obvious example is social housing.

Using the results of the scoring exercise carried out in the last *Mid-Term Evaluation of the NDP*, it is possible to summarise the types of market failures that might necessitate further investment in the various investment areas (Table 3.1). This together with the results of the scoring exercise (final column) guides the further analysis in terms of appropriateness and justification of investment needs for the next NDP. A striking feature of Table 3.1 is the poor scores for the productive sector measures. On average only the energy measures achieve the cut-off score of 0.5. This of course corresponds to the difficulty in identifying market failure or even where a market failure exists often cheaper regulatory measures are sufficient to deal with these. It should also be noted that the modest score for the transport measures was largely by the inclusion of harbours. If these are excluded the average score increased to 0.74 and if the regional airports measure is further excluded the score increases to 0.77. Similarly, R&D would have a higher average score if the sectoral measures were excluded. Overall, the scoring exercise suggests that a high priority should be accorded to investment in health; housing; childcare; social inclusion; regional, urban and rural development; education; general R&D measures; and most of the transport infrastructures and to a lesser extent arts/sports. Low priority should be accorded to investments in the areas of agriculture; forestry and fishing; tourism; enterprise/industry; telecommunications; energy and the environment.

In the microeconomic chapters these results from the scoring analysis are taken as the point of departure and the individual investment areas are again assessed in terms of the rationale for public intervention. Since the economic, social and demographic environment has changed and significant progress has been made in some areas these chapters consider the appropriate level and targeting of investment going forward. They also consider public policies in each area and any new analysis that has emerged. Furthermore, since in many cases the level of existing analysis is insufficient the chapters provide some additional analysis. However, given the scope of this study it is impossible to fill all the gaps in the analysis. For investment areas where public investment was not deemed to be justified, the argument for this conclusion as well as relevant trends in these areas are reviewed.

Table 3.1: Classification of Investments

	Public Good	Corrective	Targeted	Redistribution	Average Score
Public Physical Infrastructure	%	%	%	%	
Transport (incl. Ports, Harbours, Airports)	80	20			0.59
Environmental Infrastructure	50	50			0.50
Housing	10			90	0.76
Sport & Arts	30	30	30	10	0.53
Human Resources					
Education	90	10			0.65
Training	10		70	20	0.58
R&D	30	10	60		0.47
Productive Sector					
Energy	20	70	10		0.50
Telecommunications	20	80			0.40
Agriculture, Forestry, Fishing	10	40	40	10	0.26
Tourism	40		60		0.24
Enterprise/Industry	10	10	80		0.43
Equality/Social Inclusion			50	50	0.62
Health	100				0.80
Childcare				100	0.70
Regional Urban and Rural Development	10		80	10	0.70

Source: Fitz Gerald *et al.* (2003).

3.4 Accompanying Measures

A range of non-investment measures are needed to make the most of current and future investment and these measures are as important as the choice of the appropriate investment package. For that reason these issues are highlighted first at this point rather than just later on, since the implementation of accompanying measures is likely to reduce investment needs in a number of areas.

The effective utilisation of the existing capital stock needs to be considered. There are many examples where use of the appropriate pricing mechanism will yield a more efficient outcome and result in lower investment needs. This is important since the cost of raising a euro of revenue through taxation is greater than a euro because of the distortions inherent in any tax system. Consequently, higher taxes result in lower growth. Therefore, if an efficient outcome can be achieved through accompanying measures, in particular through appropriate pricing, this is preferable to achieving it through investment.

In some cases the current expenditure implications of capital investment are substantial. For example, if hospitals are built without current funding in place to operate them this leads to underutilisation of the capital stock.

Investments, particularly in the productive sector, may be subject to considerable deadweight, i.e. the investment would have been carried out by the private operators anyway without public intervention. Furthermore, there may be a risk that private agents 'free ride' on public good efforts targeted specifically at the productive sector. Measures can be taken to minimise the risk of deadweight and free riding, which in some cases have already been enacted.

4. MACROECONOMIC BACKGROUND

In this chapter we present our assessment of the medium-term prospects for the Irish economy over the time horizon of the next National Development Plan (to 2013). These prospects are broadly based on the forecasts presented in the recently published *Medium-Term Review*[9] (MTR). While the Irish economy grew very rapidly over the last ten years, its potential to grow further is less today than it was five years ago and it will be lower still over the period to 2015. Ireland's changing demographic structure will play a key role in this slowdown. The unutilised resources available in the economy are being used up and, while there has been a major improvement in the quality of infrastructure in the economy over the last decade, the benefits of this improvement have been partially offset by the rapid growth in demand for that same infrastructure. As a result, the economy remains constrained by the limited stock of dwellings and public infrastructure with consequent high prices and congestion.

Despite this inevitable slowdown, the fundamental factors driving growth remain quite favourable and the economy still has the potential to grow at between 4 and 5 per cent a year out to the end of the current decade. In particular, the economy will continue to face a very fortunate set of demographic circumstances over the next fifteen years. However, a number of downside risks exist. Specifically, the very high level of dependence on the building industry poses a threat. The internal risks to future prosperity must also be seen against the background of the global economic imbalances that, if anything, are growing in magnitude. A key factor determining the medium-term prospects for the Irish economy is the future evolution of these global imbalances.

The chapter is structured as follows. In Section 4.1 we discuss background assumptions relating to the external environment, demographic prospects and the building and construction sector. Section 4.2 provides an overview of the economic outlook implied by the MTR *High Growth* scenario. Section 4.3 outlines the impact that a period of low growth, either driven by an external shock or an internal housing shock, would have on this economic outlook. Finally, in Section 4.4 we look at the context of these forecasts for the next National Development Plan. We discuss the implications of

[9] Fitz Gerald, J., A. Bergin, I. Kearney, A. Barrett, D. Duffy, S. Garrett and Y. McCarthy (2005), *Medium-Term Review: 2005-2012*, Number 10, December.

the demographic profile out to 2013, the issue of crowding out effects due to an increased level of investment, and also the high level of uncertainty surrounding future growth prospects.

4.1 Background Assumptions

THE EXTERNAL ENVIRONMENT

As an exceptionally open economy, Ireland is very much dependent on what happens in the rest of the world. The economy remains exposed to events outside the Euro Area due to the importance of FDI, particularly from the US, and the growing importance of services exports. However, the future prospects for the Euro Area are clearly also of crucial importance for the Irish economy. Developments in the domestic economy must be assessed against a backdrop incorporating this external environment.

A major cause of uncertainty about the future prospects for the world economy is the large macroeconomic imbalances that are evident in the US economy. The magnitude of the current account balance has focused attention on its sustainability and at some point in the future the US economy will adjust and experience a slow-down in growth. However, considerable ambiguity remains as to the timing of the adjustment, whether it will occur gradually or sharply and the mechanism(s) by which it will take place. As a result, the MTR presented two scenarios for the external environment facing Ireland. In the first, labelled the *High Growth* scenario, the US economy does not adjust to correct for its imbalances that currently exist. As such, the US economy continues to experience robust growth, although remaining on a growth path that is unsustainable in the longer term. This scenario is used as the basis for consideration of the NDP. In the second scenario, labelled the *Low Growth* scenario, the US current account deficit declines gradually to a long-run sustainable level. The implications of this lower growth scenario for the NDP, if and when it should occur, are considered later in this chapter.

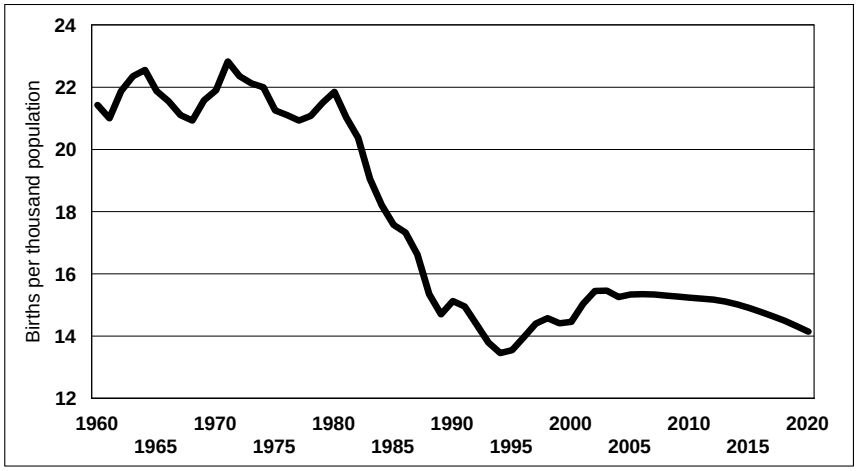
In the more favourable *High Growth* scenario, it is assumed that the US economy can go on growing at a rapid pace until 2015, with a gradual worsening in its external and Government deficits. If realised, this scenario would provide a very favourable backdrop for the Irish economy for the next decade. However, although the more benign *High Growth* scenario is considered more likely for the next few years, it is not possible for the US to continue forever on this path and we do not pursue the details of this scenario beyond 2015. When the adjustment eventually takes place the US economy will switch to a lower growth path having negative implications for that economy and also for the global economy, including Ireland. The effects of what happens in the US will be transmitted to Ireland directly through trade and FDI. However, even more important will be the indirect effects as mediated through the wider Euro Area economy.

DEMOGRAPHIC BACKGROUND

The Irish demographic profile is unique. It is characterised by a relatively young population with approximately one-fifth of the adult population in the 15-24 year age cohort. Such a favourable position means that the problems caused by ageing populations in many other EU and OECD countries are not as prevalent in Ireland today. However, this favourable structure of the population looks set to deteriorate over the longer term, as the now relatively young population ages, with fewer children coming behind. As these structural changes occur they will have an important effect on the potential growth rate of the economy, mainly through their effect on labour supply and dependency ratios. It is thus pertinent for policy-makers to incorporate such effects into medium- and long-term plans now (Barrett and Bergin, 2005).

In the past, the demographic profile has been largely shaped by the patterns observed in birth rates and migratory flows and these factors will continue to shape the demographic profile in the future. The Irish **birth rate** has undergone significant change over the last half century. Over the next decade, our forecasts suggest that the birth rate will level off at approximately 15 births per thousand of population. This means that in years to come, there will be relatively fewer persons in the younger age cohorts, provided there are no offsetting increases caused by migration. The births are forecast on the basis of a fairly constant Total Fertility Rate (TFR) of between 1.9 and 2.0.[10]

Figure 4.1: The Birth Rate



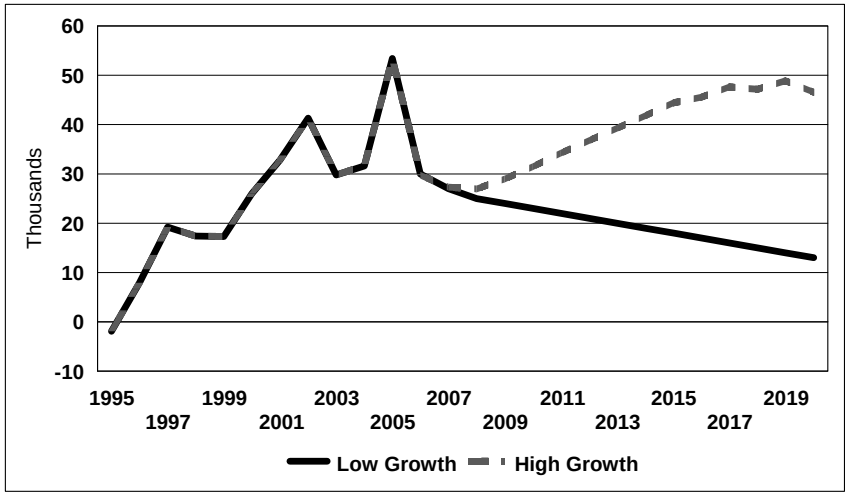
The forecast limited rise in the birth rate over the rest of the decade is accounted for by the fact that there will be an increasing number of women in their late twenties and thirties, the age at which women now typically become mothers; the population bulge of

[10] This is an artificial measure that represents the potential number of children over her lifetime for a representative woman.

young people born in the 1970s is mirrored 30 years later as they themselves begin to have children.

Migration flows have long played a crucial role in driving changes in both the population structure and the labour force. Following high net emigration rates in the 1980s, the improvement in Ireland's economic fortunes relative to its EU partners in the 1990s resulted in a reversal of this trend; the numbers immigrating greatly outweighed the numbers leaving the country since 1996. Such flows reached record highs in the year ended April 2005, when net immigration was 53,000. Over the next decade, it is expected that net inward migration will continue. The magnitude of the inflows will depend on the likely growth trajectory of the economy, as discussed in subsequent sections. The size and nature of these inflows will play an important role in the future growth of the economy and they will impact on the future demand for infrastructure, including housing.

Figure 4.2: Alternative Projections for Net Immigration



As outlined under the "external environment", the medium term prospects for the Irish economy are dependent on external developments in the global economy, and in particular on whether or not adjustment occurs in the US. If no adjustment occurs and the Irish economy continues to grow along the *High Growth* trajectory, described in detail in the next section, net immigration would continue at a high level as shown by the dashed line in Figure 4.2. However, should the reality turn out to be close to the *Low Growth* scenario, consequent on a major readjustment in the US, immigration would gradually slowdown to around 10,000 a year. These two alternative scenarios have very different implications for the economy generally and for the housing market in particular. (The implications for the housing market are considered in more detail in Chapter 13.)

Today the economic dependency ratio (Figure 4.3) is at an all time low in Ireland and, under the *High Growth* scenario, it is set to fall even further, stabilising in the next decade at a rate of between

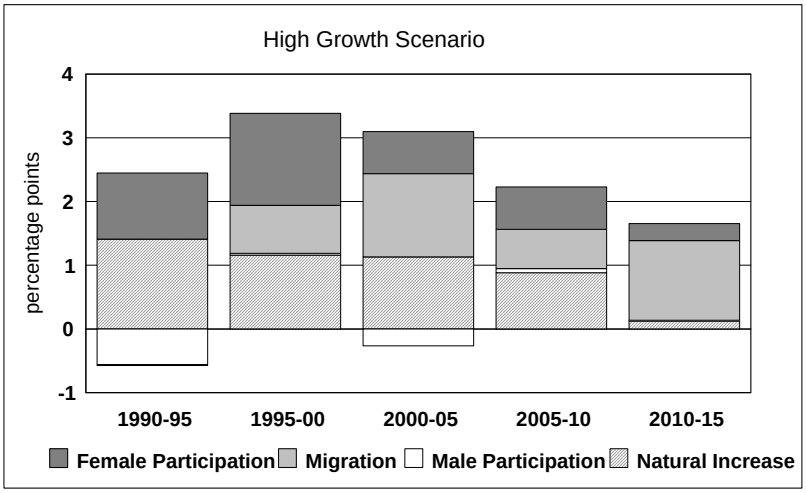
1.0 and 1.1. This means that every individual who is working will only have to support one other individual who is not. It is only after 2020 that the economic dependency rate will begin to rise. This turning point will be postponed a few years as a result of the considerable level of immigration envisaged as part of this scenario. However, the postponement will be very limited and the ratio will rise continuously from 2020 onwards. What this means is that Ireland faces an unusual demographic window of opportunity over the next fifteen years when dependency will be at an exceptionally low level. It will be important that public policy uses this demographic dividend to prepare for the long-term problems of rising old-age dependency over the following fifty years.

Figure 4.3: Economic Dependency Ratio

Turning to **labour supply**, it is driven by three main factors: the natural increase in the population, participation rates and migration. Over the last decade, these three factors have combined to produce an expansion in the supply of labour in the economy, causing it to increase from 1.44 million in 1995 to an estimated 1.96 million in 2005. Over the next decade, the rate of growth in the supply of labour is likely to decrease significantly, having important implications for the economy and for potential growth rates in particular. There is also likely to be a change in the relative weights of the different factors driving the growth in labour supply, with the role of the natural increase and rising participation rates decreasing over time and that of migration increasing, as illustrated in Figure 4.4.

The rise in female labour force participation, which played a very important role in the growth in labour supply in the 1990s, is likely to be much more limited in the future. This is because the increase already registered over the last ten years has meant that the pool of potential market entrants has become much smaller, with a large majority of the 25 to 64 year olds, particularly the younger members of this group, already in the labour force. Participation rates are now high by EU standards for women under 35 years, leaving little scope

Figure 4.4: Decomposition of the Growth in Labour Supply



for further increase. It is thus likely that much of the increase will come from the older age cohorts, whose participation rates are relatively low by EU standards. The educational attainment rates among these older women are substantially lower than those of woman under the age of 35, which will have implications for investment needs in the areas of training and life-long learning.

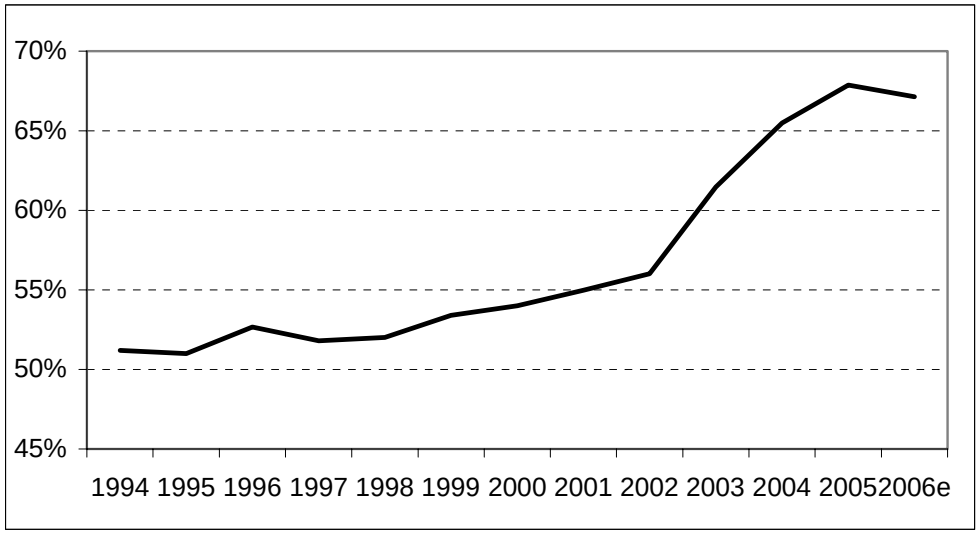
Male participation rates are not expected to contribute much to labour supply over the next ten years, while given the demographic changes already discussed, the role played by the natural increase is likely to fall significantly. On the other hand, it is anticipated that immigration will contribute around one percentage point a year to the growth in the labour force over the rest of this decade.

THE BUILDING AND CONSTRUCTION SECTOR

Over the past decade housing has become a key sector of the economy. The gross value of housing output (both new housing and repair and maintenance) was just over €20 billion in 2005, which is equivalent to 15.2 per cent of GNP, compared with 7 per cent in 1994. The economy is now very dependent on the housing sector. A strong housing market has a positive impact on the economy, not only through its direct contribution to GDP via new residential construction and home related purchases, but also through enabling home owners to extract equity from their homes to finance current consumption. Housing also influences activity and employment in the construction, financial and other business services sectors of the economy.

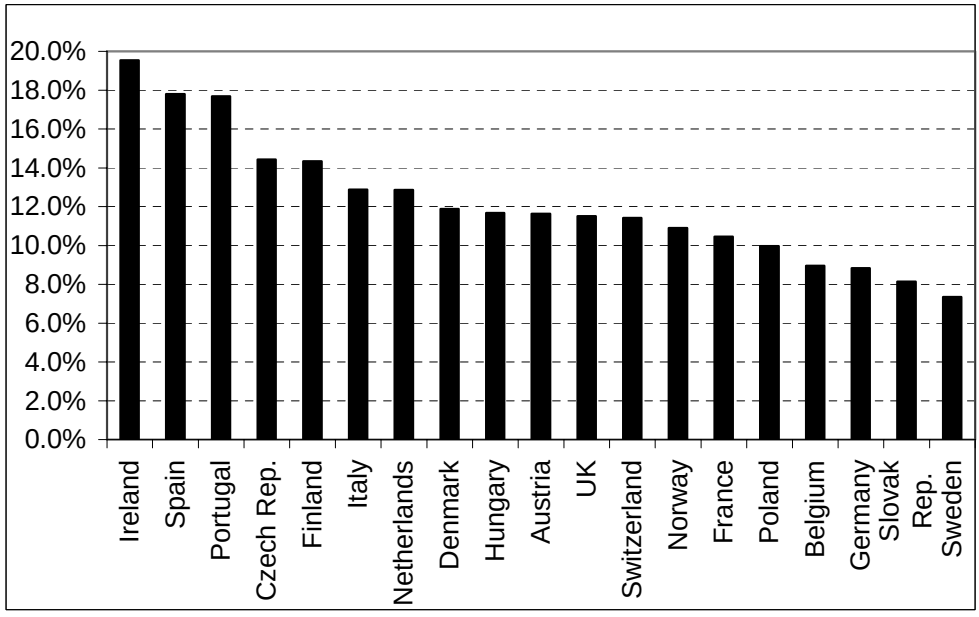
Residential construction is estimated to account for around 65 per cent of total construction output as against 51 per cent in 1994 (Figure 4.5). As a result the building and construction sector, measured in gross value added terms, represents around 18 per cent of GDP compared with an average of just over 11 per cent across 19 Western and Central European countries (see Figure 4.6).

Figure 4.5: Residential Construction Share of Total Construction Output (%) 1994-2006e



Source: DoEHLG, DKM.

Figure 4.6: Building and Construction as Percentage of GDP in 15 Western and 4 Central and Eastern European Countries, 2005e



Since 2002 the residential construction share of total construction output has increased considerably as Figure 4.5 illustrates. In the absence of any breakdown of the employment numbers between the individual sub-sectors of construction, we suspect that the strong employment growth in the sector can be attributed to the strong growth in residential construction activity. If

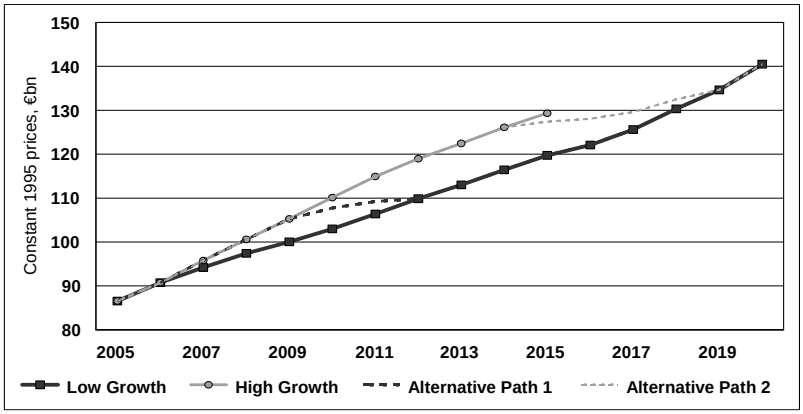
so, the economy is now very vulnerable to any slowdown in residential construction.

Our analysis of housing demand suggests that demand will remain at a high level over the medium term. Given the situation outlined above, it is important to ensure that Ireland is in a strong position to cater for the continued growth in demand without increasing the economy's vulnerability to any overheating of the housing market and thus any potential housing crash which would adversely impact on the wider economy.

4.2 Overview of Economic Outlook

Against the external backdrop and the demographic profile outlined above, the *Medium-Term Review* (MTR) (Fitz Gerald *et al.*, 2005) presented two sets of forecasts for the Irish economy. The *High Growth* and the *Low Growth* scenarios describe two paths for the growth of GNP over the next fifteen years.[11] Within the limits set by these two scenarios a range of possible adjustment paths exist. At some point, when and if the adjustment begins, the path of Irish GNP could switch from the *High Growth* to the *Low Growth* scenario. Possible paths for real GNP implied by these two scenarios are shown in Figure 4.7. Our conclusion is that by 2020 Ireland will end up closer to the lower growth path for GNP. However, when the economy will switch from the high growth path to the lower one, will depend on how long the necessary adjustment is delayed in the US. In analysing the prospects for the next NDP we use the *High Growth* scenario as a basis and later consider the implications for the NDP if the outturn should be closer to the *Low Growth* scenario.

Figure 4.7: Alternative Growth Paths for Real GNP



These alternative scenarios can be interpreted as an overview of the future prospects for the Irish economy over two horizons. In the first horizon, the seven years 2007 to 2013, if the US economy does not adjust over this period, the Irish economy could grow at a

[11] These two paths for GNP do not represent "confidence limits". It is quite possible that GNP could perform better than in the *High Growth* scenario or worse than in the *Low Growth* scenario.

rate slightly above its long-term potential growth rate, averaging 4.4 per cent per annum. However, such a strong rate of growth, and the attendant high immigration flows it would require to maintain sufficient labour supply, will put strong pressure on the capacity of the economy to accommodate such growth, particularly in the housing market and the delivery of infrastructure more generally. In addition, the Irish labour market has been operating at close to full employment for a number of years so that a further seven years of strong growth and low unemployment, coupled with rising congestion costs, could see the emergence of a wage-price spiral which would eventually challenge the competitiveness of the economy.

The *High Growth* scenario provides a forecast for the Irish economy assuming that the current pattern of growth in the rest of the world continues. Here we use this forecast as the basis for our analysis of the potential impact of the NDP on the economy. On this basis it seems likely that the economy will show quite robust growth out to the end of the decade (Table 4.1). This should see living standards, measured in terms of the more appropriate indicator of GNP per head, also rising quite rapidly by around 3.4 per cent a year. The growth in output per worker (productivity), which has been particularly slow over the first half of the decade, is expected to grow at 2.5 per cent a year out to 2010, more in line with the pre-1995 experience. The growth in wage rates is expected to be between 4 and 4.5 per cent a year for the rest of the decade. Given that the rate of inflation is expected to remain close to 2 per cent a year, this should see continuing significant rises in real wage rates.

Table 4.1: Forecast Summary, *High Growth* Scenario

	1990-95	1995-00	2000-05	2005-10
	Average Annual Growth, %			
GNP	4.4	8.8	4	4.9
GNP per head	3.9	7.7	2.2	3.4
GNP per worker	2.5	3.7	0.9	2.5
Non-Agricultural Wage Rates	4.4	6	5.5	4.3
Consumption Deflator	2.7	3.2	3.4	2.1
Employment, April	1.9	5	3.1	2.4
Labour Force, April	1.9	3.4	2.9	2.3
For end Year:	**1995**	**2000**	**2005**	**2010**
Net Immigration, thousands	-2	26	53	31
Unemployment rate, ILO Basis %	12.2	4.3	4.2	3.6
Balance of Payments, % of GNP	3.2	-0.3	-1.8	0.1
General Government Balance, % of GNP	-2.3	5.1	-0.6	0.3
Debt/GNP Ratio[1]	83.6	34.3	22.4	17.2
Housing Completions	31	50	79	70
Greenhouse gas emissions relative to 1990	8.2%	28.2%	30.1%	32.4%

[1] The National Pension Reserve Fund has been netted off the debt.

In this forecast the Government is assumed to maintain a small surplus over the forecast horizon. (Of course, funding the NDP at a level to be agreed will have implications for the public finances. This issue is dealt with when we analyse different scenarios on the NDP.) As a result, the net indebtedness of the Government sector will fall. The external balance should remain close to zero in spite of the continuing high level of investment in housing.

After the spectacular employment performance of the recent past, growth is expected to revert to a more normal rate of around 2.4 per cent a year out to 2010. This growth should be accompanied by a small fall in the unemployment rate. With the supply of labour domestically slowing, this will require a substantial continuing net inflow of skilled labour from abroad. However, the fact that GNP per head is expected to rise quite rapidly would suggest that the additional growth which is made possible by the immigration of skilled labour will enhance the living standards of the population as a whole.

After 2010, under this scenario, increasing pressures build up within the economy resulting in accelerating inflation, in terms of both prices and wages, and a serious loss of competitiveness. The tightness of the labour market is reflected in the continuing fall in the unemployment rate. The housing market also shows pressures with a continuing very high level of output and corresponding improbably high prices. All this would suggest that even if the US growth were to continue unchecked, the Irish economy could begin to encounter serious problems early in the next decade as a result of a prolonged period of exceptional growth.

The likely gradual tightening of the labour market and the resulting growth in wage inflation after 2010 under this scenario is of serious concern. The loss of competitiveness could obviously have significant medium-term consequences for the economy. In planning the next NDP, one of the objectives should be to minimise any inflationary consequences from undertaking the necessary investment. Obviously, the infrastructure when completed will go to ease some of these inflationary pressures but the time scale of such projects could mean that the short- to medium-term consequences of undertaking the investment could, none the less, be inflationary.

4.3 Summary of Possible Shocks

While the *High Growth* scenario seems the most appropriate when looking forward to the end of this decade, there is a significant chance that the US economy will begin to adjust to its imbalances before the end of the planning horizon for the NDP. As a result, it is important to consider how the policy environment would be changed by a less favourable economic outturn. The objective should be to try and choose a path for the NDP that will be robust in the face of economic "surprises".

THE *LOW GROWTH* SCENARIO

Over the longer term, the MTR argues that adjustment in the US economy is inevitable, albeit that the timing and scale of any such

adjustment is uncertain. In the *Low Growth* scenario it is assumed that the adjustment process is gradually spread over a number of years beginning in 2007. In practice, if it is to occur, the adjustment may be more of a short sharp shock. This could portend a much more unpleasant environment for the Irish economy in the year it happened, but provided that the sharper adjustment did not provoke a collapse in the domestic housing market the more rapid restoration of the world to a sustainable growth path could prove beneficial.

Table 4.2[12] summarises the major aggregates under this *Low Growth* scenario out to 2020. The cost of an immediate US adjustment beginning in 2007 is reflected in a fall in the average growth rate of Irish GNP to 3.5 per cent per annum between 2005-10, well below the estimated potential growth rate of 4.4 per cent. This underperformance would continue in the opening years of the following decade with GNP growing at 3.1 per cent per annum out to 2015 against a potential growth rate of 3.5 per cent. Beyond 2015, as the US economy returns to a sustainable growth path and begins to grow again at near its long-term capacity, the Irish economy would also start to pick up. By the end of the next decade the Irish growth rate would exceed its potential, catching up on some of the lost potential output of the years of adjustment.

This finding is significant as it suggests that even if there is a less favourable than assumed economic outturn there is little danger that investment undertaken as part of the NDP will be "wasted". The remaining infrastructure backlog is such that the optimal stock of public infrastructure will not have been attained by the end of the next NDP, still requiring a continuing elevated level of public investment out to 2020.

Table 4.2: *Low Growth* Forecast, Growth in Major Aggregates

	1995-2000	2000-2005	2005-2010	2010-2015	2015-2020
Average Annual % Growth					
GDP	9.8	5.4	4.2	4.2	3.2
GNP	8.8	4.0	3.5	3.5	3.3
GNDI	8.2	3.5	3.1	3.1	3.4
GNP per head	7.7	2.2	2.1	2.1	2.2
Investment/GNP ratio	25.6	28.6	28.6	28.6	26.5
Personal Consumption	7.7	4.3	2.6	2.6	2.6
Employment (PES) – % change	5.0	3.1	1.5	1.5	1.4
Real after tax non-agricultural wage rates, %	2.8	2.3	1.5	1.5	1.3
Non agricultural wage rates %	6.0	5.5	4.1	4.1	3.2
As Per Cent of GNP	**2000**	**2005**	**2010**	**2015**	**2020**
Balance of payments surplus	-0.3	-1.8	-0.4	3.0	6.0
Debt/GNP ratio	34.3	22.4	18.6	15.5	12.5

The sluggish growth performance in the period after 2007 would lead to a rise in unemployment while the adjustment process was under way, and a gradual easing of wage inflation. The deterioration

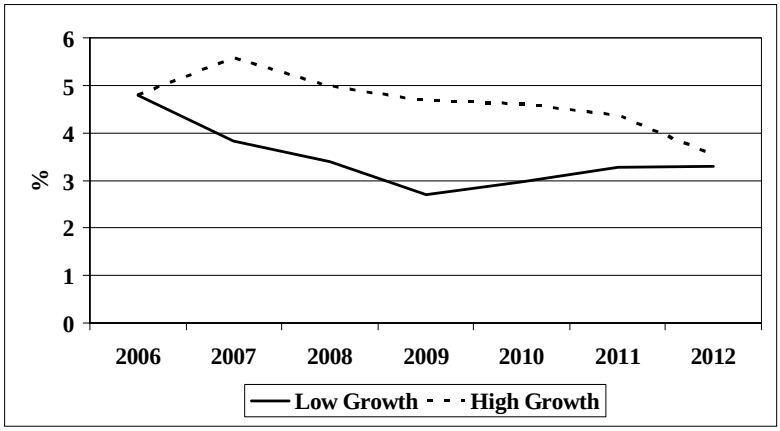
[12] Tabulated results for the *Low Growth* scenario in this chapter are presented using five year averages since our focus is on the longer term.

in employment prospects and the reduced rate of growth in incomes would together feed into a low rate of personal consumption growth. Such a dampening of employment prospects relative to the past ten years would lead to an easing of net inward migration flows relative to those recorded in recent years. While some net immigration would be expected to continue, the inflow in 2010 would be less than half that recorded in 2005 and by 2020 net immigration flows could fall to around 13,000.

This scenario presents a more sombre picture of the prospects for the Irish economy over the medium term than in the case of the *High Growth* scenario. As shown in Figure 4.8, during the adjustment process for five years the growth in GNP would be significantly lower than in the *High Growth* case. However, after 2012 growth would be somewhat higher than in the *High Growth* scenario, although the lost ground of the 2007-2012 period would never be fully made up.

Under this *Low Growth* scenario, by 2010 the level of GNP would be almost 7 per cent lower than in the *High Growth* scenario with 90,000 fewer jobs. This sluggishness would be entirely attributable to external factors throwing the Irish economy off its current growth path. None the less, the results of the *High Growth* simulation point to emerging pressures in the labour market by the end of the current decade and suggest that even with a continued benign external environment internal pressures could lead to a gradual unwinding of Ireland's competitive position over the longer term.

Figure 4.8: Alternative Projections for Growth in GNP Per Head



SHOCK TO THE HOUSING SECTOR

In the Irish economy there is a considerable exposure to any disturbance affecting the building sector. In the *Low Growth* scenario there would be a rise in unemployment consequent on an economic slowdown in 2007, and such a rise could unsettle the confidence of the household sector. The demand for housing is particularly sensitive to changes in personal disposable income and the increase in unemployment could give rise to significant fears among many of those still employed about their job security. Given the high level of

indebtedness of the household sector, many households are not in a good position to sustain a prolonged loss of employment. Such a fall in confidence could precipitate a much more dramatic internal adjustment process affecting the building and construction sector. Some of those who lost their jobs could be forced to sell on a market where many potential buyers were holding off buying until their own personal position was clarified. Even if the number of forced sales were limited, the consequence could be a major fall in house prices over a short period of time.

The MTR examined what would happen if just such a sudden loss of confidence did occur in Ireland by calibrating a housing price shock with an illustrative fall in house prices of approximately a third. A fall in house prices of this magnitude would be within the range experienced in many other countries in the past. This illustrative fall in house prices would contrast with the steady small rise in prices of 2 per cent a year envisaged in the *Low Growth* scenario. This stylised treatment of a housing shock assumes that it begins in 2007. However, if it happens at all, it could occur at any time over the course of the next NDP.

Such a sudden large decline in house prices would precipitate a rapid adjustment in the output of the building industry. Builders would see their profits turning to losses and they would rapidly adjust their activity rate. Instead of housing completions falling from their peak of between 70,000 and 80,000 next year to around 62,000 in 2010 as in the *Low Growth* scenario, they would fall to under 40,000 in 2009 in the housing shock scenario. This would represent a near halving of output over a three-year period. Such a fall in output would, in turn, trigger a very large cumulative fall in employment in the building and construction sector of 15 per cent spread over 2007-09.

Given that the building sector now represents a very large share of the economy, accounting for almost 10 per cent of GVA in 2004 and almost 13 per cent of total employment, such a large shock to that sector would have major consequences for the economy as a whole. GNP would grow by only just over 1 per cent in the first year (here assumed to be 2007) as a result of the collapse of the housing market and it would grow at less than 3 per cent in the second year of the shock, 2008. It is only from 2009 onwards that the economy would begin to recover with the growth in GNP per head rising more rapidly than in the *Low Growth* case. The consequence of this would be that unemployment would rise very rapidly to 10 per cent or more from 2008 to 2010. Such a large rise in the unemployment rate would further damage confidence in the economy and increase uncertainty about the future.

Many of those who would lose their jobs as a result of such a downturn would seek employment outside of Ireland provided that the rest of Europe did not also suffer as serious a decline in output. The consequence would be that by 2010 net immigration would almost cease, further reducing the potential demand for dwellings. This reduction in immigration would see a reduction in the population below the *Low Growth* scenario.

These simulations suggest that the worst effects of the downturn in the housing market would be felt in the first two years. After three years the economy would be beginning to recover. An important part of the recovery would be a very much lower growth in wage rates than is assumed in the *Low Growth* scenario. The reduction in the rate of increase in nominal wage rates, with a small fall in nominal wages in 2010, would be a consequence of the very high rate of unemployment. By contrast with the 1970s and the 1980s, today we see a significant Philips curve effect, with wage rates responding to unemployment and growing at a slower rate. This would help improve the competitiveness of the economy in the period after 2010. However, even with an improvement in competitiveness it would be some considerable time before employment growth in other sectors of the economy would come to replace the jobs lost in the building sector. It would probably take about five to seven years for the economy to recover fully from this very substantial shock, returning employment to near the level it would have attained without the collapse in housing prices.

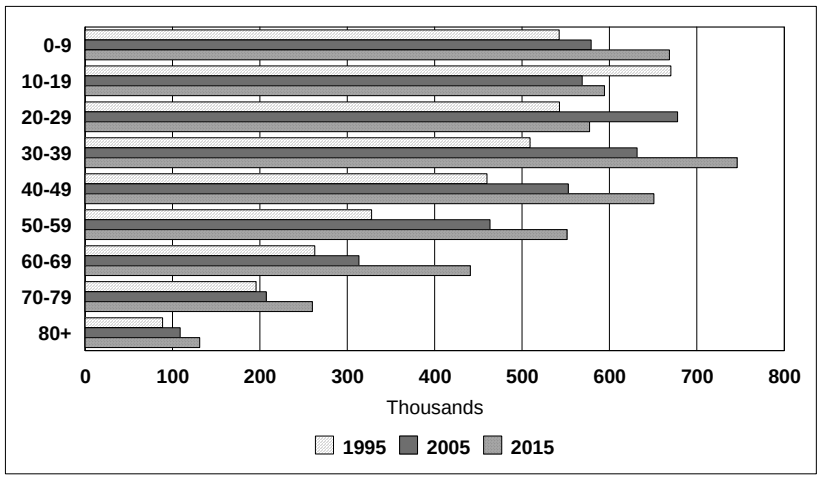
4.4 The Context for the Plan

DEMOGRAPHIC PROFILE

Over the course of the next NDP the population structure will remain broadly favourable. However, some changes in the demographic profile (Figure 4.9) will have significant implications for youth-related spending, such as provision for education and childcare. Demographic trends also have important consequences for the housing market, which are dealt with in Chapter 13. Finally regional demographic changes can have a major impact on infrastructure needs, especially on transport and housing.

The rise in the birth rate since the mid-1990s means that the number of young people of school going age will increase over the course of the next NDP. The impact of demographic change will have substantial implications for education expenditure even if there is no improvement in service quality or if participation rates remain unchanged. Between 2007 and 2012 the number of children of primary school age is projected to increase by 11.6 per cent or by 46,000, compared to a more modest increase of 1.5 per cent in the 5-year period prior to that (Table 4.3). Between 2001 and 2006 the number of individuals of secondary school age (between 13 and 18 years) fell by 8.1 per cent, however the magnitude of this decline is unlikely to continue and we anticipate that the number of people in this age cohort is likely to stabilise between 2007 and 2012. The decline in the birth rate from 1980 to the mid-1990s means that the number of individuals between the ages of 19 to 22 years is likely to continue declining over the course of the next NDP. Although the impact of demographic change may moderate spending pressure for third-level education, rising participation rates are likely to offset this.

Figure 4.9: Population Structure



Source: *Medium-Term Review 2005-2012* (2005).

Table 4.3: Projected Change in Population of School Going Age, Thousands

	2007	2008	2009	2010	2011	2012	Percentage Increase Between 2001 and 2006	Percentage Increase Between 2007 and 2012
							%	%
Between Ages of 6 and 12	395	401	412	421	431	441	1.5	11.6
Between Ages of 13 and 18	337	333	331	330	331	336	-8.1	-0.1
Between Ages of 19 and 22	245	238	234	231	229	227	-5.2	-7.4

Source: ESRI Demographic Model.

Demographic change will also have a big influence on the demand for childcare in the future. The Childcare Census reports that 57,000 children were in centre-based childcare in 1999-2000. Current figures suggest that by the end of the current NDP the numbers will meet the revised target of 31,000 childcare places. Combining our population projections for the number of children with the forecast percentage requiring centre-based care (see Chapter 22, Table 22.3) means that 137,000 places will be required by 2012. This means that over the period of the next NDP an additional 57,000 places will be required.

An increase in the provision of childcare facilities of this magnitude will necessitate a marked increase in childcare employment. Sexton *et al.* (2004) indicate that employment in childcare and related services will increase by 117 per cent or by 16,000 over the period 2001 to 2010. Traditionally individuals with lower levels of educational attainment (Junior Certificate or less) have accounted for a significant number of those at work in the childcare sector, although more recently an increase in the educational attainment of childcare workers has been observed. In 2000 around 40 per cent of those employed in childcare and related services were low skilled, this proportion has been falling steadily and in 2004 stood at approximately 20 per cent. This has implications for the opportunity cost of high skilled workers going

forwards and may lead to substantial upwards pressure on wage rates in that sector.

As discussed above, rising female labour force participation rates, which were pivotal to the growth in labour supply in the 1990s, will continue to be an important source of future labour supply growth, albeit contributing less to labour supply growth than before (see Figure 4.4). At present the employment rate for women with children under the age of 5 years is 55 per cent and their activity rate is 58 per cent. Any changes in future female participation rates will be affected by public policy; in particular, the participation rates of mothers will be affected by the availability and conditions of childcare. In addition, whether the individual or the State pays for the cost of childcare will have a significant impact on female participation rates.

Finally, the rapid economic growth envisaged over the next fifteen years will be accompanied by a substantial increase in the population, especially the population of working age. The implications of this for the housing market are dealt with later in Chapter 11. However, the composition of the growth will also have implications for the nature and location of the physical development that is likely to take place.

CROWDING OUT

As discussed above, over the last decade the building industry has seen a sustained boom. Housing completions have risen every year since 1993 to their current peak of around 80,000 units. As a result, as shown in Figure 4.10, the share of GNP accounted for by investment in building and construction at 22 per cent in 2005[13] was at an all-time high. While that investment includes a substantial input of materials and services, the bulk of those materials were also sourced domestically. Thus the share of the economy accounted for either directly or indirectly by building and construction is very large. It is much greater than the share that is found in other developed economies and reflects the huge effort being made by both the private and the public sector to rapidly increase Ireland's capital stock.

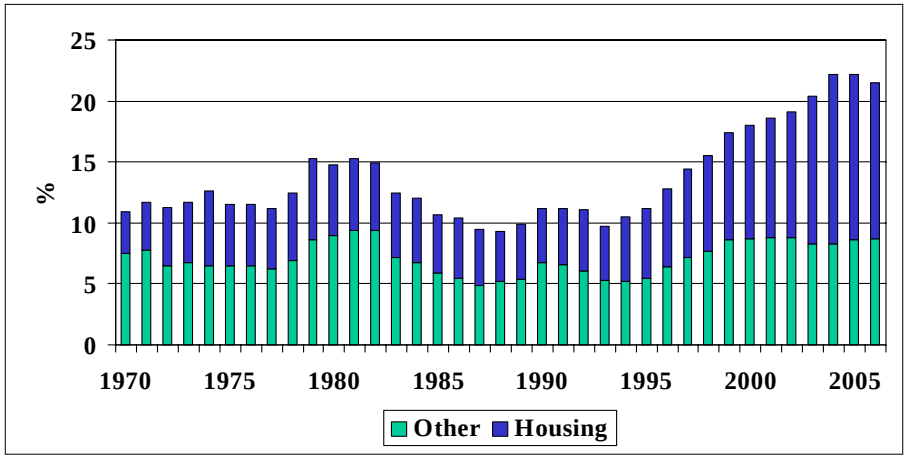
While to some extent this dramatic rise in output share has been facilitated by immigration, the bulk of the additional resources required to accommodate the increase have had to come from other sectors, leading to a reallocation of resources within the economy. While jobs in manufacturing and building are not necessarily interchangeable, it is often the case that they require the same basic level of educational qualifications. As a result, over time, this reallocation of resources can occur when new job market entrants choose employment in the building industry rather than replacing those retiring in the manufacturing or services sectors. The boom in

[13] This differs from the building sector's value added as it is calculated as the gross output of the sector (total investment in building and construction) including all the materials and services used by the sector.

the building sector has meant that a significant share of new labour market entrants have chosen the building and construction sector over manufacturing or services. For example, the number of students doing civil engineering has increased while the numbers doing electrical and electronic engineering has fallen.[14, 15]

The key signal to the labour market about the need to reallocate resources has been changes in relative wage rates. In Ireland, the building and construction sector has seen a rapid rise in wage rates relative to the rest of the economy. This has gradually bid resources away from other sectors. The resultant reduction in the supply of labour available for sectors such as manufacturing has meant that employers there have had to compete by also raising their wages. This has seen some attrition as firms have closed being unable to sustain the higher labour costs.

Figure 4.10: Building and Construction Sector as Per Cent of GNP



This natural process whereby an economy reallocates resources to areas where prices signal that the value of output is greatest does not pose a problem if the change in sectoral composition of output is expected to be permanent and sustainable. However, in the Irish case the share of resources devoted to building and construction is very much higher than the norm for developed economies. In the long run the output of the building sector will fall. As a result by 2020 that sector will account for a much smaller share of national

[14] A crude comparison of total number of undergraduate students enrolled in civil engineering and electrical and electronic engineering for 1999 and 2003 using HEA data shows that the number of civil engineering students increased by 20 per cent while the number of electronic and electrical engineering students fell by 5 per cent.

[15] In the case of Ireland, what we do know is that those who lost their jobs over the last five years have found suitable employment elsewhere, albeit maybe not in the building industry. In turn some of those jobs may have been vacant either because previous incumbents had found employment in building or else, more likely, because school leavers who would previously have chosen an alternative career path, instead chose the building industry.

output than today. This will necessitate a rise in the share of the output of the economy produced by other sectors including the tradable sector, both manufacturing and market services.

If the fall in the output of the building and construction sector occurs suddenly, it may be very difficult to rapidly move resources back to manufacturing or services sectors. The businesses that may be forced to close because they are no longer competitive as a result of the increase in wage rates may not reopen quickly if labour market pressures ease. The result could be a substantial period of unemployment (and reduced immigration or even emigration) as the economy gradually adjusts.

In addition, a further concern exists about the sustainability of the current exceptional allocation of national resources to building and construction. As already discussed, the result of the higher cost base of the Irish economy arising from the building boom is that many firms in the tradable sector have been forced to close. If Ireland were financing all of the investment in construction without significant foreign borrowing this would not be a major problem. However, there are signs that the counterpart to the squeezing of the tradable sector of the economy is that the balance of payments deficit is deteriorating. If such a deterioration were to continue indefinitely, requiring an ever-increasing capital inflow to finance the exceptional level of investment, the situation could eventually become unsustainable. While as yet this is not a major problem, it raises concerns that having seen the closure of significant sections of the tradable sector of the economy to make room for increased building activity, the reversal of this process at some date in the future could prove costly and take some considerable time.

Finally, the building and construction boom, even if it sucks in additional resources from outside Ireland, is putting pressure on the economy by increasing congestion and adding to pressure on existing infrastructure. Returning emigrants and immigrant workers need accommodation to live here, contributing to pressure on rents and housing prices. The workers in the sector have to commute to work and the building and construction sector needs large volumes of materials (and equipment) to move around the country thus putting additional pressure on roads, transport infrastructure, and the environment. A substantial part of the waste stream generated by the economy each year comes from the building and construction sector. All of these environmental pressures add to costs and, in turn, this puts pressure on the tradable sector of the economy.

Looking forward to 2013, the *High Growth* scenario shows little sign of an easing in the high level of building and construction activity. As a result, wage rates will continue to rise more rapidly than in our EU partners. This trend loss of competitiveness could become even more marked if the *High Growth* scenario persists after 2010 out to 2013. The MTR suggests that such a continuation could see some further acceleration in the rate of wage inflation reflecting increasing labour market pressures.

This is the context in which the next National Development Plan must be viewed. The key concern will be how ambitious a NDP the

economy will be able to deliver without putting even greater pressure on the tradable sector of the economy through labour market tightening. At its simplest, the pressure that the delivery of the NDP will put on the economy can be gauged by considering its effects on the share of the economy accounted for by the output of the building and construction sector.

UNCERTAINTY ABOUT FUTURE GROWTH

The analysis above suggests that under the *High Growth* scenario the key issue is the ability of the economy to deliver the required level of investment in infrastructure. The constraints are likely to be the ability of the building and construction sector to produce the required output without serious inflationary consequences for the economy as a whole. The ability of the Government sector to finance any likely required level of investment is not in doubt under this scenario.

The *Low Growth* scenario, in particular when combined with a housing shock, portrays a very different picture of the economy. Under such circumstances the growth in the years immediately following such a shock would be well below that envisaged in the *High Growth* scenario. The analysis in the MTR shows that, with appropriate policies, the economy would be likely to recover in the medium-term making up some of the lost ground. Even under the *Low Growth* scenario the average growth in output (and output per head) to 2020 would still be very significant. This suggests that even with a negative shock to the economy, reducing growth below potential, there will still be a need for very substantial investment in infrastructure.

While this analysis would suggest that the infrastructure gap is sufficiently large that it will not be closed over the period to 2013 no matter what the likely outturn in terms of growth, there must be concern about the ability of the Government sector to finance a high level of investment in the face of an albeit temporary downturn. Simulations with the *HERMES* model suggest that even with an accommodating fiscal policy, where the deficit was allowed to rise as a result of the shock, the General Government Borrowing would peak at a deficit of under 3 percentage points of GNP or GDP. If the shock were to occur in 2007 the peak effect on Government borrowing would be in 2009. Thereafter, as the economy recovered, the public finances would gradually return towards their original path. However, the debt GNP ratio would end up between 10 and 15 percentage points higher than under the *High Growth* scenario. While undesirable, this would not pose major long-term dangers for the economy.

What these simulations suggest is that choosing the appropriate NDP profile based on the *High Growth* forecast will be close to a "no regrets" policy. Even if the economy is subsequently hit by unexpected unpleasant shocks, provided that an appropriate policy stance is adopted, there should be no need to reconsider the planned infrastructural expenditure. However, as discussed above, prudence

would suggest that maintaining a tight fiscal stance under the *High Growth* scenario would be appropriate. Building up a financial reserve to be used to fund the NDP in case of unexpectedly low growth would provide an important insurance against shocks. Also, as discussed below, a tighter fiscal policy today, especially if it is achieved by taking money out of the building sector, would reduce dangerous inflationary pressures under the *High Growth* scenario.

5. MACROECONOMIC IMPACT

There have been three National Development Plans (NDPs) since 1989; the third of these, covering the period 2000-2006, is now nearing completion. This report considers the preferred composition and the likely impact of the fourth NDP covering the period 2007-2013. Over the course of the previous three plans the prioritisation of different investment channels has slowly evolved. Throughout the three NDPs considerable importance has been attached to developing human capital. As a result, Ireland devoted a higher proportion of its EU Structural Funds to this task than did the other cohesion countries (Fitz Gerald, 2006). In the first two NDPs, covering the period 1989-1999, continuing attention was devoted to support for private sector investment, as well as some income support. However, in the third NDP, which is nearing completion, these supports were substantially reduced in importance and much greater emphasis was given to investment in physical infrastructure – both in transport and environmental services. The analysis in the *Mid-Term Evaluation* of the current NDP (2000-2006) showed that even after all the progress of the last fifteen years, the infrastructural constraint remains the key priority area for further investment (Fitz Gerald *et al.*, 2003). The substantial role that these NDPs have played in facilitating Ireland's economic success and the strategy for the next NDP is reviewed briefly in Section 5.1.

A crucial issue in considering the appropriate size and configuration of the next National Development Plan (NDP) is the macroeconomic context in which it is to be implemented. This context will determine the infrastructure needs that the NDP must address; the rapid growth of the last decade has meant that the economy has, in a sense, "outgrown its clothes". The prospect of continuing significant growth over the coming decade means that these infrastructural needs will continue to grow. However, delivery of the NDP investment will require major resources, so that the macroeconomic context will itself affect the cost of the planned investment.

In Section 5.2 we outline briefly our "recommended NDP" which is based on the detailed analysis of individual programmes, covered in later chapters. This "recommended" profile takes account of the supply constraints that the macroeconomic analysis in Chapter 4 has raised.

The potential effects of the 2007-2013 NDP on the output capacity of the Irish economy in the longer term are examined in

Section 5.3. This analysis compares the likely trajectory of economic growth over the next fifteen years where the "recommended" NDP is implemented against the counterfactual where the NDP is not implemented and the infrastructural constraint proves ever more restrictive on growth.

If the necessary infrastructure could be bought ready-made from a supermarket then the optimal strategy would be to undertake the investment very rapidly. However, the bulk of the infrastructure has to be produced domestically, in particular by the building sector. This means that the more rapid the deployment of new infrastructure the greater the share of national resources that have to be diverted away from other sectors of the economy to produce the infrastructure. In Section 5.4 we consider the implications of undertaking an even more ambitious investment programme and compare the results to those of the "recommended" NDP analysed in Section 5.3. In this case the more ambitious programme considered is that outlined in the *multi-annual capital investment framework* (MACIF), published in *Budget 2006*. The results of this analysis suggests that such an ambitious programme, if delivered without accompanying fiscal measures, would produce unacceptable inflationary pressures.

Section 5.5 provides some conclusions concerning the next NDP and the capacity of the economy to deliver an appropriate level of investment.

5.1 Strategy of Previous National Development Plans

The evolving priorities of successive NDPs reflected the changing needs of the economy over the last seventeen years. The recent *Mid-Term Evaluation of the National Development Plan and Community Support Framework for Ireland 2000 to 2006* (Fitz Gerald *et al.*, 2003) suggested a high rate of return on investment in human capital and in physical infrastructure (see also the discussion of these results in Chapter 2). However, it suggested that there was a generally lower rate of return on aid to the private sector, with the exception of support for R&D. This reflected the limited evidence of continuing market failure that would justify such aid. As a result, it was recommended that funding be redirected to human capital and physical infrastructure over the remainder of the current NDP. This recommendation remains appropriate for the next NDP.

The strategy of targeting investment in physical infrastructure has evolved over time. In the second NDP, covering the period 1993-1999, the importance of developing the primary road system was given priority. The key justification for this prioritisation was that the existing poor roads infrastructure placed a constraint on normal economic activity, in particular on the activity of firms involved in exporting (Fitz Gerald and Keegan, 1993) (Fitz Gerald and Shortall, 1998). To ensure good value for money a methodology was developed by the National Roads Authority (NRA), which allowed for the prioritisation of the roads investment on a systematic basis. The methodology remains as relevant today as when it was used to

prioritise investment under the current NDP. (Fitz Gerald *et al.*, 2003.)

By the late 1990s it was becoming apparent to many economic agents, including all the social partners, that the poor quality of all transport infrastructure was constraining economic development, not just because it posed obstacles for exporters, but also because it was affecting labour supply (Fitz Gerald *et al.*, 1999). This latter effect was due to rising commuting times and the limited supply of housing at reasonable cost in the vicinity of the growth poles for new employment.

This does not mean that the emphasis on investment in upgrading the national primary road system was wrong. On the contrary, with the benefit of hindsight it would probably have been appropriate to have invested even more Irish taxpayers funds in the second half of the 1990s in upgrading the road system than was actually the case. However, the changing economic circumstances meant that there was also a growing need to provide the public infrastructure necessary to allow the rapid development of sustainable cities. In particular, there was a need to focus more on investment in public transport, as well as completing the necessary upgrading of the environmental services infrastructure to facilitate the huge private sector investment in housing. The absence of appropriate public transport infrastructure was perceived as having a serious negative impact on labour supply, affecting overall competitiveness (Fitz Gerald *et al.*, 1999).

The current NDP has prioritised the completion of the urban primary road system, which will now be achieved during the course of the next NDP. This is still the top priority for investment in physical infrastructure because the completion of the final links in key networks, such as the roads system, produces particularly high returns.

An increased priority has been accorded to public transport in the current NDP, although, as indicated in the *Mid-Term Evaluation* (Fitz Gerald *et al.*, 2003), there were concerns about the process of project selection and related concerns about value for money. None the less, the importance of developing the necessary public transport infrastructure to support in a sustainable manner the prospective economic and demographic expansion was acknowledged as is the case with major roads investment. A comprehensive system for prioritisation of public transport investment is necessary.

In the *ex ante* study for the second NDP (Fitz Gerald and Keegan, 1993) concerns were expressed about the prioritisation of environmental services investment, which was primarily driven by the need to comply with the EU Urban Waste Water Directive (UWWD) rather than by Irish environmental priorities, or the need to provide for prospective economic development. As a result, despite major investment in the intervening period, there remain serious problems with pollution of rivers and lakes and there is also a need for additional investment to provide water for new residential and commercial developments. None the less, since Ireland is now largely compliant with the EU directive, these priorities can be

funded within a reduced envelope for investment in this area in the next NDP.

The report on investment priorities (Fitz Gerald *et al.*, 1999), which preceded the current NDP, identified for the first time a major role for investment in research and development. The importance of such investment in building competitiveness has more recently been acknowledged in the Lisbon Agenda. Investment under this heading has risen rapidly under the current NDP and it will remain an important objective for funding under the next NDP (albeit, that the sums involved are small when compared to areas such as transport). Going forward it will be necessary to ensure value for money for such investments, particularly through increased commercialisation (see Chapter 19).

Investment in human capital – both in training and education – has been central to all three NDPs. The analysis of investment in human capital has been complicated by the fact that much of primary and secondary education has not been treated as part of the NDP process. The research evidence continues to point to the importance of raising educational attainment, especially for early school leavers (see Breen and Shortall (1992) and Bergin and Kearney (2004) on the economy-wide returns to investment in human capital). Because the numbers in the first and second-level systems have declined and the numbers of young adults are currently declining, the pressures on the educational system have been limited. This has allowed some increase in investment per head in human capital without requiring a major increase in funding under the current NDP. While the evolving demographics over the course of the next NDP will if anything ease pressures, especially on the third-level system, continuing economic development will require further investment in human capital. The importance of this form of investment in underpinning the success of the economy was analysed in the *Mid-Term Evaluation*, (Fitz Gerald *et al.*, 2003) and these results have been further examined in Bergin and Kearney, 2004.

While the overall strategy pursued under successive National Development Plans was appropriate, with the benefit of hindsight some limited problems can be identified. In the second NDP the level of investment, especially in transport infrastructure, was not sufficiently adventurous. In the current NDP the level of investment in physical infrastructure was, if anything, ramped up too rapidly with significant inflationary consequences. While the stance of fiscal policy under the first two NDPs was supportive of their objectives, under the current NDP fiscal policy has aggravated the inflationary consequences of the investment expenditure. This has reduced the albeit high rate of return below what might otherwise have been obtained. Finally, in programmes where there has been a major increase in levels of public investment in a short space of time there have in a number of cases been problems with project management.

For the next NDP the strategy remains rather similar to that identified in the *Mid-Term Evaluation* of the current NDP. There is a need to complete the investment in the major primary roads as soon

as possible. To provide for sustainable economic development over the coming decades there is a need to invest effectively in public transport serving major urban areas, especially Dublin. Investment in R&D and human capital also remains an important priority. With the achievement of compliance with the EU urban waste water directive there can be some slowdown in investment in that area in the next NDP. Generally, with the economy operating at close to capacity direct supports for the business sector ranging from manufacturing to tourism and agriculture should be phased out.

This report concentrates principally on the areas of infrastructure directly under state control. However, there are a number of other crucial areas where the infrastructure will be provided on a commercial basis – energy and telecommunications. In these cases the state has an important regulatory role to ensure that market failures do not prevent the crucial investment being undertaken within the necessary time scale.

As identified in Chapter 11, if the NDP is to address the infrastructural needs of the economy effectively a series of supporting measures will be required. Many of these measures were identified in previous reports (Fitz Gerald *et al.*, 1999 and Fitz Gerald *et al.*, 2003) but have not yet been fully implemented. The success of the next NDP will necessitate closer attention being paid to such measures if the best results are to be obtained from the planned huge investment programme.

5.2 Summary of Recommended NDP

One of the tasks of this report is to consider what level of public investment would be most appropriate given the likely trajectory of the economy over the coming fifteen years. While significant progress has been made over the current NDP in tackling the existing large deficit in infrastructure, it is clear that much more still needs to be done. If infrastructure could be bought ready-made and installed without cost then the answer would be somewhat simpler than is the case in the real world. The only task would be to determine the optimal stock of infrastructure, given its cost and likely rate of return. However, because the infrastructure has to be largely produced in Ireland it takes time to implement investment decisions. Also, because production of infrastructure uses up resources that could be used for other purposes there is an opportunity cost to undertaking the investment. Even if it can be shown that for an individual project the cost-benefit ratio strongly favours investing, because the cost is itself affected by the speed with which the investment is undertaken, the optimal time path for that investment is not necessarily clear. In some cases a slower implementation would so reduce the cost that this saving would more than offset delaying the benefits from the introduction of the new infrastructure.

In this section we set out a very brief summary of our recommended profile for the NDP. This recommended profile is built on the basis of the detailed microeconomic recommendations for individual investment categories set out in subsequent chapters.

Given the macroeconomic implication of the implied large investment programme the microeconomic recommendations also take account of the supply constraints that the analysis in Chapter 4 has highlighted. This "recommended" NDP, if implemented, would permit a major increase in the output capacity of the economy. It should allow for the completion of the ongoing programme to upgrade the key primary road system and it should also allow major improvements in public transport, though these will not be completed until close to the end of the next decade. The planned investment in education, training and R&D should prepare the labour force for the needs of the changing economy of the next decade.

The recommended profile for public investment assumes that no supporting fiscal policy measures are introduced to release extra capacity in the economy. As indicated later, if fiscal policy were tightened or special measures were taken to free up capacity in the building and construction sector in particular, an even more ambitious Plan could be entertained.

Where there is an enduring large infrastructure deficit we have also taken into account two additional considerations:

1. Sectors where the desired investment is increased at a particularly rapid rate are subjected to scrutiny. This reflects past experience showing that there can be serious project management problems with dramatic changes in the pace of investment.
2. Where the cost-benefit analysis is as yet incomplete it is premature to commit to large investment programmes. This applies particularly in the case of investment in environmental infrastructure and transport. In the case of transport, while a significant amount of work has been undertaken, there is as yet no comprehensive framework for assessing the costs and benefits of the full programme of investment considered as a whole (in contrast with the case of roads). There also needs to be a centralisation of the process of cost-benefit analysis, preferably under the aegis of the Department of Finance, to ensure a standardisation in approach.

Table 5.1 shows the broad outlines of the "recommended" NDP for 2007-2013. The key points in the recommendations are set out below.

As shown in Table 5.1, this report recommends a major increase in investment on transport. This should allow the completion of the programme of upgrading the primary road system over the course of the next NDP. It should also allow an ambitious programme of investment in public transport, which should provide for sustainable economic growth beyond the end of the next decade. However, this programme should be rear-end loaded within the next NDP, as the necessary analysis to support such a programme has not been completed and, previous dramatic increases in the tempo of investment in transport infrastructure have given rise to project management problems. As discussed later, this means that, as

envisaged by the Minister for Finance, all transport projects should undergo a rigorous cost-benefit analysis, preferably overseen by the Department of Finance. On the basis of this analysis, and assuming that the projects pass the required rate of return, the highest value projects should be undertaken during the course of the next NDP. Where projects pass the rate of return test but have a lower expected value they should be undertaken as part of the NDP beginning in 2014.

This report recommends a 10 per cent cut in expenditure on public investment in housing, not because such housing does not bring significant social benefits, but rather because the economy does not have the capacity to deliver such a higher level of investment without more severe inflationary consequences.

Table 5.1: "Recommended" NDP Government Capital Expenditure, € Millions

		2007-2013, Annual Average at 2006 Prices
	2006	**Recommended**
Transport	2,555	3,374
Housing	1,245	1,133
Public Administration	1,029	1,125
Health	645	721
Education	684	858
Enterprise Sector	601	521
Agriculture	214	174
Environment	590	497
Total	**7,563**	**8,403**

The investment in public administration has not been analysed in this report as it is not part of the NDP, though it is part of the Multi-Annual Capital Investment Framework (MACIF). The provision included above in Table 5.1 is taken from the *Multi-Annual Capital Investment Framework* (MACIF) published as part of *Budget 2006*. However, it has significance for the NDP because of the large size of the planned investment, nearly all of it in building and construction. It includes a provision of up to €1 billion over the course of the next NDP to provide for decentralisation. If the provision for investment in public administration could be substantially reduced it would release resources to be used elsewhere in the NDP.

For investment in health infrastructure there is provision for a volume increase for the "recommended" NDP. The rationale for this is shown later in Chapter 21.

This report also proposes a significant increase in investment in education infrastructure.

In the case of investment in the enterprise sector, including agriculture, but excluding R&D, it is recommended that expenditure should be cut back over the course of the next NDP. The role of the state is to provide the appropriate context for the business sector to operate. The direct investment by the business sector should then be determined by that sector depending on its likely commercial profitability. The same rules should be applied to the

energy and telecommunications sectors as to the rest of the business sector – no direct support by the taxpayer. With the economy continuing to run at capacity over most of the current NDP, the arguments previously advanced for providing direct support for commercial activity are further reduced.

This report also recommends a significant reduction in investment in environmental infrastructure. This recommended reduction takes account of the fact that the requirements of the EU Urban Waste Water Directive (UWWD) are now nearly achieved. In addition, the cost-benefit analysis to support such a continuing high level of investment is not as yet available.

5.3 Effects of Recommended NDP

In this section we examine the likely long-term impact of the "recommended" NDP on the macroeconomy. In undertaking this task we have considered in detail the channels through which the detailed programmes of investment, outlined in later chapters would impact on the economy. (The same methodology has been employed in this report as was used in Honohan (1997), Fitz Gerald *et al.* (1999) and in Fitz Gerald *et al.* (2003)). Here we consider in a stylised way the likely macroeconomic benefits of the "recommended" NDP. It is these permanent benefits, enhancing the productive capacity of the economy which should be crucial in prioritising individual investment projects in the next NDP.

In undertaking this analysis we first consider the short-term demand side impact of the investment, including the impact on inflation. This is important to establish the feasibility of the planned investment in the context of the prospect of continued rapid growth in the economy.

Having considered the demand side impact – the direct effects of spending the money – we then analyse the likely supply side impact of such an NDP – its *raison d'être*. This provides a measure of the return on the large sums of money to be invested as part of our "recommended" NDP.

All of this analysis is undertaken using the *HERMES* macroeconomic model. While necessarily unrealistic, we adopt the stylised approach used in all previous studies where the path of the economy assuming the NDP is implemented is compared to the counterfactual path it would follow if none of the investment in the "recommended" NDP were to take place. This stylised approach is necessary to identify the difference that the NDP makes to the Irish economy.

Obviously such an approach is utterly unrealistic – no Government would choose to undertake no capital investment. However, it does give an idea of the important long-term contribution to growth of the NDP process. With appropriate scaling these results can be used to estimate what the impact would be on the economy of a marginal increase or decrease in the NDP.

In the figures and tables shown here the effects of the NDP are shown as changes in levels compared to the stylised base of "no NDP". Table 5.1 summarised the Government Capital Expenditure

elements of this "recommended" NDP and compared them to the allocations for 2006. Figure 5.1 shows the "recommended" NDP Capital Expenditure as a share of GNP over the period 2007-2013. On the basis of the macroeconomic scenario used, NDP Capital Expenditure would lie in the region of 4.5 to 5.2 per cent of GNP out to 2013.[16]

Figure 5.1: Public Capital Programme as Percentage of GNP

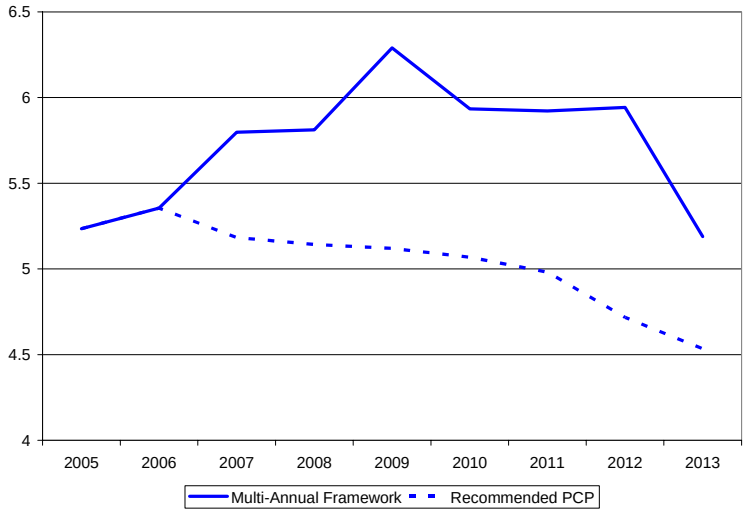
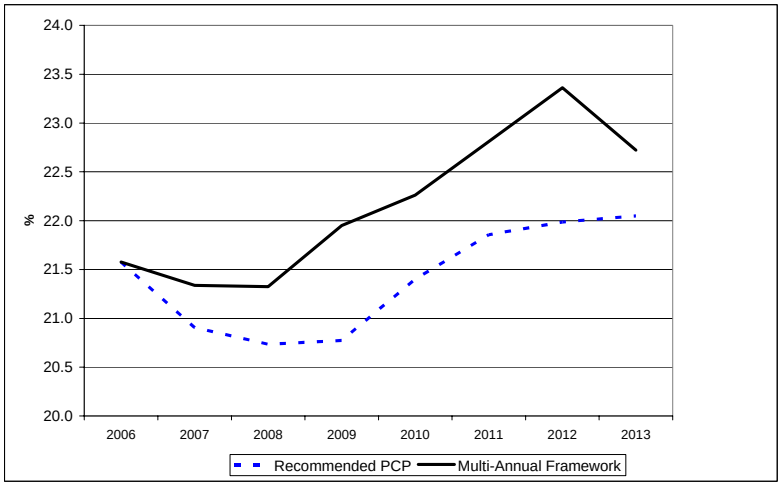


Figure 5.2: Investment in Building and Construction as Percentage of GNP



[16] The figure also shows the higher *multi-annual capital investment framework* (MACIF, published with *Budget 2006*), level of investment discussed later in this chapter, which would see the share of NDP Capital Expenditure rising from its current high level of 5.4 per cent of GNP to 6.3 per cent by 2009.

Figure 5.2 shows the resulting aggregate level of building and construction investment in the economy as a percentage of GNP. This shows that under the "recommended" NDP, if the economy continues to grow rapidly compared to 2006, such investment will marginally increase its share of GNP by 2012. This analysis suggests that in the context of continuing rapid growth in the economy and a high level of private investment, the "recommended" level of investment under the NDP is probably as large as the economy can safely absorb.

The level of investment envisaged in the "recommended NDP" coincidentally turns out to be very similar in magnitude to the profile for public investment assumed in the recent *MTR High Growth* scenario. Thus, the outlook under the *High Growth* scenario, discussed above in Chapter 4, is consistent with this configuration for the NDP. The resulting forecast for the period to 2015 is shown in Table 4.1.

Under this scenario non-agricultural wages would rise at almost 7 per cent a year in the period 2010 to 2015. As discussed in the *Medium-Term Review* such a rate of growth would not be sustainable. This lack of sustainability would have more deep-rooted causes than the NDP and, as discussed in the *MTR* it is suggested that over the course of the next NDP the economy could find itself moving towards the *MTR Low Growth* scenario. However, as discussed above such a scenario would also be compatible with an NDP along the lines of that recommended in this report.

ASSUMPTIONS ON "RECOMMENDED" NDP

In this section we assess the full macroeconomic impact of the "recommended" NDP on the economy. We use the *MTR High Growth* scenario as the benchmark "with NDP" scenario, and then examine the effects on the economy with the NDP 2007-2013 expenditures set to zero. In addition to quantifying the demand side impact of the "recommended" NDP on the economy, we also estimate the crucial supply side effect of these investments, which can be regarded as a measure of the "rate of return" on the public investment. The supply side impact is the sustained increase in GNP (and other key variables) when the investment has been completed. It may take some time after the completion of the investment before the full supply side benefits are complete. The long-term supply side effect is the key measure of the success of the NDP over the longer term.

The "recommended" NDP is equivalent to an average of between 4.5 and 5.2 per cent of GNP per annum over the period 2007-2013 (Figure 5.1). This represents an important stimulus to the economy. In order to estimate the demand side effects of these expenditures we prepared stylised annual expenditure numbers as shown in Table 5.2. The largest single item of capital expenditure, 30 per cent of the total, is Government investment on transport infrastructure. Other significant items include current (16 per cent) and capital (14 per cent) expenditure on health and education and

investment in housing (11 per cent) and public administration (11 per cent).

Table 5.2: "Recommended" NDP 2007-2013, Current Prices

	2006	2007	2008	2009	2010	2011	2012	2013
Current Expenditure								
R&D	449	507	573	648	732	827	935	1,056
Education	1,795	1,829	1,864	1,899	1,935	1,972	2,009	2,048
Other Current	239	258	279	301	325	351	379	409
Total Current	2,483	2,594	2,716	2,848	2,992	3,150	3,323	3,513
Capital Expenditure								
Housing	1,245	1,168	1,232	1,310	1,401	1,495	1,595	1,698
Public Administration	1,029	1,143	1,159	1,178	1,206	1,239	1,280	1,325
Health and Education	1,329	1,401	1,705	1,710	1,745	1,783	1,821	1,871
Transport	2,555	2,725	2,923	3,299	3,756	4,214	4,294	45,70
Enterprise Sector	601	592	580	567	557	547	538	531
Agriculture	214	207	200	193	186	180	175	169
Environment	590	573	557	542	532	524	517	510
Total Capital	**7,563**	**7,809**	**8,356**	**8,799**	**9,384**	**9,982**	**10,219**	**10,675**
Total Expenditure	**10,046**	**10,403**	**11,072**	**11,283**	**12,376**	**13,132**	**13,542**	**14,188**

In considering the long-term impact of the "recommended" NDP on the economy we consider three main channels, namely, infrastructural investment (roads and public transport), human capital and aids to the private sector. We follow closely the methodology adopted in the mid-term evaluation of the previous NDP (Fitz Gerald *et al.*, 2003) as summarised briefly here.

As discussed in Fitz Gerald *et al.* (2003), p. 63, in quantifying the supply-side effect of roads investment, we apply an elasticity of 0.5 for manufacturing value added, and 0.25 for market services value added with respect to investment in roads. Combining these effects gives an implied realised rate of return on this investment of about 25 per cent. In addition to this direct productivity effect, the alleviation of congestion will reduce consumer costs. To capture this we include a realised rate of return (1.25) on this investment applied to consumer prices. In quantifying the effect of public transport investment we apply a rate of return of 7.5 per cent, similar to that used in the previous *Mid-Term Evaluation* (Honohan, 1997). Because of the major share of the NDP expenditure to be devoted to this type of investment it would be appropriate to undertake further research into the appropriate rate of return to use in future. This feeds through directly into an increase in output potential in the market services' transport and communications sector.

Human capital investment includes all expenditure on education and training. These investments will raise educational throughput, with consequent increases in skilled labour, a fall in the skilled/unskilled wage rate and a rise in labour force participation. This is estimated to lead to a cumulative total productivity increase of around 0.6 per cent. We implement this long-term productivity increase in the *HERMES* model in both the manufacturing and

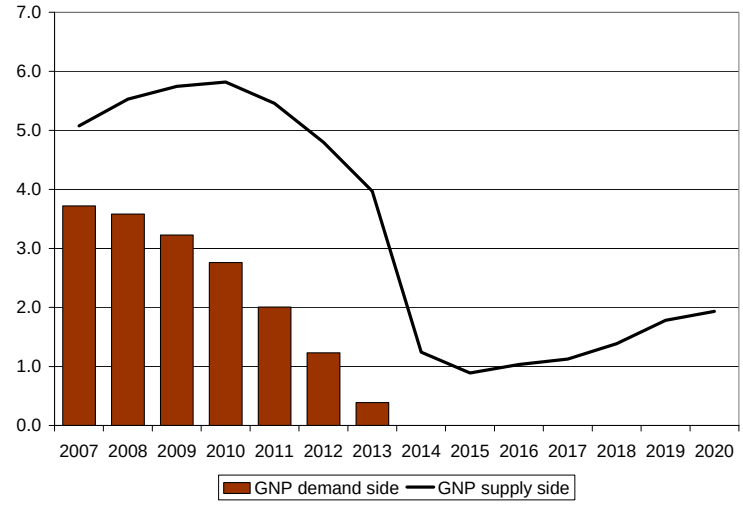
market services sectors, introducing it gradually until it reaches its full impact in 2020. Because there is a time delay involved in the education and training process, we only begin to implement this productivity effect in 2013.

Finally spending on R&D and investment in the enterprise sector are both treated as an aid to the private sector helping to stimulate investment, thereby increasing productivity and reducing costs. This investment is assumed to have a long-run return, similar to that used in previous *Mid-Term Evaluations* of about 7.5 per cent (Fitz Gerald *et al.*, 2003, Honohan, 1997).

DEMAND SIDE EFFECTS

Figure 5.3 summarises the results for the demand and the supply side effects. Here we first consider the short-term demand side effects. These effects are calculated against the stylised base of "no expenditure".[17] The cumulative demand side effects of the NDP raises GNP by less than one half of a percentage point by 2013. However the supply side effects[18] are substantial and lead to an increase in GNP of almost 2 percentage points by 2020. As is clear from the graph, the full supply side effects are not even complete by 2020. In the very long run the increase in GNP would probably settle at somewhere between 2 per cent and 3 per cent.

Figure 5.3: Total Effects of the "Recommended" NDP on GNP



The cumulative demand side effect of the "recommended" NDP on GNP is very small by 2013 at under 0.5 per cent above the base line. Initially the impact is sizeable, in the first two years GNP is more than 3.5 percentage points higher than in the base. This is closer to the initial demand-side injection; while the actual size of

[17] The need to use this counterfactual as the baseline for the estimation of the effects of the NDP was discussed earlier.

[18] These supply side effects include the demand side effects in the period 2007-2013.

the "recommended" NDP is in the order of 5.0 per cent per annum, the demand-side impact in an open economy will be lower due *inter alia* to leakage through imports of capital goods and material inputs.

However, the positive demand side impact declines very rapidly in magnitude in the ensuing years because of the inflationary effect, principally on wage rates. The rise in building employment leads to a strong growth in wages, leaving the level of non-agricultural wage rates almost 20 percentage points higher than would otherwise be the case by 2013 (Table 5.3). This in turn reduces competitiveness dramatically and leads to crowding out of the manufacturing sector. Notably the "recommended" NDP has a negative impact on manufacturing employment in the short term, which will be 55,000 lower by 2013. This crowding out effect is much stronger than in any of the previous NDPs.

The dramatic difference between demand side effects in this NDP relative to results in previous studies prompted us to explore further the reasons why this is occurring, starting with the hypothesis that this is being driven by a strong crowding out effect, which implies that the key constraint lies in the labour market. To investigate this we simulated the demand side effects of the "recommended" NDP holding the unemployment rate constant. This should prevent a rapid rise in wage rates (through the Philips curve), the cause of the deterioration in competitiveness in other sectors of the economy.

The results are shown in Figure 5.4. They suggest that the demand side effects of the "recommended" NDP on GNP (2.4 per cent) would be around 2 percentage points higher by 2013 were it not for the labour market constraint. This is because the tightness of the labour market means that increased demand tends to feed into increased wages. In the past when we assessed the likely demand impact of previous NDPs there was greater spare capacity in the economy and the inflationary consequences of any demand stimulus was much more attenuated.

Figure 5.4: Effects of Labour Market Constraint on GNP Effects of the "Recommended" NDP

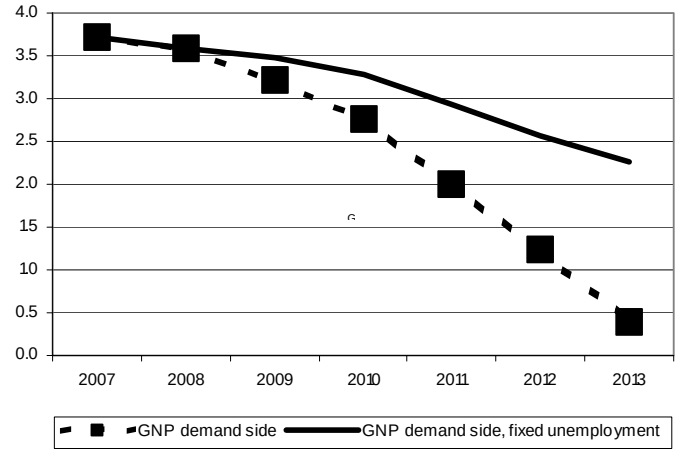


Table 5.3: Short-Run Effect of the "Recommended" NDP on Key Variables

	2007	2008	2009	2010	2011	2012	2013
GDP (%)	3.9	3.8	3.6	3.2	2.5	1.8	1.1
GNP (%)	3.7	3.6	3.2	2.8	2.0	1.2	0.4
Balance of Payments as % of GNP	-3.5	-3.7	-4.1	-4.7	-5.2	-5.5	-5.8
Exchequer Surplus as % of GNP	-5.2	-4.7	-5.7	-6.0	-6.2	-6.0	-6.2
Debt-GNP Ratio as % of GNP	4.2	8.7	13.5	18.4	23.3	27.6	31.8
Consumer Prices (%)	-0.2	-0.2	2.9	6.1	8.6	10.3	11.6
Total Investment (%)	18.5	19.4	20.4	21.1	20.7	19.7	18.8
Manufacturing Employment (thousands)	0.1	0.5	-8.9	-21.3	-33.3	-44.2	-54.9
Building Employment (thousands)	59.5	63.4	68.4	74.2	77.8	76.7	76.0
Labour Force (%)	0.6	0.6	0.4	0.4	0.6	1.0	1.3
Net Migration (thousands)	0.0	0.4	1.1	-6.2	-12.8	-16.4	-17.8
Unemployment Rate (% of Labour Force)	-5.4	-5.8	-4.1	-2.7	-1.8	-1.6	-0.7
Non-Agricultural Wages (%)	-0.2	-0.2	5.4	11.0	15.1	17.8	19.6
Investment Deflator (%)	0.6	1.4	3.9	7.7	10.9	13.2	14.4
New House Prices (%)	5.3	7.4	11.9	17.8	21.9	24.4	25.2

SUPPLY SIDE EFFECTS

At the heart of any extensive investment programme is an objective to boost the economy's long-run growth potential. The best performance indicator of the success or failure of this objective is the impact on GNP and GDP. In Figure 5.5 we show the impact of the "recommended" NDP on the level of GNP and GDP beyond 2013 when the investment programme of the next NDP will be complete. The effects are shown relative to a base of what would have happened without the NDP. This indicates that the supply-side effects take some time to fully work through the economy. It is only from 2015 onwards that the long-run impact of the "recommended" NDP begins to be seen. (Part of the slow response is due to the fact that it is assumed that the investment in human capital does not begin to produce a return till after 2013.[19]) Indeed even by 2020 the effects on GDP and GNP would not yet have reached equilibrium with both trajectories still on an upward path. However, by the end of the period the positive impact of the supply side effects will emerge as the public finances end up with a larger surplus (smaller deficit) due to the stronger performance of the economy consequent on the "recommended" NDP investment (Figure 5.6).

[19] It takes time for those in the educational system to move into paid employment. In addition, investment in the human capital of the cohort of 20 year olds will continue to add to their productivity while that cohort are still in the labour force – for roughly another 45 years.

This is the assumption used in all previous analysis of NDP's. It allows direct comparison of the results here with previous such studies.

Figure 5.5: Impact of the "Recommended" NDP on GDP and GNP Relative to Base

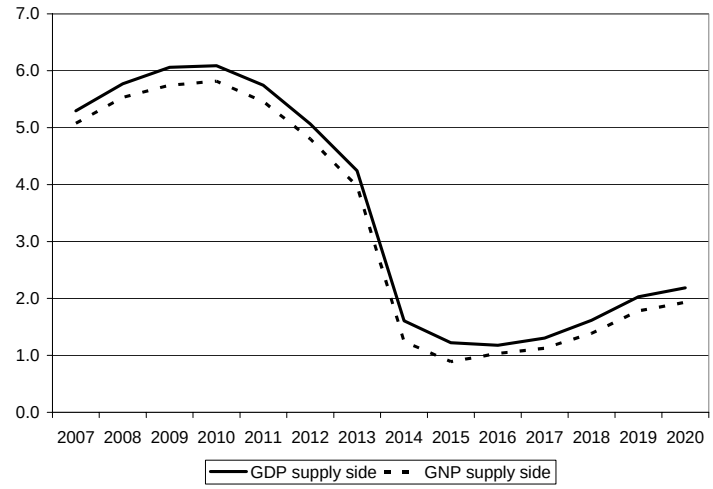
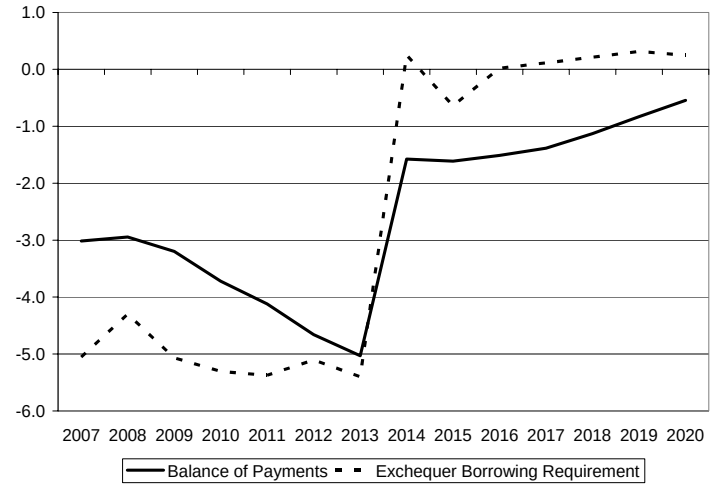


Figure 5.6: Impact of the "Recommended" NDP on Balance of Payments and Government Surplus Relative to Base



The cumulative expenditure on the "recommended" NDP over the period 2007 to 2013 would amount to a little under 29 per cent of GDP with a long-run sustained increase in GDP of around 2 per cent.[20] Without making an allowance for the timing of the costs and the benefits this would suggest a crude rate of return of around 7.5 per cent. This return would eventually be significantly higher since it is clear from Figure 5.5 that by 2020 GDP would not yet have reached its equilibrium level. In addition, the model does not fully take account of the extent to which the new investment results in an

[20] For simplicity we have not applied an appropriate rate of discount to future costs and benefits. However, it would make little difference to the overall conclusions.

outward shift in the production frontier, reducing the long-term inflationary pressures.

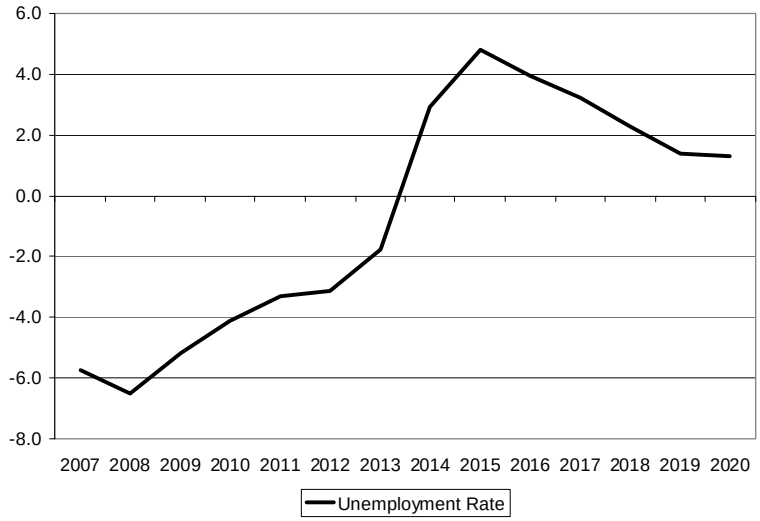
As shown in Table 5.4, over the long term the inflationary effects of the "recommended" NDP would persist with prices and wages up by 6.2 per cent and 11.7 per cent respectively by 2020. The strong employment effects of the "recommended" NDP in the building sector would fall off beyond 2013, however, employment in the manufacturing sector, having been crowded out by the demand side impact of the "recommended" NDP, would not have fully recovered by 2020 compared to the base. While the productivity effects of increases in human capital, infrastructure and aids to the private sector together would ensure a long-run positive effect on output by 2020, the unemployment rate would still be higher than in the base. However, as the economy further adjusts over the 2020s the excess unemployment would be eliminated.[21]

Table 5.4: Long-Run Effect of the "Recommended" NDP on Key Macroeconomic Variables Relative to Base

	2010	2013	2015	2020
GDP (%)	6.1	4.2	1.2	2.2
GNP (%)	5.8	4.0	0.9	1.9
Balance of Payments (as % of GNP)	-3.7	-5.0	-1.6	-0.5
Exchequer Surplus (as % of GNP)	-5.3	-5.4	-0.6	0.2
Debt-GNP Ratio as % of GNP	16.4	28.0	23.7	14.1
Consumer Prices (%)	4.9	11.6	13.2	6.2
Industrial Output (%)	6.4	2.3	-1.8	0.4
Market Services Output (%)	5.3	4.3	2.6	3.2
Manufacturing Employment (thousands)	-12.8	-44.7	-63.0	-15.5
Building Employment (thousands)	78.4	82.8	7.8	3.7
Labour Force (%)	0.7	1.8	2.1	3.5
Net Migration (thousands)	-6.4	-21.3	-24.8	-0.8
Unemployment Rate (% of labour force)	-4.1	-1.8	4.8	1.3
Non-Agricultural Wages (%)	10.3	21.6	24.8	11.7
New House Prices (%)	19.0	29.2	26.8	11.0

[21] This result is not considered significant as it arises from the artificial effects of different lag lengths assumed in the wage formation process and in determining labour supply.

Figure 5.7: Impact of the "Recommended" NDP on Unemployment Rate Relative to Base



It is interesting to note the time-path of these effects. Initially the NDP substantially raises employment in the building and construction sector, resulting in a fall in unemployment. However, the reduction in unemployment and the related higher wage rates, in turn, encourages more immigration and higher labour force participation by women, which gradually restores the unemployment level back to where it would have been without the NDP. Once the initial demand-side stimulus ends after 2013, this process is reversed; there would be an increase in the unemployment rate peaking at 4.8 percentage points of the labour force (Figure 5.7) in 2015 above the base of no NDP. Thereafter, it would fall back towards its long-run equilibrium through lower immigration. This is mainly due to the assumption that all investment under the NDP ceases after 2013, resulting in a sudden fall in building sector employment.[22]

In the long run the improvement in competitiveness, arising from the "recommended" NDP, results in a marginal increase in value added in industry by 2020. Output in the market services sector is over 3.2 per cent above the "no NDP" levels. This is due to some direct supply-side effects from the "recommended" NDP, but also to the indirect multiplier effects of the demand stimulus to the economy.

Despite an initial deterioration in the public finances due to funding the "recommended" NDP, the long-run consequences for the public finances are positive due to the high rate of return on these investments. By 2020 the exchequer surplus as a percentage of

[22] In practise there will be another NDP after 2013, albeit of a different magnitude and no such discontinuity will be observed. However, this assumption of a sudden discontinuity is essential to allow us to identify the effects of the 2007-2013 NDP on its own.

GNP would be one-half of a percentage point higher and the debt/GNP ratio, having risen by over 28 percentage points in 2013 would begin to adjust downwards rapidly so that by 2020 it would be only 14 percentage points higher. This reflects the revenue buoyancy consequent on the long-run stimulus to the economy through positive supply-side effects.

EFFECTS OF TAXATION TO REDUCE PRIVATE DEMAND FOR BUILDING

One option, albeit an unpalatable option, to ensure that adequate productive resources are made available for the NDP would be to take action to reduce private sector demand for the output of the building sector. If sufficient resources were freed up in the building industry to undertake the necessary public investment this would mean that the pressures on the labour market, and hence on the tradable sector's competitiveness, would be minimised. Here we consider the implementation of a tax to reduce private sector demand for building sector output and in the next section we consider the scenario where a slowdown in the economy also releases resources.

Using the *HERMES* model we made a stylised policy change where a tax was imposed on private sector purchases of the services of the building and construction sector, reducing private sector demand. Such a tax could include a change in the VAT rate, a property tax, the elimination of tax incentives through the income tax or corporate tax system or some other similar measures.

The effect of this policy change, even before the benefits of recycling the tax revenue through a reduction in other taxes is considered, would be to reduce the demand for labour in the building sector and in the economy as a whole. The result would be a reduction in wage rates of over 1 percentage point compared to where they would otherwise be. This would reduce crowding out of the tradable sector and as a result of this employment in the manufacturing sector would be higher.

If such a policy measure was combined with a more ambitious NDP, such as that implied by the MACIF, the effect would be to leave the tradable sector in a somewhat better position than if private sector demand for building services were left unchecked. The economy could thus benefit from a more rapid deployment of necessary infrastructure than is envisaged under the "recommended" NDP, while at the same time not suffering from the adverse inflationary consequences.

THE *LOW GROWTH* SCENARIO AND THE NDP

Provided that the *High Growth* scenario of the recent *MTR* is realised in practise, the loss of competitiveness that it would cause in the period to 2013 would eventually be made good in the years after its completion. However, it would take a number of years for the tradable sector to respond to a return to a more normal level of competitiveness and in the interim there would be considerable

economic costs. The firms that had closed in the intervening years would be unlikely to reopen. Instead there would have to be a slow process of new firms establishing a base in Ireland or existing firms expanding to fill the gap.

However, as outlined in the *MTR*, we feel it unlikely that Ireland will continue on the *High Growth* path indefinitely. In fact, the *MTR* suggested that the transition to the *Low Growth* path could happen quite quickly and would, in any event, be likely to happen by 2015. In the event of the Irish economy shifting to a lower growth path through an external shock there would be three implications for the NDP:

1. It would reduce the labour market pressures and the ability of the economy to deliver the infrastructure at reasonable cost would be enhanced.
2. Any loss of competitiveness that had occurred prior to the downturn would be heavily penalised.
3. The firms that closed in the intervening years through a loss of competitiveness would be sorely missed.

A series of simulations was undertaken where a more ambitious NDP (based on the MACIF) was superimposed on the *Low Growth* scenario. These simulations indicated that even with the higher NDP expenditure the non-agricultural wage rate would end up 8.5 percentage points lower in 2013 than under the *High Growth* Scenario (including the NDP). The much slower growth, especially the lower growth in the demand for the output of the building and construction sector, would leave spare resources available to undertake the necessary investment.

As discussed above in Chapter 4, even under the *Low Growth* scenario, when combined with a housing market shock, the public finances would still be able to sustain a significant level of infrastructural investment without breaching the limits of the *Stability and Growth Pact*. Under the more ambitious investment plans of the MACIF the deficit could temporarily exceed 3 percentage points of GDP in the face of a serious economic downturn. This would suggest that a prudent fiscal policy to accompany such an ambitious investment programme would incorporate a significant budget surplus in the coming years when growth is quite rapid. This would both reduce the inflationary pressures in the economy and would provide headroom in case of an unexpected economic downturn.

5.4 Possible Effects of a More Ambitious NDP

As discussed earlier, the infrastructure deficit in Ireland is currently substantial. While the "recommended" NDP outlined above will make major progress in tackling the outstanding deficit there will be still a significant deficit remaining to be addressed in the period after 2013. On the *High Growth* macroeconomic scenario the Government sector could potentially fund an even more ambitious investment programme. However, as discussed in Chapter 4, the constraint preventing even greater progress being made is the ability of the economy to deliver the necessary investment without

serious inflationary consequences. The "recommended" NDP outlined in the previous two sections is adjudged the maximum level of investment that the economy could sustain without causing very serious crowding out of the tradable sector.[23]

Table 5.5: Alternative Assumptions on NDP Expenditure, € Millions

		2007-2013, Annual Average at 2006 Prices	
	2006	**Recommended**	**Multi-Annual Framework**
Transport	2,590	3,374	4,042
Housing	1,211	1,133	1,308
Public administration	1,112	1,125	1,142
Health	579	721	870
Education	645	858	888
Enterprise sector	610	521	745
Agriculture	210	174	290
Environment	699	497	707
Total	**7,656**	**8,403**	**9,992**

In this section we consider an alternative investment programme that would involve more rapid progress in tackling the infrastructural deficit. For illustrative purposes we use the figures contained in the MACIF published in *Budget 2006*. The composition of the MACIF is compared with the "recommended" NDP in Table 5.5. The analysis in this section illustrates how an investment programme of substantially greater magnitude than that set out in the previous section would have inflationary consequences in the absence of suitable accompanying fiscal measures.

Because no details of investment in human capital and R&D are contained in the MACIF we concentrate here on the Public Capital Programme expenditure. As a result, the outcome shown here must be considered as only a partial assessment of the impact of an NDP based on the MACIF.[24]

Throughout the simulations we have assumed that the Government finances the NDP by additional borrowing or by less repayment of debt compared to the MTR. This would still see a gradual decline in the debt to GNP ratio over the forecast period so that this approach is sustainable. On the basis of the *High Growth* scenario for the medium term, it would also be sustainable in the sense that the General Government Borrowing would never exceed 3 percentage points of GDP over the period to 2013.

The impact effect of such a larger NDP would be to raise demand for resources in implementing the investment. In turn, this demand would add to output and employment. The effects would

[23] As outlined above, if suitable fiscal policy measures were taken a more ambitious NDP would be possible without running the risk of adding to inflationary pressures.

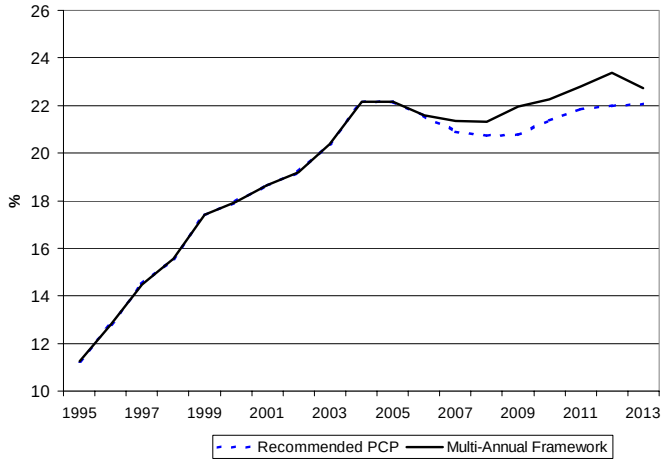
[24] The effects of the investment in human capital and R&D were considered in Section 5.3 above when we examined the effects of the recommendations in this report for the next NDP.

be complex as there would be a multiplier effect on output as well as an effect on prices depending on the supply profile for national resources, especially labour. These effects are considered first below.

As in the case of the analysis above, when the investment is spent the increased endowment of physical infrastructure or human capital would increase the long-term productive capacity of the economy after 2013. It is this long-term pay back which would represent the major return on the state's investment.

The MACIF version of the NDP would result in a significant increase in the share of building and construction activity in GNP compared to the "recommended" NDP. As shown in Figure 5.1 above, the "recommended" NDP envisaged some fall in Government Investment as a share of GNP over the period 2007-2013, which contrasts with a rise in share based on the MACIF. As shown in Figure 5.8, the "Recommended" NDP would put significantly lower pressure on the building and construction sector over the period 2007-2013. The bulk of the difference between MACIF compared to the "recommended" NDP would be in building and construction. The implementation of the MACIF would require even more resources to be reallocated from elsewhere in the economy to the building sector than would be the case under the "recommended" NDP.

Figure 5.8: Building and Construction Sector of GNP



This increased demand for labour in the building and construction sector would put further pressure on wage rates, initially in the building sector, but eventually in the whole economy. By 2013 wage rates in the economy would be almost 3 percentage points above the level under the "recommended" NDP (Table 5.6). This would represent a significant loss of competitiveness, having significant implications for the tradable sector of the economy.

The impact on house prices would be even greater (see Table 5.6). This would arise partly from the increase in costs facing the building sector and partly from the increased demand for housing consequent on higher incomes, higher immigration and a higher

population. The result would be that housing prices would peak at over 4.2 percentage points above the forecast for the "recommended" NDP by 2013. This would have knock-on effects on the economy, making Ireland a less attractive place to live, contributing to the pressure on wage rates. Consumer prices would be less affected, though still rising to 1.7 percentage points above base by 2013. None the less this would result in a significant additional loss of competitiveness over the period of the NDP.

Table 5.6: Change in Key Aggregates – Inflation and Output: MACIF Compared to Recommended NDP

		2007	2008	2009	2010	2013	2015
Non-Agricultural Wages	%	0.0	0.0	0.3	0.9	2.9	3.7
New House Prices	%	0.5	0.6	1.3	1.9	4.2	4.4
Building Investment Prices	%	0.0	-0.1	-0.2	0.4	2.5	3.1
Consumption Deflator	%	0.0	0.0	0.2	0.5	1.7	2.1
GNP	%	0.2	0.3	0.6	0.4	-0.1	-0.3
GDP	%	0.3	0.3	0.7	0.4	0.1	-0.2
Industrial Output	%	0.4	0.5	1.0	0.5	-0.3	-0.7
of which:							
Manufacturing	%	0.1	0.1	0.1	0.0	-0.5	-0.8
Market Services Output	%	0.2	0.3	0.5	0.4	0.2	0.0

The effect of the loss of competitiveness would eventually be to further crowd out the tradable sector. It would not be until the positive supply side effects of the enhanced infrastructure began to kick in at the end of the next decade that the level of GNP would rise above the level under the "recommended" NDP.

Table 5.7: Change in Key Aggregates: MACIF Compared to Recommended NDP, Percentage Points

	2007	2008	2009	2010	2013	2015
Balance of Payments	-0.3	-0.4	-0.7	-0.6	-0.8	-0.8
Government Borrowing	0.5	0.5	0.9	0.8	0.8	0.9
Debt-GNP Ratio	0.4	0.8	1.6	2.3	4.3	5.3

The higher level of Government borrowing needed to finance the increased investment is reflected in the higher balance of payments deficit (Table 5.7). The latter higher deficit arises from the need to import more goods and services to fuel the faster economic growth, especially the higher level of investment. However, it also reflects the negative effect on exports of goods and services as the tradable sector is crowded out by the building sector. Of course, in the long run the productive capacity of the economy will be expanded as a result of the higher stock of infrastructure. The implications of this enhanced supply capacity post-2013 were discussed in the last section.

Table 5.8: Change in Key Aggregates: MACIF Compared to Recommended NDP

		2007	2008	2009	2010	2013	2015
Labour Force	%	0.0	0.1	0.1	0.1	0.1	0.2
Employment							
Total	%	0.4	0.6	1.0	0.6	0.1	-0.2
Industrial	%	1.2	1.6	3.2	2.1	0.4	-0.6
Manufacturing	(000)	0.0	0.0	-0.4	-1.4	-6.5	-9.8
Building	(000)	6.2	8.7	18.0	13.1	9.1	6.6
Market Services	%	0.1	0.3	0.4	0.2	-0.1	-0.1
Unemployment Rate	% of labour force	-0.3	-0.5	-0.9	-0.5	0.1	0.4

As shown in Table 5.8, the demand side effects of the MACIF would see total employment peaking at around 1 percentage point above the level in the "recommended" NDP. To undertake the additional building activity almost 18,000 additional workers would be needed in the building sector in 2009 compared to the already high employment under the "recommended" NDP. As the loss of competitiveness began to bite towards the end of the NDP process the employment in manufacturing would begin to fall. Market services employment would show relatively little change with employment in traded market services probably suffering some fall roughly compensated for by a growth in employment in services serving the domestic economy. Some of these additional jobs would be in the areas of services meeting the needs of the building and construction sector – legal and accounting services, engineering, architectural and other related services.

When the building sector eventually contracts to a "normal" size (after 2013), even with flexible wage rates (downwards) it would take some considerable time for the tradable sector to recover competitiveness and take up the slack in the economy.

The unemployment rate, which was already expected to be close to the full employment rate in the period to 2010, could see a further temporary reduction by almost 1 percentage point in 2009. This reduction is based on the assumption that migration trends react slowly to domestic labour market circumstances. This was the experience of the 1960-2000 period. However, a more rapid adjustment in the labour force towards its long-run equilibrium level through a faster response of immigration could see a smaller reduction in unemployment and it could shave something off the anticipated significant increase in wage rates.

The results of this simulation make it clear that higher levels of public investment can only be bought at the expense of further squeezing out the tradable sector of the economy. Because it will take time for the tradable sector of the economy to adjust back upwards when the public investment programme nears completion, this could lead to significant disruption, especially in the labour market.

In addition, the higher level of investment would also see the investment deflator for building and construction rising about 1 percentage point above the level in the "recommended" NDP. This would mean that not only would the additional investment under this scenario cost more, but other investment, which would take place anyway, would also be more expensive. This would adversely affect the rate of return on the investments.

5.5 The Implications for the NDP

The analysis in this chapter largely replicates the results from previous such studies suggesting a high rate of return to successful investment in infrastructure, human capital and research and development. Ireland still has a substantial infrastructural deficit to be made up as a result of historically low levels of investment in previous decades and the very high rate of growth experienced over the past decade.

For the next NDP the strategy remains similar to that identified in the *Mid-Term Evaluation* of the current NDP. There is a need to complete the investment in the major primary roads as soon as possible. To provide for sustainable economic development over the coming decades there is a need to invest effectively in public transport serving major urban areas, especially Dublin. Investment in R&D and human capital also remains an important priority. Given the achievement of compliance with the EU urban waste water directive there can be some slowdown in investment in that area in the next NDP. Generally, with the economy operating at close to capacity direct supports for the business sector ranging from manufacturing to tourism and agriculture should be phased out. This prioritisation has been reflected in the structure of the NDP recommended in this chapter.

The analysis in Section 5.3 indicates that the planned investment in the next NDP, through relaxing the infrastructural constraint, would allow the economy to grow more rapidly in the next decade. Over the course of the decade after completion of the next NDP the capacity level of GNP would be raised by at least 2 percentage points and possibly even 3 percentage points above the level it would be without such investment. The analysis in this chapter also suggests that the rate of return to the state on the investment would be quite high, fully justifying the very substantial commitment of resources.

However, while there is a high rate of return to efficient investment the results presented in this chapter also suggest that the economy will have difficulty delivering the much-needed investment at a reasonable cost. While the funding may theoretically be there to close the infrastructure gap rapidly, the economy does not have the ability to produce all the necessary infrastructure over the period to 2013 without squeezing out other important economic activity. This means that any attempt to close the gap too rapidly will seriously raise the cost of the investment, reducing the potential rate of return.

There are two possible responses to this constraint:

- Given the likely long-term importance of the proposed infrastructure probably the best approach would be to use the tax system specifically to reduce private sector demand for the output of the building sector. This would allow the public sector to buy the necessary infrastructure at reasonable cost without putting undue pressure on the tradable sector of the economy. (It might also reduce the risk of a bubble in the housing market.) Even if the building and construction demand were not targeted specifically, a tight fiscal policy would also reduce existing demand pressures in the economy though reducing Government expenditure or increasing general taxation.
- The alternative approach, which is assumed in this report, would see the start up of some major projects being postponed by a year or two. This would delay the benefits that will undoubtedly accrue from that investment. The counterpart to this delay would be significantly lower costs for the economy in delivering the investment. The profile of investment recommended in this chapter, in our view, provides the best compromise between the urgency of the need for the infrastructure and the importance of maintaining the competitiveness of the economy in the medium term. While a "second best" result, the objective of this phasing of investment over the period 2007-2013 would be that it would ensure that the share of the economy accounted for by the building sector would not increase and would preferably show a gradual reduction towards its long-run sustainable level. The downside of such an approach would be that the economy would not have the benefit of the valuable infrastructure as early as it would under the first of these approaches.
- As the first of these approaches (tightening fiscal policy) may not prove generally acceptable, the approach adopted in this report is to recommend an NDP for the 2007 to 2013 period that, while still very ambitious, would be significantly below that envisaged in the multi-annual capital investment framework (MACIF) published as part of *Budget 2006*. This analysis argues for a slower ramping up of the investment, with more of it taking place after 2010 when there is a higher probability of the economy having slowed down. It also argues for the Government saving the money not spent due to a postponement by running a surplus, so that it would be available post-2010 to finance the higher investment programme even if the public finances had been hit by an economic slowdown.
- In terms of prioritisation the analysis would suggest that there will be less constraints in delivering on the necessary investment in human capital than there will be in the case for investment requiring building and construction. For the

infrastructural investment it will be very important to undertake the necessary cost-benefit studies to allow the prioritisation of different projects. This will be especially important in the case of the transport investment to ensure that very large projects are correctly sequenced to produce the maximum return to the economy and to minimise the direct and the indirect costs of delivery.

6. THE NATIONAL SPATIAL STRATEGY: REGIONAL, URBAN AND RURAL DEVELOPMENT

6.1 Introduction

A key recommendation of the last ESRI *Investment Priorities Study* (Fitz Gerald *et al.*, 1999) was the urgent need for a strategic spatial planning framework, since investment needs are not independent of the spatial pattern of development, and investment in itself is a regional policy tool. Following a process of consultation and research, which started in 2000, the Government published the *National Spatial Strategy 2002-2020* (NSS) in 2002. The NSS constitutes both a statement of Government policy and a blueprint for the spatial aspects of development in Ireland.

While the NSS is the spatial planning strategy for the country it does not incorporate specific investment plans. Rather the implementation of the NSS relies on other Government plans and primarily the National Development Plans. However, as the current *National Development Plan* (NDP) was published at the end of 1999, it could not reflect and incorporate the NSS. Consequently, it is not surprising that the *Mid-Term Evaluation* of the current NDP found that while the NDP did make some provision for regional development that had a positive impact, there were significant areas of the NDP that could be better tailored to implementing the long-term strategy of the NSS. Therefore, it is imperative that the next NDP fully reflects and targets investments in accordance with the NSS. Failure to do so risks that undesirable spatial development patterns continue that cannot be changed subsequently and therefore render the NSS irrelevant.

This chapter outlines our recommendations on the proper implementation of the NSS and, therefore, covers the spatial dimension of the investments priorities under the main investment headings covered in the later chapters. While these cover the bulk of relevant investments, a number of specific investment areas are covered in this chapter. These include rural development, urban and village regeneration and heritage, which were part of the current NDP. These are reviewed as part of this chapter and investment recommendations regarding these will also be made.

6.2 The National Spatial Strategy

As in all countries, population and economic activity in Ireland are not spread evenly across the country. While Ireland has experienced very rapid growth, this appears to have led to a more uneven economic development across the regions. There has been a high level of concentration of both economic activity and population growth in certain areas, which has led to congestion and other symptoms of excess concentration, which are likely to damage the overall prospects for the Irish economy, the environment and quality of life.

To deal with the uneven regional development during the 1990s, the Government published the *National Spatial Strategy* (NSS), which was to guide the spatial distribution of investment. The NSS constitutes the most important regional policy document since the *Buchanan Report* in 1968, which also sought to guide spatial planning for the whole country. However, in contrast to the *Buchanan Report*, the NSS is wider ranging in that it does not concentrate on enterprise development alone, also considering the wider set of factors driving regional development in a modern economy.

The general approach adopted in the NSS is based on 5 key principles:

- While the NSS must by definition deal with spatial imbalances within Ireland it recognises the key role that Dublin plays for Ireland since it is the only city of sufficient scale to be recognised as a major European city.
- The NSS recognises and attempts to improve the quality of life of individuals particularly as spatial planning can have a significant impact on issues such as long-distance commuting and pollution.
- Accommodating the substantial population growth within existing settlements will result in and need substantial change in our urban centres.
- Proper planning of land use and particularly planning for more compact higher density urban centres and the minimisation of urban sprawl will be a key factor in determining the success of the NSS.
- Implementation of the NSS is to be achieved primarily by ensuring that all policies and programmes are consistent with the NSS.

These principles are to ensure that all areas of the State develop their full potential and thus contribute to the overall performance of the State in economic, social and environmental terms.

The key recommendation of the NSS is that balanced regional development is to be achieved through promotion of places that have sufficient critical mass to attract investment. Critical mass is the scale and concentration of the population and economic activity and the concept implicitly assumes that below a certain size, centres are not able to generate a sufficient economic dynamic to support higher levels of economic activity. This centre-based approach is firmly supported by economic theory (see the discussion of agglomeration economies in Chapter 2). Empirically a number of

studies have shown that productivity is positively related to the density of economic activity (see Ciccone and Hall, 1996 and Ciccone, 2002). In contrast to a simple 'growth centres' approach the NSS strives to actively link the development of the hinterlands of the chosen centres to that of the centres themselves.

In addition to the 'gateways' identified in the current National Development Plan (namely Dublin, Cork, Galway, Limerick and Waterford), four further gateways were announced, which are Sligo, Letterkenny (working closely with Derry), Dundalk and, fourthly, the linked gateway of Athlone, Tullamore and Mullingar. Furthermore, nine 'hubs' were identified, which will play an important role in ensuring that all parts of the country will benefit from growth and development.

Given the strong agglomeration and urbanisation economies present in modern economies, the success of the gateways and hubs will define the success of the NSS. This means that the gateways and hubs need to be supported in the appropriate manner. In this respect there are two key aspects. First, since critical mass development relates to the scale and density of urban centres strong land use planning guidelines need to be drawn up and implemented. In this respect substantial progress has been made since the publication of the NSS, with the production of regional planning guidelines for all planning regions. Strong planning needs to ensure that settlement patterns are sustainable and facilitate public transport. Low-density development means that public transport is not practical or viable and therefore induces unsustainable transport patterns, which have a negative impact on the environment and quality of life. The importance of the planning system in achieving efficiency and sustainability is further outlined in Chapter 11.

The second way in which the NSS needs to be supported is through the targeting of public investment. In this respect the next NDP will play a key role, and, therefore, the spatial targeting of investments is considered in more detail in this chapter. In this respect it is important to note the experience from the current NDP, which was outlined in *The Mid-Term Evaluation* (Fitz Gerald *et al.*, 2003).

LESSONS FROM THE NDP

The Mid-Term Evaluation (Fitz Gerald *et al.*, 2003) showed that for all priorities the Southern and Eastern Region was to receive a substantially larger allocation of resources than the Border, Midlands and Western (BMW) region, which of course reflects the different relative size of the regions in terms of population. In per capita terms, however, expenditure in the BMW region was planned to exceed that of the Southern and Eastern region, although the relative allocations within OPs vary in some cases. For example, in the Productive Sector OP, there is a heavier emphasis on RTDI in the Southern and Eastern region which, perhaps reflects the concentration of the Third-Level Education institutions in that

region, while there is a higher weighting given to the Industry priority in the BMW region.

When it came to the actual progress the *MTE* showed that these differences were magnified in the outturn. For example, progress in the RTDI priority in the BMW region had been behind that in the Southern and Eastern Region. In general, progress was slower in the BMW region. This was particularly driven by poor progress on national roads, public transport and RTDI in the BMW region. Of course, it is important to note that some investments that have taken place in the Southern and Eastern region can also have a significant positive impact on the BMW region. This is particularly relevant in the case of transport. Thus, an improvement of a section of national road in the Southern and Eastern region can help improve market access and reduce transport costs for businesses in the BMW region.

The *MTE* argued strongly for a more appropriate project selection process where projects first need to satisfy basic economic criteria and the horizontal principles, which would address market failures or externalities that may differ between regions. For example, as outlined in Chapter 17 in relation to broadband access a market failure exists in rural less densely populated areas while none exists in urban areas.

There is little evidence that the measures in the current NDP have been specifically tailored to the needs of regions and essentially the same measures where applied in both regions. This ignores the substantial differences between and within regions. Thus, a measure that addresses the needs of some regions may be completely inappropriate in other regions. In this respect one might also consider the very substantial heterogeneity with the Southern and Eastern region, which contains the very dynamic greater Dublin region and the much less dynamic South-East.

Project selection criteria must explicitly reflect the goal of achieving balanced regional development in accordance with the NSS. In the case of two projects with identical merit but with one in a designated gateway or hub and the other in a non-designated area then the one in the gateway or hub should receive preference. In other words at the margin only projects in gateways or hubs should be supported. This prioritisation is particularly important in the context where not all economically advantageous projects should be funded in order to avoid further inflationary pressures.

Importantly, the current NDP contained no measures specifically aimed at critical mass development, and those measures that can contribute to critical mass development do not appear to be specifically targeted.

Finally, the primary regional focus of the current NDP was on the two NUTS 2 regions. These regions were primarily established for EU Structural Funds purposes and do not constitute natural economic entities. Consequently a stronger focus on the NUTS 3 level should be considered. This will also require better data collection both for evaluation purposes but more importantly for targeting purposes.

6.3 Regional Development Trends

The *Mid-term Evaluation* could only conduct a very partial evaluation of the impact of the NDP on regional development due to the lack of data for the period since 2000. Apart from the lack of data, the necessary evaluation infrastructure has also not been developed. Thus, while this study and the *MTE* could evaluate the macroeconomic impact of the NDP on a range of interconnected variables with the use of the *HERMES* macroeconometric model, such a model is not available at the regional level. Such a model is necessary in order to identify the counterfactual situation that would have obtained without the policy intervention. For example, while one may find that regional differences have increased, which might be interpreted as a failure of policies, the policies that were enacted may actually managed to limit the degree of divergence.

While data constraints and particularly the timely availability of data continue to constrain the analysis of regional development some relevant data has become available since 2003, which allows us to consider the effect of the NDP. In this context it is more appropriate to consider the NUTS 3 regions rather than the two NUTS 2 regions. A more detailed analysis of the gateways and hubs that were identified in the NSS is more difficult since many variables such as income or output are not available at this level of spatial aggregation.

Here we consider three indicators of regional development namely, output per capita, income per capita and the unemployment rate. Clearly, many other variables could be added to this list including quality of life measures, which would clearly be desirable but is beyond the scope of this chapter. Table 6.1 shows two values for each variable. One relating to 1999 and one for the most recent period for which data is available, which in the case of the income and output indicators is 2002. Both the income and output indicators are expressed as an index relative to the national average. Thus, the Border region in 1999 had per capita Gross Value Added (GVA), which was just 73.5 per cent of the national average.

Considering the output measure, per capita Gross Value Added first, it is evident that the gap between the highest value in the table and the lowest value has decreased slightly. Thus for 1999 the lowest value was 62.6 per cent (Midlands) while the highest was 133.4 per cent (Dublin), which constitutes a gap of 70.8 per cent. While the Midlands still had the lowest index in 2002 (63.4 per cent), the highest value was slightly down at 131.4 per cent (Mid-West). However, overall the dispersion, as measured by the standard deviation has increased, suggesting divergence across the regions.

This process of divergence over recent years is a continuation of a process that started in the late 1980s, which followed a period where there appears to have been at least limited convergence. In fact there appears to be something of a convergence club, in that all regions other than the South- West, Dublin and Mid-East (Greater Dublin) regions are following a similar relative growth path.

An important aspect of the divergence among Irish regions is the contribution of the different sectors to this. Data limitations mean that the regional gross value added data can only be disaggregated

into three broad sectors namely: (1) agriculture, forestry and fishing, (2) manufacturing, building and construction, and finally (3) market and non-market services, for a relatively short period of time.

An analysis of these sectors at the regional level shows the substantial decline of the primary (agricultural) sector in all regions. Furthermore, the secondary sector (industry) has increased its importance, while overall the tertiary sector has maintained its share. Unfortunately, it is not possible to disaggregate the secondary sector into building and construction and manufacturing in order to assess the role of the construction sector in driving the growth of the secondary sector.

Decomposing the sectoral contributions to overall growth in the regions yields some interesting results (see Morgenroth and O'Malley, 2003). While the overall performance of the primary sector is very poor, given the relatively small share of the primary sector this has a relatively small contribution to the overall growth rate. The tertiary sector has on average the largest contribution to overall growth, but in the case of two regions, namely the Mid-East and the South-West, the secondary sector has grown particularly strongly.

Considering the performance of each sector in each region relative to the national performance of that sector reveals the source of the convergence trends. This analysis reveals that the performance of the secondary sector has the largest bearing on the convergence/divergence performance of the regions. Of course the data limitations do not allow for a disaggregation, which could reveal which sub-sector has contributed most to divergence. However, sectoral employment trends indicate that the regional differences in the building and construction sector may in fact be the source of the regional divergence. Furthermore, a more detailed sectoral breakdown, were it available, might indicate whether some of the divergence is simply driven data distortions due to transfer pricing by foreign multinationals.

As part of the literature review above, the possibility of a negative relationship between national growth rates and regional dispersion was outlined. Using the regional Gross Value Added (GVA) data it is possible to conduct a crude test for this so-called Williamson hypothesis, by estimating the correlation coefficient between the standard deviation of the index of regional per capita GVA and national real per capita GVA growth. The correlation coefficient turns out to be -0.6, which is statistically significant at the 99 per cent level, which lends some support for the hypothesis. Thus, national growth has not lifted all regions in relative terms, despite the fact that growth rates in all regions exceed the EU average. If that hypothesis is correct then this period of negative correlation should be followed by one where there is a positive correlation and convergence.

Table 6.1: Trends in the Key Variables for Irish Regions

Region	GVA (State=100) 1999	GVA (State=100 2002	Income (State=100 1999	Income (State=100 2002	Unemployment Rate 1999	Unemployment Rate (2005)
Border	73.5	71.3	88.0	89.2	8.7	4.9
Midlands	62.6	63.4	86.4	90.9	6.5	4.0
West	78.9	71.4	89.1	90.3	5.1	3.7
Dublin	133.4	128.3	118.7	115.9	4.8	4.2
Mid-East	88.8	80.4	101.2	102.6	4.2	2.7
Dublin + Mid-East	121.8	115.4	114.2	112.3	4.6	3.8
Mid West	88.6	82.8	98.1	97.3	5.0	4.7
South East	79.9	89.4	87.3	89.5	8.4	5.6
South West	111.4	131.4	94.2	94.5	5.6	4.2
State	100	100	100	100	5.7	4.2

Source: Central Statistics Office, Regional Accounts (various issues) and CSO *Quarterly National Household Survey* (various issues).

While Gross Value Added (GVA) is a particularly useful variable in most countries, in Ireland one has to be more cautious in interpreting it. The high proportion of foreign firms in the Irish economy, which due to the relatively low corporation tax rates prefer to declare profits in Ireland rather than other countries, implies that GVA is artificially expanded. Evidence for this is found in the difference between GDP and GNP. Recently, GDP was about 20 per cent higher than GNP. The degree of these distortions differs between regions so that the analysis needs to be interpreted cautiously. It is nevertheless included here since per capita GDP is the key variable to determine EU Structural Funds eligibility. Given the drawback of the GVA measure it is also useful to consider direct personal income measures. A number of different income measures are available. Total per capita personal income is available in a consistent series since 1991 and this is the variable considered here.

The table shows that the relative differences are smaller for income compared to GVA. This reflects the fact that income is measured where the persons who earn it live while GVA is measured where it is produced. Thus, commuting flows imply that income flows out of the regions with the higher output. Another reason why the absolute differences are smaller is that the social welfare system and other subsidies (e.g. agricultural subsidies) are responsible for redistribution to the poorer regions. Overall, there appears to be convergence across regions regarding income.

Finally, the unemployment rate has dropped significantly in all regions between 1999 and 2005. Also noticeable is the fact that the dispersion of unemployment rates has decreased, so that there has been a convergence between regions in terms of unemployment.

Overall, this analysis suggests that regional disparities have not increased except for GVA, which may be significantly biased anyway. This suggests that policies including the NDP might have been effective at reducing disparities. A definite answer cannot be provided for this question until an appropriate regional economic model is available.

POPULATION

The demographic developments in Ireland have been outlined in Chapter 4. However, the spatial distribution of the population and trends thereof play an important role in determining overall investment needs and must therefore be considered. Table 6.2 shows the population in the NUTS 3 regions for selected years, and the share of each region in the total population in parenthesis. Overall, the population grew in all periods since 1986, but this growth was not even.[25] In particular, a population decline was recorded in the Border and Midlands regions for the period 1986 to 1996. All regions recorded strong population growth since 1996. However, the Border region continued to grow at below average rates while the Midlands region grew faster than the average. Notable is the below average population growth in Dublin and the South-West and to a lesser extent in the Mid-West. Thus, the regions with the largest urban centres appear not to have had low population growth. The CSO estimates for 2005 show a continuation in the strong growth of the population.

As a consequence of the differential population growth rates the share of the national population resident in the regions is also changing. The share of the Border, West, Mid-West and South-West has been declining steadily, while that of Dublin and the South-East has been relatively stable. On the other hand the Mid-East region and to a lesser extent the Midlands have increased their population share significantly.

This trend is closely related to the relationship between these two regions and Dublin, which appears to have strong impact on internal migration. In contrast to the past where Dublin had a net-inflow of population through internal migration this trend has changed to one where Dublin is losing population to the surrounding regions. As recorded in the *2002 Census*, Dublin suffered a net loss of 6,138 persons to the Mid-East over the period 2001/2002. The Mid-East in turn suffered a net loss to all other regions and particularly to the Midlands and South-East.

The changed internal migration patterns make regional population forecasts more uncertain as it is not clear if the changed pattern will be permanent or transitory. Consequently, the CSO produced a range of scenarios for their regional population projections with a 'medium' pattern, which implies that the recent changes are transitory being preferred (CSO, 2005). In Table 6.2 two sets of projections are shown which are derived using the *MTR* demographic projections for the *High Growth* scenario, which were outlined above, and the implied regional trends under the CSO 'medium' and the continued 'recent' trends projections. The two columns show that the assumptions about internal migration make a significant difference to the regional shares. In particular for Dublin the difference between the two projections is significant in that the

[25] For a more detailed description of the demographic trends at the regional level see Walsh (2006) and Morgenroth (2005).

recent trends projection suggests that the population in 2013 will be 76,000 lower than projected under the medium assumption. This difference drives the differentiation between the two projections for the other regions, which is distributed according to internal migration patterns. Thus, the Mid-East and the Midlands would experience a particularly substantial increase in their population. Particularly the recent trends projection suggests a strong spillover of growth from the Greater Dublin Area (GDA) to the Midlands. Of course this population spillover may be a result of housing market pressures in the GDA rather than economic development in the Midlands (see Morgenroth, 2002). If population growth is not accompanied by economic development then the population increase in the Midlands is likely to result in further commuting growth to Dublin. Such a development would undermine the aims of the NSS and would be inconsistent with the objective of promoting sustainable development.

Regardless of the assumption concerning regional distribution, the *MTE High Growth* scenario implies substantial population growth of almost half a million, which would put additional pressure on infrastructure. All regions would experience an increase in their population by at least 10 per cent.

Table 6.2: Regional Population for Selected Years

Region	1986	1996	2002	2005 (Estimate)	2013 Projection (Medium)	2013 Projection (Recent)
Border	410,899 (11.6%)	407,295 (11.2%)	432,534 (11.0%)	455,400 (11.0%)	506,824 (10.8%)	519,719 (11.1%)
Midlands	207,994 (5.9%)	205,542 (5.7%)	225,363 (5.8%)	242,900 (5.9%)	272,634 (5.8%)	289,431 (6.2%)
West	348,328 (9.8%)	352,353 (9.7%)	380,297 (9.7%)	406,000 (9.8%)	462,282 (10.1%)	471,717 (10.1%)
Dublin	1,021,449 (28.8%)	1058,264 (29.2%)	1,122,821 (28.7%)	1,160,100 (28.1%)	1,334,932 (28.4%)	1,258,993 (26.9%)
Mid-East	314,670 (8.9%)	347,407 (9.6%)	412,625 (10.5%)	452,400 (11.0%)	544,307 (12.8%)	555,366 (12.9%)
Greater Dublin	*1,336,119 (37.7%)*	*1,405,671 (38.8%)*	*1,535,446 (39.2%)*	*1,612,500 (39.0%)*	*1,879,239 (40.7%)*	*1,814,359 (38.8%)*
Mid-West	315,435 (8.9%)	317,069 (8.7%)	339,591 (8.7%)	352,300 (8.5%)	387,979 (8.1%)	388,878 (8.3%)
South-East	384,972 (10.9%)	391,517 (10.8%)	423,616 (10.8%)	451,900 (10.9%)	500,352 (10.6%)	516,681 (11.0%)
South-West	536,894 (15.2%)	546,640 (15.1%)	580,356 (14.8%)	609,700 (14.8%)	666,544 (13.9%)	675,068 (14.4%)
State	3,540,641	3,626,087	3,917,203	4,130,700	4,675,854	4675,854

Source: CSO *Census of Population* and *Annual Population and Migration Estimates*, various issues. The projections for 2013 are own calculations based on the ESRI *Medium-Term Review* national projections for the *high-growth* scenario and the trends in regional shares implied by the CSO *Regional Population Projections* under the medium internal migration scenario.

URBANISATION AND POPULATION DENSITY

As was outlined above, agglomeration economies have been pervasive in the new economic geography literature, and the creation of critical mass of selected urban centres is one of the primary aims of the NSS. One way to measure agglomeration is to consider the degree of urbanisation. So far research has not identified the size, which an urban centre in Ireland needs to be before it can generate self-sustaining growth through agglomeration economies.

In 2002 there were just 34 urban centres with a population of 10,000 inhabitants or more. Of these 12 were in the Greater Dublin Region. Urbanisation measured by the proportion of the population that reside in these larger towns and cities is very unequally distributed between the regions.[26] While Dublin is almost completely urbanised, the Border, Midlands and West regions have a very low level of urbanisation at considerably less than 30 per cent of the population. Indeed the poor urban structure is evident in the fact that there are only four cities with a population in excess of 50,000. Urbanisation has increased in all regions except Dublin. Interestingly, the Midlands region increased its degree of urbanisation recently, which further supports the 'ripple' effect of the development of the Greater Dublin Region.

Overall, while there is some evidence of increasing urbanisation, the differences between the regions remain quite substantial. Given the link between urbanisation and growth, the aim of the NSS to support the development of critical mass, particularly in the selected gateways, needs to be supported.

Another important aspect of the size and distribution of the population is the population density. From a policy point of view the distinction between density and urbanisation is important since recent research has also shown that larger urban centres tend to be more environmentally sustainable than smaller ones (see Moles *et al.*, 2002), and it is considerably easier and cheaper to provide a particular service level for urban populations compared to rural populations. The latter applies to many public services. Many other services are also more expensive to provide to a dispersed population, including utilities such as telecommunications (see the lack of broadband roll-out in rural areas), energy or the postal service. A recent study by Bűttner *et al.* (2004), on the costs of local services in Germany confirmed that a low population density can increase the cost of some services such as roads, energy, water supply and cultural affairs.[27] However, these cost differences are not reflected in differential charges. Rather these cost differences are hidden and implicitly subsidised. Thus, individual choice is not

[26] Using this measure, 48.2 per cent of the population across the country live in urban areas. This compares to 59.6 per cent when urbanisation is defined as the proportion of the population resident in towns and cities with a population in excess of 1,500.

[27] A cursory analysis for cost of providing water and sewerage services in Ireland appears to confirm these results.

based on information on the full costs of dispersal. Similarly, Government policy to sustain rural and peripheral communities does not appear to consider the wider costs of maintaining the dispersed pattern of population distribution, despite the fact that the broad principle of the *National Spatial Strategy* is to generate critical mass. Ultimately, the distribution of the population will be decided by public policies and individual choice. These choices should reflect the differential costs for different location.

Table 6.3 shows the population density for EU-15 countries. Ireland has the third lowest population density. A lower density is only recorded for Finland and Sweden. However, even though Sweden and Finland have a significantly lower population density than Ireland, their degree of urbanisation is not lower than that of Ireland. Indeed it is substantially higher in Sweden than in Ireland. In Sweden large parts of the country are essentially uninhabited which accounts for the low population density rather than a low degree of urbanisation. Thus, the cost of providing services holding all other factors constant is lower in Sweden than in Ireland despite the fact that Sweden has a lower population density.

Table 6.3: Population Density and Urbanisation for EU-15 Countries

Country	Population Density Persons Per Km^2	Urbanisation (%)
Netherlands	476.7	62
Belgium	338.6	97
United Kingdom	243.3	89
Germany	231	88
Italy	189.7	90
Luxembourg	172.5	91
Denmark	124.7	72
Portugal	112.8	53
France	109.7	76
Austria	96.4	54
Greece	83.5	60
Spain	81.6	76
Ireland	57.3	60
Sweden	21.8	84
Finland	17.1	62

Source: Eurostat, *New Cronos* Database, Population Reference Bureau, World Population Data Sheet.
Note: Population Density data is for 2002. Urbanisation is defined as the proportion of the population resident in towns with a population in excess of 2,000 inhabitants.

SUMMARY AND IMPLICATIONS OF THE DATA ANALYSIS

The analysis presented above suggests that over the period of the current NDP regional differences appear to have diminished suggesting that policies may have had a beneficial effect. However, it is not possible at this point to firmly determine the role of policy since the necessary evaluation infrastructure does not exist. We, therefore, recommend that some resources be devoted to building a

regional economic model. This will also require a wider range of data to be made available than is currently the case, which of course would benefit the wider research community.

There is a clear need for further research to uncover the underlying mechanisms which give rise to the differential performance of the regions. The available research suggests that urbanisation in itself is an important factor, which coupled with the path dependence outlined in Chapter 2 results in sustained differences between regions (e.g. Bradley and Morgenroth, 1999; Boyle, McCarthy and Walsh, 1998; O'Leary, 2001). Another factor is the differing educational attainment rates, which again lead to a path dependent process. There is a clear divergence between counties in relation to the proportion of the population that possess a third-level qualification (see Morgenroth, 2005). A key factor in the location of high-tech, high value added employment is the availability of skilled workers (see Chapter 2). Firms are more likely to locate in areas where there is an abundance of skilled labour. This in turn will attract more skilled workers thereby reinforcing the process.

Closely related to the divergence in educational attainment is the capacity of the regions to innovate. The recent gateways study (Fitzpatrick Associates, 2005c) shows that third-level based research capacity is heavily concentrated, particularly in Dublin and to a lesser extent in Cork, Limerick and Galway. The international literature on spillovers from university research discussed in Chapter 19 suggests that such spillovers are quite limited in distance, which implies that the bulk of the wider benefits accrue to the four metropolitan areas. However, Jordan and O'Leary (2005) suggest that in Ireland firms utilise a wider network for innovative activities. This may well be related to the high level of FDI in Ireland where the Irish operation of a foreign multinational will have close connections with their headquarters.

Another interesting finding is that for manufacturing at least a more diversified industrial structure appears to result in higher productivity compared to a specialised industrial structure (see Morgenroth, 2006). That analysis also shows that counties with a higher proportion of foreign owned plants have a higher productivity, which suggests that efforts should be made to increase the productivity of indigenous firms.

Population growth remains strong, and while all regions have recorded population growth, the growth rates have differed markedly across regions. Interestingly population growth has been slower in the more urbanised regions. This may reflect the lack of sufficient zoned land, higher development costs or simply the preferences of individuals. Whatever the reason for the slower growth in the more urbanised regions it suggests that critical mass may not be adequate. This is important in the context of the poor urban structure in Ireland with few urban centres of scale. Since economic development in advanced economies is urban driven the lack of a sufficient number of larger urban centres may have a negative impact on economic development going forward. In

addition the low urbanisation and low population density adds to the cost of providing public services and infrastructure. It also reduces the viability of public transport and particular fixed rail services.

Given the population trends and the persistent low level of urbanisation the implementation of the NSS is of considerable importance. The need to generate critical mass in the gateways and hubs is now as important as ever. However, the NSS needs to adapt to the dynamic changes that are occurring and should therefore be continually updated. Furthermore, a formal mechanism of monitoring the progress in implementing and achieving the goals of the NSS needs to be put in place.

6.4 Implementing the NSS

In this section we outline the spatial aspects of the investment priorities outlined in the later chapters. Before we turn to our recommendations we briefly review the recommendations of the recent study on investment priorities in the gateways (Fitzpatrick Associates, 2005a). While this study should form a useful input into the specific spatial targeting recommended here, given its limited scope which means that the basis for the recommendations contained in the gateways study are not outlined, it is of limited use for our purposes. There is some interesting general analysis, especially the analysis on R&D capacity, the recommendations for each gateway are unsupported by analysis, and are in some cases very general and do not include costings.

The gateways study made specific short-term recommendations for each gateway, which we summarise below:

Cork:

- Integrated Public Transport.
- Improved link to airport.
- Upgrade N28 to Ringaskiddy Port.
- North Ring Road.
- Improve amenities and urban fabric.
- Develop and strengthen cultural and recreational amenities.
- Facilities Development for R&D.
- Docklands regeneration.

Dublin:

- *Transport 21*.
- Integrated public transport.
- Consolidated metropolitan development.
- Resolution of water supply problems and capacity for waste water treatment.
- Social Amenities.
- Strengthening of the international status of third-level institutes.

- Improved quality of design of built environment.

Dundalk:

- Strengthening and modernising local economic and enterprise structure.
- Investment in local roads and water services.
- Develop and integrated public transport system.
- Community development.
- Investment in social housing.
- Provision of recreational and cultural amenities.
- Shared innovation strategy.

Galway:

- Strategic urban transport routes.
- Investment in sanitary infrastructure.
- Provision of social and community facilities.
- Shared innovation strategy.
- Protection of natural and built heritage facilities.

Letterkenny:

- Road investment to deal with congestion black-spots (A5/ N14, A2/N13).
- Improved capacity in water services.
- Improved energy supply.
- Shared innovation strategy.

Limerick-Shannon:

- Phase II of the Southern ring road and N69.
- Improved public transport.
- Development of recreational facilities.
- Shared innovation strategy.
- Targeted urban renewal.
- Branding and marketing.
- Infrastructure delivery co-operation across local authorities.

Midlands Gateway:

- Strategic transport routes.
- Strengthening water, waste water and solid waste infrastructure.
- Significant investment in Athone Institute of Technology.
- Strategic development plan.
- Needs to develop a shared identity.

Sligo:

- Strategic urban distribution routes.
- Regional sports and recreation facilities.

- Cultural entertainment quarter.
- Build up research and innovation capacity.
- Shared innovation strategy.
- Targeted urban renewal.

Waterford:

- Completion of the M9 and N25 by-pass.
- Enhancing port facilities.
- Investment in Waterford Institute of Technology.
- Shared innovation strategy.
- Development potential on the North-Quays.

Many of the specific actions identified in the gateways study would appear to have significant merit, and subject to their satisfying the necessary selection criteria they should be funded under the next NDP. In the following sections we outline the spatial aspects of our microeconomic chapters.

TRANSPORT INFRASTRUCTURE

Investments in transport infrastructure are among the most 'spatial' investments since apart from servicing a local area transport infrastructure also provides wider access. As was highlighted above, transport infrastructure is not only an important locational determinant for many firms but also a key driver of growth. Consequently, investments in infrastructure have a significant role in regional development. It should however also be pointed out that improved access is bi-directional. In some cases improved access may actually have a negative effect on local firms if they only supply the local market since it allows competitors to enter that market. That said given the geography of Ireland being relatively peripheral within Europe, areas that are peripheral within Ireland would benefit significantly from improved access.

With respect to national primary roads our recommendations support the approach taken in *Transport 21* to complete the National Primary route system to standards adequate for predicted traffic volumes, which in many cases should be to motorway standard. The completion of this investment will primarily aid the major gateways, but will also have a significant impact on areas that are proximate to these roads. Given that the bulk of freight transported in Ireland is transported on the road this investment should help businesses in most regions in their efforts to reach wider markets.

The primary roads network alone will not be able to promote the NSS. Rather, the national secondary roads and some key non-national roads will play at least as important a role, since they will provide connectivity between the gateways and hubs and provide access to these from the wider hinterlands. In this respect some of the prioritisation contained in *Transport 21* is puzzling, and consequently we recommend a modified prioritisation.

While the Ring of Kerry, West Cork Coastal and Clare Coastal routes serve an important role in the tourist industry in those areas,

other roads that were not prioritised within *Transport 21* will yield a higher return since they connect a large population and more urban centres. In particular we recommend that the N62 North-South route through the Midlands, from the N8 Dublin-Cork road at Horse and Jockey through Thurles-Templemore-Roscrea-Birr-Athlone, should be accorded a high priority in addition to some of the other routes chosen (e.g. N52 Dundalk-Mullingar-Tullamore-Birr-Nenagh, and N80 Tullamore-Portlaoise-Carlow-Enniscorthy). These routes cater for substantially higher traffic volumes than certain of the coastal routes, which have been selected. Overall, we recommend that a specific and comprehensive programme of National Secondary road improvements should be included in the next National Development Plan. In many cases, roads classified as Regional roads, and in some cases even as County roads, carry traffic volumes well in excess of the less busy National Primary and Secondary roads. A specific fund should be made available for investments in a limited number of strategic non-national routes. Alternatively, a review of road classification might allow these roads to attract funding as part of the national road network.

Rail transport has been increasing its 'market share' in certain areas, and appears to be preferred by commuters. Against this preference, the costs of providing a service both in capital and operating cost terms need to be considered. Our recommendations on both main-line and suburban/urban fixed rail investment is that careful analysis of individual projects needs to be carried out well in advance of planning such infrastructure. Where the project evaluations pass established criteria, including a comparison between alternative modes, investment should proceed. As the international evidence shows, for inter-urban routes rail investment is rarely the correct choice. This is especially the case in Ireland since the population density in many areas is low resulting in relatively low demand when judged against the total potential capacity and costs. The available evidence on the Western Rail Corridor is not convincing and we accord this project a relatively low priority.

There may be a need for expansion of urban public transport in all gateways. In this respect some fixed rail investment may be optimal. In the transport chapter we recommend that such investments are not only judged against alternative modes, but also that the system wide impact is taken into account. In relation to fixed rail investment in the Greater Dublin area, if accompanied with the appropriate spatial planning control, this can have a significant positive impact reducing congestion.

It is established Government policy that the principal commercial air and sea ports should no longer be recipients of State funding for capital works, and that they should be financed, as to both operating and capital costs, by charges to users. We endorse this approach, which internalises the costs and also provides market signals to guide investment. With respect to regional development it appears more important that access to the major airports Dublin, Shannon and Cork be improved than to improve the infrastructure in regional airports that have limited scope to expand routes to key

international hubs. Since air travel is particularly important for those individuals who require relatively speedy transport, access to major hubs has become increasingly important.

WASTE INFRASTRUCTURE

There is now a much-reduced role for central Government funding of waste management services, our recommendations here are limited. There is a level of momentum building up in the sector, in terms of increased diversion of waste from landfill, and the delivery of new infrastructure, and this should continue without the need for direct Government intervention.

It is important that the administratively imposed regional structures do not impact on investment decisions for major infrastructure such as landfills and incinerators, specifically the number and size of these facilities. These should be decided on economic grounds, taking into account environmental considerations. Considerable economies of scale exist in the delivery and operation of these facilities: fewer, larger landfills and incinerators will cost society less than more, smaller facilities.

WATER INFRASTRUCTURE

The regional need for water infrastructure is driven by the evolution of the population and economic activity. Of course, overall use of water could be reduced through the correct pricing of water and through leakage reduction. Allocating infrastructure rationally is greatly aided by the correct pricing of water, and in this respect involvement of developers is also important.

From a regional development perspective it is important to develop sufficient capacity to accommodate the population growth and growth in economic activity. The NSS seeks to increase the critical mass and thereby the population of the hubs and gateways. Consequently, for the gateways and hubs a limited 'strategic reserve' capacity in water supply and waste water treatment should be considered. This would ensure that capacity is available for new investment.

HOUSING

As with water, social and affordable housing needs are demand driven. However, as house price inflation has been particularly severe in the major urban areas, which also tend to contain concentrations of poor individuals, the need for investment in housing should be concentrated in those areas. This, however, should be subject to further detailed analysis of housing waiting lists and other relevant information.

Apart from the social and affordable housing, the housing needs of the wider population need to be catered for. This is not a function of the public sector. However, it is important that sufficient serviced land will be available especially in the hubs and gateways in order to ensure that critical mass is generated.

ENERGY

The regional development issue regarding energy is the capacity of the energy transmission network to supply all energy needs. In some parts of the country (e.g. Donegal and some parts of the West) the electricity transmission network has insufficient capacity in order to cater for significant additional demand. This could restrict the development potential of these areas. While direct public intervention is not warranted, it will be important to ensure that the planning process will not delay any improvements in the infrastructure.

TELECOMMUNICATIONS

The availability of broadband is argued to be important in ensuring future competitiveness. While one can argue with this view, it is important that firms in particular have access to modern telecommunications infrastructure, and in particular broadband. With the MAN's programme considerable progress has been made in rolling out broadband in many small towns. It is unlikely that significant unmet demand exists in the gateways and hubs. However, particularly in rural areas, the roll-out of broadband remains problematic. While rural areas have a very low broadband coverage, these are also the areas with the lowest PC ownership and therefore potential demand. In Northern Ireland there is 100 per cent broadband coverage but take-up has been poor. This suggests that a cautious approach to providing rural broadband should be followed.

HUMAN RESOURCES

Many of the interventions in the area of human resources are 'space neutral', that is they apply to all areas. However, particularly in the area of third level and early school leaving there is more regional differentiation. Early school leaving is a national problem, but a number of urban areas have more concentrated problems, which are more amenable to intervention.

As was highlighted above, a process of divergence in relation to third-level attainment rates across the regions has been ongoing. This is important for regional development since the availability of graduates has become more central to economic development than almost all other factors. While the spatial distribution of universities is uneven, creating new universities or converting the Institutes of Technology to universities is not warranted. This is supported by the high third-level participation rates among some countries, which do not have a university. Rather, the problem is with attracting the graduates back to their home areas. In this respect the circular relationship between the availability of highly-skilled workers and the demand for them. If an area does not have a high-skills workforce it is unlikely that a high-skills employer will locate there, thereby reducing the incentive for high-skills individuals to live in this area. This needs to be tackled through other measures that determine the quality of life and firm location.

RESEARCH AND DEVELOPMENT

The regional innovation strategies that were supported through the current NDP have not been a success. With the increased funding recommended in this study, new ways of ensuring that innovation takes place in all regions will need to be found. In this respect the Institutes of Technology will play an important role. However, it seems unrealistic to expect them to carry all the burden of innovation at the regional level. Thus, closer links between the Universities and the ITs and Universities and firms in all regions need to be fostered.

CHILDCARE

As with other investments, childcare is highly dependent on demand and thus the evolution of the population. As the hubs and gateways are targeted for growth, more resources are likely to be needed in those centres.

SPORTS AND ARTS

Sports and arts facilities play an important role in determining the quality of life of the population. As quality of life is important in attracting and retaining skilled workers these facilities play an important role in regional development.

NEW GATEWAYS AND HUBS MEASURE

While all these individual investments are important, their co-ordination is even more important. This will require effective planning at the local and regional level. Consequently, the NSS required regional planning guidelines (RPGs) to be drawn up. While the experience with these RPGs is still patchy there appears to be more take-up.

In order to incentivise the gateways and hubs further we propose that an integrated measure for gateways and hubs be established in the next NDP. This will fund large integrated projects on a competitive basis. While at the margin resources should be targeted at the gateways and hubs rather than other areas, incentivising the gateways and hubs and in particular those that are made up of more than one urban centre or more than one local authority would appear to help in fostering a greater emphasis on joint projects. The funds available through this measure should be additional to those available under other measures, which means that there should be an incentive for gateways and hubs to apply. The types of projects that should be supported under the measure should always incorporate either several different investment strands (e.g. the integration of different infrastructure) or several administrative units (e.g. several local authorities). This ensures that there is significant value added from the investment, which might not take place otherwise.

There are two ways in which a competitive nature to the measure can be achieved. First, funds in this measure could be allocated subject to very tight criteria so that the total budget is not spent

unless sufficient good applications are forthcoming. Alternatively, the measure could be set up in such a way that only some gateways and hubs are successful. While the latter has the disadvantage that not all projects, regardless how good they are, would be funded while the former has the disadvantage that there is always a danger that once funds are available, that they will be spent regardless of the quality of applications. The level of funding proposed below is indicative and clearly one may want to alter this in light of some pilot costings.

A major failure of the current NDP was not to include regional development selection criteria as part of the programme complements. As the discussion above indicates, almost all investments have a role to play in regional development. Going forward the NSS needs to be fully taken into account through explicit project selection criteria that take regional development into account.

6.5 Current Activity on Specific Urban, Rural and Regional Development Measures

As was indicated above, under the current NDP a number of measures were aimed specifically at rural development. The *Area Base Rural Development* initiative provided funding for a range of local activities including networking, the production of business plans, local crafts and tourism/agri-tourism. While this measure is useful its scope limits the likely impact on total employment. Furthermore, the cost of a job created under this measure was quite high.

The *Village and Town Renewal* measure suffered from poor progress but was nevertheless evaluated favourably as part of the *Mid-Term Evaluation*. This measure can play an important role in improving the built environment in urban areas of various size with should have a positive impact on the quality of life in these area. In this respect the protection and enhancement of the heritage needs to be an important objective, which will also help support a vibrant tourist sector. This aim was supported through the *Heritage Conservation* measure.

The *Western Development Fund* on the other hand was more specifically aimed at conventional enterprise support through the provision of loans and equity for SMEs and firm start-ups. Thus, this sub-measure is very similar to the micro-enterprise and equity sub-measures in the Productive Sector OPs, but with a specific spatial extent in that it relates only to the counties of the Western region as defined by the Western Development Commission Act. Given the fact that rurality is not just an issue affecting the selected western counties it is difficult to understand the limited spatial remit of this measure. Furthermore, as it is similar to other measures there appears to be a degree of duplication, indeed there is also a similar measure aimed at Gaeltacht areas. These concerns are particularly pressing as the unit costs of the measures differ significantly. The *Mid-Term Evaluation* of the current NDP pointed to the fact that the cost of creating a job through the Western Development Fund was

over six times higher than that of a job created through the micro-enterprise Selective Financial Intervention sub-measure.[28] In general it is not good practice to have proliferation of different schemes, which are essentially doing the same. Thus, all measures of financial support to small and start-up enterprises should be merged, but carry a bias towards rural areas.

The *Rural Development Fund* provided support for research, evaluation and pilot actions. As solutions to the problems of rurality need to be developed this measure appears to be useful. However, attention needs to be directed towards the outputs of the measure. Currently, the performance indicators are the number of consultancy reports produced and the number of recommendations adopted. There has to be a more direct link to policymaking and other measures. For example, if research funded under such a measure produces a finding that is relevant to another measure there should be a mechanism by which the findings can be incorporated.

RECOMMENDATION ON THE SPECIFIC MEASURES

Given the poor prospects of the primary sector on farm structural and fisheries measures should be downgraded but the general rural development measures should be maintained. This suggests that a general redirection of resources to a better-targeted rural development measure would be desirable. Better targeting not only refers to identifying target groups of individuals and firms but also spatial targeting. The experience from the *Mid-Term Evaluation* suggests that some measures would benefit from a significant review and re-design. The Area-based Rural Development Initiative suffered from the high costs of additional jobs created. In this respect it performed no better than the Western Development Fund, which we recommend should be merged with a number of other similar measures. It may well be the case that the existing performance indicators in this area are not appropriate.

Overall, our recommendations are to maintain expenditure in all specific regional development measures that were part of the current NDP as these make an important contribution.

Furthermore, as highlighted above, we propose that a new integrated infrastructure measure to support the NSS be established. This will ringfence some of the resource recommended for expenditure under the various infrastructure investment areas for a competitive fund for gateways and hubs.

[28] At the time of the *Mid-Term Evaluation* 122 new jobs had been created in the BMW region through the Western Development Fund at a cost of €27,352 per job, while a total of 3,637 jobs had been created under the Selective Financial Intervention measure at a unit cost of €4,431. According to the Department of Community, Rural and Gaeltacht Affairs, the unit cost to this point is €13,900.

Table 6.4: Urban, Rural and Regional Development

Measure	Recommendation	2006 (€ million)	2007-2013 Average (€ million)
Rural Development Fund	Same	5.5	5.5
Heritage Conservation (Historic Properties)	Same	19.0	19
Urban and Village Renewal (incl. Gaeltacht)	Same	21.5	21.5
Area Based Rural Development Initiative	Same	13.0	13
NSS integrated infrastructure measure	New	0	70
Total		59	129

The 2006 allocation is based on the figures for the NDP and is not directly comparable with the MACIF used in Chapter 5.

6.6 Summary and Re-commendations

The results of the latest academic literature on economic geography suggest that lagging regions may find themselves locked in a vicious circle of underdevelopment, which even with public intervention is likely to be difficult to break. The international experience shows, that small remote communities are often not viable without substantial public supports, since the economic basis on which they were founded has disappeared. It is important to re-emphasise that rural development is a much wider concept than agri-development. At a time where the primary sector continues to decline in importance not just nationally but also in almost all rural areas more attention needs to be focused on activities that are outside the primary sector. Already, the majority of farmers are working only part-time on their farms, and thereby the rural economic base is broadening.

The poor urban structure and low population density has limited the scope for development in some regions. This, coupled with the dominance of Dublin has also focused attention on the generation of critical mass in 'counter poles' to Dublin. This of course needs to recognise that Dublin is the only city of international size on the island.

Overall, focusing on critical mass, the central aspect of the NSS, is supported by the economic geography literature. Furthermore, critical mass development that concentrates the population in and around selected centres results in lower costs in public service provision and better services. Changing the recent development pattern from one of dispersal towards one of concentration will have significant environmental benefits through reduced long distance commuting.

It is against this background that the NSS was framed. Given the aims of supporting critical mass outside of Dublin, while not undermining Dublin and simultaneously supporting development outside the gateways and hubs means that the NSS balances a number of potentially competing aims. Achieving these aims requires thorough co-ordination of all Government policies, and especially investment policies. The NDP is perhaps the most

important tool to implement the NSS. In this respect there are a number of key actions that will be necessary:

- Investment in the gateways and hubs needs to be prioritised which requires the project selection criteria to explicitly incorporate the NSS. This is important for all aspects of the NDP not just a subset.
- The regional focus of the NDP has to move from the NUTS 2 level towards the NUTS 3 planning region level.
- A specific NSS measure should be introduced in the NDP.
- The investments under the NDP must be supported by strong planning, particularly in order to prevent further urban sprawl and in order to build up the critical mass.
- The evaluation of the regional aspects of the NDP and the NSS require the proper research infrastructure to be built up.
- Further research in the mechanisms driving the spatial patterns needs to be undertaken.

7. ENVIRONMENT

7.1 Introduction

Given the huge scope of economic activity covered by the NDP it will have a wide-ranging impact on the environment. The channels through which it will impact on different environmental media (water, air etc.) are many.

The most obvious and direct channels are where the investment has been driven directly by environmental needs. These types of investment include the investment to clean up emissions to water and to guarantee a safe and satisfactory water supply for households and business. In addition, while not a major call on public resources, the regulation and provision of facilities for dealing with solid waste are also of clear economic and environmental importance.

The second type of channel through which the NDP will impact on the environment is indirectly through the effects on economic activity of specific NDP measures undertaken for reasons other than their environmental impact. For example, the investment in public transport should allow a reduction in commuting by car and, hence, in greenhouse gas emissions and in congestion. These environmental benefits are a by-product of the investment.

The third and most indirect channel is where NDP measures affect the overall level of economic activity in the economy and where that economic activity itself has an indirect effect on the environment. For example, at the most aggregate level the NDP investment, by relieving constraints on economic growth, will contribute to a long-term higher level of output in the economy. *Ceteris Paribus* higher output will result in higher emissions of greenhouse gases. Under the *High Growth* scenario, described in Chapter 4, emissions of greenhouse gases in 2013 will be about 3 percentage points (relative to 1990) higher than today. However, much of this increase would happen even if there were no NDP investment.

7.2 Progress to Date

In the case of the current Economic and Social Infrastructure Operational Programme environmental principles have played a key role in the selection of the priorities. These include the Public Transport Priority, selected because it holds out the prospect of, among other things, reduced congestion and emissions and a better spatial distribution of habitation, though the balance with respect to roads is not spelt out. The Environmental Infrastructure Priority addresses environmental concerns including those of EU Directives (Urban Waste Water and Drinking Water), pollution of rivers and lakes and inadequate access to public waste water treatment facilities.

Major progress towards achieving full compliance with the directive will be made under the current NDP.

The aims of the Priority for Sustainable Energy include improved local air quality and reduction of pollutants, especially of CO_2 emissions, to levels agreed in the Kyoto Protocol on combating climate change. In the current NDP this measure is limited in nature, though still making a contribution to promoting energy efficiency. The alternative energy provision in the NDP was to some extent overtaken by events. Extensive deployment of wind energy is taking place driven largely by market forces rather than because of any state support under the NDP. In this case the fact that money has not been spent while the objective has been achieved represents a significant success.

Where the Roads Priority in the current NDP is concerned, environmental principles affect its manner of delivery so that the investment will ensure 'a high level of environmental protection'. Many of the projects in the Regional Operational Programmes are guided by environmental objectives, especially in the Local Infrastructure Priority, which includes waste management, habitat protection and heritage conservation. The Agriculture and Rural Development Priority includes support for farm waste management and animal carcass disposal. However, as discussed later it is questionable whether such support should be necessary to achieve the desirable environmental goals.

7.3 NDP 2007-2013

The underlying purposes of investment in water infrastructure are on the one hand the provision of clean and safe water and, on the other hand, the protection of public safety and water quality in water bodies. Economic and demographic growth, the implications of the Spatial Strategy, the need to meet national and EU standards, and the satisfaction of benefits from water-related activities and passive enjoyment on the part of tourism, are drivers of the 'where', 'how' and 'how much' investment is advised. It goes without saying that the achievement of efficiency in the investment's specification, delivery and subsequent operation, or getting value for money, is a key requirement.

While there will still be some work to be done in the next NDP to achieve full compliance with the Urban Waste Water Directive, the progress achieved to date has been maximised as all the larger projects have been completed or are nearing completion. The result is a major improvement in the waters surrounding the island of Ireland. Where progress is still required is in the quality of water supply and in reducing emissions to the rivers and lakes of Ireland from human activity, including agriculture.

The next plan will be framed in particular by the standards and procedures specified for drinking water and in the Water Framework Directive. Population growth of 13 per cent by 2013 and 28 per cent by 2020 (according to the high growth scenarios) point to extra demand for water services as well as opportunities for installing water-using equipment and procedures for efficient water

consumption. In addition to population growth, projected lower occupancy of dwellings also raises consumption.

The issue of global warming may be a long term one but its possible impacts should also be considered. Water availability for increased abstraction in the eastern and south-eastern regions is becoming tight and there are associated implications for ground water use, the possibility of low-flow situations and potential problems for dilution of water-borne effluent. As a consequence water services will be more costly to deliver and efficiency becomes all the more important. In so far as the existence of water infrastructure acts as a 'facilitator' for future population and growth, the positioning of such infrastructure has long-term effects. Given significant economies of scale, enjoyed by waste water treatment plants in particular, careful consideration of positioning at hubs and gateways is called for.

Because of the absence of domestic water charges the consumption of water by the domestic sector, which constitutes approximately half of all consumption, is insulated from the costs it imposes on the system, not to mention future potential environmental costs. This situation goes against the spirit of the Water Framework Directive and it means that careful users ultimately pay through their taxes for the wasteful use of others. Analysis of the issue is called for as it could see excess capacity being provided as well as water-saving technology ultimately not receiving the support it deserves (because of the failure to acknowledge the true economic cost of water use). A serious and sensible look at charging is required.

In keeping with the underlying purposes of investment in water services outlined above, the indicators need to be carefully formulated to look at the results of specific investments. Water quality downstream of plant needs to be measured before and after investment to show whether the investment policy achieves its aim. Such indicators would also constitute parameters for the cost-benefit analyses. Cost-benefit analyses should become increasingly important under the Water Framework Directive, which is more flexible than the Urban Waste Water Treatment Directive by being relatively more focused on objectives rather than on means and has the potential for greater efficiency. More attention should also be paid to the potential benefits of leakage reduction.

While not a major factor in expenditure under the NDP, the problem of minimising the generation of solid waste and of disposing of it in an environmentally satisfactory manner has featured in the current NDP and should be a feature of the next NDP. This is a regulatory issue as the large investment to be made should be undertaken on a purely commercial basis and the cost should be paid by those who generate the waste – businesses and households. Significant progress has been made in implementing the polluter pays principle in this sphere and this is having a significant impact in reducing the volume of waste generated by households (Scott, Watson and Gorby, 2006).

Going forward the regulatory regime needs to ensure that the cost of the investment to be undertaken in waste disposal is minimised and that the new infrastructure is used as efficiently as possible. Rather than encouraging the development of many different waste disposal facilities the aim should be to reap the economies of scale that technology allows (Barrett and Lawlor, 1995). This will also be important to ensure that the necessary environmental regulation of the waste disposal facilities can be undertaken on an ongoing basis in a cost and environmentally effective manner.

Another measure under the NDP directly affecting the environment is the investment in promoting energy efficiency. These measures are designed to encourage more efficient use of scarce energy resources and also to minimise the resulting emissions of harmful gases, especially greenhouse gases.

The impact of the transport investment is difficult to determine without having details of the public transport programme that is warranted on cost benefit grounds. However, as provided for in Chapter 12, there is likely to be a major increase in investment in this area of the economy over the course of the next NDP. To some extent the provision of such infrastructure will, through normal market forces, result in some increase in urban densities, some reduction in car-based commuting and a move towards more sustainable living.

If the investment in urban public transport is to produce its full economic benefits, as discussed in Chapter 12, it will need supporting measures to be implemented. These will include road pricing and physical planning guidelines designed to move Dublin towards a more sustainable model of living.

If the investment is to produce a reasonable economic return to society it will be important that the physical planning process changes to promote much denser development around the new public infrastructure network. This, in turn, will produce an environment that is more sustainable in terms of lifestyle. With higher utilisation of public transport and, as a result, less commuting by car, emissions of greenhouse gases will be reduced in the long-term. In addition, it will reduce the problems of congestion. It will also produce more efficient use of scarce land resources. Finally, because of economies of scale in the provision of other infrastructure such as water, waste water and waste disposal, it may produce additional economic savings and environmental benefits.

It will be important that if and when a comprehensive study is done on the proposed public transport network for Dublin the environmental effects are also examined. Even if a value is not put on these benefits some account needs to be taken of them in deciding on the prioritisation of public transport projects.

The proposal to implement appropriate road pricing in the long term would have important environmental benefits as well as producing much more efficient use of costly transport infrastructure. Even without the internalisation of the cost of greenhouse gas emissions, the effect of such a regime would be to

reduce commuting and unnecessary journeys. In reducing congestion it will also reduce emissions per commuter journey even where undertaken by car. In promoting a more sustainable lifestyle based around increased utilisation of public transport it would enhance further the environmental benefits already identified above.

Large investment is likely to materialise in the next NDP and potential technologies and spatial choices range from the environmentally sensitive to the environmentally insensitive kind. The opportunity to incentivise choices so that they are mindful of environmental costs should be exploited wherever appropriate by the application of the polluter pays principle.

The recent housing policy framework entitled *Building Sustainable Communities*[29] emphasises a number of key policy directions for the medium term, including the building of active and successful communities, continuing improvements in the quality of houses and neighbourhoods as well as introducing measures to modernise the private rented sector. If implemented as part of the social housing programme it would also have environmental benefits.

The direct effects of a number of key measures in the NDP on emissions of greenhouse gases will be beneficial. In particular the investment in public transport and in sustainable energy can be expected to mitigate the increase in emissions that would otherwise occur. However, by facilitating more rapid growth in the economy, resulting in the level of GNP being almost 2 per cent higher than would otherwise be the case in 2020 (Chapter 5) the NDP will have an offsetting indirect effect of increasing emissions of greenhouse gases. For 2020 the analysis in Chapter 5 would suggest that greenhouse gas emissions would be around 3.25 per cent higher than would be the case with no NDP. However, this estimate takes no account of the benefits, mentioned above, which are likely to arise from individual measures such as investment in public transport.

[29] *Housing Policy Framework – Building Sustainable Communities*, Department of the Environment, Heritage and Local Government, December 2005.

8. LISBON STRATEGY

The Lisbon Strategy was drawn up at the EU European Council held in Lisbon March 2000. It is the EU response to the challenges of accommodating the impact of globalisation and enlargement and has the overarching aim of making the EU …*the most competitive and dynamic knowledge-based economy in the world, capable of sustainable economic growth with more and better jobs and greater social cohesion*. Since the EU Commission has only limited policy levers to achieve this goal the key responsibility to pursue the Lisbon Strategy rests with the Member States.

The Strategy identified the low employment rates especially among woman and older persons, high structural unemployment and the under-developed service sector as particular weaknesses. Furthermore, it pointed to the need for a shift towards a knowledge driven economy which is to be achieved through investments in R&D and the information society. The development of the information society is projected to provide a strong engine for growth. Importantly, the Lisbon Strategy also recognised the need for modernisation of the European social model.

Progress on achieving the Lisbon Strategy has been slow, and consequently it was re-launched in 2005. Noting that the EU had diverged in terms of economic performance from the main competitors, the EU Commission asserted that achieving the aims of the Strategy were more important than before. Overall, the aims of the re-launched Strategy are to "…deliver stronger, lasting growth and creating more and better jobs". Specifically, the Lisbon Strategy is to be implemented through the *National Reform Programme (NRP), which brings* together the wide variety of policies and initiatives under the ten key policy areas that were identified in the re-launched Lisbon Strategy:

- Extend and deepen internal market.
- Open and competitive markets inside and outside.
- Improve European and national regulation.
- Expand and improve European infrastructure.
- Increase and improve investment in R&D.
- Facilitate innovation, the uptake of ICT and the sustainable use of resources.
- Contribute to a strong European industrial base.
- Attract more people into employment and modernise social protection systems.
- Improve the adaptability of workers ad enterprises and the flexibility of labour markets.

- Increase investment in human capital through better education and skills.

Given the focus on employment, the Lisbon Strategy supersedes the *European Employment Strategy*, which was devised in 1997/98 in the context of high unemployment in Europe and focused on interventions to tackle unemployment and social exclusion. A further development is the preparation of the National Strategic Reference Framework (NSRF), which is required by the EU commission in relation to cohesion policy. The NSRF is to link the various national policies to the EU Cohesion goals.

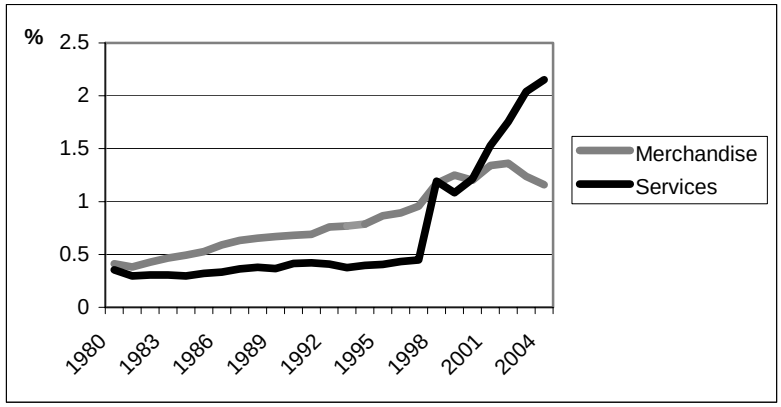
RECENT DEVELOPMENTS

If one considers the key aim of the Lisbon Strategy is to enhance competitiveness of the EU, it is useful to consider the contribution that Ireland is making towards this objective. Given that export shares are a measure of competitiveness it is straightforward to analyse the evolution of Ireland's competitiveness using data from the United Nations on Irish exports as a share of total world trade. As services exports are becoming an increasing share of total exports it is also important to consider both merchandise and services shares, which are both shown in Figure 8.1. The Irish share in world merchandise trade increased steadily until 2002 and declined since then. This suggests that with respect to merchandise trade Ireland has lost competitiveness. Services exports as a proportion of world services trade grew very slowly until 1997 but have increased rapidly since then. This structural break may reflect a change in classification so this graph has to be interpreted cautiously.[30] Nevertheless, the recent growth has been very significant, and while there was a small dip in the share in 2000, this growth has continued, suggesting that Ireland remains competitive with regard to services trade. Overall, the annual average real growth of services exports from Ireland was 27.5 per cent. With the exception of transport (4.8 per cent), tourism (2.9 per cent) and royalties (-8.3 per cent) all sub-sectors grew at a very high rate over the period 1998 to 2004. For example, there has been strong annual average real growth in insurance (40.1 per cent), financial services (42.2 per cent), computer services (36.1 per cent) and business services (40 per cent).[31]

[30] The International Financial Services Centre (IFSC) which could also be thought to contribute to the structural break was set up in 1987 so is unlikely to be the source of the break.

[31] These numbers are derived from the balance of payments statistics using the GDP deflator to convert the current series into a constant price series.

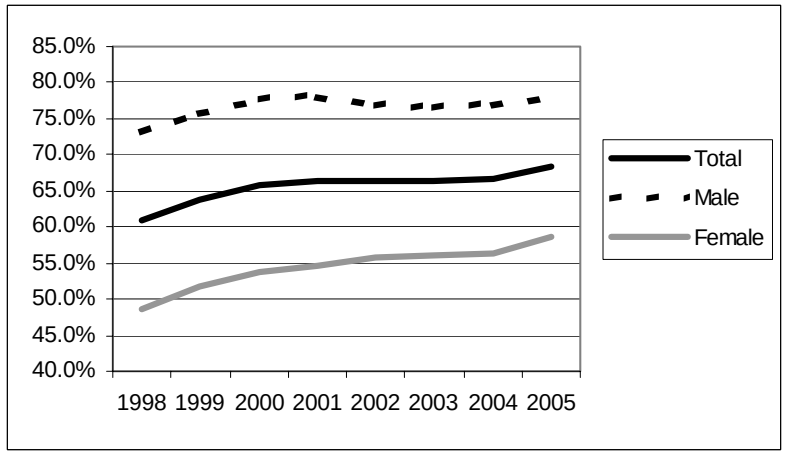
Figure 8.1: Irish Merchandise and Services Export Shares in Total World Trade



Source: United Nations Trade Statistics (www.un.org).

A key aim of the Lisbon Strategy is to increase the employment rate, that is the proportion of the population aged between 15 and 64 years that is working. A particular focus is on the employment rates of females and older workers. In this respect EU targets have been set. The overall employment rate targets are 67 per cent by 2005 and 70 per cent by 2010, while for females the more modest targets at 57 per cent by 2005 and 60 per cent by 2010 reflects the lower labour force participation. Also important is that there is some convergence between the male and female employment rates.

Figure 8.2: Employment Rates (Numbers Employed Divided by the Population Aged 15-64 Years)

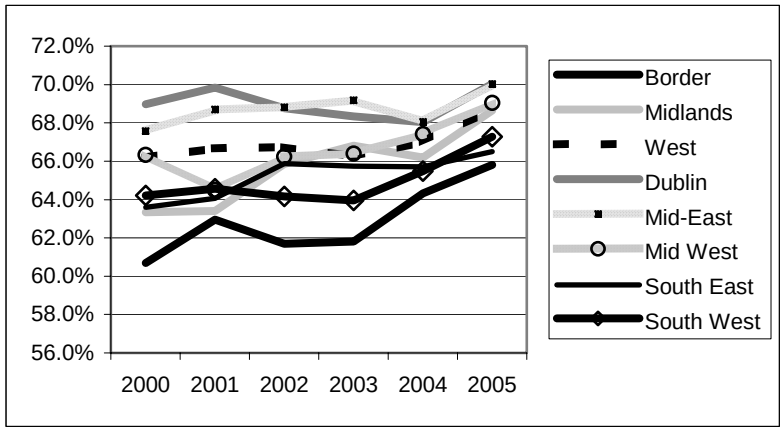


Source: Own calculations using CSO *Quarterly National Household Survey* and *Population and Migration Estimates*, various issues.

There is considerable heterogeneity between the regions in terms of the employment rate, which is shown in Figure 8.3. Again a pattern of convergence between regions is evident which is to a

large extent driven by increases in the female labour force participation.

Figure 8.3: Employment Rate by Region



Source: Own calculations using CSO *Quarterly National Household Survey* and *Population and Migration Estimates*, various issues.

ROLE OF THE NEXT NDP

The next NDP will build on what has been achieved so far in order to consolidate and improve competitiveness and thereby contribute to the achievement of the Lisbon Strategy. By enhancing the productive capacity of the economy, and especially by addressing key constraints, the next NDP can increase sustainable economic and employment growth. All investments recommended in this study address the key policy areas of the Lisbon Strategy. Exceptions are: extension and deepening of the internal market, fostering competitive markets and improving European and national regulation. However, they are not irrelevant to this study in that they set an important context. For example, the expansion and deepening of the internal market is likely to have a stimulatory effect and allows Ireland to benefit since it will open new markets. In this respect developments in freeing up services trade are likely to be important. Ireland is already highly competitive in traded services and lower barriers to services trade are likely to benefit Ireland more than other countries. Similarly, the degree of competition has an important impact not only on the general price level but particularly on sectors related to the investment priorities. In this respect increased international competition for construction projects might reduce the capacity constraint of the sector and is likely to result in more modest inflation. As part of the accompanying measures this report proposes a number of recommendations on regulation for example in the telecommunications area.

This report accords the highest priority to addressing infrastructure bottlenecks and, therefore, recommends substantial further investment in infrastructure particularly in the areas of transport, water services and housing. Investments in other areas such as waste, energy and telecommunications will largely be put in

place through own resources of the service providers, be they state owned companies or private enterprises. Not using public resources in these areas supports competitiveness for two reasons. First, the private sector, due to the profit motive has the incentive to seek out the most productive investments. Given the incentives for the public sector it is much less likely to choose the best investments in areas where the private sector is strong. Second, since higher taxes reduce growth through their impact on competitiveness, limiting the total public investment to those areas of highest priority supports growth.

The recommendations on R&D are to increase resources devoted to this area substantially. Building on investments to date, the aim of our recommendations is to achieve a step change in the level of R&D investment in Ireland over the period of the NDP 2007-2013. Our recommendations envisage substantial increases in public investment in both higher education R&D and support measures for private sector R&D activity. This increased investment in R&D will facilitate innovation and contribute to a strong European industrial base. Of course the focus of the Lisbon Strategy on the industrial base is somewhat misplaced since it appears to undervalue the role of traded services in driving growth.

Furthermore, this report recommends increased spending on education and training, which will increase the stock of human capital and, therefore, is likely to raise productivity. This will not only facilitate the increase in R&D required but will also address educational failure, which is associated with poor labour market outcomes. Therefore, the investment in education is likely to result in improved labour market participation and indeed lower unemployment.