

**MEDIUM-TERM
REVIEW**

2003-2004

**ADELE BERGIN
JOE CULLEN
DAVID DUFFY
JOHN FITZ GERALD
IDE KEARNEY
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Work on this year's *Medium-Term Review* has been a lengthy process, which involved many experts both from within and outside of The Economic and Social Research Institute. In preparing the *Review* for publication the authors have drawn heavily on the expertise of the Director and staff of the ESRI.

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The last word of thanks goes to Pat Hopkins, Regina Moore, Mary Cleary and Deirdre Whitaker all of the ESRI, because without their professionalism, expertise and attention to detail, publication would simply not have been possible.

Finally, the authors themselves are solely responsible for the analysis, views and conclusions reached throughout the *Review*.

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SUMMARY

Introduction

In the mid-1990s, when Ireland's period of exceptional growth began, there were some who feared that it was a mirage and that, as the dust settled, Ireland would wake up and find that the growth in output had never happened. However, as successive years of growth built into a boom, such fears were seen to be groundless. One of the clearest manifestations of the real success of the 1990s was the rapid move from high unemployment in the first half of the decade to a period of full employment at its end.

Today, after almost two years of slow growth with rising unemployment, expectations as to future prospects are very much reduced. The current relative gloom is deepened by the obvious difficulties facing our Euro area partners. Looking forward, there is continuing concern that the current downturn represents a definitive end to the Irish success story of the late 1990s. Like Icarus,¹ has the Irish economy melted its wings by flying too close to the sun and is a crash-landing likely? In this *Review* we argue that even if Icarus has singed his wings, the prospects remain reasonably bright for a "soft landing". Provided that the world economy, and especially the European economy, finds its way back to its normal growth path by 2005, the factors that gave rise to the very rapid growth in the last decade are not yet exhausted, and the Irish economy still has the potential to grow at 5 per cent a year for another five years to the end of the current decade. As a result, after the current period of underperformance, there could be a corresponding period of catch-up, to return the economy to full employment. Once the unused potential is exhausted, possibly around the turn of the current decade, the Irish economy would then revert to a more sedate European and US pace, growing at around 3 per cent a year. Whether this potential is realised depends, firstly, on a recovery in the EU economy to realise its growth potential and, secondly, on a restoration of domestic competitiveness.

Because of the uncertainty that is inevitably attached to forecasting, it is very important to look at a number of different scenarios to get a feel for the range of possible outcomes. While we believe that the most likely outcome is that portrayed in the *Benchmark* forecast in Chapter 3, the one certainty is that reality will prove rather different.² As a result, in Chapter 4 we look at what might go wrong and what might go right, both externally and domestically, and how alternative scenarios might change the prospects for the economy over the course of the decade.

The *Benchmark* forecast and the likely margin of error that attaches to it, as discussed in Chapter 4, should inform policy makers as to how best to prepare the economy for the demands of an uncertain and evolving external environment. Policy should be formed so as to be robust in the face of quite a wide range of possible outcomes. It would be dangerous to stake success on any one scenario, even on the scenario we consider to be the most likely outcome, the *Benchmark* forecast of Chapter 3.

¹ In Greek mythology Icarus made a set of wings and learnt to fly. His father Daedalus uttered frequent warnings about the dangers of soaring too high towards the sun. Like many kill joys (and many fathers) he was ignored! When the sun melted the wax holding Icarus' wings together he crashed into the sea, with fatal consequences.

² Appendix 2 looks at the *Medium-Term Review's* track record over the last seventeen years.

Background Assumptions

While some serious policy mistakes have been made domestically over the last five years, the primary cause of today's slowdown lies outside the country. The rather different problems affecting the US and the Euro area economies in the short term provide a very unfavourable environment for an economy as open as Ireland's.

As we saw in the last *Medium-Term Review* in 2001, the US economy was on an unsustainable growth path, with a rapidly rising external deficit, even before the events of September 11th. As discussed in Chapter 2, the change in the euro-dollar exchange rate that has occurred in recent months will go some way to easing this problem, but it will still leave dangerous imbalances in the US. In the case of the Euro area economy, the problems with competitiveness, inefficiency, and the deteriorating public finances have all contributed to a prolonged period of underperformance.

The recent rapid appreciation in the euro, along with falling oil prices, has imparted a strong deflationary impulse to the Euro area. On top of the existing problems of the Euro area economies, this will further reduce profitability and competitiveness on the wider world market. As a result, it seems unlikely that there will be a strong European recovery before 2005. However, in spite of the prevailing pessimism, we see the European economy as having the potential to grow at up to 3 per cent a year once the current difficulties are resolved. The financial imbalances present in the US economy are not present in the same way in the EU.

Domestically, a number of demographic factors that made the boom of the late 1990s possible, especially the growth in the skilled labour supply, still may raise Ireland's potential growth rate above that of its neighbours (Chapter 2). The growth in labour supply could average around 2 per cent a year to the end of the decade, with the unskilled labour supply falling and the bulk of the increase concentrated among those with a third level education.

The falling dependency rate will continue out to the end of the decade. This will ease the pressures on the public sector, while at the same time greatly enhancing the output potential of the economy. The natural increase in the population will also remain elevated relative to our EU partners because of the legacy of high birth rates in previous decades. Immigration, which has played a positive role in enhancing labour supply and the productivity of the labour force, is likely to continue out to the end of the decade.

The Benchmark Forecast

The economy has the potential to grow quite rapidly for another five years. While it is likely to be much less vibrant than in the boom years of 1994-2001, it will nonetheless be well above the dreams of our EU neighbours. This potential for quite rapid growth is due to the key demographic factors remaining favourable, and also to related factors affecting the productivity of the labour force.

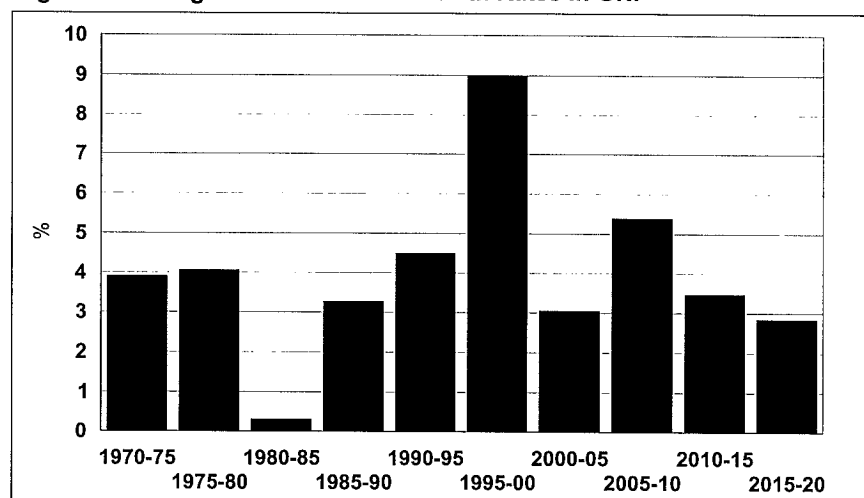
Looking beyond 2004, we anticipate a world recovery from 2005 onwards, with the Irish economy regaining some lost ground. The period of underachievement in the first half of the decade could be offset in the second half of the decade by a period of growth above the long-term potential of the economy (Table 1). Such a time path for output would see the economy restored to full employment by the end of the decade. This is the picture portrayed in the *Benchmark* forecast in Chapter 3 of this *Review*. It shows a similar average growth rate for the decade to that in *Medium-Term Review: 2001-2007* published in September 2001 – we have not greatly changed our view as to the potential growth rate of the Irish economy. The difference in this *Review* is that we see more of the growth occurring in the second half of the decade, 5.4 per cent a year, compared to 3.1 per cent a year in the first

half (Figure 1). After 2010, the growth rate will slow to around 3 per cent a year, reflecting the changed demographic circumstances.

Table 1: Benchmark Forecast, Major Aggregates

	2002	2003	2004	2005	2006	2007	2008	2009	2010	1995-00	2000-05	2005-10	2010-15	2015-20
	Per Cent									Annual Average % Growth				
GDP	6.3	2.6	3.1	6.1	6.6	5.9	5.9	5.3	5.0	9.8	4.8	5.7	3.3	2.9
GNP	0.6	2.4	3.0	4.7	5.7	5.6	5.7	5.1	4.8	9.0	3.1	5.4	3.5	2.8
GNDI (incl. Capital Transfers)	2.9	1.2	1.1	4.5	5.5	5.4	5.7	5.1	4.8	8.6	2.9	5.3	3.2	2.2
Investment-GNP Ratio	27.3	26.6	26.4	26.2	26.1	26.1	25.9	25.5	25.1	25.2	26.8	25.7	24.4	20.7
Consumption Deflator	5.6	3.5	2.0	3.2	2.8	3.0	3.2	3.4	3.2	3.3	3.7	3.1	2.5	2.0
Employment, April	2.0	1.2	1.2	2.4	2.5	2.7	2.0	2.0	1.7	4.9	2.1	2.2	1.1	0.5
Real After Tax Non-Agricultural Wage	3.1	1.2	1.1	0.8	0.6	1.3	1.7	1.8	2.1	2.6	2.0	1.5	2.1	2.0
	Per Cent of GNP									2000	2005	2010	2015	2020
Balance of Payments	-0.2	-0.6	-0.8	-0.2	0.4	1.0	1.9	2.3	2.8	0.1	-0.2	2.8	3.1	4.6
Debt – GNP Ratio	36.5	36.3	37.3	37.2	36.4	34.8	32.7	30.4	28.3	34.4	37.2	28.3	20.1	7.1
General Government Deficit	0.1	0.9	1.5	0.9	0.5	-0.2	-0.5	-0.9	-0.9	-5.2	0.9	-0.9	-1.1	-2.9
	Per Cent of Labour Force (ILO Basis)													
Unemployment Rate	4.2	4.9	5.7	5.4	5.2	4.7	4.6	4.3	4.3	4.3	5.4	4.3	3.1	3.2
	In Thousands													
Net Immigration	29	15	5	14	19	21	20	18	17	20	14	17	10	10

Figure 1: Average Annual Volume Growth Rates in GNP



Whether this potential for a return to rapid growth will be realised will depend partly on the external environment, but also to a very significant extent on the competitiveness of the economy. The very rapid inflation in wage rates and in the related prices of many domestic services over the period 2001 and 2002 had probably already left the economy overexposed. The recent exchange rate changes have led to a deflationary shock to the economy. In the normal course of events this will see a very significant fall in domestic inflation. As shown in Table 1, we see the underlying rate of inflation, measured by the consumers' expenditure deflator, falling below 3

per cent next year.³ Depending on how consumer prices react, the pass through into lower inflation could be even more dramatic than we have forecast. The more rapidly that the domestic price level, including wage rates, adjusts to the changed circumstances, the lower will be the level of economic disruption from the recent exchange rate changes. In this *Review*, in line with past behaviour under similar circumstances, we see the rate of increase in wage rates averaging 3.5 per cent a year between 2004 and 2006. Whether this will represent a sufficiently rapid downward adjustment in inflation to restore competitiveness in the face of the exchange rate shock that has recently occurred is still open to question.

Employment growth has slowed over the last two years and the rise in unemployment has to date only been kept down by adjustments to hours worked and to the participation rate. Unemployment is likely to continue rising until the Euro area begins to recover in 2005. However, given the flexibility of the labour market, a period of more rapid growth after 2005 should restore full employment by the end of the decade.

The manufacturing sector will be less of an engine for growth than in the past. While we see a return to quite rapid growth, by EU standards, for the high-technology sector between 2005 and 2010, this will be on a much more moderate scale than was experienced in the 1990s. This reflects the fact that the sector is now quite large relative to the rest of industry and the economy as a whole. In any event, with more constrained labour supply and infrastructural resources than in the 1990s, the economy could not absorb the level of foreign direct investment (FDI) seen over the last decade. In addition, as jobs become higher paid, requiring higher skills, they tend to move off the production floor into offices and laboratories – the market services sector. This is the pattern in all the main world economies that enjoy a very high standard of living. In the long run Ireland is unlikely to be an exception to this pattern.

While gradually declining in significance, manufacturing will still remain extremely important until the end of the decade. However, policy must prepare for a situation where the “baton” will pass to the market services sector from the manufacturing sector, requiring a changing approach to economic development.

The building sector, having geared up to undertake the current huge programme of investment, faces a period of slow growth or even contraction over the coming decade. The fact that the number of dwellings built last year was roughly a third of the number built in the UK and a quarter of the number built in Germany highlights the magnitude of the achievement to date. However, building at this rate will see the backlog of demand for housing gradually reduced.

At some stage over the coming decade, when the demand for housing has been largely met, it is likely that prices will fall to levels closer to the EU average and this will be the signal for a winding down in capacity in the sector. In the civil engineering sector it is likely that demand will continue at an elevated level well into the next decade. However, the inevitable process of adjustment to lower demand for building and construction output, which is still some way off, will prove painful for the sector.

The rapid growth Ireland has experienced, and is likely to experience out to 2010, has put serious pressures on both infrastructure and on the environment. Already Ireland exceeds its target for emissions of greenhouse gases by a wide margin and dealing with this problem over the decade will prove difficult. Tackling the infrastructural deficit, ranging from housing and energy to transport and environmental services, will also put huge pressure on national resources.

³ The blip upwards in 2005 is due to the assumed introduction of a carbon tax.

Whereas in most other countries that enjoy Ireland's standard of living 80 per cent of resources are available for consumption, in Ireland the figure is under 75 per cent. This reflects the fact that the persistent infrastructural deficits require a very high level of investment, currently around 27 per cent of output (Table 1), whereas in countries like France or Belgium the figure is closer to 20 per cent. As a result, while Ireland is technically one of the richest countries in the world, it may not always feel that way, with such a high share of resources pre-empted for investment purposes.

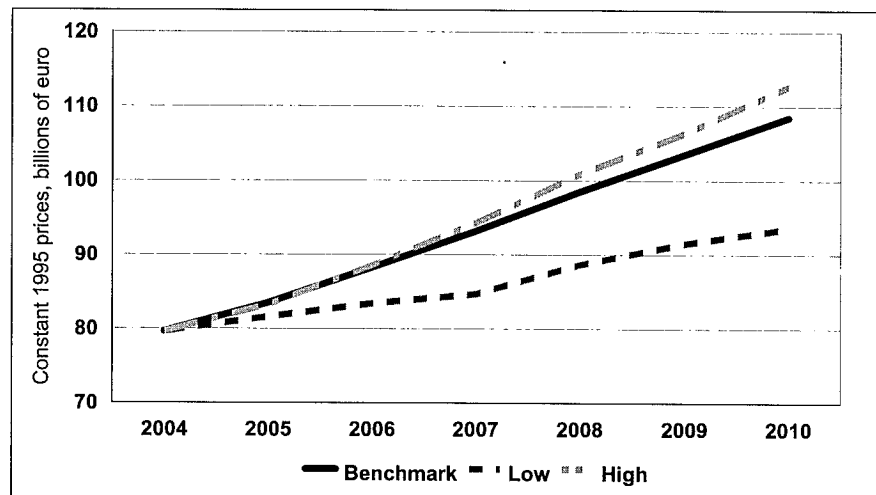
The public finances remain under pressure as a result of the current slowdown. Because of the risks identified in Chapter 4, it is prudent to maintain tight control over the coming eighteen months. However, when the economy returns to growth from 2005 onwards the resources available to the State should increase significantly. Indeed, unlike the period in the first half of the decade when many of the resources available were required to fund the massive increase in infrastructural investment, more will be available to fund improved public services.

Once the current infrastructural deficit is dealt with, some time in the next decade, the public sector resources released could then be used to invest in financial assets – the pension fund. In the meantime, the level of saving by the government sector is almost double that of most of Ireland's developed EU partners representing a significant preparation for the burdens of ageing in the period after 2025.

Alternative Scenarios

Given the uncertainty that surrounds any forecasting exercise it is always unwise to rely on a single projection for the future. In Chapter 4 we explore a number of different scenarios that could alter the future course of the economy over the medium term. The first two scenarios concentrate on our competitiveness on world markets while the third looks at Ireland's vulnerability to a very sharp external deflationary shock arising from exchange rate changes.

Figure 2: Alternative Forecasts for GNP



In the first scenario we examine the likely consequences of a deterioration in Ireland's competitiveness through a combination of wage demands above productivity growth rates, a failure to address the current infrastructural deficit, and related high price increases in the non-traded goods and services sectors of the economy. The results suggest that there are significant downside risks over the medium term if policy does not focus on promoting competitiveness on world markets; growth and employment would fall

significantly and living standards would be 10 per cent lower than in the *Benchmark* by 2010 (Figure 2).

In the second scenario we consider the possibility that Ireland will be more competitive over the medium term than is assumed in the *Benchmark*. On average past *Medium-Term Reviews* have been too pessimistic about future growth prospects. In this case we consider a more optimistic scenario than the *Benchmark* forecast, with GNP growing at 0.7 per cent per year above the *Benchmark* growth rate. Because of the current congestion problems facing the economy, this probably represents an upper bound on the feasible growth rate of the economy over the medium term. This analysis highlights the importance of delivering the planned major increase in infrastructure. Without it the economy will not achieve its potential growth rate over the next decade.

The third scenario (not shown in the Figure) looks at the possibility that the US dollar continues to depreciate very sharply against the euro to a value of \$1.40 per euro by 2004. This scenario is also based on the worst-case outcome for the US where the Federal Reserve would react to higher inflation by raising interest rates, in spite of the negative consequences for growth. This scenario has fairly dramatic negative consequences for the Irish and EU economies over the three-year horizon considered. The very rapid deflation which it would cause, combined with much lower world demand, would push Irish output and employment significantly lower than in the *Benchmark* forecast, despite lower wages and prices. The consequences for the public finances would be very negative. Under this scenario, the rising government deficit would not be sustainable over the medium term, implying severe consequences for government spending and taxation levels.

This scenario highlights the need for prudence in the public finances today to leave adequate room to deal with such a shock, if it should occur. It also highlights the importance of a speedy and flexible response in the labour market and in the market for domestic services to the exchange rate shock that has already occurred.

Medium-Term Challenges

While some of the underperformance of the economy over the last two years has been due to inappropriate domestic policies, especially fiscal policy, the primary factor underlying the current and prospective low growth next year is the slowdown in the world, and especially in the Euro area economies. It is not within the powers of the Irish authorities to provide more than limited insulation from these economic tribulations.

The recent exchange rate shock, and the possibility of further adjustments, poses significant short-term problems for the economy. As a result, many firms face competitiveness problems today in the wider European market. If these short-term problems are to be overcome and the medium-term growth potential realised it is important that the rate of inflation in wages and prices adjust rapidly to the changed circumstances. While market forces will probably bring about the bulk of this adjustment, the Partnership process has proved especially valuable in the past in difficult times in helping all the social partners to understand the pressures facing the economy, and the difficult trade-offs facing individuals and companies. Hopefully, it will play a similar constructive role over the next two years in bringing the economy through what is likely to be a temporary period of difficulty.

Looking further out to the end of the decade, the analysis in this *Review* indicates that the infrastructural constraints, apparent in the economy two years ago, have not gone away. Given that the economy still has the potential to grow quite rapidly to the end of the decade, the realisation of this potential will depend to a significant extent on tackling these constraints effectively. The basic strategy underlying the *National Development Plan*

remains valid because the current economic difficulties are seen as essentially temporary in nature.

The changing structure of the economy, illustrated in the *Benchmark* forecast, has implications for Irish development strategy. The policy pursued over the last thirty years has been very successful in producing a very significant inflow of foreign direct investment into the manufacturing sector. While a continuing inflow of such investment will remain very important over the coming decade, the engine of growth is likely to switch more towards the market services sector, as in all the other most developed world economies. As jobs become higher paid, requiring higher skills, they tend to move off the production floor into offices and laboratories.

Finally, while the demographic structure is currently very favourable, with a small proportion of old-age dependants and declining youth dependency, this will begin to reverse after 2020. Over the next twenty years the average age of the population, which is currently around 34.5, will rise to almost 38. After 2025 the problem of old-age dependency will become increasingly acute. Already attention has been focused on how the costs of ageing will be financed. The analysis in this *Review* suggests that the appropriate method of financing this future burden needs further consideration as it involves complicated issues of intergenerational equity. The investment in infrastructure today is part of the preparation for these future burdens of dependency. The time to undertake major investment in financial assets in the state pension fund will be in the middle of the next decade, when the major infrastructural investment is complete.

1. INTRODUCTION

1.1 Introduction

In the mid-1990s, when Ireland's period of exceptional growth began, there were some who feared that it was a mirage and that, as the dust settled, we would wake up and find that the growth in output had never happened. However, as successive years of growth built into a boom, such fears were seen to be groundless. One of the clearest manifestations of the real success of the 1990s was the rapid move from high unemployment in the first half of the decade to a period of full employment at its end.

Today, after a period of almost two years of slow growth and a rise in unemployment, expectations as to future prospects are very much reduced. The relative gloom of today is exacerbated by the obvious difficulties facing our Euro area partners. Looking forward, there is continuing concern that the current downturn represents a definitive end to the Irish success story of the late 1990s. Like Icarus,¹ has the Irish economy melted its wings by flying too close to the sun and is a crash-landing likely? In this *Review* we argue that even if Icarus has singed his wings, the prospects remain reasonably bright for a "soft landing". Provided that the world economy, and especially the European economy, finds its way back to its normal growth path, the Irish economy has the potential to grow more rapidly than its EU neighbours for a further period out to the end of the decade. Whether this potential is realised depends first, on the EU economy returning towards its growth potential and, second, on a restoration of domestic competitiveness.

While some policy mistakes have been made domestically over the last five years, the primary cause of today's slowdown lies outside the country. The rather different problems affecting the US and the Euro area economies currently provide a very unfavourable environment for an economy as open as Ireland's. As we said in the last *Medium-Term Review* in 2001 it was clear that the US economy was on an unsustainable growth path, with a rapidly rising external deficit, even before the events of September 11th. As discussed in Chapter 2, the change in the euro-dollar exchange rate that has occurred in recent months will go some way to easing this problem, but it will still leave dangerous imbalances. In the case of the Euro area economy the problems with competitiveness, inefficiency, rigidities and the deteriorating public finances have all contributed to a prolonged period of underperformance.

Domestically, a number of demographic factors, especially the growth in the skilled labour supply that made the boom of the late 1990s possible, still have the potential to raise Ireland's potential growth rate above that of its neighbours (see Chapter 2). Because of the unfavourable external environment and the deterioration in the competitive position of much of Irish business over the last four years, this potential is currently not being realised. This underperformance is reflected directly in a rise in

¹ In Greek mythology Icarus made a set of wings and learnt to fly. His father Daedalus uttered frequent warnings about the dangers of soaring too high towards the sun. Like many kill joys (and many fathers) he was ignored! When the sun melted the wax holding Icarus' wings together he crashed into the sea, with fatal consequences.

unemployment, and indirectly in a temporary decline in female labour force participation.

Looking beyond 2004, we anticipate a world recovery from 2005 onwards, with the Irish economy regaining some lost ground. The period of underachievement in the first half of the decade could be offset in the second half of the decade by a period of growth above the long-term potential of the economy. Such a time path for output would see the economy restored to full employment by the end of the decade. This is the picture portrayed in the *Benchmark* forecast in Chapter 3 of this *Review*. It shows a similar average growth rate for the decade to that in *Medium-Term Review: 2001-2007* published in September 2001. The difference in this *Review* is that we see more of the growth occurring in the second half of the decade than in the first. We have not greatly changed our view as to the potential growth rate of the Irish economy.

For this relatively benign scenario to be realised will, of course, require the implementation of sensible economic policies domestically. The infrastructural deficit, that accumulated in the latter years of its rapid growth phase, still needs to be addressed. The economy needs a period of significant adjustment to restore competitiveness, through increasing efficiency throughout the economy and through adjustment in the path of domestic costs, including labour costs, to an expected low rate of inflation. A return to rapid growth will also require a relatively early resolution of the major economic problems facing the world economy: the burgeoning US current account deficit; the Euro area economies' fiscal problems; the EU's structural economic problems, including labour market rigidities, and the task of successfully integrating the ten new entrants from 2004.

Because of the uncertainty that is inevitably attached to forecasting, it is very important to look at a number of different scenarios to get a feel for the range of possible outcomes. While we feel that the most likely outcome is that portrayed in the *Benchmark* forecast in Chapter 3, the one certainty is that reality will prove rather different.² In Chapter 4 we look at what might go wrong and what might go right, both externally and domestically, and how alternative scenarios might change the prospects for the Irish economy over the course of the decade.

The wide range of possible outcomes should inform policy makers as to how best prepare the economy for the demands of an uncertain and evolving external environment. Policy needs to be robust in the face of quite a wide range of possible outcomes. It would be dangerous to stake the success of the economy on any one scenario, even on the scenario we consider to be the most likely outcome, the *Benchmark* forecast of Chapter 3. In Chapter 5 we consider some of the implications for economic policy of the analysis contained in this *Review*.

1.2 The Seeds of Economic Success

One of the effects of the rapid growth of the late 1990s is that, at least for a short period, the Irish economy has become fashionable for economists to cogitate on! The result has been a wide range of publications concerning the factors underlying the rapid convergence of Irish to EU average living standards. These publications have produced fairly wide agreement on the ingredients that went to make up the success, but somewhat less agreement about how the ingredients were mixed in the recipe to produce the actual outcome.

In this *Review* we share the views of a strand of the literature that sees the Irish experience as a belated success, due to a range of different factors. This research in the ESRI and elsewhere (Duffy *et al.* (1999, 2001), Ó Gráda

² Appendix 2 looks at the *Medium-Term Review's* track record over the last seventeen years.

(2002) and Honohan and Walsh (2002)) suggests that the period of exceptional growth in Ireland over the second half of the 1990s was neither an accident nor a regional boom (Barry, 2002).

Ireland began its career as an independent state with many advantages. In particular, its standard of living in 1922 was higher than that of many other countries in Western Europe (Kennedy *et al.*, 1988). In spite of these advantages, its ranking within Europe in terms of standard of living fell over the following forty years. In the post-war years it failed to live up to its potential, falling far behind its Northern European neighbours over a period when the rest of Europe experienced a prolonged period of rapid growth. Some of this failure must be attributed to the inappropriate policies of successive post-war governments, continuing the protectionist stance of the pre-war years (Ó Gráda, 1994). We now know that this failure to fully participate in the post-war European recovery was, in a sense, a self-inflicted wound. As described in the most prominent of these analyses, Honohan and Walsh (2002), the rapid growth of the last decade represented the fruits of demographic factors and some key policy initiatives that bore results in the 1990s, restoring the Irish economy to the position it should have achieved a decade or more earlier.

With this background, the story of the Irish economy for much of the 20th century may be better considered as a case study in failure: the late 1990s boom is better seen as a belated catching up, consequent on the reversal of the ill-conceived policies of the immediate post-war years, rather than as an “economic miracle” (Fitz Gerald, 2000).

The strategy of economic development adopted in Ireland since 1960 has involved the opening up of the goods and the capital markets as part of the long-term process of EU integration. However, there was more to Ireland's success than merely a liberalisation of markets. There was also active intervention by the State investing in human capital, albeit twenty years after the rest of Northern Europe, and by directly encouraging foreign direct investment. This two-pronged approach has been pursued with consistency by all governments over the last thirty-five years. There were also a series of “enabling” factors that have facilitated the success of the last decade, as well as some policy mistakes that have rendered the convergence path unnecessarily bumpy.

While Ireland still had an economic dependency ratio well above the EU level in the 1980s, it has now fallen below the EU average. This contrast, and its related effects on living standards represented by the movement in GNP per head, reflects the window of opportunity that is available to Ireland over the next twenty years. The declining dependency ratio, at a time when the ratio is rising elsewhere in the EU, has made possible a rapid rise in living standards in Ireland.

To understand more fully the productive capacity of the economy it is useful to decompose GNP per capita into a number of individual components, namely productivity, employment, participation and dependency, as follows:

$$\frac{GNP}{N} = \frac{GNP}{LTOT} \cdot \frac{LTOT}{LF} \cdot \frac{LF}{N1564} \cdot \frac{N1564}{N}$$

$\frac{GNP}{N}$	=	$\frac{GNP}{LTOT}$	·	$\frac{LTOT}{LF}$	·	$\frac{LF}{N1564}$	·	$\frac{N1564}{N}$
GNP per capita		Productivity		Employment Rate		Participation Rate		Dependency Ratio (inverse)

where *LTOT* is total employment, *LF* is the labour force, *N1564* is the population of working age (15-64) and *N* is the total population. The first term on the right hand side of the equation measures productivity (output per employee), the second term measures employment as a proportion of the labour force (equal to one minus the unemployment rate), the third term

measures the participation rate and the fourth term is the inverse of the dependency rate.

Figure 1.1 plots the growth in each of the components of GNP per capita in five-year intervals from 1970. It is clear from the chart that productivity growth has been strong throughout the past thirty years. It peaked at 3.9 per cent a year in the 1995-2000 period. Over the thirty-year period 1970 to 2000 it averaged growth of 2.7 per cent a year, well above the experience of the rest of the EU in recent years. A significant factor contributing to this growth has been the rising educational attainment of the labour force, which probably had its peak effect in the 1990s. The inflow of foreign direct investment has also made an important contribution.

Figure 1.1: Decomposition of GNP Per Capita Growth

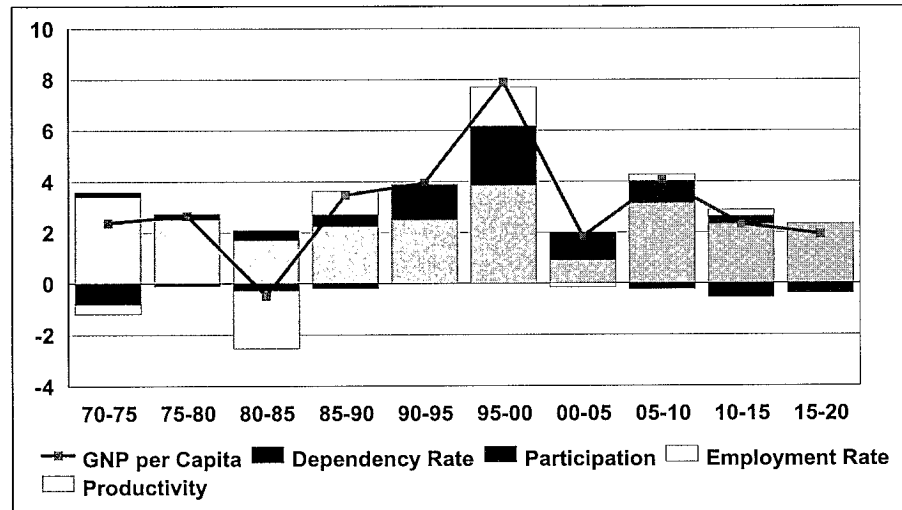


Figure 1.1 indicates that in the 1990s each of the factors, productivity, employment, participation and dependency have made net positive contributions to growth. This growth experience was driven by the coincidence of several favourable underlying factors. Strong productivity growth reflects the strength of the supply-side of the economy driven *inter alia* by the growth in the stock of human capital and improvements in the physical infrastructure of the economy. This in turn increased employment. The rise in participation rates, driven by increased participation of women in the workforce, is strongly linked to the increase in investment in education as well as cultural change and improved employment prospects. At the same time underlying demographic trends (especially with declining unemployment) have reduced the dependency ratio.

The proximate cause of the fall in GNP per capita in 1980-85 was a large increase in unemployment (a fall in the employment rate). In the second half of the 1990s increases in participation and employment made a strong positive contribution to overall growth in GNP per capita. In the case of female participation its increase added almost 1.5 per cent a year to the potential growth rate. In the current five-year period from 2000-2005 the slowdown in the world economy has affected the growth in realised productivity. The less favourable labour market situation has seen a rise in unemployment and it has slowed the increase in female participation.

The decomposition of growth in Figure 1.1 essentially sets out the critical supply-side factors that shaped the Irish economy since 1970. This is but one side of growth determination. Demand factors that significantly influenced the Irish growth story include the trends in world output growth, foreign direct investment and competitiveness factors. In addition, a range of "facilitating" factors contributed to the turn around in the Irish economy. First and foremost was the correction of the huge imbalances in the public

finances and of the external position of the 1980s. While very painful at the time, once it was clear that the Irish economy had turned the corner there was a dramatic change in private sector confidence in the economy. However, this confidence on its own would not have been enough (Bradley and Whelan, 1997). The transition was greatly facilitated by the strong growth in the world economy at the time.

There has been much debate about the role of the "Partnership" process in bringing about the transformation in the economy. The National Economic and Social Council (NESC, 2003) and Blanchard (2002), attribute quite an important role to this factor. Honohan and Walsh (2002) see it instead as a facilitating factor. Fitz Gerald (1999) indicates that since the early 1980s private sector wage formation has been generally determined by market forces. However, while the partnership process may not have greatly influenced the long-term path of wage rates, it did provide an important facilitating role as it led to greatly enhanced industrial peace; it helped produce a more coherent approach to policy making; and it implemented the trade-off between wage rates and cuts in direct taxation in the late 1980s and early 1990s which econometric models suggested was driving the wage formation process.

With the benefit of hindsight, it is useful to look back today at Ireland's transition from a semi-independent exchange rate regime to the very different environment of Economic and Monetary Union (EMU). When the ESRI undertook its study of the economic implications for Ireland of EMU in 1996 (Baker, Fitz Gerald, and Honohan, 1996) the conclusion was that it would be mildly beneficial to Ireland. The small advantage was expected to result from the benefits of a significant reduction in real interest rates more than offsetting the costs of reduced flexibility. In particular, it was expected that the risk margin on interest rates relative to the German Deutschmark would fall to less than 0.25 percentage points, compared to a possible margin of one percentage point if Ireland had remained outside EMU.

The reduction in the risk margin (relative to Germany) actually took place in Ireland and the rest of the Euro area in the months immediately preceding the start of EMU. This reduction in interest rates due to the "credibility gain" from EMU was largest for countries such as Italy which had a high debt/GDP ratio (Sinn, 2001). Ireland, although having a lower risk margin than countries such as Italy, experienced a reduction in interest rates that was, nonetheless, significant. A consequence of the fall in interest rates and the related cost of capital was a significant gain in competitiveness and a stimulus to further growth. This added fuel to the strong growth that was already under way.

However, probably more important than the immediate reduction in interest rates was the greater certainty that EMU gave about the future cost of capital. Using a model of central bank behaviour,³ Faust, Rogers and Wright (2001) have modelled what might have happened to interest rates in individual Euro area economies if EMU had not taken place. Using realistic parameters, in a model of potential output similar to that used by the EU and similar to the model that probably underlay international market expectations, their approach would suggest that interest rates in Ireland would have risen to 10 per cent or more in the late 1990s. Such exceptionally high interest rates would have resulted from the fact that the method used to model potential output in the Irish economy greatly underestimated its true potential. This was reflected in the incredulity with which much financial market comment greeted the late 1990s Irish experience.

³ This particular rule, referred to as the "Taylor" rule, models central banks' objectives in terms of a trade off between an inflation objective and an output objective.

The result of such a rise in interest rates would certainly have been an avoidance of the rise in inflation from 2000 onwards. However, it would also have choked off the boom well before full employment was reached and earlier than would have been necessary to avoid the inflation that actually occurred. Thus the full benefits of the boom of the 1990s might not have been achieved without membership of EMU.

There is a lesson from this experience for accession countries. Where countries' potential growth rates are uncertain, EMU can avoid the danger that growth may be choked off prematurely through an unnecessary rise in interest rates. The cost of this additional insulation is, of course, that interest rates will be insensitive to inflationary (or deflationary) dangers in individual economies.

Since our last *Review* in 2001, the Irish economy has experienced a sharp slowdown in economic output and employment growth from the highs experienced in 1999 and 2000. The persistence of high relative consumer price inflation in Ireland and a turnaround in the near decade-long decline in the rate of unemployment are significant markers for the macroeconomic situation from which our *Review* launches. High wage settlements in recent years combined with the recent reversal in the euro exchange rates from its depreciating trajectory followed since its inception, have begun to erode cost competitiveness. The public finances have moved back into deficit as revenues have undershot, while expenditure growth has been strong over the period.

The performance of the Irish economy in the last two years, however, must be viewed as a relatively soft landing given the extent of the global slowdown. This international slowdown over the last three years has been perpetuated by a series of events hitting confidence: the bursting of the speculative stock-market boom in mid 2000; the heightened geopolitical tensions after the terrorist attacks of September 11th; the wars in Afghanistan and Iraq; and the corporate accounting scandals of 2002. Given its openness to trade and its exposure to multinational investment, the Irish economy has been remarkably resilient. The uncertain environment has led to interest rates at historically low levels internationally. This has produced extremely loose monetary conditions that have resulted in strong credit growth in Ireland and continued strong house price growth, despite record house building in the last two years.

The budgetary policy pursued domestically continues to display a tendency for pro-cyclical actions but the new social partnership agreement has taken a departure from previous arrangements by not having a tax-cutting element. The wage terms in *Sustaining Progress* may steer expectations more in line with sustainable productivity-justified pay increases for the Irish economy. The Benchmarking awards for public service pay agreed last summer at a rate of 9 per cent on average will have a significant negative impact upon the public finances in the coming years. The on-going commitment to devote 1 per cent of GNP to the *National Pension Reserve Fund* and the cost to the Exchequer from its contribution to the *Special Savings Incentive Scheme* will also be significant outlays from the public purse. These commitments are in place over the medium term, while simultaneously the State will have to finance the ambitious *National Development Plan* from domestic sources while still staying within the rules of the *EU Stability and Growth Pact*.

The gap between domestic production, as measured by GDP, and domestic income, as captured by GNP, has widened dramatically since the last *Review*. The nature of the Irish production base, with its heavy concentration of multinationals engaged in high value-added activities, explains this divergence. This duality is also evident in the very large difference between the rates of return on foreign liabilities and assets in the non-IFSC sector which averaged over 26 percentage points during 1999-2001

(Lane, 2003). Both of these trends would seem to imply that transfer pricing remains an issue within the Irish economy.

The rapid appreciation in the euro in the first half of 2003, along with falling oil prices and lower interest rates, has imparted a strong deflationary impulse to the economy. Despite continued high growth of non-traded goods and services prices and higher administered prices, domestic inflation is firmly on a downward path in the short term. The spectre of deflation is a real one, if currently improbable, and requires Irish economic policy be flexible enough to respond to its possible emergence. Ireland, however, is still likely to have higher inflation compared to its main trading partners, putting continued pressure upon competitiveness over the medium term. Since Irish living standards are ultimately dependent on the economy remaining an effective export platform, re-establishing competitiveness must be a key objective in the immediate future. However, in the next decade Ireland must become competitive not as a low cost platform, but rather in high value-added activities, whether domestically or foreign owned.

1.3 Methodology

In the discussion of the *Benchmark* scenario in Chapter 3 we emphasise the annual average change in key variables for each five-year period, beginning with the current period of 2000 to 2005. This is because we feel that much wider margins of error attach to the forecasts for individual years than to the forecast trend growth rates. While we still present year-by-year forecasts out to 2010, this gives a misleading impression of the degree of precision that can be expected from such an exercise.

In addition to the detailed numbers for the years to 2010, we have also included some summary measures for average growth rates for the subsequent decade. Obviously there can be even less precision about such numbers than for the current decade, but these numbers are useful in illustrating important changes that are likely to occur in the structure of the economy. In particular, in assessing the appropriate policy stance on the problem of ageing and the necessity of infrastructural investment, it is important to take such a long-term view.

As discussed in Appendix 2, our forecasting record, while better than average, is still not perfect. As a result, in preparing our forecasts we have also examined a number of scenarios reflecting the range of uncertainty that surrounds our forecast of the growth in the potential output of the Irish economy.

The forecast presented in this *Review*, and the analysis underlying the range of different scenarios, has been developed with the assistance of three different economic models.

In developing our forecast for the world economy and the external environment for the Irish economy we have used the NiGEM world model of the National Institute of Economic and Social Research in the United Kingdom. Using this model allows us to simulate different options on how the US economy is likely to cope with its internal imbalances and how these different options are likely to affect the rest of the world. It also allows us to examine how changes in exchange rates may affect the economic prospects for the major world economies. The benefit of such a model is that it allows "what if" experiments to see how sensitive our forecasts are to changes in different underlying assumptions. This model has proved an essential tool in preparing a consistent set of forecasts for the major world economies of relevance to Ireland.

In analysing changes in the population structure that are taking place we have used a demographic model of the Irish economy. This model uses very detailed data from successive CSO *Labour Force Surveys* and *Quarterly National Household Surveys* on labour force status broken down by level of education, age and sex. The model is driven by the educational attainment of

the population. In the model individuals, as they reach the age of 20, are assigned a level of education based on current trends. This level of education has a major impact on their labour force behaviour. The model is used to project births, deaths, the population, the labour force, the number of households, and the human capital of the work force. The level of migration is input into the demographic model, having itself been determined in the macroeconomic model.

The *HERMES* macroeconomic model has been used for fifteen years in preparing successive *Medium-Term Reviews*. The latest version of *HERMES* has been re-estimated using data from National Income and Expenditure, 2001. Appendix 1 of this *Review* provides an outline description of the key mechanisms in that model.

While any forecast involves many assumptions that rely on the authors' judgement, this model is an essential tool in ensuring the coherence of the resulting forecast. In addition, the model is an indispensable tool for undertaking the kind of sensitivity testing we have used extensively in this *Review*, and in developing a range of scenarios that are internally consistent.

2. BACKGROUND ECONOMIC ENVIRONMENT AND ASSUMPTIONS

2.1 Introduction

As a small open economy, Ireland is very much influenced by global events and by the international economic outlook. Despite membership of *Economic and Monetary Union* (EMU), the economy remains significantly exposed to events outside the Euro area. This exposure arises from the productive structure of the economy, especially the importance of Foreign Direct Investment (FDI) from the US. It is reaffirmed by the decision of the UK to remain outside EMU, which leaves much of the traditional manufacturing sector exposed to the effects of changes in the bilateral euro-sterling exchange rate.

The first section of this chapter sets out our assumptions concerning the external environment in which the Irish economy will operate over the next seven years and seeks to draw out the implications of this environment for our economic prospects. The slowdown in world activity over the last three years has led to increased uncertainty about future growth prospects. However, if the recent realignment of the dollar against the euro proves sufficient to redress the macroeconomic imbalances in the US economy, and if global geopolitical tensions ease, then the world economy could return to trend growth by the end of 2004 and continue to grow strongly for the rest of the decade. In Section 2.2 we present medium-term forecasts for the three major economic blocks that impact on the Irish economy: the US, the Euro area and the UK economies. In preparing our forecasts we have utilised a number of different sources including the EU Commission, OECD and the IMF economic medium-term assessments on the world economies. We also made extensive use of the National Institute of Economic and Social Research (NIESR) *Economic Review* from April 2003 as the basis for our medium-term forecast for the major economies. This forecast has been modified to take account of additional information available to us from a range of other sources. In carrying out these modifications, and in examining the sensitivity of our forecast to alternative assumptions, we have used the NIESR *Global Econometric Model* (NiGEM).¹

In addition to the external environment, the changing demographic situation plays a very important role in determining the future productive capacity of the economy. In Section 2.3 we present our demographic projections for the forecast period. Demographic factors that made the boom of the late 1990s possible, especially the growth in the skilled labour supply, still have the potential to raise Ireland's potential growth rate above that of its neighbours. The growth in labour supply could average around 2 per cent a

¹ We are very grateful to Ray Barrell and Ian Hurst of NIESR for their assistance in using the NiGEM model. The forecast used here remains the sole responsibility of the ESRI authors.

2.2 The International Environment

year to the end of the decade, with unskilled labour supply falling and the bulk of the increase concentrated among those with a third level education.

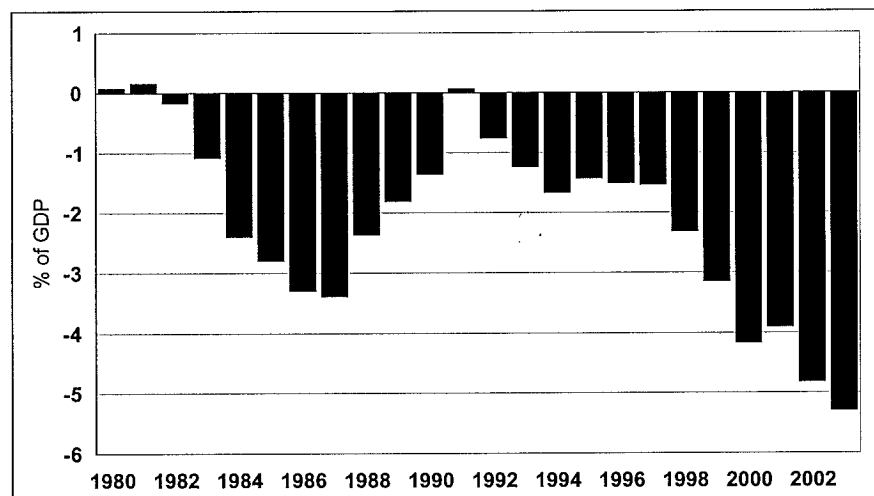
Finally Section 2.4 presents our underlying assumptions on the public finances. This section firstly looks at the likely structure of the public sector over the next twenty years, against the backdrop of the current infrastructural deficit and the likely ageing of the population beyond 2025. We suggest that in the current decade there should be a lower priority for investing in financial assets, to pre-fund future pension liabilities, as opposed to investing in infrastructure. Once the infrastructure is in place, around the middle of the next decade, the resources used to fund it will be freed up and can be used to invest in financial assets. The latter part of this section presents a range of more detailed assumptions relating to the medium term out to 2010.

USA

In recent years the US economy has been the main driver of world economic growth and that seems unlikely to change in the immediate future. One of the consequences of this has been growing imbalances in the US economy as evidenced by a large and growing Balance of Payments current account deficit. The US current account deficit widened steadily in the late 1990s rising to 4.8 per cent of GDP by 2002 (see Figure 2.1). According to IMF estimates in their *World Economic Outlook*, the United States is now absorbing 6 per cent of world savings.

The size of the deficit has focused attention on its sustainability, see for example, Cooper (2001), Holman (2001) or Mann (2002). The rapid growth in the size of the deficit is seen to be the result of investment encouraged by recent high US productivity growth and a consumer boom based on equity market increases. The IMF argue that excessive expectations about future profits of the ICT sectors attracted large capital inflows, which also supported the appreciation of the dollar. Traditionally, substantial reductions in a current account deficit are achieved by slower output growth, leading to lower domestic demand, or by a depreciation of the real exchange rate, making domestically produced goods more competitive. Thus, the large deficit exposes the US economy to the danger of a sharp fluctuation in the value of the dollar. This danger was discussed in some detail in the last *Medium-Term Review* and remains a real risk for the world economy. Indeed, Duffy and Fitz Gerald (2000) argue that the Irish economy is now more exposed to the US economy rather than to its traditional trading partner, the UK.

Figure 2.1: The US Current Account, % of GDP



The performance of the US economy was much weaker in 2001-2002 than during the latter part of the 1990s. Real GDP growth is forecast to improve this year to 2.5 per cent (see Table 2.1), with an annual average of 3.1 per cent forecast between 2005 and 2010.

Table 2.1: Forecasts for the US Economy

	2003	2004	2005	2006	2007	2008	2009	2010	2000-2005	2005-2010	2010-2015
	Per Cent								Annual Average % Change		
Real GDP Growth	2.5	3.2	3.2	3.2	3.2	3.0	3.0	3.0	2.3	3.1	3.0
Inflation*	2.0	1.3	2.8	2.8	2.0	1.4	1.3	1.4	1.9	1.8	1.6
Short-term interest rate	1.3	1.9	4.2	4.6	5.0	5.2	5.2	5.5	2.6	5.1	5.5
*Consumer Expenditure Deflator											

The slow growth of the economy since 2000 has resulted in a forecast increase in the unemployment rate to an annual average of 5.5 per cent this year from a low of 4 per cent in 2000. Given the expected recovery in the US economy over the medium term this is expected to represent a peak, with the unemployment rate forecast to fall in subsequent years.

The uncertainty that has surrounded the world economy and the US economy has contributed to a rise in the personal savings ratio, that is personal saving as a percentage of disposable personal income. This had declined to 2.3 per cent in 2001 but had risen to 3.7 per cent in 2002, having been negative during the late 1990s boom. Despite strong growth in the economy and a tightening labour market, inflation did not represent a problem over the 1990s, averaging 1.9 per cent between 1995 and 2000, and remaining low since then. Given our assumption of a dollar/euro exchange rate settling of between \$1.15 and \$1.20 over the rest of the decade, the US economy is not expected to enter a period of deflation, although inflation levels will remain subdued. The inflation rate, as measured by the consumer expenditure deflator, is expected to average just under 2 per cent between 2000 and 2005 and to decline to an annual average of 1.8 per cent between 2005 and 2010.

Interest rates in the US are at their lowest since the 1950s. On the basis of our exchange rate assumptions, and the forecast that US economic growth recovers towards the middle of the decade, official interest rates are forecast to average 2.6 per cent between 2000 and 2005 and 5.1 per cent between 2005 and 2010. While these rates represent a substantial increase from current levels, they are still well below the rate of 6.5 per cent in December 2000.

Towards the end of the 1990s and in 2000 the emerging, and growing, federal government surplus provoked a discussion on how to spend it and how sustainable it was (for example Alesina 2000). The government balance moved into surplus in 1998, at a level equivalent to 0.3 per cent of GDP. By 2000 this fiscal surplus had reached 1.4 per cent of GDP. However, the government finances deteriorated dramatically in 2001, with the deficit re-emerging at around -0.5 per cent of GDP. Since then the deficit has increased to an average of -3.3 per cent in 2002 as the US has increased its defence spending and cut taxes. The forecasts for this *Medium-Term Review* indicate that a public finance deficit will remain a feature of the US economy over the forecast period, averaging 2.2 per cent of GDP between 2000 and 2005 and 3.6 per cent between 2005 and 2010.

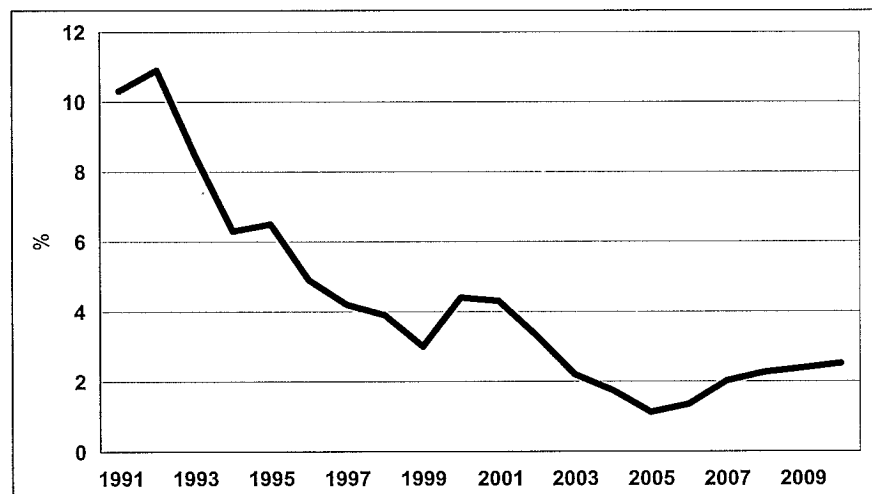
THE EURO AREA

In contrast to initial expectations, the new euro currency weakened substantially against both the dollar and sterling following its launch. At its weakest levels it was worth only \$0.825 US cent in October 2000 and STG£0.571 in May 2000. Since then the turnaround in the euro has been steady and in the first half of 2003 there was a strong appreciation taking it back to its launch levels of \$1.175. The forecasts in this chapter are based on the assumption that this appreciation is maintained and that, over the forecast period, the dollar/euro exchange rate averages between \$1.15 and \$1.20.

Despite an improvement in growth performance in the latter half of the 1990s and into 2000, the immediate outlook for the Euro area is for a period of low growth next year, with a recovery in 2005. This would see growth averaging 1.4 per cent per year between 2000 and 2005. The delayed recovery reflects the impact of a much stronger euro on the member states' competitiveness. Thereafter, growth is expected to pick up in the second half of the decade to an annual average of 3.2 per cent. This would be somewhat above the long-term potential growth rate of the Euro area as the economy is forecast to recover some of the lost ground of the first half of the decade.

Since its inception the European Central Bank (ECB) has operated a relatively tight monetary policy, albeit at much lower interest rates than those experienced in the early 1990s after German reunification. The main ECB interest rate peaked at 4.75 per cent in October 2001 and has since fallen to 2 per cent in the light of the general economic weakness in the Euro area (Figure 2.2). Euro area interest rates are expected to be reduced still further as the strength of the euro reduces inflation substantially. Thereafter, interest rates are expected to gradually increase beyond 2004. Official Euro area interest rates are forecast to average 2.7 per cent between 2000 and 2005. The annual average for the period 2005 to 2010 is forecast to be higher at 4.2 per cent.

Figure 2.2: Short-term Interest Rates for the Euro Area



As a consequence of the appreciation in the euro, inflationary pressures will be very subdued in the Euro area over the forecast period. The Euro area consumer expenditure deflator is forecast to average 1 per cent a year between 2000 and 2005, and an annual average of 1.2 per cent between 2005 and 2010. As a result of the recent strengthening of the euro, the Euro area economy is expected to experience a fall in the average price level in 2004 and 2005, with inflation recovering to 1.5 per cent a year from 2007 onwards. Our forecasts suggest that this Euro area deflation would affect the major

economies such as France and Germany. The smaller peripheral economies could continue to experience price inflation.

Table 2.2: Forecasts for the Euro Area Economy

Euro Area	2003	2004	2005	2006	2007	2008	2009	2010	2000-	2005-	2010-
									2005	2010	2015
	Per Cent								Annual Average % Change		
Real GDP Growth	1.0	1.5	2.3	3.3	3.2	3.2	3.1	3.0	1.4	3.2	2.7
Inflation*	1.1	-0.6	-0.5	0.0	1.5	1.5	1.5	1.5	1.0	1.2	1.7
Short-term interest rate	2.2	1.7	2.0	3.0	4.5	4.5	4.5	4.5	2.7	4.2	4.5

*Consumer Expenditure Deflator.

A central concern for the Euro area is the deterioration in its public finances in recent years. Having averaged a deficit equivalent to 5.7 per cent of GDP in 1993, public finances steadily improved as economic growth recovered. Indeed, the Euro area enjoyed a small surplus of 0.2 per cent of GDP in 2000. Since then the public finances have again deteriorated and in 2003 it is estimated that the deficit in the public finances will reach 2.4 per cent of GDP. On the basis of our forecast of a recovery in world activity this represents the trough and by 2007 the Euro area public finances again move into surplus. On an annual average basis we are forecasting a deficit of 1.5 per cent of GDP between 2000 and 2005 and a negligible deficit of 0.1 per cent between 2005 and 2010. Of course, the average for the Euro area hides differing performances between member states. Of particular concern for the Euro area outlook are the public finances of the larger members. In the short-term both Germany and France breach the rules of the Stability and Growth Pact, effectively removing fiscal policy as an option to tackle the current poor growth performance. The role of the Stability and Growth Pact is taken up in Chapter 5.

THE UK ECONOMY

The UK economy remains an important trading partner for the Irish economy, despite its relative decline as a destination for exports. Even though the UK economy has over the past number of years had to deal with a strong currency, it has continued to perform reasonably well, albeit driven mainly by the services sector. It has had output growth of an annual average of 2.9 per cent between 1995 and 2000. Indeed, a concern during the late 1990s was the development of a two-speed economy as the manufacturing sector under-performed while the services sector boomed. Over the period 2000 to 2005 real GDP growth in the UK is forecast to average 2.5 per cent, with a marginal slowing to an annual average of 2.3 per cent between 2005 and 2010. Economic performance will be aided by the weakening of sterling against the euro that underpins our international forecasts.

A continuing issue facing the UK economy, and one of particular importance to Ireland, is the issue of EMU membership. This was dealt with in extensive detail by the HM Treasury report *UK Membership of the Single Currency: An Assessment of the Five Economic Tests* (June 2003). The report found that the UK was not ready yet to join EMU.

It is assumed, for the purposes of this *Review*, that the UK does not join EMU over the forecast period. Some of the issues relating to the question of EMU membership for the UK are outlined in the National Institute of Economic and Social Research (2003). However, the subject of the UK and EMU is still important for the Irish economy, not least from a competitiveness perspective. An accompanying study for the Treasury report suggests that a

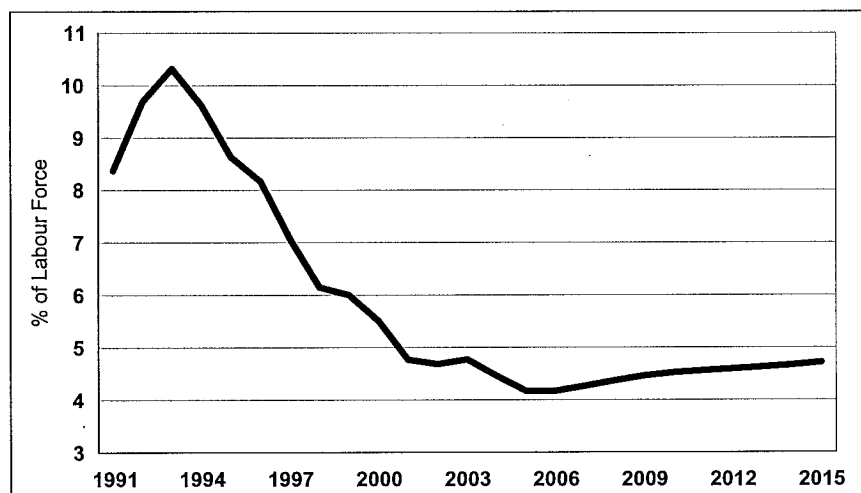
possible medium-term rate against the euro is STG£0.73 (see Wren-Lewis, 2003). This is somewhat lower than estimated by NIESR, who suggest a rate STG£0.69, but directly in line with an estimate by Lehman Brothers (2003). In the Benchmark forecast in this *Review* we have assumed that the UK does not join EMU in the foreseeable future but that sterling stabilises at a rate of £0.73 per € (roughly equivalent to GBP£0.93 per IR£).

Table 2.3: Forecasts for the UK Economy

	2003	2004	2005	2006	2007	2008	2009	2010	2000-2005	2005-2010	2010-2015
	Per Cent								Annual Average % Change		
Real GDP Growth	2.5	3.0	3.0	2.5	2.3	2.3	2.3	2.3	2.5	2.3	2.0
Inflation*	2.8	3.2	1.9	2.0	2.3	2.3	2.3	2.3	1.9	2.2	2.4
Unemployment (% of labour force)	5.0	4.7	4.4	4.4	4.5	4.6	4.7	4.8	4.8	4.6	4.9
Short-term interest rate	5.6	5.9	5.8	6.2	6.6	6.5	6.5	6.5	5.2	6.5	6.5

*Consumer Expenditure Deflator

Figure 2.3: UK Unemployment Rate, % of Labour Force



In common with other monetary authorities, the Monetary Policy Committee have also cut rates in recent years in response to the world economic slowdown. Having been at 6 per cent for most of 2000, official UK interest rates were reduced steadily throughout 2002, and following the most recent cut of 0.25 percentage points in July 2003 they currently stand at 3.5 per cent.

Steady growth in the UK economy reduced the unemployment rate substantially. From an annual average of 10.3 per cent in 1993, the number of unemployed as a percentage of the labour force declined to an annual average unemployment rate of 4.7 per cent in 2002 (Figure 2.3). Despite our forecast of continued steady growth in the UK economy we anticipate only a limited further decline in the unemployment rate. Therefore, an annual average unemployment rate of 4.8 per cent is forecast between 2000 and 2005. Although an annual average of 4.6 per cent is forecast for the period 2005 to 2010, the middle of this decade will represent the strongest performance by the UK labour market and some gradual loosening of labour market conditions is forecast as we move towards 2010.

The tightening of the UK labour market has not been accompanied by strong growth in manufacturing earnings, reflecting the two-speed nature of the economy. Manufacturing earnings grew by an annual average of 4.4 per cent between 1995 and 2000. This is forecast to be unchanged between 2000 and 2005, before increasing between 2005 and 2010 to an annual average of 4.7 per cent.

THE CONTEXT FOR IRELAND

At present the Irish economy faces an uncertain international environment. Despite the accommodative monetary and fiscal policy conditions in place internationally since 2001, the global economy is still sluggish. With growth in our main trading partners forecast to remain relatively muted during 2003, before strengthening somewhat in 2004, the trading environment for an exporting economy like Ireland over the short-term is poor. Growth may be assisted by further monetary easing but with interest rates already at historically low levels, the effectiveness of further cuts is limited.

The recent appreciation in the value of the euro will dent the external contribution to growth in all countries in the Euro area and may compound many of the existing structural problems that exist inside many of these economies. Ireland, with its greater exposure to non-Euro area trade, is more likely to incur greater price competitiveness pressures. The prospects for UK membership of EMU are therefore important over the medium term to Ireland if it is to limit the effects of exchange rate misalignment in future. As mentioned in the previous section, the UK Treasury, in its latest assessment, found that four of the five tests necessary for an EMU membership recommendation were not met. While the government did remain quite pro-euro in principle, no time scale for adoption was indicated. Another assessment will take place in early 2004 but it is still not clear-cut whether a referendum on membership will take place before the next UK election in 2006.

In this *Review* we have assumed that the UK does not join EMU in the foreseeable future. The on-going detachment of the UK from the common currency will keep open the prospect of further sterling depreciation. As discussed in Chapter 4, this could have a serious negative impact on the economy in the short to medium term.

The appreciation of the currency will also add to the already considerable deflationary trends inside the Euro area, especially Germany. Although still a remote scenario, as discussed in Chapter 4 deflation could feasibly become a real issue for the Irish economy in the event of a further major appreciation of the euro.²

The global slowdown has also reduced the levels of international flows of foreign direct investment. While this may slow FDI flows from the US in the short term, this may to some extent be counterbalanced by the effects of a return to growth in the US itself. The accession of ten new member countries into the European Union from May 2004 will increase the competition for non-EU sourced FDI flows in the medium term. However, for many of the relevant sectors the accession countries may not be direct competitors with Ireland in the market for FDI.

Our forecast is for world economic growth to recover from 2005 onwards. This suggests that the international context for Ireland will be difficult in the near term, but improve substantially over the remainder of the decade.

² The worst-case scenario for Ireland would be to experience deflation when the rest of Europe is experiencing rising prices. This asymmetry would mean that because of the relative size of the Irish economy, monetary policy would be unlikely to take account of Ireland's isolated situation and could actually reinforce the deflationary pressures in the economy. However, such a scenario can not be envisaged at this point in time.

2.3 Demographic Assumptions

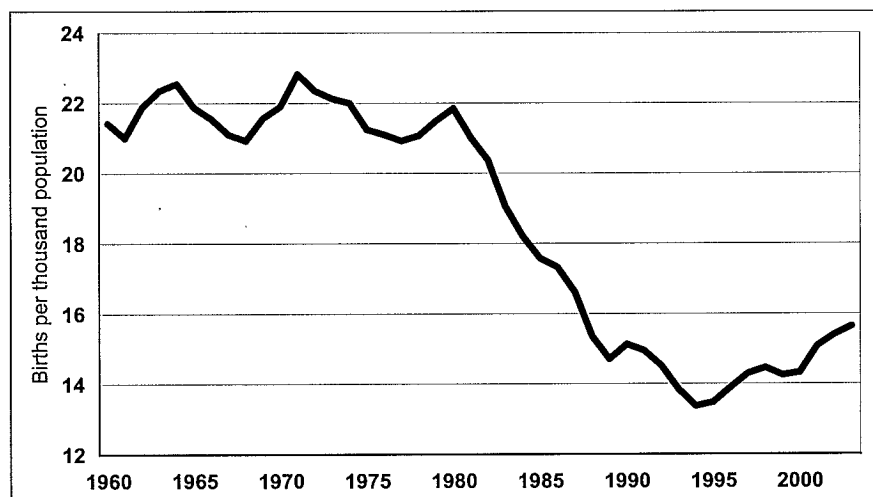
Provided the domestic productive base can remain competitive, the international backdrop for Ireland contained within this *Review* is broadly favourable.

The success of the Irish economy over the last decade has been built on factors affecting the supply of labour, primarily demographic, and factors affecting the demand for labour, such as foreign direct investment and competitiveness. Demographic factors combined over the last decade to produce a major expansion of the work force – increasing supply.

These factors, which included a very favourable demographic profile, rising female labour force participation rates, and the reversal of a tradition of emigration, accounted for around one-third of the growth in GNP per capita in the first half of the 1990s and around half of the growth between 1995 and 2000.³ As a result, the factors that will determine the potential supply of labour over the coming decade are crucial to understand.

Following the post-Second World War baby boom, the birth rate remained uniquely high in Ireland until 1980 while it fell much earlier elsewhere in Europe (Figure 2.4). From 1980 to the mid-1990s, the birth rate declined rapidly. While there has been a limited increase in the birth rate since 1994, we expect it to stabilise at its current level for the remainder of this decade. The falling birth rate since the 1980s means that as the 1980 cohorts enter the labour supply there is, and there will continue to be, a decline in the natural increase in the labour force. This is in contrast to the effect that the high birth rates of the 1960s and 70s had on labour supply. Figure 2.5 shows a breakdown of the expected contribution to labour supply.

Figure 2.4: Birth Rate

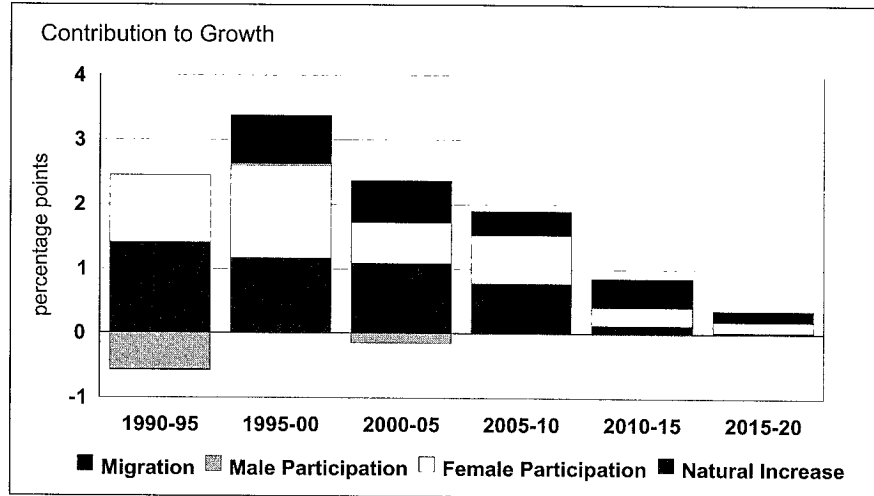


The *Total Fertility Rate* (TFR) at 2.0 in Ireland is currently above the EU average of 1.5 and over the coming years we are expecting it to plateau at this level (Figure 2.6). However, this masks two different patterns of fertility that are emerging for women according to age. The birth rate in the 20 to 29 year age group has been declining and the birth rate for women in the 30 to 39 year age group has been increasing. We expect this pattern to continue in the short term and then to stabilise. The fact that women are having children

³ This accounting decomposition of growth into changes in labour supply and productivity obviously does not explain the causes of the growth. As discussed elsewhere, the factors driving success involved a complex interaction of supply and demand factors.

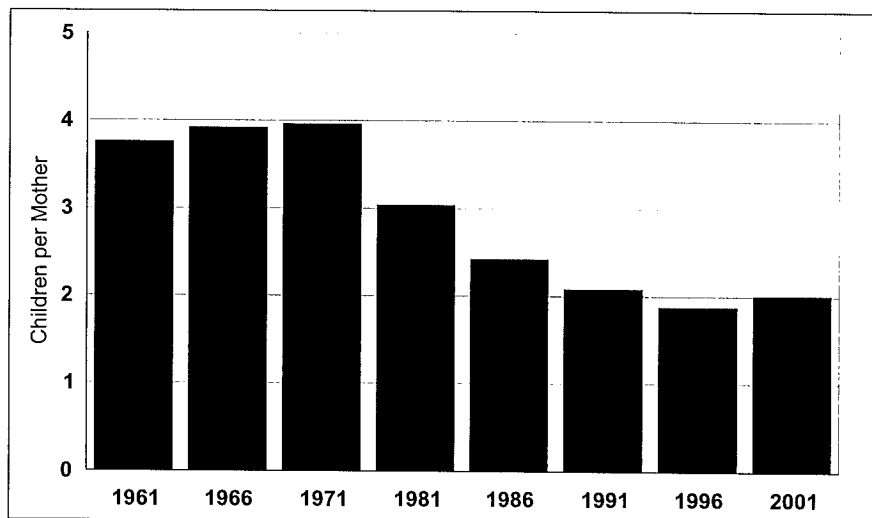
later in life has implications for female labour force participation and may help explain why Irish participation rates for 25 to 29 year-old women are already amongst the highest in the OECD area.

Figure 2.5: Decomposition of Growth in Labour Supply



Ireland's demographic structure is unusual in comparison to other EU countries. The high birth rate of the 1960s and 70s means there is now a large cohort of people of working age (Figure 2.7). The fall in the birth rate since the 1980s implies that young age dependency is falling. At the same time the high level of emigration in Ireland up to the 1960s means that many of the people born in Ireland who are now in their sixties and seventies emigrated, reducing the numbers in the older cohorts of the population, thereby reducing the old age dependency ratio.

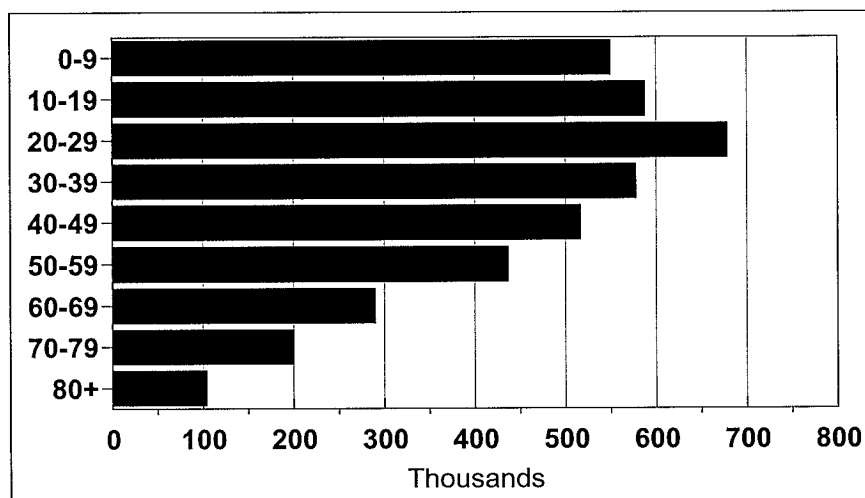
Figure 2.6: Total Fertility Rate



The demographic profile has significant ramifications for the economy and society now and in the future. As the proportion of the population in the older cohorts is small, the problems of ageing populations faced by many other OECD countries are not relevant to Ireland today. In addition, the high birth rates of the 1960s and 70s coupled with the decline in young age dependency, due to the subsequent fall in the birth rate, means that currently a high proportion of the population is of working age. This serves to reduce the burden on those who are working. However, as discussed in Chapter 3, Ireland is facing a problem in relation to household formation. The rapid rise

in the number of young adults will continue to put pressure on the housing sector.

Figure 2.7: Population Structure in 2003



Another important factor driving growth in labour supply over the last decade has been the accelerated rise in the female labour force participation rate. Cultural changes, improving labour market conditions and, most significantly, rising educational attainment have all contributed to this rise. With a tight labour market in the late 1990s, the conditions for increased participation were particularly favourable as employers sought new sources of skilled labour. The last decade has seen female participation rates for women up to the age of 45 increase, with the exception of the 15 to 24 year old age cohort. The reduction in participation rates for this latter cohort reflects increased numbers completing their Leaving Certificate and, more recently, attending third level education. This should serve to increase participation rates in the future, as participation rates are highest for women with Leaving Certificate and third level education. This education effect accounts for approximately one-third of the rise in female participation rates over the last twenty years (Fahey, Fitz Gerald and Maître, 1988) and it has contributed to over one-third of the growth in the female labour supply in the 1990s. When the effects of rising educational attainment are excluded, rising female participation contributed 0.6 percentage points to the growth in labour supply in the first half of the 1990s and 1.2 percentage points in the second half. This rises to between 1 per cent between 1990 and 1995 and one and a half percentage points between 1995 and 2001 if we include the effects of education (Figure 2.5).

The female participation rate rose by around one-third over the course of the 1990s. Typically, women have a higher labour supply response to a change in wages than men, and women with levels of education of Junior Certificate or less have higher wage responsiveness than women with higher levels of education. During the 1990s the increase in female participation came predominately from skilled female labour and their supply elasticity fell (see Doris, 2001). Conversely, the wage responsiveness of women with lower levels of education rose slightly. Overall, the female wage responsiveness has fallen, largely due to the rise in participation. Looking to the future, the increase in female labour force participation rates is likely to occur more among the unskilled, who are still very responsive to changes in wage rates. However, the vast bulk of the actual increase in female labour supply (as in male labour supply) will be skilled.

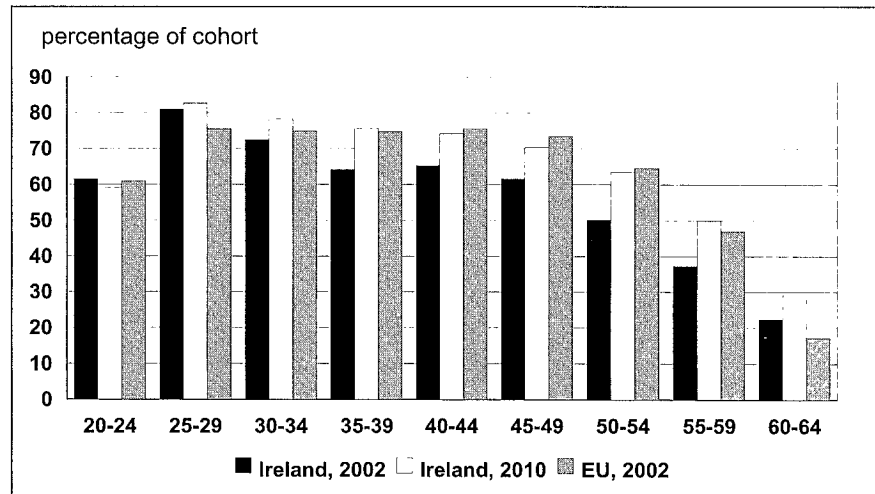
Figure 2.8: Female Labour Force Participation

Figure 2.8 shows the current female participation rates by age for Ireland and the EU and our forecasts for the rates in Ireland in 2010. Although participation rates in Ireland for women under thirty-five are comparable to the EU average, they are significantly lower for older women. In the short run there has been a small fall in female participation concentrated in the younger age groups, for the first time since 1988. We view this as interesting but temporary. This has probably been caused by economic circumstances reducing the demand for labour combined with the high cost of childcare. This reduction in participation rates has moderated the rise in unemployment. However, we assume that when the economy returns to more rapid growth there will be a further substantial rise in rates, making up for the current temporary fall.

Looking forward, there is more limited scope for further increases in female labour force participation due to the high rates already achieved in the younger age groups. We anticipate some limited increase in participation rates among women in the 25 to 34 age cohort. It is among the older cohorts that we expect to see substantial rises in participation over the coming decade.

Migration is the final key element that directly determines changes in the labour supply. In the 1980s, high unemployment rates in Ireland, when compared to other labour markets that Irish people had access to, encouraged many people to emigrate. The bulk of those who emigrated were young and better educated than the typical emigrants of the past, leading to fears of a “brain drain”. In the first half of the 1990s net migration was flat as employment prospects abroad deteriorated relative to Ireland. In the second half of the 1990s, strong economic growth and a tighter labour market encouraged inflows into the country and net immigration contributed around 0.75 percentage points to growth in the labour supply, about half of whom were foreign nationals. The majority of immigrants, Irish or foreign, over this period were highly skilled. From 2000 to 2002 there has been a significant level of immigration of unskilled labour with work permits.

As growth in the economy slows, Ireland will become less attractive for immigrants in the future. Increasing congestion and the rising cost of living have reduced the attraction for skilled labour of working in Ireland. However, we forecast that net immigration will still contribute to labour supply growth but at a lower rate than was observed in the late 1990s – around 0.4 percentage points per annum for the rest of the decade. We assume that the temporary large immigration of unskilled labour of the last

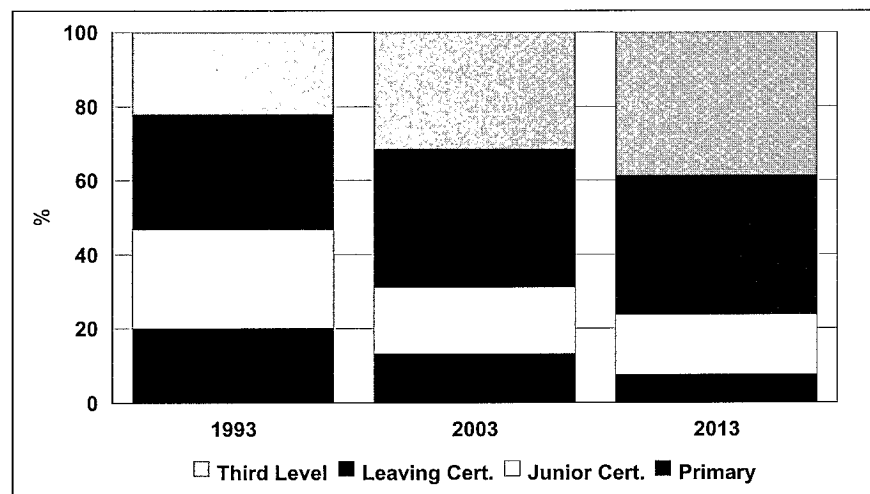
three years will be wound down and that over the rest of the decade the bulk of immigration, albeit at a reduced rate, will be skilled.⁴

With the exception of the last three years, the bulk of the immigration has been skilled, contributing significantly to the growth in output and productivity of the economy, (Barrett, Fitz Gerald and Nolan 2002.) In addition it has been shown that returned emigrants have higher productivity and higher earnings because of their experience abroad. (Barrett and O'Connell 2001.) With almost a third of the younger cohorts being returned emigrants, this effect on individual productivity must be beginning to affect the economy as a whole.

Taking all of these factors together there is still considerable scope for labour force growth over the coming decade, albeit at more moderate rates. Following a growth rate of 3.7 per cent a year between 1995 and 2000, we are forecasting growth of 2.3 per cent per year in the current five years 2000-2005. It will slow to 1.9 per cent a year in the second half of the decade and to around 0.9 per cent in the early part of the next decade. This slowing of the rate of growth of the labour supply has important implications for determining the potential growth rate of the economy for the rest of the decade.

The changing educational attainment of the labour force is shown in Figure 2.9. As the participation rates in education rose over the 1990s, with the increase being more marked in third level education, there will be a continuing upgrading of the human capital of the labour force for many years to come. The graph shows a decline to date in the numbers with only primary education and these are set to decline further over the next ten years. While the numbers with Junior Certificate level education fell over the ten-year period 1993-2003, we expect a slight rise over the next ten years. There has been a steady increase in the numbers participating in the labour force with Leaving Certificate education and this trend is set to continue over the decade. However, the biggest increase to the labour force will be people with third level education. The effects of the rising human capital of the labour force continue to be significant over the rest of the decade and will help the economy sustain higher rates of productivity increase. Ireland is unusual in Northern Europe in still having such an educational bonus for productivity; countries like Germany benefited from it most in the 1970s.

Figure 2.9: Educational Attainment of the Labour Force



⁴ For a discussion of immigration policy see the last *Medium-Term Review 2001-2007*, pp. 132-4.

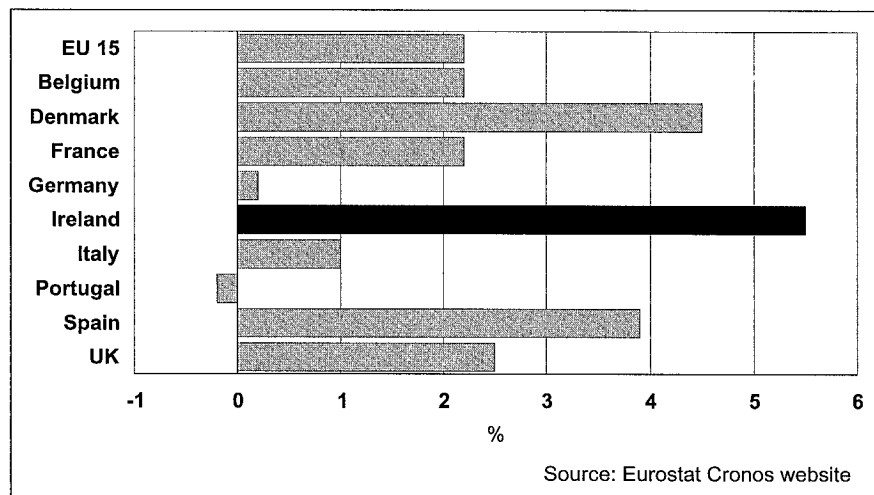
2.4 The Public Finances

As has been highlighted in the previous Section, the Irish economy is unusual in its demographic structure. The share of the population in the working age groups is high and will continue to increase for some time to come. This means that some of the pressures on public services that were seen in the past in Ireland, and are being experienced elsewhere in Europe today, will not face Irish governments again for another fifteen or twenty years (assuming unemployment still stays low). However, this does not mean that managing the pressures on the public finances will be easy over the coming decade.

In Ireland's case, while the pressures on current expenditure have eased somewhat compared to the 1980s, the difficulties of managing public services to produce a satisfactory service at a realistic price pose very serious problems for policy makers in the immediate future, e.g. the health services. Even more important from the medium-term point of view is the urgent need to put in place adequate infrastructure for a modern economy. Making good the infrastructural deficit that exists in Ireland, while maintaining broad fiscal balance, is itself placing major pressures on the public finances.

To fund this necessary major programme of public investment, the Irish public sector has had to save at an exceptionally high rate (public sector savings is defined as the difference between current revenue and current expenditure, all in national accounts terms). In 2002 the saving by the public sector was nearly 5.5 per cent of GDP whereas for the EU as a whole it was just over 2 per cent – a difference of around 3 percentage points (Figure 2.10). For any given profile on taxation, this has meant holding back current consumption, thereby impacting on the growth in public services. The need to fund continuing infrastructural investment for at least the next decade will continue to pre-empt substantial resources. Within any given budget (in terms of expenditure share of GNP) it will leave fewer resources to fund improved public services in the future.

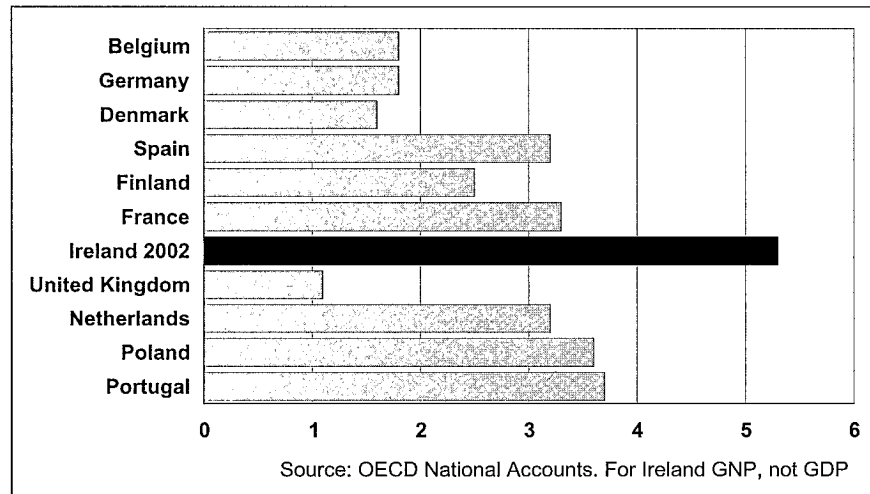
Figure 2.10: Public Authorities' Savings, 2001, as % of GDP



The need to finance a major catch-up in infrastructure is generally reflected in the public finance position of countries in the EU that are converging, or have recently converged. For countries that have been wealthy for a number of decades, where the necessary infrastructure is already in place, a much lower share of national income needs to be spent on public investment (Figure 2.11). Ireland stands out as dramatically different from even the other cohesion countries, with public investment in 2002 of over 6 per cent of GNP. Spain and Portugal were both investing around 3.5 per cent of GDP each year compared to the 1 per cent to 1.5 per cent a year for Belgium, Denmark, Germany and the UK. This gap between

Ireland's experience and that of the fully developed EU economies mirrors the picture on public sector savings.

Figure 2.11: Public Investment, 2000, as a % of GDP



There is an argument that the current generation may end up shouldering a disproportionate burden. It is paying for the pensions of a previous generation (albeit smaller than the current generation) on a pay-as-you-go basis. It is paying for the infrastructure that will serve future generations. It is paying an additional cost through the disruption that the investment in infrastructure entails. Finally, it is investing in a pension fund to part-fund its own pensions. The sums have not yet been done to attribute correctly the burdens involved over different generations. However, when they are done, it may suggest that some of the burden of infrastructural investment today should be shifted to the next generation by limited borrowing. It could also suggest that the current payments into the *National Pension Reserve Fund* (NPRF) are premature.⁵

In considering the need to fund future pension liabilities in Ireland after 2025 or 2030, when the dependency ratio will show a serious deterioration, a number of strategies could be adopted. The public sector, in making prudent provision for these problems, has adopted one strategy, setting up the NPRF, into which 1 per cent of GNP is paid each year. However, the government sector was already saving (the difference between current expenditure and current revenue) at an exceptionally high level relative to other EU countries. Thus, in addition to investing in financial assets, it is devoting an even larger sum to investing in infrastructure.

Once the infrastructural investment is complete those resources needed to fund the exceptional level of investment in the current decade, around 3 percentage points of GNP, will become available for other purposes. This could, of course, be used to cut taxes or further improve current services. However, in this *Review*, in looking out beyond 2015, we assume that public investment will decline by 3 percentage points of GNP (roughly halving the volume of investment) and that those additional resources will be saved to prepare for the impending problem of ageing that is expected to severely impact on the public finances from 2030 onwards. This may suggest a lower priority for investing in financial assets as opposed to real assets in the current decade, with the investment in financial assets beginning, at an even higher rate, from around the middle of the next decade.

⁵ Though the saving of windfall gains from events such as privatisations seems wise.

This, then, is the broad outline of the structure of the public sector assumed for the next twenty years. There remains a range of more detailed assumptions, which relate, in particular, to the medium term out to 2010. We have assumed that over the current decade the public sector, on average, balances its books. The general government deficit is assumed to average 0.3 per cent of GNP between 2001 and 2005, followed by a surplus of 0.4 per cent a year on average in the subsequent period to 2010. While not fully consistent with the EU *Stability and Growth Pact* (SGP), we feel that this would, in practise, be acceptable to all concerned, even if the SGP is not reformed, as discussed in Chapter 5. From 2016, as discussed above, the public sector is assumed to run a surplus of between 2 and 3 percentage points of GNP.

Within these broad parameters, it is assumed that out to 2010 the combined pressures to improve public services and invest in infrastructure will see a small increase in the public sector's share of national resources (tax/GNP ratio) – by around 1 percentage point of GNP. This would still leave the share of national resources going to the public sector in Ireland very low by the standards of the EU.

This assumption of a limited rise in the relative share of the State within the economy is based on the assumption that the Irish public's preferences for public services are similar to those in other countries. This means that, with rising living standards, consumers will choose both an increase in private consumption and an increase in public consumption.

National accounting conventions dictate that public consumption is shown net of all charges to users. As a result, the increase in charges assumed over the course of the next seven years of 1 percentage point of GNP (discussed below) reduces the share of current expenditure (net of charges) in GNP below the level it would otherwise have attained. This means that in the tables in the next chapter, the share of public expenditure in GNP is understated.

The share of income tax in personal income is assumed to rise by around 0.3 percentage points a year from 2005 onwards. In 2006 and 2007 this increase reflects the ending of the *Special Savings Incentive Accounts* (SSIA) scheme. However, there is also assumed to be a once-off reduction in social insurance contributions in 2005 funded by the revenue from the introduction of a carbon tax. The net effect of these changes is to see little change out to 2010 in the share of GNP accounted for by revenue from personal taxation (though there is a small rise in its share of personal income).

Revenue from company taxation is affected in 2006 and 2007 by the change in the tax rate applicable to the IFSC from 10 per cent to 12.5 per cent. A similar change occurs in 2011 and 2012 affecting the manufacturing sector. Thereafter it is assumed that the rate of company tax rises by around 0.5 percentage points a year to the end of the next decade.

Because of the serious task that faces Ireland in complying with its obligations under the Kyoto protocol, it will be important that policy action is taken by the beginning of 2005. In any event, the EU emissions trading regime will come into force on that date affecting the electricity sector and the most energy intensive sectors of manufacturing, see Bergin, Fitz Gerald and Kearney (2002). For the rest of the economy it will be important to put in place a carbon tax that roughly matches in magnitude the likely price of emissions permits, as outlined in Fitz Gerald (2002). The effect of this regime will be to raise the cost of energy for the public. We have assumed that the permits are auctioned and that the price is €20 a tonne of carbon dioxide from 2005 onwards. We also assume that the carbon tax announced in the last Budget, is introduced at €20 a tonne of carbon dioxide from the beginning of 2005. This should result in revenue of around €850 million in 2005 or 0.67 per cent of GNP.

As outlined by Scott and Eakins (2002), these measures will have a negative income distribution effect. As a result, it is assumed that around €250 million from the revenue is used to raise welfare payments (and make other improvements affecting low-income households. The rest of the revenue is assumed to be used to reduce social insurance contributions.

To some extent the current problems in the public finances reflect the effects of the sudden appreciation of the Euro, which will impart a deflationary shock to the Irish economy. With the estimates set in nominal terms a "surprise" fall in inflation can adversely affect the exchequer balance next year. The counterpart to this deflationary shock will be a downward adjustment in the rate of wage inflation over the period 2005-07, in turn reducing cost pressures for the public sector thereafter. (The possible effect on the public finances of a further euro appreciation is considered in Chapter 4.)

In light of the current problems with the public finances, the growth in the volume of net current expenditure on goods and services (public consumption) is likely to be small this year and next year. However, as outlined above, we anticipate that when the economy returns to more rapid growth, a share of that growth will be devoted to improving public services. The pattern in the past has been that, as living standards have risen, the public has demanded a rising level of public services as well as of private services. We assume a similar pattern over the coming decade. As a result, we assume that employment in the public sector grows by 4 per cent a year from 2005 to 2010. After the benchmarking increases affecting the public finances this year and next year, we assume that pay rates in the public sector broadly follow those in the private sector in subsequent years. This reflects the fact that over the long run public and private rates of average earnings have broadly kept pace with one another.

Some of the cost of the increased provision of public services will be recouped by increased user charges. It is assumed that these charges are raised gradually to reach 1 percentage point of GNP by 2010. These charges could involve some mix of volume-based charges for waste and water, congestion charges for traffic, parking charges, tolls etc. In an accounting sense the revenue will be used to reduce the sums required to fund government current expenditure on goods and services.

In the case of transfers, a substantial portion of government current expenditure, we have assumed that they are broadly indexed to wage rates. The expected slowdown in wage inflation from 2005 onwards will impact on their rate of increase. In addition to the indexation provision, we have assumed that demographic factors mean that there will be a volume increase of around 1 per cent a year out to 2015, rising to 1.5 per cent thereafter.

It is assumed that government capital expenditure will continue growing quite significantly out to 2010, thereafter slowing to 2015. The nominal increase between 2005 and 2010 is assumed to be something over 9 per cent a year. With a deflator of 2 per cent, this implies a volume increase of up to 7 per cent a year.

Public investment is assumed to be halved in 2016, growing by 5.5 per cent in value from the lower base from 2017 to 2020. This reduction is based on the assumption, discussed above, that by then Ireland's physical infrastructure has been fully modernised. This assumption is essentially arbitrary but it reflects the likelihood that, at the current rate of investment, some time in the next decade Ireland's infrastructure will reach the appropriate level and further investment needs will be greatly curtailed. Whether this plateau is reached before or after 2015 is, as yet, difficult to judge. However, it seems very probable that it will occur well before the most serious consequences of ageing affect the economy, from 2025 or 2030 onwards, leaving additional resources available to prepare for this long-term problem.

3. THE BENCHMARK FORECAST

3.1 Introduction

In this chapter we set out in detail the *Benchmark* forecast for the Irish economy to 2010. As in the previous *Review*, our analysis suggests that the Irish economy has the potential to grow more rapidly than its EU neighbours for the rest of the decade, albeit at a much slower rate than the exceptional performance witnessed in recent years. This growth scenario should facilitate a continuation of the recent convergence towards average standards of living in the EU.

We expect that the current slowdown in the Irish economy, which began in 2001, will gradually unwind through 2004 as world economic conditions improve. If this happens, then the Irish economy has the potential to grow at an average of above 4 per cent per capita for the rest of the decade, through a combination of productivity growth at above 3 per cent a year and further rises in the participation rate. Beyond 2010 our relative demographic advantage will have been spent and average living standards are likely to track the change in productivity, resulting in growth of around 3 per cent a year.

The *Benchmark* forecast is discussed in depth in Sections 3.2 through to 3.7. The forecast describes a relatively benign scenario, with sustained economic growth over the medium term averaging 5.4 per cent per annum between 2005 and 2010. Beyond the medium term, we foresee a gradual winding down to an estimated long-run potential growth rate of 3.5 per cent to 2015, falling further to 2.8 per cent between 2015 and 2020.

In this chapter, we present detailed annual forecasts out to 2010, together with indicative forecasts out to 2020. Our forecasts are based on the *National Income and Expenditure (NIE) 2001* national accounts, together with the Summer *Quarterly Economic Commentary* forecasts for 2003 and 2004. The ESRI's medium-term macroeconomic model, *HERMES*, was used to produce the majority of the forecasts, although we also availed of information and forecasts contained in the ESRI's *Quarterly Economic Commentary* (McCoy *et al.*, 2003).

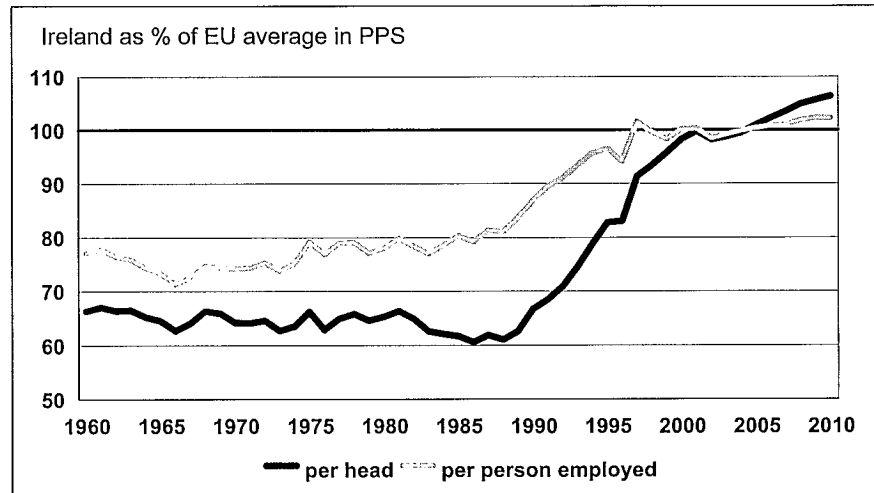
Section 3.2 summarises our forecasts for the key macroeconomic aggregates. The assumptions underlying these forecasts in relation to the public finances and labour supply were outlined in Chapter 2. Section 3.3 looks at the crucial supply side of the economy, the driving force behind the growth process. Given the supply side, we then move on to look at incomes, expenditure and prices in Section 3.4, clearly of importance in terms of the likely future implications of growth for living standards. Section 3.5 then considers the labour market with forecasts for employment and unemployment. Section 3.6 discusses the balance of payments, the public finances and savings. The likely implications of our forecast for the housing market and for the environment and the demand for energy are analysed in Section 3.7 before our overall conclusions are reached in Section 3.8. Finally, the track record of previous editions of the *Review* is analysed in Appendix 2.

3.2 Overview

In the ten years between 1990 and 2000 the Irish economy more than doubled in size in terms of GDP, and by 2001 in terms of GNP. This

remarkable period of high growth has led to full convergence between Ireland and the EU average in terms of GNP per capita, as shown in Figure 3.1. In our *Benchmark* forecast we expect output growth rates to continue to exceed the EU average for the rest of the decade so that GNP per capita, which for the thirty years between 1960 and 1990 hovered around 60-70 per cent of the EU average, is expected to approach 110 per cent of the EU average by the end of the decade.

Figure 3.1: GNP Per Head Relative to EU Average



The picture in terms of GNP per person employed, national productivity broadly defined, is somewhat less dramatic. Irish productivity levels were closer to the EU average between 1960 and 1990, averaging between 70-80 per cent. Furthermore, convergence in productivity began in the late 1980s with full convergence achieved in the latter half of the 1990s. In the *Benchmark* forecast we expect productivity growth to continue increasing at a slightly higher rate than the EU average to the end of the decade so that productivity levels will marginally exceed the EU average by 2010. The difference between the output per head and the output per person employed measures is the rate of economic dependency. There has been a sustained and steady decline in the Irish economic dependency ratio since the mid-1980s, and it is likely to dip below the EU average by 2010. In the mid-1980s the average worker had 2.2 dependants compared to 1.5 for the EU average. This was due to a combination of high unemployment, low female participation rates and a high proportion of children. In the 1990s rising employment, rising participation rates and a fall in youth dependency led to a rapid decline in the economic dependency rate, and while these are likely to plateau out over the next decade we envisage that further limited increases in female participation will be sufficient to drive the economic dependency rate below the EU average as shown in Figure 3.2.

In Chapter 1 we introduced a relatively simple decomposition of GNP per capita levels in terms of productivity and economic dependency, where the latter is decomposed into employment, participation and age dependency. As can be seen from Figure 3.3, the productivity growth rate in the period 2000-05 dropped significantly, to 0.9 per cent annual average.¹ This reflects the

¹ The fall in productivity growth is much less dramatic in terms of GDP, 2.6 per cent annual average, the difference is due to very strong growth in profit repatriations in 2000 and 2002 and a sharp drop in the growth of inward income flows.

Figure 3.2: Economic Dependency



downturn in 2002 and the forecast continued downturn out to 2004. However, we expect the economy to recover in 2005 and beyond, with a growth rate for productivity of over 3 per cent in the period 2005-10 and averaging 2.3 per cent in the following decade.

Figure 3.3: Decomposition of GNP Per Capita Growth Rate, Annual Averages

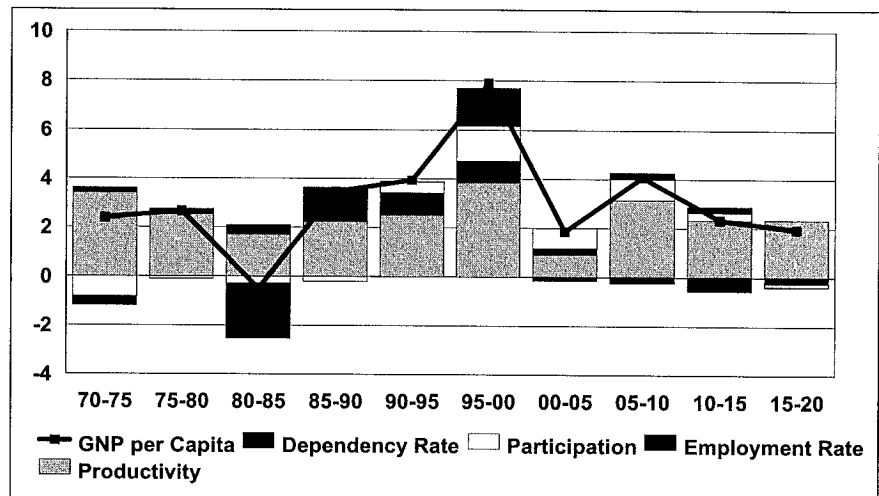


Figure 3.3 highlights the role played by economic dependency factors in driving the exceptional growth in the period 1995-2000; in particular strong growth in employment and participation together accounted for half of the total growth in GNP per head in these years. While the scope for further growth in these factors is limited, we expect further increases in participation out to 2010 to add almost 1 per cent per annum to the growth in per capita GNP. Beyond 2010 changes in economic dependency will cease to play a significant role, so that the per capita growth rate will track the growth in productivity levels more closely.

In the *Benchmark* forecast the GNP growth rate recovers slowly from the very low rate of 0.6 per cent in 2002 to 3 per cent in 2004. We expect the economy to bounce back to a higher growth rate of 4.7 per cent in 2005 and averaging 5.4 per cent per annum over the five-year period 2005-2010. Beyond 2010, as the economic dependency ratio stabilises, we expect the economy to grow more slowly, averaging 3.5 per cent per annum in the period 2010-15 and 2.8 per cent in the period 2015-20.

This medium-term growth scenario is similar to that presented in the previous *Medium-Term Review*, reflecting our assessment that the economy has the ability to grow at over 4 per cent to the end of the decade through a combination of continued strong productivity growth and rising participation. However, the timing of this forecast is different; because of the depth of the current slowdown we expect the economy to grow more rapidly in the latter half of the decade than forecast in the previous *Review*.

Underlying this forecast of a gradual decline in the growth in productivity over the next decade is a gradual shift out of manufacturing activities and into high-value services. The Irish economy is more heavily concentrated in industry than is typical for our main trading partners, and we expect that the economy will follow the pattern of development in other rich countries in shifting into high value-added services. Nevertheless we expect the industrial sector, in particular the high-technology sector, to continue to perform strongly over the forecast period, albeit at a more moderate pace than the exceptional growth rates recorded in the 1990s.

The services sectors that are likely to show more rapid growth over the rest of the decade are communications (both telecommunications and broadcasting); transport; business services, such as accounting and consulting; financial services; computer related services; research and development; and aspects of recreation and entertainment. All of these sectors are currently exporting some of their services. This new pattern of business is greatly facilitated by modern communications and their role as exporters is likely to continue growing over the decade. Unlike the high-technology sector, the domestic value-added in these sectors is likely to be high with much lower levels of profit repatriation.

These sectors are also currently among the biggest employers of skilled labour in the economy. In 1996, whereas the manufacturing sector employed only 15 per cent of all those in employment who had third-level education, most of the rest (just under 80 per cent) worked in the services sector. With the supply of people with third-level education rising rapidly over the decade, there should be continuing pressures on wage rates, keeping these skill-intensive sectors competitive.

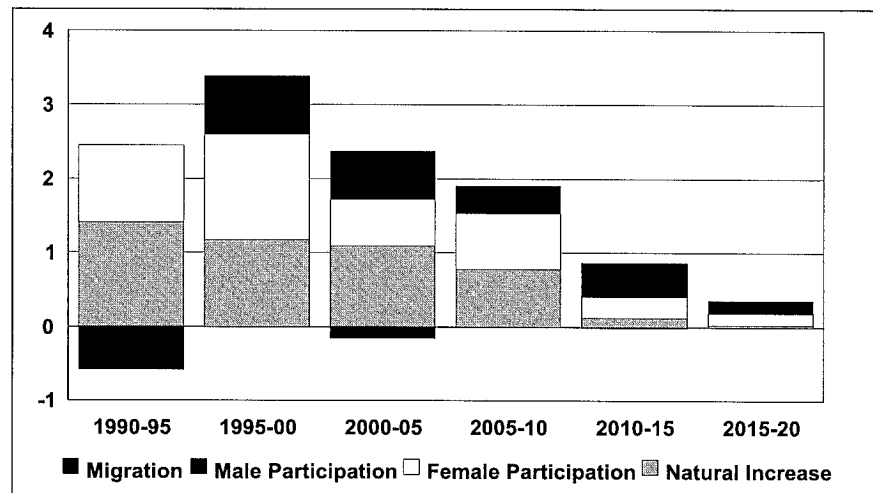
Table 3.1: Benchmark Forecast, Growth in Major Aggregates

	2002	2003	2004	2005	2006	2007	2008	2009	2010	1995-00	2000-05	2005-10	2010-15	2015-2020
	Per Cent									Average Annual % Growth				
GDP	6.3	2.6	3.1	6.1	6.6	5.9	5.9	5.3	5.0	9.8	4.8	5.7	3.3	2.9
GNP	0.6	2.4	3.0	4.7	5.7	5.6	5.7	5.1	4.8	9.0	3.1	5.4	3.5	2.8
GNDI (incl. Capital Transfers)	2.9	1.2	1.1	4.5	5.5	5.4	5.7	5.1	4.8	8.6	2.9	5.3	3.2	2.3
Investment-GNP Ratio	27.3	26.6	26.4	26.2	26.1	26.1	25.9	25.5	25.1	25.2	26.8	25.7	24.4	20.7
Consumption Deflator	5.6	3.5	2.0	3.2	2.8	3.0	3.2	3.4	3.2	3.3	3.7	3.1	2.5	2.0
Employment, April	2.0	1.2	1.2	2.4	2.5	2.7	2.0	2.0	1.7	4.9	2.1	2.2	1.1	0.5
Real After Tax Non-Agricultural Wage	3.1	1.2	1.1	0.8	0.6	1.3	1.7	1.8	2.1	2.6	2.0	1.5	2.1	2.0
	Per Cent of GNP									2000	2005	2010	2015	2020
Balance of Payments	-0.2	-0.6	-0.8	-0.2	0.4	1.0	1.9	2.3	2.8	0.1	-0.2	2.8	3.1	4.6
Debt – GNP Ratio	36.5	36.3	37.3	37.2	36.4	34.8	32.7	30.4	28.3	34.4	37.2	28.3	20.1	7.1
General Government Deficit	0.1	0.9	1.5	0.9	0.5	-0.2	-0.5	-0.9	-0.9	-5.2	0.9	-0.9	-1.1	-2.9
	Per Cent of Labour Force (ILO Basis)													
Unemployment Rate	4.2	4.9	5.7	5.4	5.2	4.7	4.6	4.3	4.3	4.3	5.4	4.3	3.1	3.2
	In Thousands													
Net Immigration	29	15	5	14	19	21	20	18	17	20	14	17	10	10

A more appropriate measure of changes in a country's overall level of income is Gross National Disposable Income (GNDI): equal to GNP adjusted for the terms of trade plus international transfers. On this measure the growth in income will be slightly lower over the forecast period, as current transfers from the EU decline and Ireland becomes a net contributor to the EU. However, the gap is relatively small. Another important factor in assessing living standards is the level of investment required to realise this forecast growth rate. As can be seen in Table 3.1, we expect that investment will have to average between 26 and 27 per cent of GNP to the end of the decade. This is substantially higher than average investment levels in the EU (expected to be approximately 20 per cent) and reflects the very high level of investment in infrastructure that will be needed out to 2015 to ensure that the economy can grow at or close to potential. In other words, in terms of consumption per head, Irish living standards in 2010 will remain close to the EU average despite a higher income per capita as shown in Figure 3.1.

As mentioned above, the sharp decline in the economic dependency ratio is expected to plateau out over the next decade. Nevertheless the growth in labour supply is likely to remain strong out to 2010, averaging over 2 per cent per annum, as shown in Figure 3.4. This is due to further increases in the population of working age, together with rising female participation rates and continued net immigration. Beyond 2010 the growth in labour supply will fall to much more modest levels, although we expect a continued flow of net immigration throughout the forecast period.

Figure 3.4: Decomposition of Growth in Labour Supply, Annual Averages



This relatively benign view of the medium term growth prospects for the Irish economy is built on a number of key assumptions, some of which are discussed in detail in Chapter 2. First, we expect that the world economy will recover from the current slowdown, and in particular that the EU and US will perform well over the next decade and a half. Second, we expect that domestic policies will facilitate the realisation of this potential growth rate. This includes a high rate of investment in infrastructure out to 2015, as mentioned above, and a commitment to improving domestic cost competitiveness. The ability of wages and prices to react quickly to the deflationary impact of recent exchange rate changes will be paramount in ensuring that Ireland remains competitive.

Throughout the 1990s the main benefit of growth was increased employment. Labour's share of value added fell as profitability and competitiveness improved. Over the forecast period employment growth is likely to be more modest with a gradual stabilisation of labour share, and some loss in competitiveness. Figure 3.5 shows Irish labour costs as a

percentage of other EU countries. It shows that between 1996 and 2002 Irish labour costs rose faster than elsewhere, remaining close to parity with the UK, and substantially higher than Spain and Italy. Nevertheless we expect that with a gradual reduction in the rate of inflation, following the pass-through of exchange rate changes into prices and wages, the growth in real wages over the forecast period will move in line with productivity growth rates, ensuring that the competitiveness of the economy is not further eroded.

The key factors that will drive growth over the coming decade can be broadly classified under factors affecting the supply of labour and factors affecting the demand for labour. We have discussed in Chapter 2 the demographic factors that will determine the growth in labour supply. We also discussed how the rising human capital endowment of the labour force is likely to lead to enhanced growth in labour productivity. Over much of the past fifty years however, Ireland has had a large supply of labour but little employment growth, so that labour supply itself is no guarantee of economic success. Whether the labour supply will find suitable employment in Ireland over the coming decade will depend on the factors affecting the demand for labour.

Given the openness of the economy, labour demand in Ireland is crucially dependent on growth in external demand, especially in our EU markets. The prospects for an upturn from 2005 onwards have already been discussed. However, it also depends on the competitiveness of the economy: can firms produce goods and services profitably in Ireland to supply the external market. As discussed above, the high inflation of the 2000-2002 period and the recent change in the exchange rate leaves many firms today less competitive than in the past. However, the HERMES economic model suggests that the private sector labour market is quite flexible. Given time, wage rates will adjust to restore competitiveness to a level that will sustain growth. The more rapidly this can be achieved the better placed will the economy be to take advantage of the upturn in world demand. The factors affecting labour productivity, discussed above, will also tend to reduce the cost of producing in Ireland.

Finally, the economy will also benefit from any upturn in the US. While competitiveness has been lost *vis a vis* the US economy, for certain key sectors Ireland still remains an attractive base for selling into the EU. As a result, some further FDI can be expected, though on a smaller scale than in the 1990s.

Figure 3.5: Irish Labour Costs as a Percentage of Other Countries

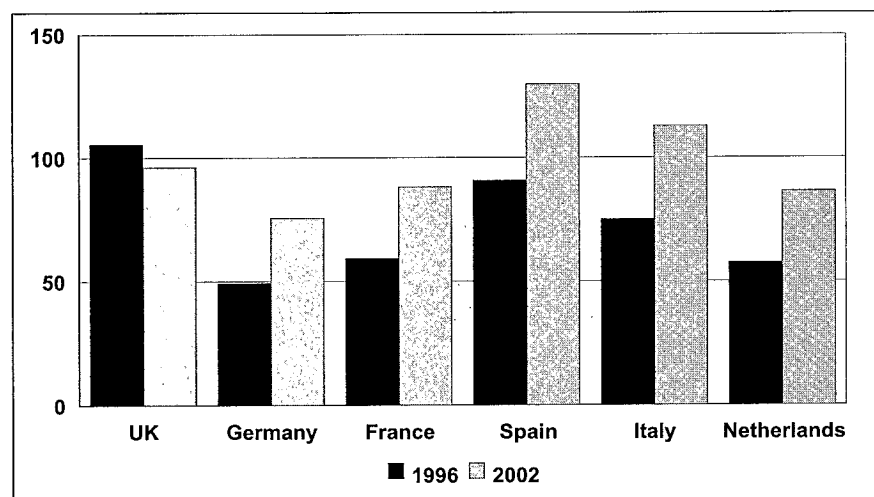


Table 3.1 gives an overview of the *Benchmark* forecast. Looking at the five-year averages, we can see that, following the exceptional performance of

the 1995-2000 period, there is a return to more modest growth in output and employment, and an end of large government surpluses. Despite the substantial infrastructural investment programme to be financed out to 2015, the public finances are likely to remain in reasonable shape, with the general government account broadly in balance for the decade as a whole. In other words, the government will have the opportunity over the decade to achieve a further reduction in the burden of the national debt, while simultaneously investing large amounts in our physical infrastructure. The growth in employment will ensure that the economy is at full employment levels by 2010, with continued net in-migration.

3.3 The Supply Side

The supply side of the economy includes both the tradable and non-tradable sectors. The openness of the economy means that productive capacity is driven by the performance of the tradable sector on world markets. Tradable sector output is determined both by world demand and competitiveness. Therefore, the cost of domestic inputs relative to other countries is central to maintaining international competitiveness. Output in the non-traded sector is driven by domestic demand. The non-traded sector also affects competitiveness as prices and wages in this sector influence the cost of production in the traded sector, including wage levels.

The economy performed very robustly throughout the last decade, recording average GDP (at factor cost) growth of over 9 per cent between 1995 and 2000. Since then activity has faltered, and although we anticipate some acceleration in activity next year and especially in 2005, GDP at factor cost is forecast to grow at an average of 5 per cent over the period 2000 to 2005. (This performance is in itself deceptive because the very rapid growth in net factor flows over this period mean a much more modest growth of 3.1 per cent in GNP.) Predicated on a rebound in international activity and the economy restoring competitiveness relative to other countries, growth should return to close to potential in the medium term. GDP at factor cost is forecast to grow by 5.9 per cent per annum in the second half of this decade. Thereafter, we are forecasting a slowdown in activity, with average growth falling to 3.2 per cent per annum in the next decade, a more sustainable long-term growth rate.

The Irish economy has for many years relied on industry as the main engine of growth. Structural change is currently underway in the economy and it is expected that manufacturing, in particular the high-tech sector, will make a declining contribution to growth in the long term. The counterpart to this is that market services will become more important in determining growth in the economy. Ultimately, this transformation should see the economy being much more dependant on services.

The success of the 1990s, both in terms of output and employment growth, was promoted by substantial inflows of Foreign Direct Investment (FDI), particularly from the United States. Looking to the future, it will be hard for the economy to move even higher up the value added chain in high technology industries (e.g. pharmaceuticals) than it has already done. Consequently, some slowdown in FDI is likely, especially in high-technology industries, as the economy evolves to a more mature model with greater importance of skilled services.

INDUSTRY

The industrial sector in the ESRI macroeconomic model is divided into tradable and broadly non-tradable sectors. The tradable sector comprises manufacturing industry, which is further broken down into the traditional

manufacturing,² food processing and high-technology industries.³ The non-tradable sector includes the building and utilities industries.

Table 3.2: Percentage Change in Output, GDP at Factor Cost at Constant 1995 Prices

	2002	2003	2004	2005	2006	2007	2008	2009	2010	2000-05	2005-10	2010-15	2015-20	
	Per Cent										Annual Average % Growth			
Agriculture	-4.4	7.1	-6.4	0.8	0.8	0.8	0.8	0.8	0.8	-0.7	0.8	0.7	0.6	
Industry	8.7	2.4	2.7	6.9	7.5	6.3	6.2	6.2	6.1	5.6	6.4	3.2	3.2	
Manufacturing	9.4	2.6	3.0	7.6	8.2	6.7	6.9	6.8	6.7	6.1	7.1	3.5	3.6	
Utilities	3.5	5.1	8.0	8.4	9.0	9.0	3.5	3.5	3.5	6.4	5.7	3.5	3.5	
Building	6.2	-0.5	-1.0	0.8	0.9	0.7	0.6	0.7	0.6	1.9	0.7	-0.5	-2.8	
Market Services	3.6	2.0	3.2	7.4	7.6	7.2	6.9	5.4	4.5	4.9	6.3	3.7	2.9	
Distribution	1.6	2.4	2.7	5.8	6.5	6.5	6.6	6.0	3.9	4.4	5.9	3.3	2.4	
Transport & Communications	1.6	2.4	2.7	5.7	6.9	6.6	6.5	5.6	4.9	4.3	6.1	4.1	3.0	
Other Market Services	4.9	1.7	3.6	8.4	8.2	7.5	7.2	5.1	4.7	5.2	6.5	3.8	3.1	
Non-Market Services	8.3	1.1	1.5	4.2	4.2	4.2	4.2	4.2	4.2	4.1	4.2	2.2	1.7	
Health & Education	9.8	1.0	1.3	4.0	4.0	4.0	4.0	4.0	4.0	4.6	4.0	2.0	1.5	
Public Administration	4.5	1.1	2.2	4.8	4.7	4.7	4.7	4.6	4.6	2.9	4.7	2.6	2.1	
Adjustment for Financial Services (-)	-3.7	2.0	2.0	8.3	8.6	7.8	7.6	6.8	6.3	3.3	7.4	4.1	3.5	
GDP at Factor Cost	7.0	1.9	3.0	6.5	6.8	6.1	6.0	5.4	5.0	4.9	5.9	3.2	2.9	
Taxes on Expenditure	-1.5	6.2	3.0	2.9	3.9	3.9	4.0	4.2	3.8	2.2	4.0	3.5	2.8	
Subsidies	-9.4	-4.6	-4.4	1.2	1.6	1.5	1.5	1.6	1.4	-2.9	1.5	1.0	0.8	
GDP at Market Prices	6.3	2.6	3.1	6.1	6.6	5.9	5.9	5.3	5.0	4.8	5.7	3.3	2.9	
Net Factor Income	37.6	3.3	3.8	11.7	9.7	7.2	6.3	6.3	5.5	13.1	7.0	2.6	3.0	
GNP at Market Prices	0.6	2.4	3.0	4.7	5.7	5.6	5.7	5.1	4.8	3.1	5.4	3.5	2.8	

MANUFACTURING

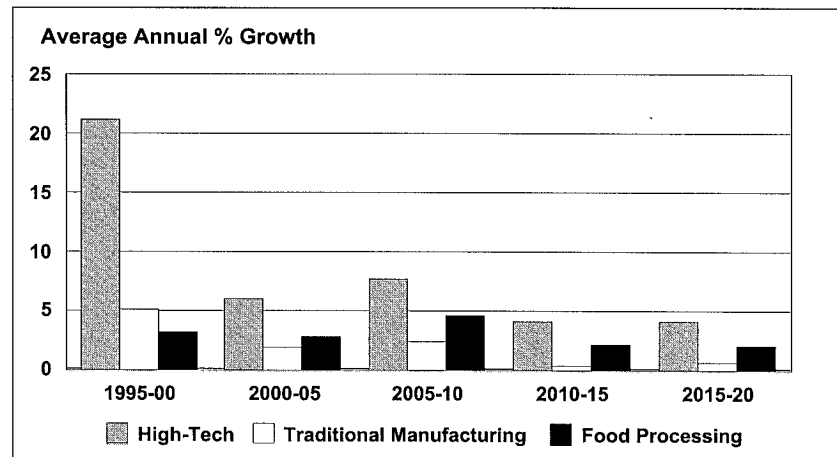
The exceptional growth in manufacturing over the course of the last decade accounted for approximately half of the growth in the Irish economy between 1990 and 2000 and about a third when profit repatriations are taken into account. The high-technology sector has been the main engine of growth in manufacturing, with gross output in real terms increasing by 390 per cent between 1990 and 2000, compared with around 65 per cent growth in traditional industries. This exceptionally high rate of growth has been made possible by significant gains in productivity and significant levels of investment within the sector.

We expect growth in manufacturing to moderate somewhat over the rest of this decade from the double-digit figures recorded in the late 1990s. The current slowdown in manufacturing activity is largely attributable to the deterioration in the international economy, the negative impact on competitiveness of the appreciation of the euro, and high domestic input costs relative to other countries. Predicated on a rebound in international activity, average growth of 6.1 per cent is forecast for the period 2000 to 2005, and 7.1 per cent for the second half of the decade.

² This sector includes drink and tobacco, textiles, leather, wood products, paper and printing, and mining and quarrying.

³ This sector includes the chemicals, metals and engineering industries.

Figure 3.6: Output in Manufacturing

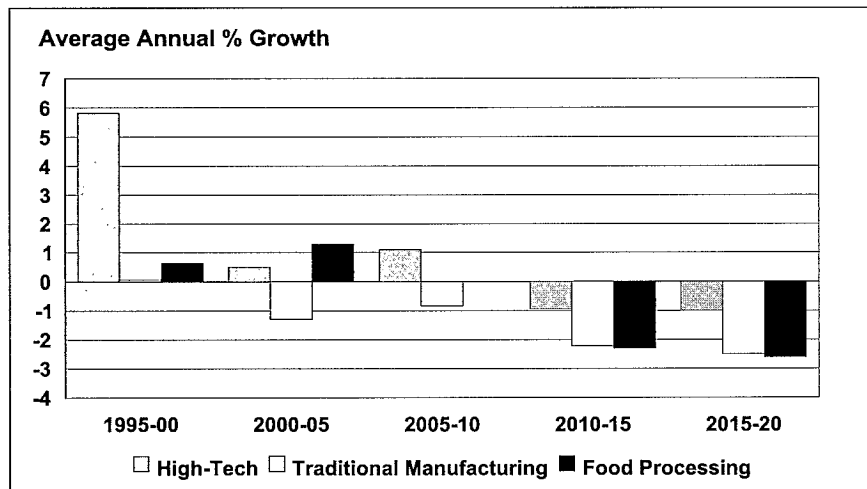


The medium-term prospects for the high-technology industry remain positive and the sector will continue to be an important contributor to GNP growth. In the past, growth in this sector was fuelled by significant FDI flows and a steady influx of foreign-owned multinationals. Going forward, more moderate FDI flows coupled with the maturing of the sector, will inevitably lead to some slowdown in growth rates. We forecast average growth of 6.0 per cent in the current 2000-2005 period, before increasing to 7.7 per cent between 2005 and 2010, assuming an improved international outlook. There has been a shift in the sub-sector composition of growth towards “new” industries (e.g. biotechnology) and we expect this trend to continue. This makes it increasingly difficult to distinguish between high-tech industries and internationally traded services.

Traditional manufacturing industries have performed reasonably well in recent years, although growth has been well below the levels experienced in the high-tech sector. This is understandable given its greater dependence on domestic and UK demand. As the sector is sensitive to changes in the competitive position of the country, more competition from Asia and the Accession countries, which have considerably lower labour costs than Ireland, and the forecast appreciation of the currency, will continue to impair the prospects for this sector. We anticipate lower growth rates compared to the 1990s averaging 1.9 per cent between 2000 and 2005 and 2.4 per cent in the following five-year period. Thereafter the rate of growth is likely to decline, averaging less than 1 per cent per annum over the next decade.

The food processing industry is identified separately within the ESRI macroeconomic model as production is uniquely constrained by the available supply of inputs from the agricultural sector and the seasonal nature of that supply. This dependence has lessened somewhat in recent years. Owing to considerable restructuring and rationalisation, and the rise of the Irish agri-food multinational, output grew significantly since the early 1980s and peaked in the 1990-1995 period. Output growth declined in the subsequent period and this downwards trend is likely to continue in the short run. A resumption of growth is likely in the second half of this decade although longer term prospects remain fairly bleak. This is consistent with the forecast decline in the importance of agriculture (see below). Growth of 4.6 per cent is forecast for 2005 to 2010 before weakening to average 2 per cent per annum in the following decade.

Figure 3.7: Employment in Manufacturing



Employment in manufacturing increased throughout the 1990s, with a marked increase between 1995 and 2000 when the numbers employed grew by 38,000 or almost 3 per cent. However, medium-term employment prospects in manufacturing are poor (see Figure 3.7). Growth in manufacturing employment is likely to stagnate for most of this decade before falling in the next decade.

Growth in high-tech sector employment peaked in the 1995 to 2000 period. Growth in this sector is unlikely to match the exceptional rates of the 1990s. We are forecasting employment growth of 0.5 per cent a year for the period 2000 to 2005 before rising to average 1.1 per cent between 2005 and 2010 and then declining by around 1 per cent per annum in the next decade. There has been very little employment growth in traditional manufacturing over the last decade. Numbers employed in this sector are forecast to fall by 1.3 per cent per annum between 2000 and 2005, then by 0.8 per cent per annum over the period 2005 to 2010 and the rate of decline is forecast to accelerate over the course of the next decade. The corresponding fall in actual employment in this sector between 2000 and 2010 is approximately 11,000. Employment in food processing increased slightly in the 1990s and we anticipate a small increase of 1.3 per cent per annum during the current 2000-2005 period before growth stagnates for the remainder of the decade and then falls in the next decade at a rate of over 2 per cent per annum.

High levels of investment underpinned much of the output growth in manufacturing in the second half of the 1990s. Investment is expected to contract by 4.7 per cent between 2000 and 2005 compared with growth of 13 per cent over the previous five-year period. Given the slow pace of growth in economic activity in Europe at the moment, it is likely that interest rates will remain low in the short term. However, substantial growth in investment is not anticipated until any rebound in activity is seen as being sustainable. With the Irish economy returning to its potential growth rate in 2005, manufacturing investment is anticipated to recover and grow at 6.6 per cent per annum in the second half of the decade. Modest investment growth is forecast for the next decade. This is consistent with the maturing of many high-tech firms, together with the expected relative decline in traditional manufacturing.

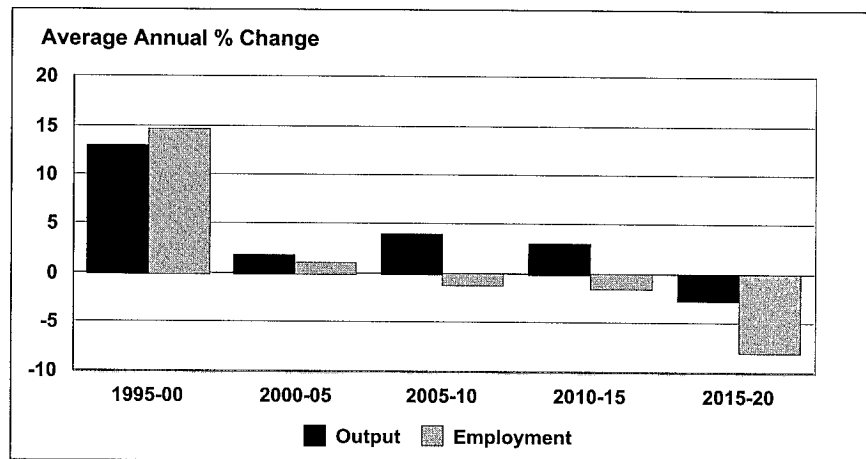
Growth in output and employment in the manufacturing sector diverged in the 1990s with employment growing at a much slower pace. This meant that productivity was very high and that it made a significant contribution to growth. Growth in productivity is likely to be less than 3 per cent in the short term, following annual average growth of 8.4 per cent from 1990 to 1995 and 14.8 per cent between 1995 and 2000. Thereafter, productivity growth is

expected to increase in the medium term to average 7 per cent per annum between 2005 and 2010. Over the next decade we expect to witness a slowdown in this growth as industries mature.

BUILDING

The building industry reflected the transformation of the Irish economy in the 1990s in various ways. Since 1994, gross output has witnessed phenomenal growth, with average annual growth of over 13 per cent in the 1995-2000 period. We envisage lower, more moderate growth for the current decade averaging 1.8 per cent in the current 2000-2005 period before increasing to 4.0 per cent per annum in the following five years (see Figure 3.8). These rates are sustainable over the medium term. Output growth is forecast to moderate post 2010 to 3.0 per cent per annum before decreasing by an average of 2.6 per cent per annum in the 2015-2020 period, due to a slackening in residential demand and the assumed completion of the infrastructural investment.

Figure 3.8: Output and Employment in the Building Sector



Because this sector is of its nature very employment intensive, the strong growth in the 1990s translated into average annual growth in numbers employed in excess of 14 per cent during the 1995-2000 period. A slowdown in the numbers employed is expected for the current five-year period with average growth of 1.1 per cent consistent with the forecast downturn in output growth in these years.

The main source of the boom in the building sector has been the demand for new housing. This demand soared in the 1990s due to the high growth rates in the economy, the unusually strong demographic profile, particularly the large number of young labour market entrants, and increases in household formation. The price deflator for output in this sector shows the strength of the demand, growing by 10.4 per cent over the 1995-2000 period, over three times the average rate of increase for the economy as a whole. The remarkable growth in this sector over such a short time span demonstrates a high degree of flexibility in raising output, albeit at the cost of soaring prices. Residential demand for housing is likely to remain high and fairly stable throughout the decade as discussed later in this chapter.

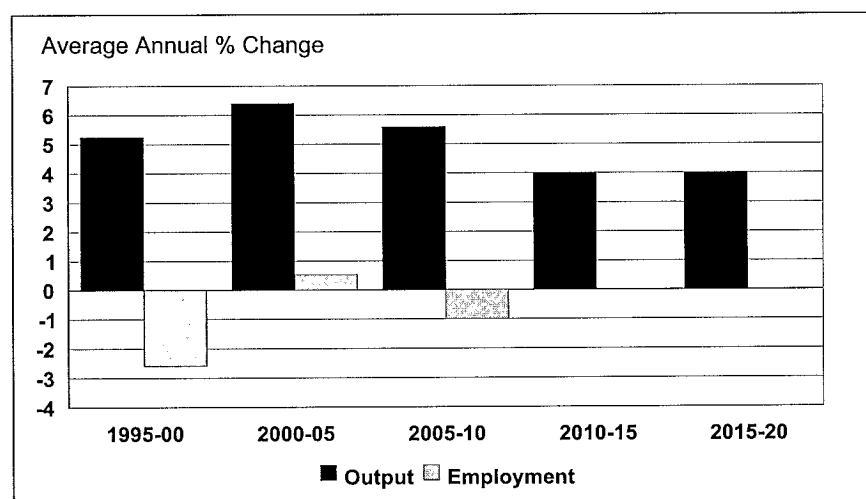
In addition to the boom in demand for housing, the expansion in the services and industrial sectors has led to increased demand for new buildings. Strong growth is expected in these sectors over the second half of the decade and this will contribute to output growth in the building sector. Furthermore, the *Benchmark* forecast assumes that the government fulfils its investment targets as set out in the *National Development Plan* (NDP). Thus substantial

government investment in roads, public transport and environmental as well as social and recreational infrastructure is envisaged over the coming years.

UTILITIES

Growth in the utilities sector (which includes electricity, gas and water) is driven by the demand for energy in the rest of the economy (see Section 3.7) so it tends to follow growth in other sectors of the economy. Growth in output is expected to be 6.4 per cent per annum in the current 2000-2005 period (Figure 3.9), slightly higher than growth over the preceding five-year period, before moderating slightly to 5.6 per cent between 2005 and 2010. Growth in this sector will continue to be driven by the expansion in commercial sector activity.

Figure 3.9: Output and Employment in the Utilities Sector



The numbers employed in this sector fell on average during the 1990s primarily due to the restructuring in the electricity sector and, while we expect average growth of around 0.5 per cent per annum in the current five-year period, we expect the numbers employed to fall at a rate of 1 per cent per annum between 2005 and 2010. No growth in employment is forecast after 2010.

AGRICULTURE⁴

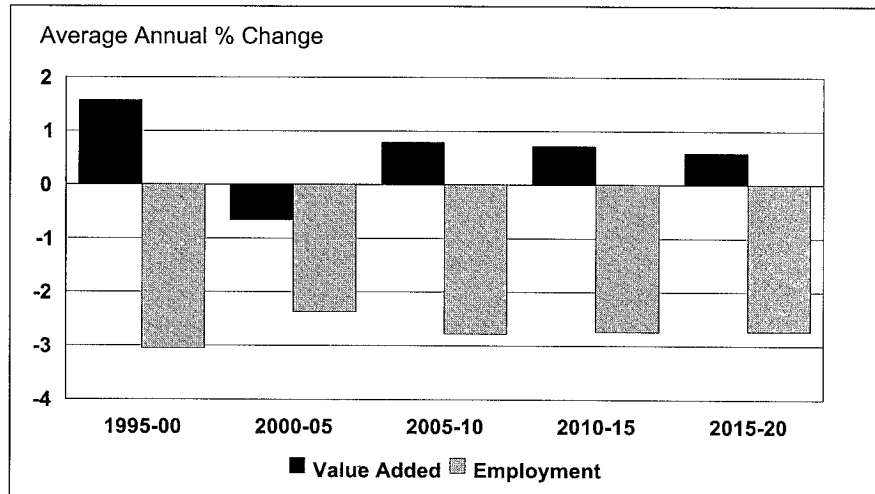
Growth in the agricultural sector (which includes forestry and fishing) in the last decade was very low, especially in comparison to other sectors of the economy. Prospects for this sector remain very weak with a decline of 0.7 per cent per annum forecast between 2000 and 2005. This is not surprising given the negative supply-side shocks that have hit the sector in recent years, notably BSE and the measures used to prevent the spread of foot and mouth disease. The proposals contained in the *Mid-Term Review* of the Common Agricultural Policy, relating to the decoupling of payments from production will have a negative impact on production over the forecast horizon.⁵ Beyond 2005, we anticipate average annual growth of around 0.8 per cent per annum (Figure 3.10). This sluggish growth will serve to reduce the importance of agriculture by halving agriculture's contribution to GNP growth. In addition,

⁴ The forecasts for the agricultural sector rely heavily on research done by Teagasc, although the authors accept full responsibility for the content of this section (Teagasc, 2003).

⁵ The implications of the June 2003 agreement have not been incorporated into our forecasts.

with a small rise in prices forecast, agricultural incomes will only show a very minor increase.

Figure 3.10: Output and Employment in Agriculture



Employment in agriculture has been declining steadily for a number of decades. This downward trend is expected to continue over the medium term. Between 1995 and 2002 the numbers employed in this sector fell by 28,000 to 115,000. Over the current 2000-2005 period, we expect employment in agriculture to fall by 2.4 per cent per annum and by 2.8 per cent thereafter to 2010. This implies that there will be approximately 94,000 people working in this sector in 2010.

MARKET SERVICES

The market services sector is modelled using three separate sub-sectors, namely distribution, transport and communications, and other market services. Consumption levels, tastes, demographics as well as the level of growth in the economy as a whole drives demand for these services. Historically, the market services sector was broadly classified as non-tradable, but developments in technology and the reduction in trade barriers have resulted in increasing exposure to international competition.

The market services sector has witnessed impressive growth since the mid-1980s, peaking in 1999 at just over 10 per cent. Output grew by an average of 6.2 per cent per annum over the course of the 1990s and growth averaging 6.1 per cent per annum is forecast for the current decade. As output from the market services sector is quite labour intensive, growth in this sector has important implications for employment. This sector experienced the highest growth in employment in the 1990s, averaging just below 5.0 per cent per annum and this trend is expected to continue over the forecast horizon. Following strong growth at the beginning of the decade, employment growth has moderated somewhat, although we expect it to increase in the medium term. Employment growth of 3.2 per cent is forecast between 2005 and 2010. Thus almost 920,000 people will be employed in this sector by 2010 compared with just under 670,000 in 2000. This means that in 2010 employment in the market services sector will be nearly twice that of the industrial sector and just under ten times that of the agricultural sector.

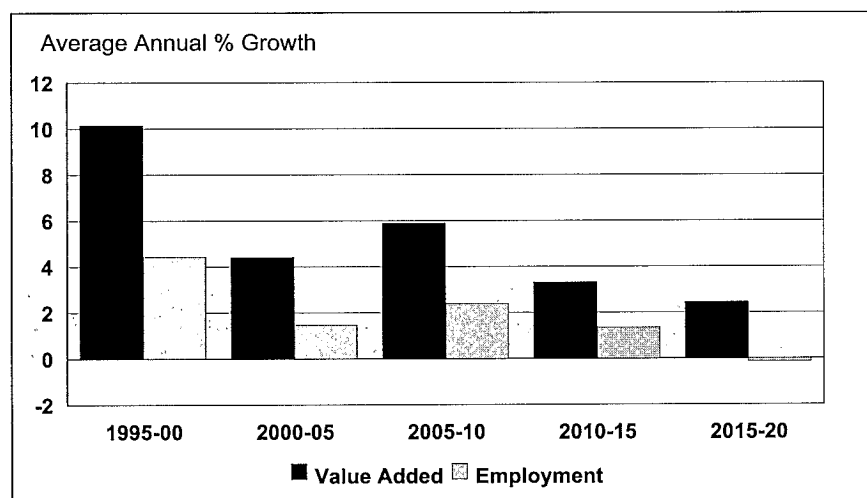
DISTRIBUTION

The primary determinant of output in the distribution sector (which includes both wholesale and retail services) is the volume of consumption in the

domestic economy. The demographic profile of the population also helps to determine output. In Ireland, increased labour force participation, particularly from the younger age groups, and falling dependency rates have helped to change the demand for different types goods and services. Typically, these goods and services have higher margins and more specialised customer service so the employment intensity of output is increased. Since the mid-1990s rising affluence has increased the demand for better quality goods and services.

The distribution sector recorded impressive average growth rates in excess of 10 per cent over the period 1995 to 2000. Prospects for growth in this decade remain positive, despite the current short-term downturn in economic activity growth of 4.4 per cent is forecast for the current 2000-2005 period, before increasing to 5.9 per cent per annum from 2005 to 2010 (Figure 3.11). Thereafter, growth is expected to slow in line with overall activity in the economy.

Figure 3.11: Output and Employment in the Distribution Sector



The numbers employed in the sector increased from 187,000 in 1995 to 233,000 in 2000 (a 25 per cent rise). Employment growth is expected to remain flat in the short term while an average increase of 2.4 per cent is expected over 2005 to 2010.

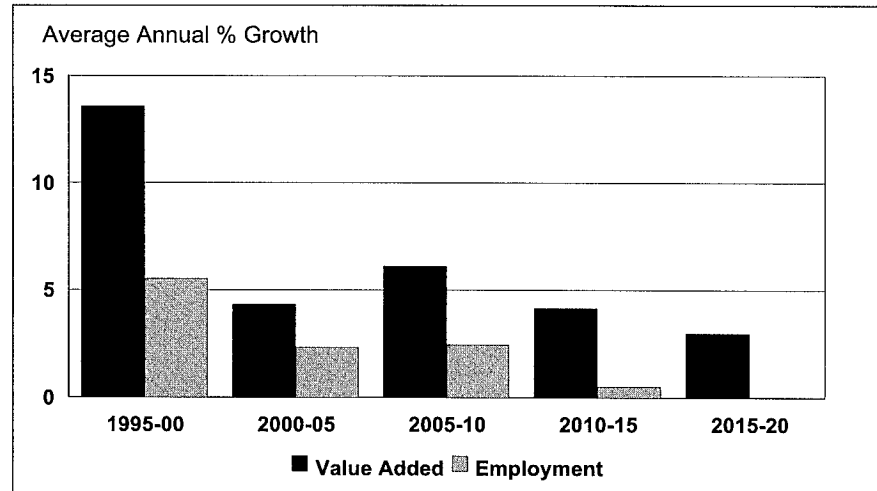
TRANSPORT AND COMMUNICATIONS

The output of the transport and communications sector is also primarily driven by domestic demand. Nevertheless, government involvement and intervention in semi-state bodies in this sector means it is different in many ways from the rest of the market services sector. The process of liberalisation has increased competition in the sector, mainly in aviation and telecommunications. The development of new technologies has increased the potential for growth in this sector especially in communications.

During the 1990s, the growth rate of output in transport and communications surpassed growth rates in the rest of the market services sector. Continued strong growth is expected over the forecast horizon, with average annual growth of 4.3 per cent forecast between 2000 and 2005 rising to 6.1 per cent per annum in the following five years (Figure 3.12). Phenomenal rates of investment, particularly in the late 1990s underpinned much of the growth in the sector in the last decade, serving to expand and upgrade the stock of capital. A reduced rate of investment growth, averaging 4.1 per cent per annum, is envisaged for the first five years of this decade before accelerating to 10.7 per cent in the second half of the decade.

Employment in this sector increased from 68,000 in 1990 to 99,000 in 2000, in stark contrast to the 1980s when employment fell, albeit marginally, over the course of the decade. Slower employment growth due to continued restructuring is forecast in the current decade and by 2010 employment in this sector is forecast to stand at 126,000. However, the rapid deployment of new technology and changing tastes could see even more rapid growth.

Figure 3.12: Output and Employment in the Transport and Communications Sector



OTHER MARKET SERVICES

This sector comprises a broad range of diverse service activities and includes both personal and professional services. Personal services cover activities such as restaurants, hotels, pubs, hairdressers, etc. and professional services include legal services, banking, insurance and other professions. Traditionally, these services were part of the non-traded sector of the economy. However, technological advancement in recent years has pushed many of these services into the traded part of the economy, especially in the financial and information technology sectors. Nonetheless, there are still many services that remain sheltered from international competition and some of these face little domestic competition.

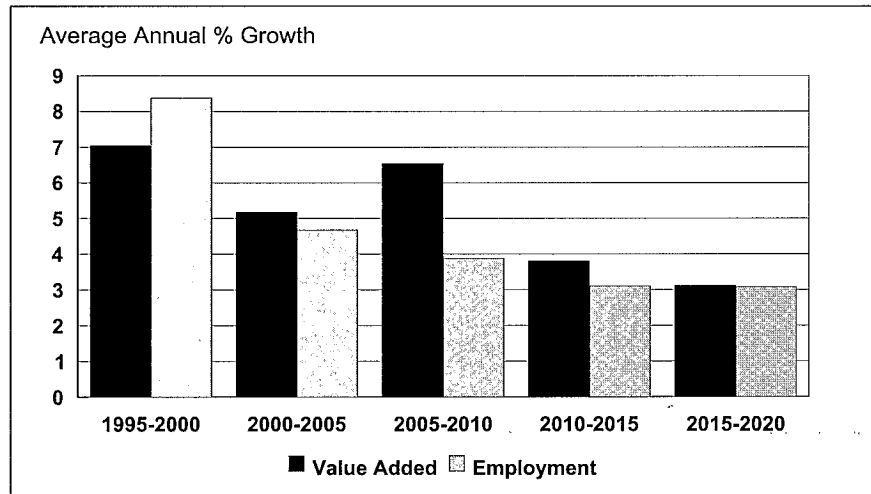
As in the rest of the services sector, output is driven by domestic demand, while output from those services that are internationally traded is driven by both domestic and foreign demand. Over the five years 1995 to 2000 output in this sector grew by an average of 7.1 per cent per annum and continued high growth averaging 5.8 per cent per annum is expected for the current decade (Figure 3.13). The reason for the strong growth is that as disposable incomes rise, usually an increasing proportion of these incomes are spent on personal and professional services.

Employment growth was rapid throughout the 1990s and strong growth is forecast over the medium term, averaging 4.7 per cent in the first half of the decade and 3.9 in the subsequent half. Although growth is expected to be lower than in the previous decade it compares very favourably to employment growth forecasts in other areas of the economy. The level of employment in this sector is set to increase from 335,000 in 2000 to 509,000 in 2010, a rise of 52 per cent. By 2010 employment in this sector will account for approximately 55 per cent of market services employment and over one-quarter of total employment in the economy.

NON-MARKET SERVICES

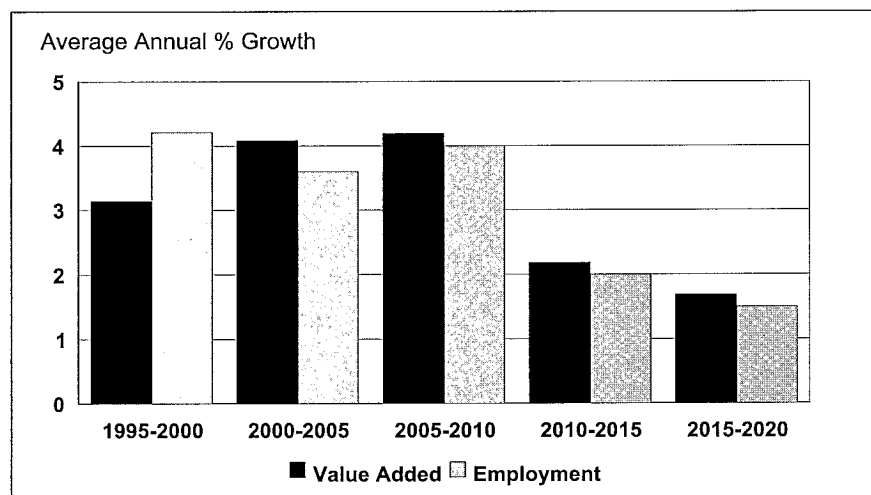
The ESRI macroeconomic model identifies two separate components of output in the non-market services sector namely, health and education, and public administration and defence. Generally, the government provides most of these services and many of them have “public good” characteristics. Output in this sector is driven by the government’s demand for public services. In turn, this demand will depend on the demographic profile of the country, the current budget and the public demand for such services reflecting their underlying utility function.

Figure 3.13: Output and Employment in the Other Market Services Sector



Throughout this decade, growth in non-market services is expected to be above that of the 1990s, with average annual growth of 4.1 per cent. Thereafter, value added is forecast to grow at a slower rate over the course of the next decade. Investment in this sector grew by over 19 per cent per annum between 1995 and 2000 and we envisage a sharp reduction in this rate to average 4.8 per cent between 2000 and 2005 and 3.7 per cent between 2005 and 2010.

Figure 3.14: Output and Employment in Non-Market Services



Employment in non-market services grew by 4.2 per cent between 1995 and 2000 (Figure 3.14), with numbers employed in health and education rising by 5 per cent on average per annum. We expect 479,000 people to be

employed in this sector by 2010 and over three-quarters of these to be in health and education. This implies average employment growth of 3.8 per cent per annum during this decade.

Table 3.3: Personal Income, Percentage Change

	2003	2004	2005	2006	2007	2008	2009	2010	2000 -05	2005 -10	2010 -15	2015 -20
	%								Average Annual % Growth			
Agricultural Incomes	-12.5	3.8	4.0	3.0	2.7	1.6	3.2	3.4	1.2	2.8	3.8	3.8
Non-Ag. Wage Income	8.8	5.6	4.4	7.4	6.4	7.9	7.6	8.0	7.8	7.5	6.0	4.6
Transfer Income	23.7	3.2	5.5	5.5	4.7	5.9	7.0	7.4	9.6	6.5	7.5	6.2
Other Personal Income	-1.1	14.8	-0.1	1.9	8.0	7.8	8.9	6.6	2.3	7.6	3.8	1.9
Non-Ag. Profits etc.	17.2	3.6	4.8	9.0	11.4	9.4	9.8	8.3	8.8	9.3	4.4	3.9
National Debt Interest	1.5	9.9	7.0	9.6	6.2	5.0	2.8	1.8	3.7	3.2	-0.9	-8.1
Net Factor Income	41.2	0.5	4.0	13.7	11.6	9.1	8.4	8.4	14.6	9.0	4.4	4.6
Other Private Income	-1.3	9.5	4.8	4.5	11.2	9.3	10.7	7.4	3.6	9.2	3.7	2.3
Undistributed Profits(-)	-1.6	1.7	12.9	8.2	15.7	11.2	12.9	8.5	5.6	11.3	3.5	2.7
Personal Income	8.2	6.7	3.7	6.0	6.3	7.4	7.6	7.5	6.8	7.2	5.8	4.4
Taxes on Personal Income	-0.6	3.9	2.8	7.5	7.0	9.0	8.6	9.1	4.4	8.4	5.6	4.1
Personal Disposable Income	10.4	7.3	4.0	5.6	6.1	7.0	7.3	7.1	7.3	6.9	5.9	4.5
Personal Consumption	7.7	5.6	5.1	6.2	6.7	7.0	7.3	7.7	6.8	7.2	6.1	4.7
Personal Savings	38.4	20.7	-4.0	1.0	1.3	7.0	7.3	2.0	11.9	4.9	3.7	2.1
	% of Disposable Income											
Tax Ratio	17.6	17.5	17.7	17.8	18.1	18.3	18.5	18.7				
Savings Ratio	12.5	11.5	11.0	10.5	10.5	10.5	10.0	10.0				

3.4 Income, Expenditure and Prices

The past number of years represented a difficult time for agriculture. The BSE crisis, falling employment numbers and the foot and mouth scare of 2001 all served to damage the sector. These also contributed to very modest income growth between 1995 and 2000, when incomes grew by just 0.8 per cent per annum. As outlined earlier in this chapter, the prospects are for continued falls in employment. Annual average income growth is forecast to remain low at 1.2 per cent between 2000 and 2005 (Table 3.3), with some further improvement to an annual average of 2.8 per cent between 2005 and 2010.

In contrast, non-agricultural incomes have grown rapidly. Between 1995 and 2000 this growth averaged over 12 per cent per annum, partly driven by strong employment growth, with the numbers at work increasing by 370,000. Slower employment growth is forecast for the next decade. This is likely to underpin growth in non-agricultural incomes over the period and growth of 7.8 per cent is forecast between 2000 and 2005 and 7.5 per cent between 2005 and 2010.

Strong growth is also forecast for transfer incomes. Having grown by an average of 6.9 per cent per year between 1995 and 2000, growth is expected to increase to an annual average of 9.6 per cent between 2000 and 2005, before moderating back to 6.5 per cent between 2005 and 2010. The strong increase in the current five-year period reflects some increase in the numbers unemployed and the increases in transfer payment levels of recent budgets. At the same time, the reduction in the numbers receiving transfer payments due to the falling dependency ratio is also slowing. Significant reductions in interest rates have reduced national debt interest payments. Even with some rise in interest rates in the medium term, the declining national debt burden means that any increases in national debt interest are likely to be moderate.

Annual average growth in personal taxes is expected to be lower at 4.4 per cent between 2000 and 2005, compared with growth of nearly 11 per

cent per annum between 1995 and 2000. An increase in growth to 8.4 per cent per annum is forecast between 2005 and 2010, in part a reflection of the ending of the SSIA scheme during 2006 and 2007. (The government contribution to these accounts is funded from income tax receipts.) It is forecast that personal income growth will exceed growth in personal taxes over the period, which should result in personal disposable incomes continuing to grow quite strongly during the decade.

CONSUMPTION

The rapid economic growth in the late 1990s was reflected in strong growth in personal consumption, averaging 7.9 per cent per annum between 1995 and 2000. Of course, that exceptional period for the Irish economy was a time of strong growth in wages, personal disposable income and falling unemployment. Consumption has also been boosted by historically low interest rates and the expectation that interest rates will not rise to levels experienced prior to Ireland's entry to EMU. These low interest rates encouraged borrowing, for example mortgage borrowings, and discouraged savings. The personal savings ratio declined to below 9 per cent in 2001. Despite low nominal, and negative real interest rates we estimate that savings rose in the last two years.

Table 3.4: Expenditure on GNP, Constant Prices, Percentage Change

	2003	2004	2005	2006	2007	2008	2009	2010	2000 -05	2005 -10	2010 -15	2015 -20
	%								Average Annual % Change			
Personal Consumption	2.0	3.0	2.9	3.8	3.8	4.0	4.2	3.8	3.0	3.9	3.5	2.7
Public Consumption	1.0	1.4	4.0	4.0	3.9	3.9	3.9	3.9	5.0	3.9	2.1	1.8
Fixed Investment	-0.5	1.2	4.7	5.7	6.1	5.7	4.5	3.9	1.0	5.2	3.1	-0.3
Building	-1.6	0.2	3.6	4.4	4.7	4.5	3.4	3.0	1.8	4.0	3.0	-2.6
Machinery	1.0	2.5	6.1	7.4	7.9	7.2	5.9	5.0	0.1	6.7	3.3	2.1
Total Exports	0.1	2.7	8.8	9.1	7.4	7.3	6.8	6.6	4.4	7.4	3.7	3.5
Total Imports	-1.3	1.2	7.0	7.8	6.5	6.5	6.4	6.2	2.4	6.7	3.7	2.9
Gross Domestic Product	2.6	3.1	6.1	6.6	5.9	5.9	5.3	5.0	4.8	5.7	3.3	2.9
Net Factor Income	3.3	3.8	11.7	9.7	7.2	6.3	6.3	5.5	13.1	7.0	2.6	3.0
Gross National Product	2.4	3.0	4.7	5.7	5.6	5.7	5.1	4.8	3.1	5.4	3.5	2.8

Our forecasts for personal consumption (Table 3.4) are based not only on our assumptions regarding income growth and changes to personal taxes but also include the effect of changing house prices on personal wealth. We expect that such rapid growth will not be a feature of the current decade. Thus, growth in the volume of personal consumption is expected to average 3 per cent per annum between 2000 and 2005. Growth is forecast to increase in the latter half of the decade to an annual average of 3.9 per cent.

Public consumption in the late 1990s grew by an annual average of 5.8 per cent. We expect growth in public consumption to slow marginally to 5 per cent per annum in the 2000 to 2005 period, before slowing to annual growth averaging 3.9 per cent between 2005 and 2010.

INVESTMENT

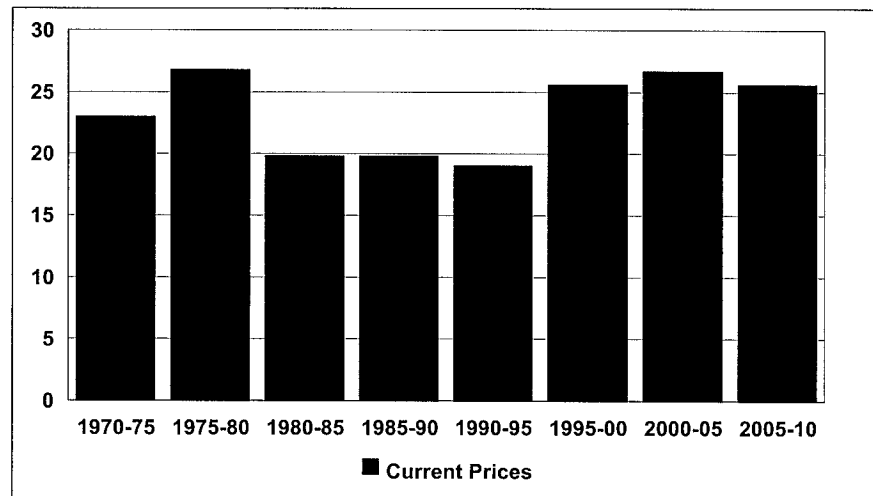
A feature of the late 1990s was dramatic growth in the volume of overall investment, averaging 14.3 per cent per annum. This growth is a reflection of the major investment undertaken to address the infrastructure constraints limiting the growth of the economy as well as investment in productive capacity aimed at increasing supply at a time of strong economic growth.

A very different situation prevails in the first half of this decade. The sharp slowdown in world and domestic economic activity since 2000 has resulted in overall investment contracting in 2001 and a further contraction is expected to

occur this year. Thus, despite some recovery in investment growth in 2005, the annual average for 2000 to 2005 is expected to be just 1 per cent. As economic growth returns towards potential output levels, growth in overall investment is forecast to increase to an annual average of 5.2 per cent between 2005 and 2010.

Investment as a percentage of GNP rose from 19.6 per cent of GNP in 1995 to a peak of 28.2 per cent in 2000. The average investment to GNP ratio between 1995 and 2000 was 25.2 per cent (Figure 3.15). Some moderate decline in this ratio is expected and an annual average of 26.8 per cent is forecast for the period 2000 to 2005 and 25.7 per cent between 2005 and 2010. This ratio implies that Ireland will continue to provide substantial resources for both public and private investment over the forecast period.

Figure 3.15: Investment as a Share of GNP



As has been outlined in the supply side analysis, output growth was particularly strong between 1995 and 2000. This growth caused investment to expand significantly across all sectors of the economy. This expansion in investment is common across the two broad categories of investment – building, and plant and machinery. Indeed, growth in investment in machinery and equipment outpaced that of building investment in the period 1995 to 2000. However, the sharp slowdown that has occurred in investment growth in recent years will reverse this. Investment in machinery and equipment is expected to grow by just 0.1 per cent per year between 2000 and 2005. In the latter half of the decade the need for investment in plant and machinery will result in growth increasing to an annual average of 6.7 per cent.

Although investment in building has also slowed sharply in the current decade, the continuing demand for new housing will to some extent underpin investment in this sector and so annual average growth of 1.8 per cent is forecast between 2000 and 2005. Although an increase in growth to just under 4 per cent is forecast between 2005 and 2010 this is a more moderate increase than anticipated for investment in machinery and equipment. As the housing needs of the population are gradually met and the volume of new house completions declines, lower levels of building investment will be required.

EXPORTS

Since the 1970s Irish export growth has been very strong and has largely resulted from the economy acting as an important export base for a large number of multinational corporations, particularly US companies. These firms have been attracted by favourable tax incentives, low labour costs, an

educated workforce and Ireland's location inside the EU. In the 1990s export volume growth reached exceptionally high levels with volume growth of 12.8 per cent in the first half and 17.3 per cent in the second half of the decade. It is clear, therefore, that export growth has played a pivotal role in the expansion of the Irish economy in the 1990s.

Since the 1970s, the industrial sector has been the major driver of export growth. From the mid 1970s, exports from the industrial sector increased by an average over 10 per cent per annum. Again, growth rates were particularly high in the 1990s, with rates of 14.3 and 16.7 per cent in the first and second half of the decade respectively. During this period, the ICT and pharmaceutical sectors were particularly prominent. Although historically the services sectors' share of total exports has been quite small, and has had a rather muted impact on overall export growth as compared to visible exports, service exports' share of total exports has doubled since 1995, due mainly to increasing computer service exports and exports of other specialised services.

Following a peak of 21 per cent growth in volume terms in 2000, export growth has slowed down dramatically in recent years and is forecast to continue to grow more moderately in the medium term. From its high at the start of the decade, we forecast growth in 2003 to be broadly flat, actually falling for the industrial sector, before picking up by 2005. The lower growth relative to previous years has been as a result of a more uncertain world environment together with mounting competitiveness pressures due to the appreciation of the euro and continued increases in the domestic cost base. More moderate FDI flows will also impinge on Ireland's export growth capacity in the medium term. For the period 2000 to 2005 average annual export growth is forecast at 4.4 per cent before strengthening to 7.4 per cent in the second half of the decade, in line with a pick up in international demand more generally.

While much of this slowdown in export growth is due to a fall-off in exports from the industrial sector, service exports will also show more moderate growth in the medium term. Services exports are set to grow at an annual average of 8.3 and 7.0 per cent during the first and second half of the decade respectively. Tourism in particular, which had an average annual growth rate of 7.2 per cent over the period 1985 to 2000, is forecast to grow by only 2.5 per cent for the period 2000 to 2005, before picking up thereafter due to an increase in international disposable income. However, the maintained strength of the euro will continue to weigh heavily on the pockets of tourists, especially those from the US, who have been vital to tourism growth in the recent past.

Table 3.5: Exports by Sector, Constant Prices, Percentage Changes

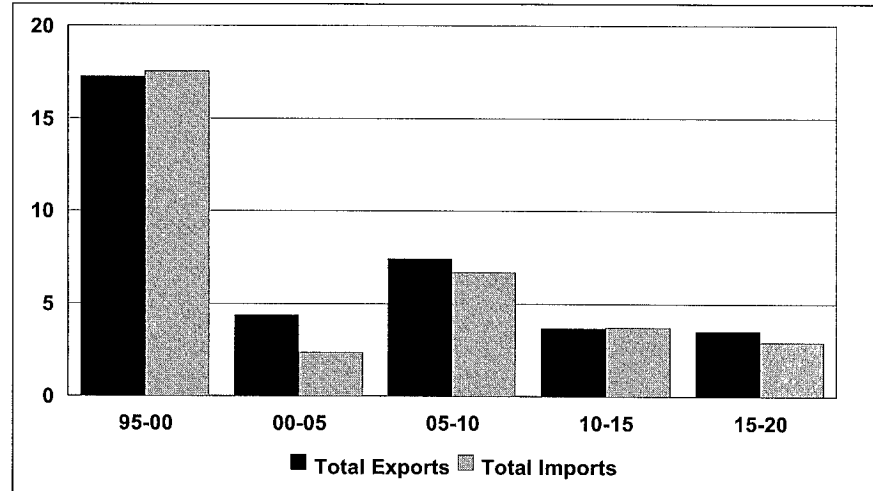
	2003	2004	2005	2006	2007	2008	2009	2010	2000-2005	2005-2010	2010-2015	2015-2020
	%								Annual Average % Growth			
Agriculture	-3.0	2.5	2.0	-0.8	-0.8	-0.8	1.1	1.2	-2.8	0.0	-2.9	-3.9
Industry	-1.1	2.1	9.3	9.7	7.8	7.7	7.2	6.9	3.6	7.9	4.0	3.8
Merchandise	-1.2	2.2	9.0	9.2	7.5	7.4	7.0	6.7	3.3	7.6	3.8	3.6
Tourism	0.5	2.0	1.6	2.4	2.9	2.7	2.5	2.9	2.5	2.7	3.4	3.9
Other Services	4.9	4.6	9.0	9.4	7.4	7.3	6.7	6.4	9.2	7.4	3.3	3.1
Services	4.4	4.3	8.2	8.6	7.0	6.9	6.3	6.1	8.3	7.0	3.3	3.2
Goods and Services	0.1	2.7	8.8	9.1	7.4	7.3	6.8	6.6	4.4	7.4	3.7	3.5

IMPORTS

We forecast import growth to follow the trend in the overall economy and to stay in line with the more moderate export growth, as described in the previous section. Following robust growth of 9.9 and 17.5 per cent per annum in the first and second half of the 1990s respectively, we forecast a sharp slowdown in the current period 2000-2005 with average annual growth of just 2.4 per cent. This will reflect the slowdown in domestic economic

activity in which both output, and more importantly incomes, are forecast to grow at a more moderate pace. Based on our forecast of quite a strong rebound, both internationally and domestically, we forecast import growth to pick up post 2005 as the economy regains some lost ground. We therefore estimate stronger growth of 6.9 per cent per annum in the second half of the decade before moderating thereafter (see Figure 3.16).

Figure 3.16: Volume Growth in Total Exports and Imports



NET FACTOR INCOME

For the majority of countries there is no substantial difference between GNP and GDP as prospective measures of economic growth. In fact, the latter is almost solely used as a means of international comparison. In this respect Ireland can be viewed as an outlier with substantial and increasing differences between the two measures in the past. Currently GNP, which is usually a better indication of Ireland's income level, only accounts for 80 per cent of GDP. The reason for this divergence has been the substantial factor income flows leaving the economy. Net factor income is made up of national debt interest payments, repatriated profits and "other" factor income flows.

The most significant of these three items has been profit repatriations, which reflects the large-scale multinational presence in the economy. Manufacturing output has been driven by a small number of sectors, most notably the ICT and pharmaceutical sectors, which are almost exclusively foreign-owned. These firms are characterised by a small labour share of value added and much of the excess is repatriated abroad as profits to the parent companies and shareholders. These repatriations have had a negative effect on GNP since the mid-1970s and, as evidenced in Table 3.6, such flows are estimated to have the largest negative effect on GNP over the period 1995-2000, when they knocked some 3.2 percentage points off average annual GNP growth rates. In fact, the negative contribution to growth has increased in parallel with the expansion in the high-tech sector in recent years.

Although profit repatriations are forecast to have slightly less of a negative effect on GNP in the current period 2000 to 2005, the overall effect of net factor flows is forecast to be greater than in any of the previous periods, reducing GNP by over 2.7 percentage points. Driven mainly by strong growth in profit repatriations, this negative contribution will also be buoyed up by a negative contribution from "other factor income". This constituent of net factor flows increased by an annual average of 29 per cent over the period 1985 to 2000. This category is, among others, made up of the return on the accumulation of private foreign assets and has resulted from the increased propensity of Irish people to invest abroad, especially in the 1990s. The

positive contribution of these flows is forecast to reverse in the current period, 2000 to 2005, due to a fall off between 2000 and 2002 and this is likely to reduce GNP by 0.5 percentage points. Other income flows are forecast to decrease by an annual average of 11 per cent over the period 2000 to 2005 before increasing moderately thereafter but contributing very little in terms of GNP growth.

Since the early 1980s, where previous fiscal mismanagement resulted in nearly half a percentage point being knocked off GNP growth per annum, national debt interest has become less and less of a negative contributor to GNP growth. In the 1990s, due to a stable national debt and lower interest rates, the level of outflow actually fell, thus contributing to GNP growth. This trend is forecast to continue for the foreseeable future and, as evidenced in Table 3.6, national debt interest is forecast to have a negligible influence on GNP growth in the medium term.

Overall then, we forecast net factor income growth to moderate substantially in the medium term and beyond. Following average annual growth of 20.3 per cent between 1995 and 2000, we forecast growth of 14.6 and 9.0 per cent over the first and second half of the current decade respectively. We forecast further falls in the growth rates thereafter. This will be mainly driven by a moderation in profit repatriations and will reflect the increasing shift to a high productivity service dominated economy as opposed to a high-tech manufacturing dominated economy as experienced in recent years.

Table 3.6: Contribution of Net Factor Flows to GNP Growth, Percentage Points of GNP

	1980-85	1985-90	1990-95	1995-00	2000-05	2005-10	2010-15	2015-20
National Debt Interest	-0.41	-0.19	0.04	0.18	-0.05	-0.03	0.03	0.10
Profits etc., Outflows	-0.79	-1.06	-1.49	-3.15	-2.13	-1.97	-0.77	-0.92
Other Factor Income	-0.03	0.23	0.71	0.74	-0.53	0.06	0.01	-0.03
Net Factor Income	-1.23	-1.03	-0.74	-2.23	-2.72	-1.95	-0.73	-0.86

GROSS NATIONAL PRODUCT

Following exceptionally high volume growth rates in the late 1990s, when GNP grew by an average of 9 per cent per annum, growth has fallen off substantially at the start of the current decade due mainly to changes in the external environment. We expect real GNP growth to average 3.1 per cent between 2000 and 2005 (Table 3.7). In the second half of the decade we forecast the economy to regain some of the lost ground and grow above trend at an average of 5.4 per cent per annum, before returning to more moderate growth rates thereafter. This growth will continue to be greater than that of most of our EU partners to the end of the decade and should lead to a continuing increase in living standards above the EU average in the medium term (See Section 3.1).

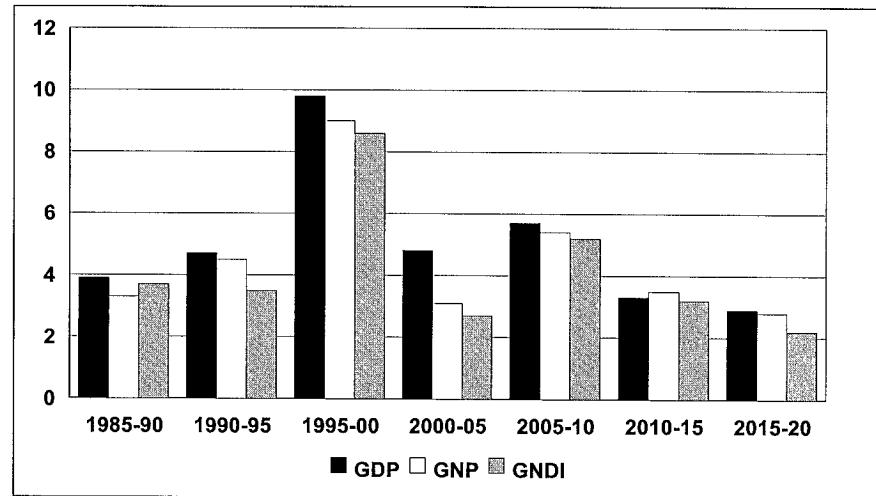
As mentioned in the previous section GDP growth has been almost always higher than that of GNP over the last thirty years, with strong negative net factor flows accounting for the difference. The gap was most pronounced in 2002 when the gap between the two measures reached 5.7 percentage points. However, given our assumptions regarding net factor flows in the previous section, we forecast that this gap between growth rates will narrow considerably over the next decade and beyond, as the high-tech sector matures and the market services sector increases in significance for the overall economy.

GROSS NATIONAL DISPOSABLE INCOME

Gross National Disposable Income (GNDI) gives a more complete indication of the standard of living as it corrects for changes in the terms of trade and current transfers, especially those to and from the EU. As can be seen from Table 3.7, during the 1980s growth in GNDI exceeded GNP by an average of

nearly 0.5 percentage points, due mainly to the significant inflow of funds from the EU over the period. In the 1990s, however, GNP growth exceeded GNDI growth. This resulted from a reversal in the positive contribution from the terms of trade and a reduction from the early 1990s in inflows of EU transfers expressed as a percentage of GNP.

Figure 3.17: Average Annual Volume Growth in GDP, GNP and GNDI



Over the next decade the terms of trade is forecast to have little effect on GNDI although increasing transfers to the EU will continue to have a negative impact. Therefore, during the current period, 2000-2005, we forecast GNDI growth to be 0.4 percentage points lower than GNP growth and 0.2 percentage points lower in the second half of the decade.

Table 3.7: The Terms of Trade Effect, Percentage Change

	1980-85	1985-90	1990-95	1995-00	2000-05	2005-10	2010-15	2015-20
GNP	0.3	3.3	4.5	9.0	3.1	5.4	3.5	2.8
Effect of Terms of Trade	0.4	0.1	-0.6	0.0	0.1	0.0	-0.2	-0.5
GNP adjusted for Terms of Trade	0.7	3.3	3.8	9.0	3.1	5.4	3.2	2.3
Effects of Transfers	0.1	0.4	-0.3	-0.4	-0.4	-0.2	0.0	-0.1
GNDI + Capital Transfers (National Resources)	0.8	3.7	3.5	8.6	2.7	5.2	3.2	2.2

PRICES AND WAGES

Despite the remarkable growth in real output experienced during the 1990s in Ireland, consumer prices, as measured by the growth in the personal consumption deflator, remained reasonably stable at close to a 3 per cent average throughout the decade. Prices began to trend higher over the course of the decade, with the annual average growth in prices rising from 2.7 per cent in the period 1990-1995 to an average of 3.3 per cent between 1995-2000. This trend reflected an international environment where low single digit inflation rates had become the norm. A modest appreciation in the currency combined with lower oil prices and the need to have the inflation rate converging close to the European average, as a condition under the Maastricht criteria for EMU membership, meant that Irish price growth stayed broadly in line with our main trading partners, despite having output growth above potential.

Given the openness of the economy, the overall rate of consumer price inflation in Ireland is primarily determined by external factors. The internationally trading sectors of the economy compete on world markets requiring price inflation commensurate with competitor nations. Inflation in the non-internationally traded sectors, however, can be influenced by

domestic costs and wages. The trend in wages and domestic costs throughout most of the 1990s remained very favourable for competitiveness, reflecting spare labour capacity and the modest terms in the social partnership agreements. The growth in non-agricultural annual earnings rose from an average of 4.4 per cent between 1990-1995 to an average of 5.9 per cent between 1995-2000. Industry's unit labour costs continued to fall over the decade, at an average of 1.8 per cent per annum, with the share of value-added going to labour continuing its monotonic decline over the decade. Unit labour costs continued to rise for marketed services, reflecting the above average wage growth in that sector, combined with lower growth in output.

Economies experiencing the strength of output growth that Ireland had at the end of the last decade would expect some real appreciation of the exchange rate. Indeed, Ireland opted for a modest revaluation of the Irish pound on the way into EMU, which combined with a fall in oil prices during 1998 and a sharp ratchet downwards in interest rates, meant that consumer price inflation was quite low for the first year of monetary union. However, as part of a currency union, nominal appreciation could no longer be relied upon to bring about the necessary adjustment for a fast growing economy with overheating pressures. Indeed from its inception at the start of 1999, the euro depreciated considerably against both sterling and the dollar increasing inflationary pressures throughout the Euro area. The real exchange rate appreciation required for Ireland had then to come about through higher wage growth and inflation than in competitor countries.

This "productivity hypothesis" (or Balassa-Samuelson effect) means that higher productivity in the traded sector of the economy is likely to push up prices in the non-traded sectors by allowing real wages to increase. Due to the tight labour market conditions in place by 2000, and the strong demand for labour arising from the competitiveness boost from the weak exchange rate, wage growth increased sharply. This in turn led to higher prices particularly in the sheltered, non-traded sectors of the economy. A tripling in crude oil prices during the course of 1999 and strong personal consumption growth, boosted by lower interest and higher disposable income, along with the delayed inflationary impulse passing through from the currency depreciation, meant that the rate of inflation rose by a full percentage point to average over 4 per cent in 2000 and 2001. Irish inflation rates have been significantly higher than those of other Euro area members and this has resulted in the Irish price level moving above the European average. This leaves Ireland substantially exposed to potential competitive losses.

The modest pay terms in previous partnership agreements gave way to substantially more wage growth provided for in the *Programme for Prosperity and Fairness* that took effect in 2000. Non-agricultural earnings growth averaged 8.5 per cent in 2000 and 2002, higher than provided for in the agreement, with the effect that unit labour costs began to increase substantially. Since the last *Review*, the euro has appreciated steadily against both the dollar and sterling back to levels close to its launch value. In addition, the extended global slowdown has meant that international prices have experienced very modest growth in recent years. This combination of changes in traded prices and euro appreciation has led to a strong deflationary impact on the prices of the traded sectors of the economy. However, while these trends have been in place and are passing through into Irish consumer prices, the attention over the last year has been on the resilience of inflation with rates at or above 5 per cent.

Our *Benchmark* forecast is for personal consumption price growth to average 3.7 per cent over the period 2000-2005 which is only a half a percentage point higher than the preceding five-year period. The average for the current five-year period, outlined in Table 3.8, masks the reduction in personal consumption price growth we anticipate between 2002 and 2004.

Table 3.8: Prices and Wages, Percentage Change

	1995-2000-2005-2010-2015-												
	2003	2004	2005	2006	2007	2008	2009	2010	2000	2005	2010	2015	2020
	Prices, % Change									Annual Average % Change			
Personal Consumption	3.5	2.0	3.2	2.8	3.0	3.2	3.4	3.2	3.3	3.7	3.1	2.5	2.0
Government Consumption - Total	8.5	6.1	2.8	2.2	3.2	3.6	4.0	4.7	4.3	5.7	3.5	3.9	3.2
Investment - Building	4.2	3.0	1.9	2.0	2.5	2.6	2.5	2.5	10.4	5.2	2.4	1.9	1.8
Investment - Machinery	2.2	2.1	2.2	2.1	2.0	2.0	2.0	1.9	1.9	2.3	2.0	1.9	1.7
Exports	-2.7	0.3	1.8	1.7	1.8	1.9	2.0	1.9	2.5	1.1	1.9	1.7	1.5
Imports - Energy	4.8	-11.6	-1.8	-0.2	0.2	0.6	0.8	1.0	8.8	-2.2	0.5	1.5	2.0
Imports - Non-Energy	-2.6	1.9	2.0	1.9	1.9	1.9	1.9	1.9	2.4	1.1	1.9	1.9	1.9
Agricultural Output - Gross	1.0	1.0	0.4	0.1	-0.9	0.3	0.6	0.3	-1.3	-0.4	0.1	1.0	1.0
Manufacturing Output - Gross	-7.0	-4.0	1.3	1.3	1.3	1.3	1.3	1.3	0.9	-1.5	1.3	1.2	1.2
	Average Annual Earnings, % Change									Annual Average % Change			
Industry	4.2	3.0	4.5	3.6	4.8	5.2	5.6	5.6	5.4	5.2	5.0	4.7	4.2
Non Market – Public Administration	6.4	3.3	4.4	3.5	4.7	5.2	5.5	5.5	4.7	5.9	4.9	4.6	3.9
Non Agricultural	4.1	2.9	4.4	3.5	4.8	5.2	5.6	5.6	5.9	5.2	4.9	4.6	3.9

The higher rate of inflation for 2005 is affected by the assumed introduction of a carbon tax and carbon trading. Without this change, the rate of inflation would be around 2.7 per cent. As the economy returns to average European output growth rates, the personal consumption deflator will increase at a more moderate pace, averaging about 3 per cent between 2005 and 2010. We forecast that the government price deflator growth will be substantially ahead of consumer prices, averaging 5.7 per cent during 2000-2005, reflecting the public sector earnings growth. Average growth in non-agricultural earnings of 5.2 per cent in 2000-2005 and 4.9 per cent between 2005-2010 is forecast in our *Benchmark* scenario.

Irish labour costs relative to other European countries, as outlined earlier, are forecast to rise to levels comparable to high cost locations within the Euro area. Labour costs converging to European levels must be counteracted by higher relative productivity growth to preserve competitiveness and living standards. Real wages, adjusted for inflation, need to reflect productivity growth rates. Over the course of the 1990s, real wages grew by an average of just under 2 per cent per annum, with the real after tax wage showing similar increases. Our forecast for real non-agricultural wage growth over the period 2000 to 2005 is 1.5 per cent, and 1.8 per cent for 2005-2010, see Figure 3.18. Average real after tax wage growth of 2 per cent per annum between 2000 and 2005, and 1.5 per cent between 2005 and 2010 is also forecast.

Productivity growth in terms of GNP per person employed, at 0.9 per cent, is lower than real wage growth in 2000-2005 but higher at 3.2 per cent in 2005-2010, reflecting under-utilisation of labour resources in the earlier part of the decade. Labour's share of value added excluding agriculture and depreciation, which had been declining since the 1970s (see Figure 3.19), continues to fall during 2000-2005 period, despite the close to full employment conditions at the start of the decade. It begins to decline more moderately during the decade before stabilising by the end of 2005-2010.

The most significant concern about the prospects for prices in the short term concerns the potential for a period of deflation in the EU. Our *Benchmark* international forecast envisages a period of falling prices within some countries in the Euro area. This alone would not result in deflation in Ireland. However, as discussed in Chapter 4, a further major appreciation of the euro could lead to such an outcome, with serious economic consequences.

Figure 3.18: Trends in Real Non-Agricultural Wages 1970-2010

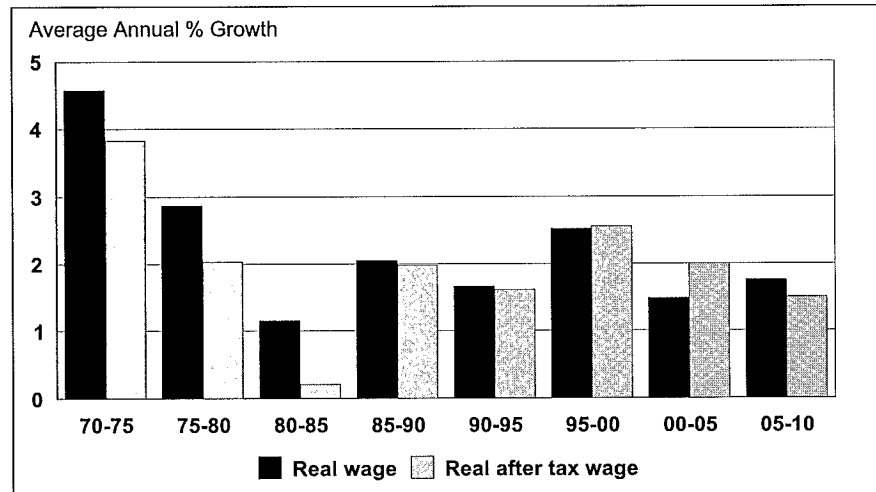
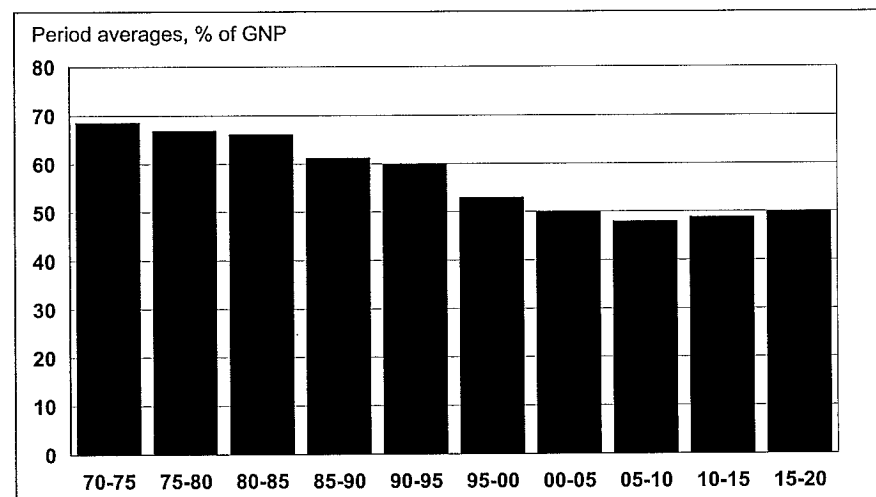


Table 3.19: Labour Share of Value Added, Non-Agriculture



**3.5
The Labour
Market**

Unprecedented employment growth underpinned much of the boom in the Irish economy in the 1990s. It is hard to overstate the transformation that has taken place in the labour market, moving from double-digit unemployment rates to a situation of virtually full employment.

Employment growth accelerated considerably in the second half of the 1990s mitigating the fears of so-called jobless growth that occurred in the early part of the decade. From 1995 to 2000, total employment grew by 27 per cent, the unemployment rate fell by 6.8 percentage points and the labour force increased by 18 per cent on a PES basis.⁶ This translates into an increase of 340,000 jobs so that total employment stood at 1,588,000 in 2000. Employment growth will be somewhat constrained in the medium term as growth in labour supply is expected to slow to an average annual rate of 2.2 per cent between 2000 and 2005, and 1.9 per cent per annum thereafter to 2010, compared with average growth of 3.4 per cent per annum between 1995 and 2000. Nonetheless, employment is forecast to grow at an average

⁶ Throughout the *Review* we use the PES definition of employment rather than the ILO definition, as only consistent series of the former are available back to the 1970s. When talking of the unemployment rate we use ILO definitions.

annual rate of 2.1 per cent in the period 2000 to 2005 and on average at 2.2 per cent per annum thereafter to 2010.

The rise in employment in recent years helped to dramatically reduce the level of unemployment in the economy. On an ILO basis, the level of unemployment fell from 179,000 in 1996 to 65,000 in 2001. This fall in unemployment is more impressive when we consider the substantial inflows of net migration that occurred at the same time. In the short term an increase in unemployment is forecast, primarily due to the current slowdown in world and domestic activity. We expect the unemployment rate to peak at 5.7 per cent in 2005 and then to gradually fall, as the domestic and international economies recover, to 4.3 per cent in 2010.

The sectors that have recorded the highest growth in employment are, in general, the sectors that experienced the strongest growth in output, which include building, high-tech manufacturing and all of the services sector. The details of our employment forecasts are summarised in Table 3.9 and in Table A.8 of Appendix 3. Total employment is forecast to increase by 263,000 from 2003 to 2010 and two-thirds of this increase (178,000 jobs) in employment will be in the market services sector. A further 40 per cent of this growth (equivalent to 110,000 jobs) is forecast to come from the non-market services sector, while the numbers employed in industry and agriculture are forecast to decline by 3,000 and 19,000 respectively.

Following phenomenal employment growth, at almost three times the economy wide average, building sector growth has slowed considerably and is expected to decline over the forecast period from 179,000 in 2003 to 164,000 in 2010. As discussed in Section 3.3, little employment growth is expected in the high-tech sector in the medium term, with the longer-term trend being for employment to fall, primarily due to the maturing of the sector. In the medium term, employment in this sector is anticipated to increase from 142,000 in 2003 to 158,000 in 2010.

In contrast to the expected weak performance of these two sectors, prospects for employment growth in the services sector remain very positive, especially in other market services and health and education. Employment in each of the market services sectors was also considered in Section 3.3, and by 2010 employment in this sector will account for just under 47 per cent of total employment. Employment growth in market services has consistently remained above the average for the economy as a whole and this trend is expected to continue over the forecast horizon. Within this sector employment growth in other market services is expected to be stronger than in distribution and transport and communications, and by 2010 three-quarters of all new jobs in market services will be in other market services. Employment growth in non-market services is expected to exceed that of market services in percentage terms. Annual average employment growth in non-market services is forecast to be 3.6 per cent between 2000 and 2005 before rising to an average of 4.0 per cent for the remainder of the decade. In terms of levels, an increase of 106,000 is expected between 2003 and 2010.

Sluggish employment growth is forecast for the remaining sectors of the economy, with numbers employed in agriculture, traditional manufacturing and utilities expected to fall over the forecast horizon. The fall is most marked in the agricultural sector. This is the continuance of a trend that has long been evident in the sector. Numbers employed in agriculture are expected to decline by 19,000 in the medium term, from 113,000 in 2003 to 94,000 in 2010.

The majority of the forecast increase in employment will be in "high skilled" areas such as the other market services sector (which includes professional services such as banking, insurance as well as internationally traded services) and also in the health and education sector. These activities, being human capital intensive, require a skilled labour force. These two

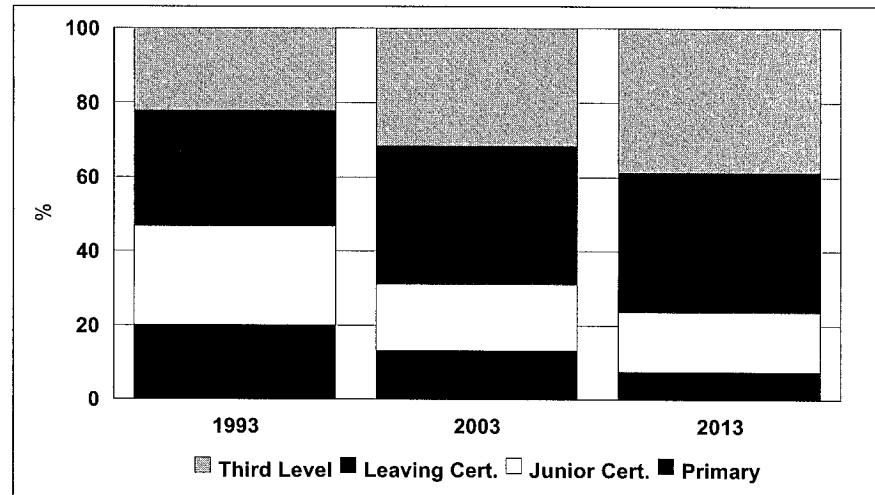
Table 3.9: Employment and the Labour Force, Percentage Change, Mid-April

	2002	2003	2004	2005	2005	2007	2008	2009	2010	2000-2005 Annual	2005-2010 Average	2010-2015 Annual	2015-2020 Average
	%										Annual Average % Growth		
Agriculture	1.7	-1.8	-1.2	-2.8	-2.8	-2.8	-2.8	-2.8	-2.8	-2.4	-2.8	-2.7	-2.7
Industry	-2.7	-0.9	1.2	-0.7	-0.1	0.0	0.0	-0.4	-0.5	0.4	-0.2	-1.5	-3.6
Manufacturing:													
Traditional	-3.1	-0.9	1.1	-0.5	-0.5	-0.8	-0.8	-1.0	-1.0	-1.3	-0.8	-2.2	-2.5
Food Processing	-1.0	-0.9	1.2	-0.1	0.0	0.0	0.0	0.0	0.0	1.3	0.0	-2.3	-2.6
High Technology	-6.4	-1.5	3.9	0.9	1.2	1.1	1.1	1.1	1.1	0.5	1.1	-0.9	-1.0
Manufacturing	-4.5	-1.2	2.5	0.3	0.4	0.3	0.3	0.2	0.2	0.0	0.3	-1.5	-1.7
Utilities	0.4	1.0	0.5	-4.2	-1.0	-1.0	-1.0	-1.0	-1.0	0.5	-1.0	0.0	0.0
Building	0.0	-0.5	-1.0	-1.9	-1.0	-0.5	-0.5	-1.5	-1.8	1.1	-1.1	-1.4	-8.0
Market Services	2.2	3.1	1.5	4.4	4.0	4.4	2.7	2.9	2.1	3.2	3.2	2.2	1.8
Distribution	-0.1	0.0	0.0	2.1	3.7	2.6	3.2	2.2	0.3	1.5	2.4	1.3	-0.1
Transport & Communications	-0.5	0.0	0.0	2.6	2.5	2.5	2.5	2.4	2.3	2.3	2.4	0.5	0.0
Other	4.7	6.2	2.8	6.4	4.6	5.9	2.5	3.4	3.0	4.7	3.9	3.1	3.1
Non-Market Services	8.5	1.1	1.5	4.0	4.0	4.0	4.0	4.0	4.0	3.6	4.0	2.0	1.5
Health & Education	9.8	1.0	1.3	4.0	4.0	4.0	4.0	4.0	4.0	3.8	4.0	2.0	1.5
Public Administration	4.5	1.1	2.2	4.0	4.0	4.0	4.0	4.0	4.0	3.0	4.0	2.0	1.5
Total Employment	2.0	1.2	1.2	2.4	2.5	2.7	2.0	2.0	1.7	2.1	2.2	1.1	0.5
Unemployment	16.6	11.9	6.1	-1.4	-0.5	-5.1	-0.3	-3.0	0.8	4.3	-1.6	-3.3	1.0
Labour Force	2.8	1.9	1.6	2.2	2.3	2.2	1.9	1.7	1.6	2.3	1.9	0.9	0.5
										2005	2010	2015	2020
Unemployment Rate (ILO)	4.2	4.9	5.7	5.4	5.2	4.7	4.6	4.3	4.3	5.4	4.3	3.1	3.2
Net Immigration, Thousands	28.9	15.2	5.2	13.8	18.9	20.7	19.5	17.6	17.0				

sectors alone will account for 44.6 per cent of total employment in 2010 and 78 per cent of new jobs generated between 2003 and 2010. The decline in the numbers employed in agriculture, building and traditional manufacturing will have a disproportionate effect on unskilled labour, although some of this may be offset by employment growth in personal services, which is predominately lower skilled.

Figure 3.20 illustrates the envisaged change in the minimum educational attainment of the labour force, which is important given the forecast demand for skilled labour. The proportion of the labour force with primary education only has fallen markedly in the last ten years and is expected to fall further, so that by 2011 it will include just 9 per cent of the labour force. At the same time, a significant increase in those with third level education has been recorded with 27 per cent of the labour force falling into this category in 2001. By 2011, 37 per cent of the labour force will have third level education.

Unemployment rates vary by level of education; typically they are lower for those with high levels of educational attainment and higher for those with lower educational qualifications. In the 1995 to 2000 period, the average unemployment rate for those with primary education only was 22.8 per cent; the average was 13.2 per cent for those with Junior Certificate level education only; for those with Leaving Certificate Education it was 6.3 per cent; and for those with third level education it was 3.3 per cent.

Figure 3.20: Labour Force by Educational Attainment

In recent years, strong economic growth and a tighter labour market have encouraged net migration inflows. Up to 2000 the majority of the immigration was skilled. This had the effect of reducing the rate of wage inflation for skilled labour, allowing the economy to expand more rapidly. The result was higher demand for unskilled labour, a narrowing in the wage differential between skilled and unskilled labour and a big reduction in unemployment (Barrett *et al.*, 2002). The current slowdown in the economy means that we are likely to see a reduction in net immigration in the short term; however, net immigration is forecast to increase when the economy returns to its potential growth path. If the pattern of immigration reverts to that of the second half of the 1990s, the resulting increase in skilled labour will play a significant role in expanding the productive potential of the economy.

3.6

The Balance of Payments, Public Finances and Savings

THE BALANCE OF PAYMENTS

Over the course of the 1990s the Irish economy experienced quite a significant turnaround in the position of its balance of payments on current account. Following an average current account deficit of 6.7 per cent of GNP in the 1980s, it moved into a surplus of 2.5 per cent, on average, between 1992 and 1999. Much of this reflects exceptionally strong output growth relative to domestic demand over the period. The main driving force behind the robust output growth has been the very strong export performance, as mentioned in Section 3.4.

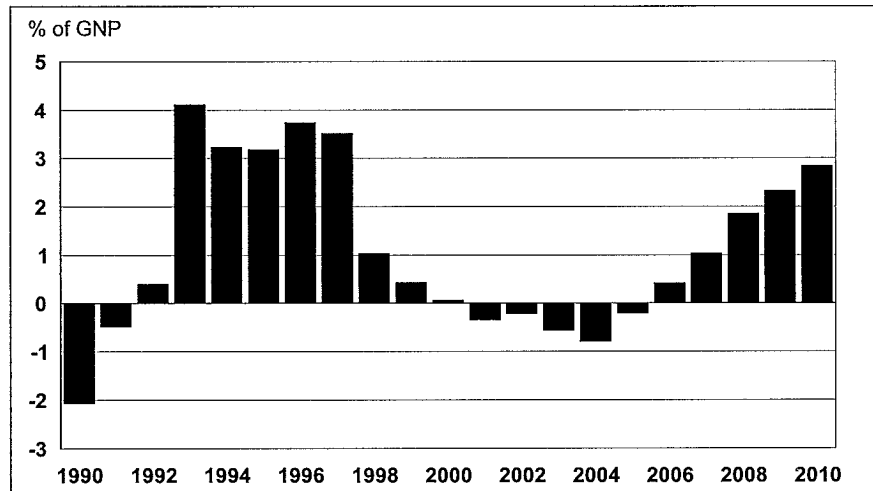
At the start of the present decade, however, the current account moved back into quite a small deficit and is expected to remain around this level until 2006. Between 2000 and 2005, we forecast an average current account deficit of 0.4 per cent of GNP. It is worth pointing out that being a member of a single currency area has diminished the importance of the balance of payments, as it does not necessarily act as a constraint on growth, although it may be indicative of imbalances in the economy.

As shown by Figure 3.21, we forecast a swing back into surplus from 2006 to 2010. During this period, we forecast the annual current account balance to average 1.7 per cent of GNP. This trend is also expected to continue into the longer term. This improvement in the balance of payments position will reflect a movement back into surplus by the government sector together with a reduction in the demand for funds in the private sector as investment growth, particularly in the housing market, moderates.

THE PUBLIC FINANCES

The large surpluses enjoyed in the Irish public finances at the end of the 1990s and into 2000 have given way to a forecast period of fiscal deficits. This trend mirrors the deterioration in the public finance position in many international economies, most notably France, Germany, the US and the UK. Forecasting the public finance outturns has become particularly fraught in recent years.

Figure 3.21: Balance of Payments Surplus as a Percentage of GNP



The public finances over the course of the 1990s improved as a consequence of a virtuous circle, whereby demographic changes, that had aggravated the fiscal problems of the 1980s, began to become more favourable as employment levels increased significantly and the rate of unemployment plummeted. The falling dependency ratio meant that more citizens were contributing to the State coffers rather than drawing upon them. This generated significant tax revenue growth and, given the lower age profile, less demand for state services and transfers. The pressures on current expenditure in Ireland had eased somewhat compared to the 1980s, but the current difficulties in financing and managing the health services are bringing forth new pressures.

The main focus for public expenditure has been in the area of infrastructure investment as set out in the *National Development Plan 2000-2006*. The task of tackling the infrastructural deficit that currently exists, while maintaining broad fiscal balance, is itself placing major pressures on the public finances. Funding this necessary programme of public investment involves substantial public sector savings over the next decade and a half. This will continue to pre-empt substantial resources from other areas of public provision within any given budget in terms of expenditure as a share of GNP. The implications for intergenerational equity are dealt with in Chapter 5. Once the infrastructural investment is complete, here assumed to be 2015,⁷ the resources needed to fund the exceptional level of investment of around 3 percentage points of GNP will become available for other purposes.

We have assumed that from 2005 to 2015 the public sector, on average, runs a small surplus of under 1 percentage point of GNP. This trajectory reflects the on-going transitional needs of the Irish economy over the next decade. Compliance with Ireland's obligations under the *Kyoto Protocol*, is assumed to involve the use of a carbon tax which we set at €20 a tonne of

⁷ This date is chosen for purely illustrative purposes.

carbon dioxide from the beginning of 2005. This should result in revenue of around €850 million in 2005 or 0.7 per cent of GNP. To overcome negative income distribution effects it is assumed that around €250 million from the revenue is used to raise welfare payments with the remainder used to reduce social insurance contributions.

The current problems in the public finances in part reflect the effects of the sudden appreciation of the euro, which will impart a deflationary shock to the Irish economy. Given that estimates of expenditure are set in nominal terms, an unexpected decline in inflation can adversely affect the underlying public finance position. The impact of such a deflationary surprise can also alter the intended fiscal stance. This issue is examined in more detail in Chapter 4.

Given the current slowdown, the growth in the volume of net current expenditure on goods and services is likely to be small in the short term. However, we anticipate that when the economy returns to more rapid growth, a share of that growth will be devoted to improving public services. As a result, we assume that employment in the public sector grows by 4 per cent a year from 2005 to 2010. Some of the cost of the increased provision of public services will be recouped by increased user charges. It is assumed that these charges are raised gradually to reach one percentage point of GNP by 2010. These charges could involve some mix of volume-based charges for waste and water, congestion charges for traffic, parking charges, tolls etc. from which the revenue will be used to reduce the sums required to fund government current expenditure on goods and services.

Ireland has one of the lowest shares of output accounted for by public expenditure within the EU, a fact that can only partially be explained by the favourable demographics. International comparisons in terms of output ratios typically use the GDP measure of output. However, given that GDP is nearly 1.25 the size of GNP, it can be potentially misleading. GNP is the better measure in the Irish case as it may better reflect the economy's taxable base. As shown in Figure 3.22, from a peak in the early 1990s of almost 48 per cent of GNP, government expenditure fell to a low last year of 33 per cent. The implications of the assumptions set out in Chapter 2 for the share of GNP accounted for by public expenditure over the coming decade is shown in Figure 3.22. The time path depends upon the policy directions taken over the course of the next decade. It is possible, through choosing different levels of provision of public services, to deliver different paths for the expenditure share. The impact upon economic performance would not be greatly affected, within reasonable magnitudes, by a slightly lower share or a slightly higher share, provided that tax rates were adjusted accordingly.

As discussed in Chapter 2, we have assumed that the objective of the government sector over the coming decade will be to maintain the general government balance close to zero over the course of the decade. (Figure 3.23). The combination of small deficits in the current period, followed by small surpluses in the second half of the decade, should see the debt to GNP ratio continuing to fall over the decade. The rate of decrease is assumed to be much slower than over the last five years. By the end of 2010 the debt/GNP ratio should probably be under 30 per cent of GNP (Figure 3.24).

Figure 3.22: Government Expenditure and Taxation as a Percentage of GNP

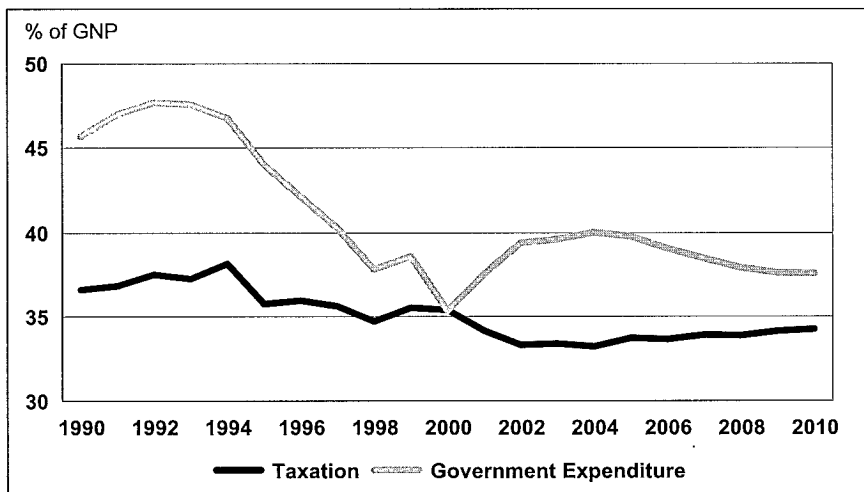


Figure 3.23: General Government Deficit as a Percentage of GNP

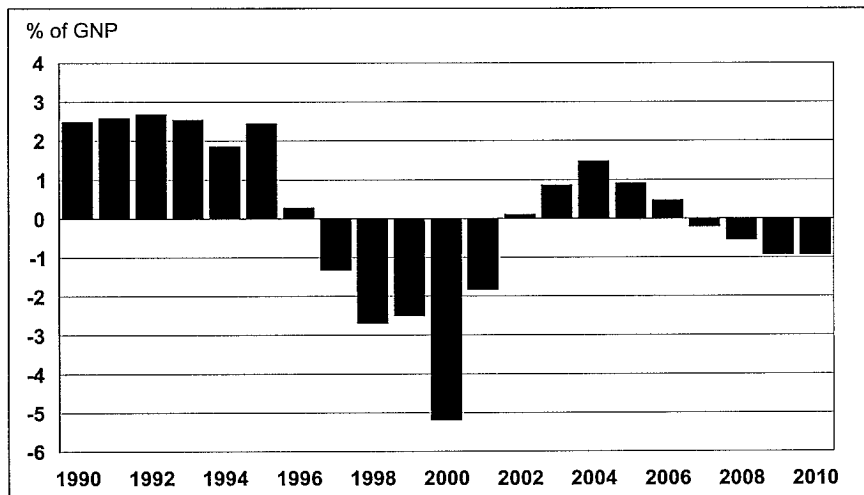
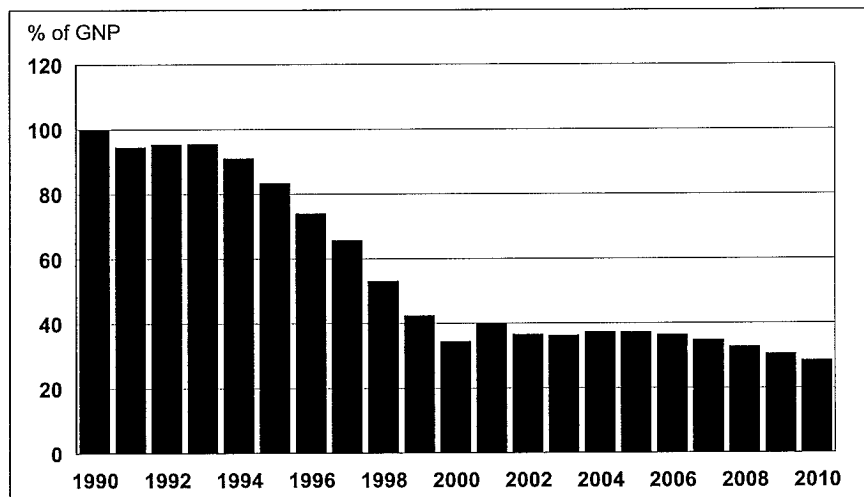


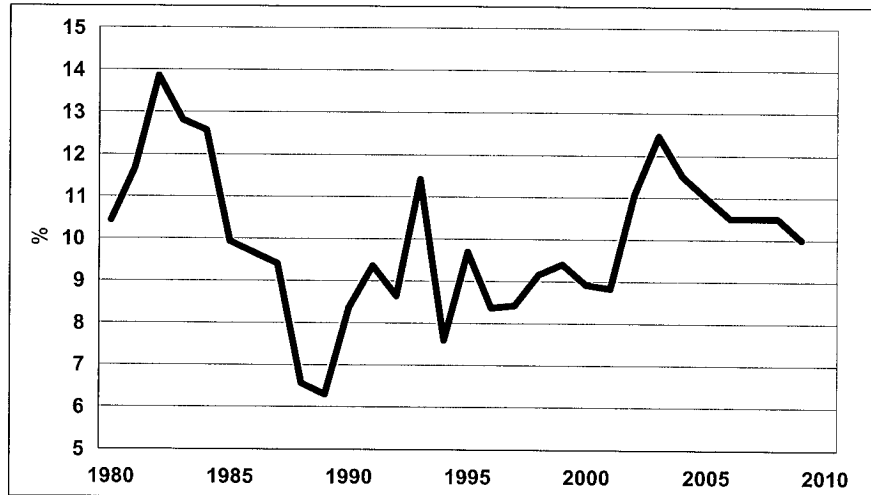
Figure 3.24: General Government Debt as Per Cent of GNP



SAVINGS

As signs of economic stabilisation began to emerge in the late 1980s the personal savings ratio fell, although the ratio rose again in response to the currency crisis in the early 1990s (Figure 3.25). This represents a peak in the personal savings ratio for the following ten years. The economic boom, low interest rates, rapid house price increases and higher disposable incomes contributed to a decline in the savings ratio. However, despite all these factors the personal savings ratio remained at an annual average of 9 per cent of personal disposable income over the 1990s.

Figure 3.25: Personal Savings Ratio, Per Cent of Personal Disposable Income



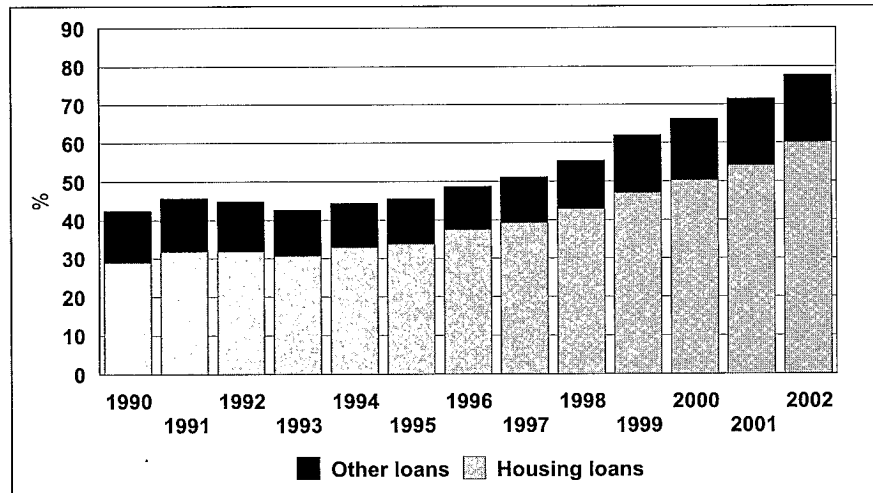
The continued strength of the economy in 2000 and 2001 resulted in the savings ratio declining to below 9 per cent. However, in 2002 the ratio increased sharply to 11 per cent. This rise can be attributed to increased uncertainty about the economic outlook and prospects for the labour market. Savings may have also increased as a result of the introduction of the Special Savings Incentive Accounts (SSIAs). The savings ratio is estimated to have risen again in 2002 to 12.5 per cent. Over the medium term we expect that the saving ratio will decline gradually as interest rates remain low and economic activity picks up. An annual average personal savings ratio of around 10.5 per cent is forecast out to the end of this decade.

One of the concerns during the boom period of the late 1990s and the first years of the current decade was the indebtedness of the household sector. Such concerns are driven by strong consumer spending growth, house price inflation and the rate of private sector credit growth. Figure 3.26 shows the level of personal debt⁸ as a percentage of personal disposable income. As is evident the level of debt remained broadly stable until 1993, but over the period of strong economic growth there has been a sharp rise in the level of personal indebtedness. The strength of the rise suggests that growth in personal debt has outpaced income growth over the period. The vast majority of this increase has been in borrowings for housing purposes. House mortgage finance and other housing finance amounted to just over 29 per cent of personal disposable income in 1990. By 2002 this had risen to 60 per cent. In contrast, other personal debt (finance for investment and other advances) has risen from nearly 13.5 per cent of personal disposable income

⁸ Advances by all credit institutions to the personal sector, taken from the Central Bank *Quarterly Bulletin*.

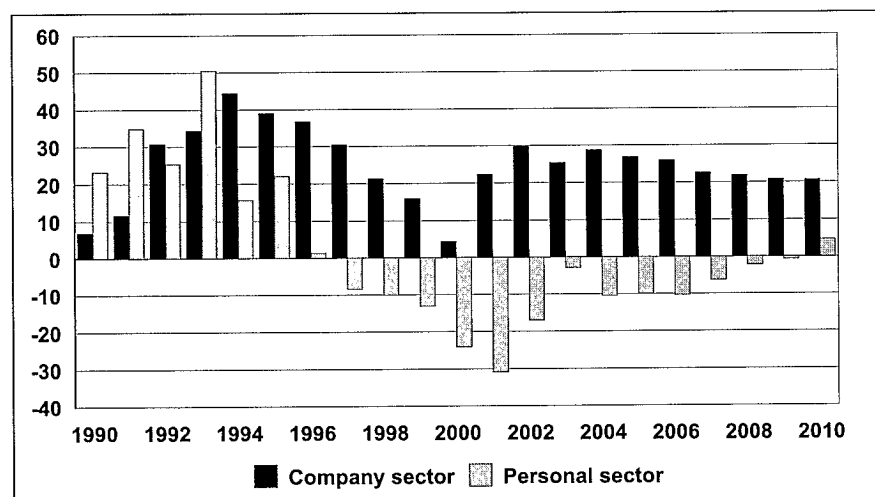
in 1990 to 17.5 per cent in 2002. The rapid rise in the ratio of personal debt to income suggests that the exposure of households to an economic shock has increased. As much of the increase is the result of borrowing for housing purposes this suggests that the Irish economy is exposed to a shock affecting the housing market.

Figure 3.26: Household Debt as a Per Cent of Personal Disposable Income



It is important to note that these figures relate to the gross level of household indebtedness and do not take account of savings held by the household sector. Figure 3.27 shows the proportions of gross savings by the personal and the company sectors that have been used to acquire financial assets. Historically, savings by the personal sector have been greater than required to finance personal sector investment, primarily in housing. The residual was used to acquire financial assets. These acquisitions involved the transfer by the financial sector of the spare personal sector savings to the company or public sectors (or abroad) that needed them to finance their own investment programmes. As is evident from Figure 3.24 the personal sector has become a net borrower because the pressures of financing the very large investment in housing now exceeds household savings.

Figure 3.27: Ratio of Net Acquisition of Financial Assets to Gross Savings



This suggests that the household sector will continue to be a net borrower until around the end of the current decade, primarily due to the need to finance investment in housing. As a consequence, the indebtedness of the household sector will remain high until then. Thereafter, as the housing

3.7 The Housing Market and Energy

needs of the population are met, the population ages, and provision for retirement increases, the household sector is forecast to become a net investor in financial assets.

The boom in the Irish economy meant an extremely profitable period for the company sector. Thus, the company sector's own resources provided much of the necessary funds to undertake investment, primarily aimed at expanding productive capacity. Although Figure 3.24 indicates pressure on own resources at the beginning of the current decade, the forecasts suggest that for the company sector savings will be greater than any investment undertaken in the immediate future.

The housing market is a very important sub-sector of the Irish economy. The boom in house prices in the late 1990s focused attention on the housing market. Having increased rapidly, the rate of house price growth moderated in 2000 and 2001, albeit remaining strong. One of the consequences of this house price boom is that it has increased the Irish economy's exposure to a house price shock. The supply of housing is essentially inelastic in the short-term. The boom in prices has resulted, after a lag, in a new record of house completions in each year, with 57,695 dwellings being completed in Ireland in 2002. This is an exceptionally high level of completions for an economy the size of Ireland and is equivalent to 22.7 per cent of completions in Germany, a country with a population of over 82 million. The level of house completions in Ireland is nearly double the number of completions in 1995.

Ireland has one of the highest proportion of owner-occupiers in the EU, 81.3 per cent in 1999. This is the third highest owner-occupier rate in the EU-15, after Greece, 84.1 per cent and Spain, 83 per cent, in contrast to Germany with the lowest rate of owner-occupation at 42.1 per cent. Eurostat figures suggest that there has been a marginal decline in owner occupation in Ireland between 1998 and 1999, in common with Spain and Italy.

The demand for dwellings consists of the growth in the number of households, driven by demographic factors, the growth in the demand for second dwellings and the building of replacement dwellings. Demand by purchasers and investors in the housing market is driven by a number of factors, which include:

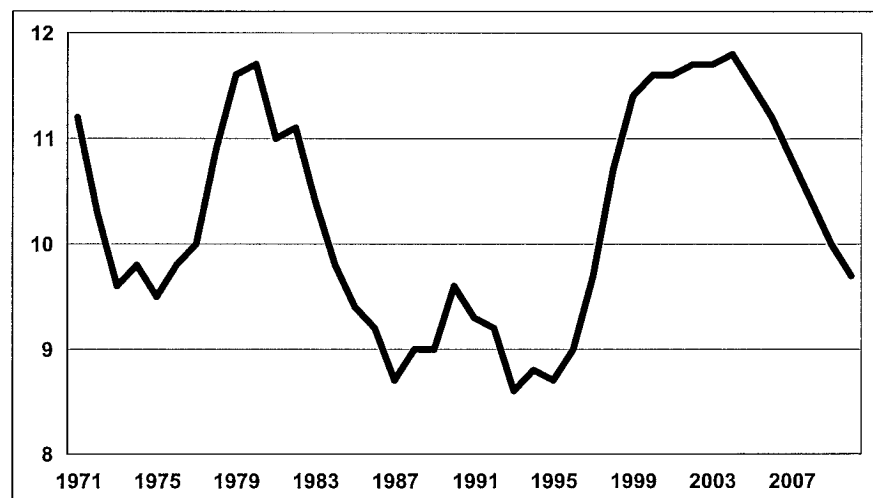
- Overall economic growth, which is resulting in rising incomes and employment growth.
- Demographic factors, such as the proportion of the population in the household forming age groups and net inflows of people into the country.
- Cultural changes in terms of family patterns and behaviour.
- Affordability is obviously very important. This determines whether young adults set up independent households or remain at home, and it can affect immigration flows.
- Rising standards of living have also increased the demand for second dwellings i.e. holiday homes.
- The cost of borrowing, as measured by the fixed and variable mortgage rate.

In our *Benchmark* forecast we have assumed that Irish headship rates (the proportion of people in each age group who are heads of households) rise from current levels to reach current UK levels by 2016. As in other European countries, the average number of persons per household in Ireland has declined, reaching 2.1 per cent in 2001. This is higher than the EU average of 2 and compares with 1.8 in Germany. On the basis of our assumptions regarding headship rates, it is assumed that by 2011 the average number of adults per household in Ireland will be 1.9. This would be in line with the current figure for the UK.

The *HERMES* macromodel contains a number of equations designed to forecast activity in the housing market.⁹ The forecasts suggest that as house price growth enters a more moderate phase, and the supply response meets the underlying demand for housing, the supply of new dwellings will gradually fall. By the end of this decade housing output will be down to around 45,000 units, from a peak in 2002 of 58,000 private completions.

As can be seen from Figure 3.28, new house prices relative to personal disposable income per head peaked in 2000, the highest point since 1981. The moderation in house price growth in recent years narrowed the gap with growth in non-agricultural incomes, resulting in a marginal improvement in affordability. Nominal growth in personal disposable income, coupled with a forecast of more moderate growth in nominal new house prices will improve affordability beyond 2005. This is also a reflection of our forecast that new house prices will fall slowly in real terms.

Figure 3.28. Nominal Growth in House Prices and Personal Disposable Income



The rise in house completions has been prompted by rising prices and continuing strong demand for dwellings. Despite a slowdown in economic activity, the housing market has continued to perform well, boosted by declines in interest rates. This strong demand continued over the period of rapid price growth. The rate of return, or the user cost of housing provides a measure of the cost of owning a house and aims to take account of capital appreciation. More elaborate measures take account of tax, indebtedness and expectations. In Figure 3.29, this is calculated as the mortgage interest rate minus the change in new house prices. The Figure shows the user cost of new housing has fallen since 1992. This fall in the user cost helps explain why demand for new dwellings continued to rise, even at a time of rapid price growth. New houses, although highly priced, were relatively cheap to live in because of low real interest rates and expected capital gains. Our forecasts indicate that user cost will continue to underpin demand in the housing market out to 2005 at least.

As outlined at the start of this section, demographic factors have played a key role. Rising headship rates and a continuing net inflow into the country imply that demand for housing from these two sources will require around 16,600 dwellings per annum between 2001 and 2006. Taking account of the natural increase in the population, demographic factors account for nearly 35,000 new dwellings each year between 2001 and 2006. The natural increase

⁹ Based on Murphy, A. and F. Brereton (2001). An overview of the housing section of the macro-model is given in Duffy, D. (2002).

in the population is the major factor underpinning housing demand. The first half of this decade also sees a major contribution to demand from second and replacement dwellings, averaging over 14,000 a year. When all these factors are taken account of, the annual average requirement for new dwellings is nearly 49,000 in each year between 2001 and 2006. Table 3.10 shows a breakdown of the factors underpinning the demand for housing by four main categories: the change due to population growth (rising number of adults); the change due to rising headship (proportion of each age group who are heads of households); the change due to net migration, and second and replacement dwellings.

Figure 3.29: User Cost of New Houses,¹⁰ 1972-2010

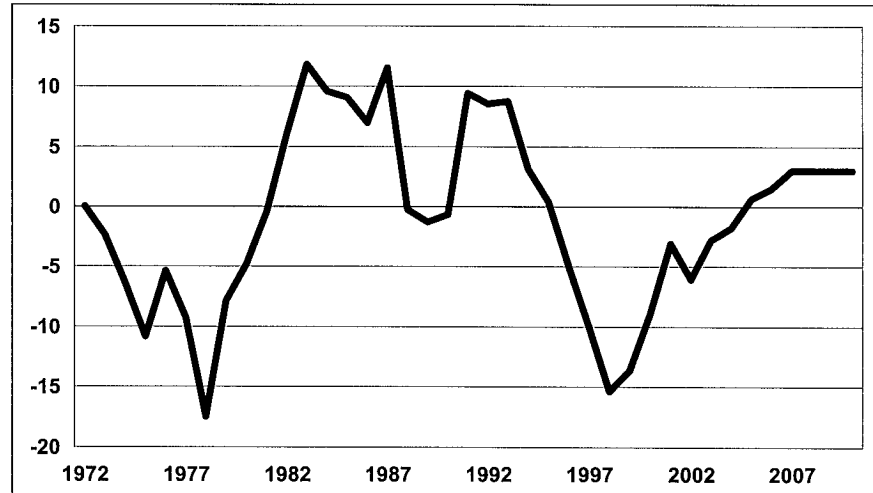


Table 3.10: Decomposition of Housing Demand, Thousands, Annual Averages

	1991-1996	1996-2001	2001-2006	2006-2011	2011-2016
Population Growth	14.7	15.4	18.0	16.9	15.0
Change in Headship	3.1	12.4	11.4	11.9	4.6
Migration	0.0	5.9	5.2	6.1	3.7
Replacements	9.3	11.0	14.3	7.1	9.0
Total	27.0	44.6	48.9	42.0	32.3

Despite the rapid rise in house prices in the late 1990s and the associated issues of affordability, the expectation that prices would continue to rise encouraged many young adults to form independent households. Although house price growth has slowed, the proximity of the recent house price boom will continue to motivate young adults to purchase their own dwelling. This rising headship is forecast to add 11,400 dwellings a year to housing demand between 2001 and 2006. This is forecast to rise to 11,900 between 2006 and 2011. A feature of the housing market in recent years has been the contribution to demand from the net inflow of returning emigrants and foreign nationals. These are estimated to have added around 6,000 dwellings to housing demand in the period 1996 to 2001. Net migration is forecast to continue to make a similar contribution to housing demand in the current five-year period, averaging 5,200 between 2001 and 2006. The migration assumptions used in preparing the *Benchmark* forecast, averaging 18,000 a

¹⁰ Defined as mortgage interest rate minus the change in new house prices

year between 2000 and 2010, implies a need for around 6000 dwellings a year between 2006 and 2011 to accommodate the new entrants.

ENERGY AND THE ENVIRONMENT

We have expanded the *HERMES* model to incorporate a sophisticated energy sector that allows the production of consistent forecasts for energy use and related emissions of greenhouse gases (Fitz Gerald *et al.*, 2002). This builds on the work in the last *Review* that also incorporated energy and emissions forecasts.

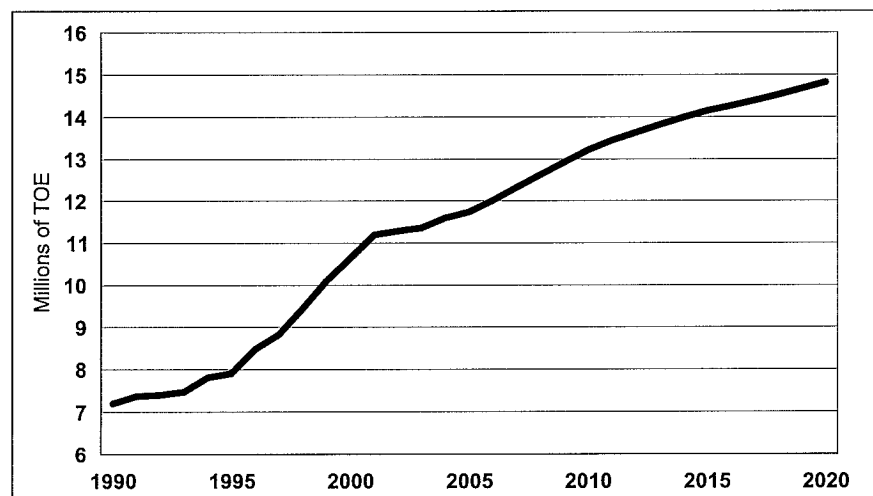
The background to this forecast for energy demand is the serious problem of how Ireland is going to meet its targets for reducing emissions of greenhouse gases, as agreed under the Kyoto protocol. Under this agreement, and the subsequent EU allocation of emissions ceilings, Ireland is required to reduce its emissions of greenhouse gases to no more than 13 per cent above the level they were at in 1990 by the period 2008-2012. With emissions today around 27 per cent above their level in 1990, there is a very difficult task ahead.

The EU has agreed an emissions trading scheme that will apply to electricity generation and other major energy using sectors. If agreed by the EU parliament, this will enter into force from the beginning of 2005. The effect of this regime will be to substantially raise the cost of burning fossil fuels (oil, gas, coal and peat) in the affected sectors. This will have a very significant effect on the electricity sector over the coming decade.

It would be both economically inefficient and inequitable if only the energy-intensive sectors were targeted for action to reduce emissions: As a result, the government has announced that a carbon tax will be introduced in 2005. This should only affect the sectors that are not covered by the emissions trading regime. As discussed in Chapter 2, we have assumed that the price of emissions permits will be €20 a tonne of carbon dioxide from 2005 onwards and that the carbon tax will be levied at the same rate. This will encourage energy saving and fuel switching to less polluting fuels. It will also raise the cost of energy for consumers, adding over 0.4 percentage points to the rise in consumer prices in 2005.

As discussed in Chapter 2, we have assumed that, whether through a tax or an auction, the price of carbon dioxide emissions will be €20 a tonne from 2005 onwards and that the government will use some of the revenue to cut social insurance contributions and a limited part to raise welfare benefits (Scott and Eakins, 2002).

Figure 3.30: Final Consumption of Energy



Following on a big increase in energy demand in the 1990s, consequent on the rapid economic growth, the current decade will see a more moderate rise in energy demand (Figure 3.30). The effect of the higher prices will be to partly offset the effects of the continuing economic growth. Table 3.11 shows the forecast increase in energy demand by sector. The rising number of households over the coming decade will see a rise in demand for energy by that sector. The changing structure of the economy, with a move towards a greater role for the market services sector and a smaller contribution from industry, is also reflected in the forecast growth in energy demand.

Over the next twenty years the growth in demand by the transport sector, primarily for motor fuel, will be the biggest factor driving energy demand. The demand in the 1995 to 2000 period was increased by the greater attractiveness for Northern Ireland consumers of buying fuel in the Republic. This factor will unwind to some extent because of the changes in the exchange rate. However, the model used for forecasting may still be underestimating demand from the transport sector, and the figures shown for that sector should be considered a lower bound on likely future demand.

Table 3.11: Final Energy Demand by Sector

By Sector:	1990	1995	2000	2005	2010	2015	2020	Average Annual Growth Rates				
								1995-2000	2000-2005	2005-2010	2010-2015	2015-2020
Household	2,190	2,177	2,571	2,862	3,106	3,273	3,333	3.4	2.2	1.7	1.1	0.4
Industry	1,722	1,749	2,253	2,280	2,588	2,748	2,843	5.2	0.2	2.6	1.2	0.7
Services	1,007	1,228	1,569	1,759	2,085	2,261	2,373	5.0	2.3	3.5	1.6	1.0
Agriculture	252	288	334	312	300	292	290	3.0	-1.3	-0.8	-0.5	-0.1
Transport	2,025	2,461	3,902	4,523	5,134	5,573	5,979	9.7	3.0	2.6	1.7	1.4
Total	7,196	7,902	10,629	11,736	13,213	14,146	14,819	6.1	2.0	2.4	1.4	0.9

Table 3.12: Final Energy Demand by Fuel

By Fuel:	1990	1995	2000	2005	2010	2015	2020	Average Annual Growth Rates				
								1995-2000	2000-2005	2005-2010	2010-2015	2015-2020
Coal	848	380	528	308	235	173	124	6.8	-10.2	-5.2	-5.9	-6.5
Oil	3,875	4,756	6,713	7,467	8,232	8,472	8,341	7.1	2.2	2.0	0.6	-0.3
Gas	576	738	1,203	1,463	2,009	2,570	3,294	10.3	4.0	6.5	5.0	5.1
Peat	757	615	303	235	126	63	31	-13.2	-5.0	-11.8	-12.8	-13.3
Renewables	109	130	140	153	151	148	145	1.5	1.9	-0.4	-0.4	-0.3
Electricity	1,032	1,284	1,742	2,109	2,461	2,719	2,884	6.3	3.9	3.1	2.0	1.2
Total	7,196	7,902	10,629	11,736	13,213	14,146	14,819	6.1	2.0	2.4	1.4	0.9

The demand for different kinds of final energy is shown in Table 3.12. This shows a continuation in the trend decline in demand for solid fuel. This decline has already been affected by clean-air legislation in 1990 and by the increased penetration of gas in urban areas. The forces behind the decline in demand for solid fuel will be strengthened by the advent of a carbon tax. The tax will target the higher pollution from solid fuel per unit of heat.

The demand for gas has been greatly enhanced by the gradual expansion of its availability in urban areas. Consumers have switched from solid fuel and from oil to gas for space heating purposes and this trend will continue for some time to come. While this has affected demand for oil for space heating purposes, this has been more than offset by the increasing demand for oil from the transport sector.

Electricity demand, which has grown rapidly over a very long period, will see significant further growth over the coming decade. While somewhat less rapid than the growth in the period to 2000, it will still require major investment to ensure that likely demand is met.

In the period to 2010 probably the biggest effect of the increased cost of emitting greenhouse gases will be on the electricity sector. The change in the economics for the different types of generator is likely to be very substantial. Here we have assumed that the sector does not experience any constraint on funding the necessary investment to shift fuels. This investment will be additional to the substantial investment needed to “keep the lights on”.

The change in the shares of electricity generated by the different fuels is shown in Table 3.13. In spite of a higher cost of operating because of emissions trading, it seems likely that the Moneypoint coal station will still be economic well into the next decade. However, the oil stations may well drop out of the system by 2010. In spite of new more efficient peat stations being built, it will probably be economic to close all peat stations by 2010. The

Table 3.13: Share of Electricity Generated by Fuel Type, Per Cent of Total

	1990	1995	2000	2005	2010	2015	2020
Coal	42	39	28	26	22	20	19
Oil	11	16	20	0	0	0	0
Gas	30	31	40	60	66	67	65
Peat	13	10	7	8	0	0	0
Renewable & Hydro	5	4	6	6	11	12	15

higher cost of using fossil fuel powered generating plant will make a much wider deployment of renewable energy economic. Provided that the planning obstacles to such a deployment are dealt with, and that the electricity system can absorb this amount of wind energy, renewables could account for at least 15 per cent of production by 2020.¹¹

Table 3.14: Demand for Primary Energy, Thousand TOE

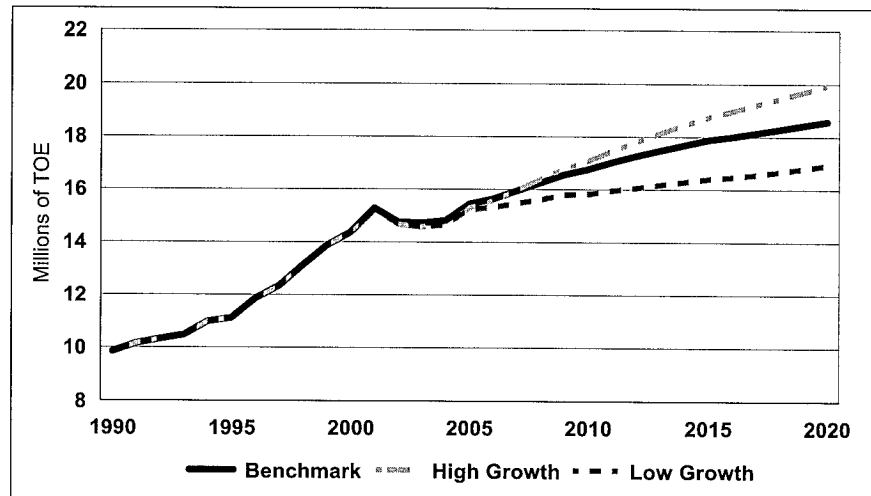
	1990	1995	2000	2005	2010	2015	2020	Average Annual Growth Rates Between:				
								1995-2000	2000-2005	2005-2010	2010-2015	2015-2020
Coal	2,162	1,917	1,989	1,835	1,762	1,700	1,651	0.7	-1.6	-0.8	-0.7	-0.6
Oil	4,286	5,454	7,868	7,590	8,355	8,595	8,464	7.6	-0.7	1.9	0.6	-0.3
Gas	1,446	1,916	3,059	4,868	5,970	6,928	7,752	9.8	9.7	4.2	3.0	2.3
Peat	1,358	1,214	804	818	126	63	31	-7.9	0.4	-31.3	-12.8	-13.3
Renewables	110	132	187	264	477	519	616	7.2	7.1	12.6	1.7	3.5
Electricity	59	60	73	67	67	67	67	3.9	-1.8	0.0	0.0	0.0
Feedstock	430	423	384	0	0	0	0	-1.9	-100.0			
Total	9,851	11,116	14,364	15,441	16,756	17,872	18,581	5.3	1.5	1.6	1.3	0.8

The forecast final demand for energy and the forecast development of the electricity sector are combined to give a forecast for primary (raw) energy demand in Table 3.14. The combination of slower growth in the economy, the fact that the economy is maturing in terms of energy use, and the policy measures undertaken to reduce emissions of greenhouse gases will combine to produce very much slower growth in primary energy demand. The closure of the IFI fertiliser plant has already had a significant effect on the demand for gas and this significantly reduces the growth in total energy consumption in the current period. The demand for solid fuel, coal and peat, is forecast to fall continuously over the forecast period, reflecting the higher handling costs for consumers and the penalty it will pay for its higher emissions.

¹¹ Wind energy poses special problems for the electricity system because people are likely to be upset if the lights go off when there is no wind!

The growth in oil consumption for the transport sector is masked by the reduced demand elsewhere in the economy. As discussed above, the demand from the transport sector may be underestimated. Gas and renewables will see continuing growth over the next decade, partly reflecting their superior environmental performance. If the measures assumed here to tackle greenhouse gas emissions prove inadequate, and the rate of tax is higher than assumed and the price of permits is also higher, then the demand for energy could be further reduced. Figure 3.31 also shows the *Benchmark* forecast for primary energy demand, together with the forecasts based on the two main alternative macroeconomic scenarios discussed in Chapter 4, involving higher economic growth or lower economic growth.

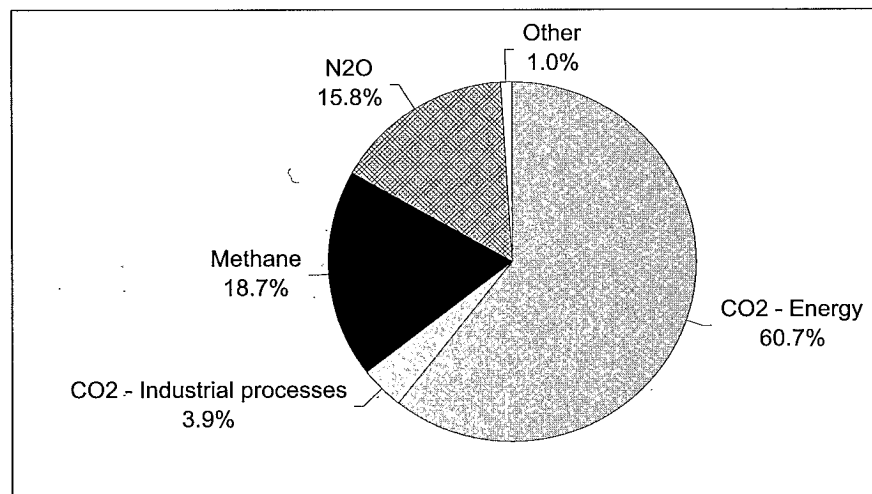
Figure 3.31: Demand for Primary Energy Under Different Economic Assumptions, thousand TOE



The growth in demand, especially for electricity, will require a continuing programme of major investment in generation and transmission infrastructure over the next decade. The need to change our energy sector to comply with our requirements under the Kyoto protocol will further add to investment needs. This need for new investment contrasts with the position of many other more mature economies where there may even be excess capacity in the sector. Because of the major investment requirement, it will be very important to minimise the cost of capital, and so minimise the impact on consumers of financing the investment (Helm, 2003). In turn this will require the regulatory authorities to provide as certain an environment for new investment as possible, because uncertainty greatly raises the cost of raising finance.

The growing dependence of the economy on gas, especially the dependence of the electricity sector, is a cause for concern. While measures have been taken to ensure physical security, Ireland could still be more exposed to gas price shocks than many of its competitors. For this reason the pattern of electricity production shown above will need to be considered by policy makers and this could alter the conclusions on the optimal mix of fuels for electricity generation.

The single biggest source of greenhouse gas emissions in Ireland is from the burning of fossil fuels to provide energy (Figure 3.32). The bulk of the emissions of N_2O and methane (CH_4), which together amounted to over a third of all emissions in 2000, come from agriculture. The emissions from industrial processes, such as cement manufacture, are relatively small. In the case of agriculture, the bulk of the emissions are related to the production of ruminants – cattle and sheep.

Figure 3.32: Source of Greenhouse Gases

Source: Environmental Protection Agency.

In preparing our forecasts we have used Teagasc's estimates of the likely impact of the earlier Fischler proposals on CAP reform through decoupling (Teagasc, 2003). (No estimates are available for the proposals agreed in June 2003.) This study suggested a substantial fall in cattle numbers over the course of the decade with a consequent big drop in emissions. While this probably overestimates the impact of the final agreed package, we have incorporated the changes suggested by the TEAGASC report into our overall forecast.

In the case of the process emissions from industry we have used our forecast of output in the traditional manufacturing sector to provide an estimate of likely trends. Because of the forecast fall in the building sector output in the long run, this is likely to translate into a fall in demand for cement output, reflected in a fall in the output of the traditional manufacturing sector. This should see some fall in process emissions, even without the impact of the EU emissions trading scheme.

Table 3.15: Emissions from Energy, by Sector, 2000, Thousands of Tonnes of CO₂

	1990	1995	2000	2005	2010	2015	2020	Average Annual Growth Rates:				
								1995-2000	2000-2005	2005-2010	2010-2015	2015-2020
Household	10,426	10,263	11,198	11,655	11,098	11,118	10,605	1.8	0.8	-1.0	0.0	-0.9
Industry	7,956	8,611	10,353	10,222	10,240	10,783	10,943	3.8	-0.3	0.0	1.0	0.3
Services	4,825	5,840	7,358	7,769	8,136	8,701	8,990	4.7	1.1	0.9	1.4	0.7
Agriculture	1,044	1,193	1,300	1,168	1,058	1,028	1,017	1.7	-2.1	-2.0	-0.6	-0.2
Transport	6,194	7,529	11,941	13,831	15,699	17,043	18,289	9.7	3.0	2.6	1.7	1.4
Feedstock	990	973	883	0	0	0	0	-1.9	-100.0			
Losses	303	445	369	518	545	549	550	-3.7	7.0	1.0	0.2	0.0
Total	31,739	34,855	43,402	45,163	46,775	49,222	50,393	4.5	0.8	0.7	1.0	0.5
% Change on 1990		9.8	36.7	42.3	47.4	55.1	55.1	58.8				
Memo Item:												
Electricity	10,828	13,185	15,542	16,290	15,005	15,913	16,144	3.3	0.9	-1.6	1.2	0.3

Table 3.15 shows our forecast for emissions from the energy sector out to 2020. The emissions are broken down by the sector using the energy. The emissions from the electricity sector have been attributed to the sectors that use the electricity. We also show, as a memo item, the emissions from the electricity sector.

The emissions for the transport sector are probably underestimated due to the underestimate of energy use discussed above. For the household sector there is very little change in emissions over the forecast period. This reflects increasing efficiency in the electricity sector, greater gas penetration at the expense of solid fuel, and a slowdown in the rate of household formation. The highest percentage growth is expected in the services sector. As discussed earlier, this reflects the change in the structure of economic growth expected in the long term, with the baton being taken up by the services sector from the manufacturing sector. The low growth in emissions from the electricity sector arises from the major restructuring anticipated within the sector as a result of the EU emissions trading scheme.

Table 3.16: Greenhouse Gas Emissions, Thousands of Tonnes of CO₂ Equivalent

	1990	1995	2000	2005	2010	2015
CO ₂ - Energy	29,775	32,620	41,406	43,819	45,376	47,753
CO ₂ - Industrial processes	1,931	2,041	2,645	2,368	2,672	2,707
Methane	11,900	12,595	12,785	10,208	8,919	8,919
N ₂ O	9,544	10,050	10,760	10,657	9,327	9,370
Other	92	277	657	112	112	112
Total	53,241	57,583	68,252	67,165	66,405	68,860
Change on 1990 %		8.2	28.2	26.2	24.7	29.3

The forecast for aggregate greenhouse gas emissions is shown in Table 3.16. This shows that Ireland in 2002 was already around 28 per cent above the level of 1990. As Ireland's limit is an increase of 13 per cent over 1990 for the period 2008-2012, this suggests that major changes will be needed to bring Ireland close to compliance. Table 3.16 also shows our forecast for 2010. For that year Ireland would still be around 25 per cent above 1990 levels, in spite of a substantial reduction in emissions from cattle and in spite of the introduction of a carbon tax and emissions trading. This situation is more difficult than was shown in Bergin, Fitz Gerald and Kearney, 2002, because the Environmental Protection Agency (EPA) has recently applied a new required UN methodology to the emissions data. This shows Ireland as having a much worse problem than had previously been thought.

If this forecast for the next decade were broadly correct, the result would be that Ireland would be a net buyer of emissions permits after 2008. If the price of permits were around €20 a tonne, the cost of purchasing the necessary additional permits could amount to €150 million by the end of the decade, less than 0.1 per cent of forecast GNP.

The costs for the economy in adjusting to the assumed regime, where the price of carbon dioxide would be €20 a tonne, are probably not very significant if sensible policies are deployed (Fitz Gerald, 2002). However, the cost of reducing emissions to the Kyoto level rather than buying permits could be somewhat higher. As yet it is very difficult to predict what the price of carbon is likely to be at the end of the decade but this issue will continue to pose problems for economic policy in Ireland over the course of the coming decade.

3.8 Conclusions

The economy has the potential to grow quite rapidly for another five years. While it is likely to be much less vibrant than in the boom years of 1994-2001, it will nonetheless be well above the dreams of our EU neighbours. This potential for quite rapid growth is due to some key demographic factors remaining favourable, and also to related factors affecting the productivity of the labour force.

The falling dependency rate will continue out to the end of the decade. This will ease the pressures on the public sector, while at the same time greatly enhancing the output potential of the economy. The natural increase in the population will also remain elevated relative to our EU partners because of the legacy of high birth rates in previous decades. Immigration, which has played a positive role in enhancing labour supply and the productivity of the labour force, is likely to continue out to the end of the decade.

Whether this potential for a return to rapid growth will be realised will depend partly on the external environment but also to a very significant extent on the competitiveness of the economy. The very rapid inflation in wage rates and in the related prices of many domestic services over the period 2001 and 2002 has probably already left the economy overexposed. As discussed in this chapter, the recent exchange rate changes have led to a deflationary shock to the economy. In the normal course of events this will see a very significant fall in domestic inflation. Depending on how consumer prices react in the changed circumstances of EU membership (Fitz Gerald, 2001), the pass through into lower inflation could be even more dramatic than we have forecast. The more rapidly the domestic price level, including wage rates, adjusts to the changed circumstances, the lower will be the level of economic disruption. In this *Review* we see the rate of increase in wage rates averaging 3.5 per cent a year between 2004 and 2006. Whether this will represent a sufficiently rapid adjustment to restore competitiveness in the face of the exchange rate shock that has recently occurred is still open to question.

The manufacturing sector will be less of an engine for growth than in the past. While we see some return to quite rapid growth for the high-technology sector between 2005 and 2010, this will still be on a much more moderate scale than was experienced in the 1990s. This reflects the fact that the sector is now quite large relative to the industrial sector and the economy as a whole. With more constrained labour supply and infrastructural resources than in the 1990s, the economy could not absorb the level of foreign direct investment (FDI) seen over the last decade. In addition, as jobs become higher paid, requiring higher skills, they tend to move off the production floor into offices and laboratories. This is the pattern in all the main world economies that enjoy a very high standard of living. In the long run Ireland is unlikely to be an exception to this pattern.

While gradually declining in importance, this sector of the Irish economy will still remain extremely important until the end of the decade. Even sustaining the current levels of output and employment will require a continuing substantial inflow of migrants. However, policy must prepare for a situation where the market services sector will become a more significant driver of growth, requiring a changing approach to economic development.

The building sector, having geared up to undertake the current huge programme of investment, faces a period of slow growth or even contraction over the coming decade. The fact that the number of dwellings built last year was roughly a third of the number built in the UK and a quarter of the number built in Germany highlights the magnitude of the achievement to date. However, building at this rate will see the backlog of demand gradually reduced. At some stage over the coming decade, when the demand has been largely met, it is likely that prices will fall to levels closer to the EU average and this will be the signal for a winding down in capacity in the sector. In the civil engineering sector it is likely that demand will continue at an elevated level well into the next decade. However, the inevitable process of adjustment to lower output, which is still some way off, will prove painful for the sector.

The rapid growth Ireland has experienced, and is likely to experience out to 2010, has put serious pressures on both infrastructure and on the

environment. Already Ireland exceeds its target for emissions of greenhouse gases by a wide margin. Dealing with this problem and the infrastructural deficit ranging from housing and energy to transport and environmental services is putting huge pressure on national resources.

Whereas in most other countries that enjoy Ireland's standard of living, measured in terms of output per head, 80 per cent of resources are available for consumption, in Ireland the figure is under 75 per cent. This reflects the fact that the persistent infrastructural deficits require a very elevated level of investment, currently around 27 per cent of output, whereas in countries like France or Belgium the figure is closer to 20 per cent. As a result, while Ireland is technically one of the richest countries in the world, measured in terms of output per head, it may not always feel that way with such a high share of resources pre-empted for investment purposes.

4. SHOCKS AND SURPRISES

4.1 Introduction

In Chapter 3 we present our best estimate of the likely course of the Irish economy over the next decade. This is based on a detailed set of assumptions about the world economy, demographics, and the likely future policies pursued by the government over this period, as outlined in Chapter 2. Furthermore, the forecast draws on a detailed and ongoing study of the underlying behaviour of the economy over the past forty years, including output determination in different sectors, wage bargaining, and the behaviour of firms, workers, households and government, as described in Appendix 1. It is an occupational hazard that forecasters are proved wrong. The lesson from previous *Medium-Term Reviews* is that we have in general been over-pessimistic, although notably not in the last issue where we did not anticipate the depth of the current slowdown in economic growth (see Appendix 2). Because of the wide margin of error that inevitably attaches to any economic forecast, it is important to explore some of the more important foreseeable events that could significantly alter the course of the economy over the coming decade. This will allow readers to assess what margin of error to attach to particular forecasts.

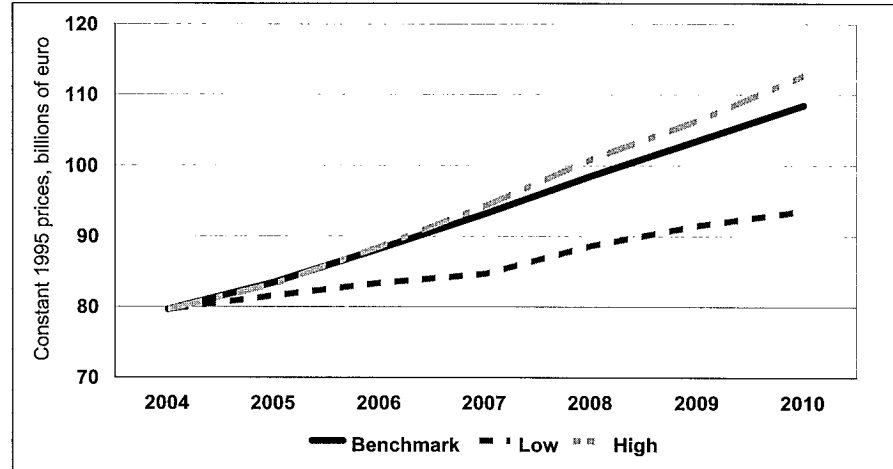
In this *Review* we concentrate on the medium-term growth potential of the Irish economy going forward. Short-term deviations from this growth rate in individual years, mainly due to cyclical changes in the world environment, can generally be offset with little change to the overall growth profile. But if domestic policies over the medium term deviate significantly from our underlying assumptions, then the economy could be moved permanently onto a different growth trajectory. In Section 4.2 of this chapter we examine a stylised low-growth scenario, this describes a situation where the Irish economy grows significantly below potential over the medium term, due to a failure of domestic policy to fully implement the necessary infrastructural investment over the coming decade combined with excessive domestic cost increases. This scenario describes a “wasted opportunity”. The path of GNP to the end of the decade is significantly below the *Benchmark*, as shown in Figure 4.1, together with lower employment and living standards and higher emigration.

Our second scenario, described in Section 4.3, examines the possibility that the economy could grow faster over the medium-term than anticipated in our *Benchmark*. Previous medium-term forecasts have tended to underestimate the strength of the Irish economy. Here we examine a scenario where the economy is more competitive than we have assumed in the *Benchmark*, with the annual average growth rate 0.7 percentage points higher than in the *Benchmark* over the period 2005 to 2010. The additional labour required to make this possible is assumed to be the result of a significantly higher level of immigration.

Figure 4.1 suggests that the downside risks attached to changes in our competitive position relative to the *Benchmark* are greater than the upside; in the graph the high-growth trajectory for GNP is a much tighter upper bound than the low-growth trajectory. As shown in Figure 3.5 in the previous chapter, Irish labour costs are moving close to parity with other EU partners such as the UK, and they are significantly higher than the lower-cost

economies such as Spain. With a highly mobile workforce, especially for skilled labour, we consider that this high-growth trajectory forms a reasonable upper bound on foreseeable improvements in competitiveness over the medium-term, especially in the light of the infrastructural deficit currently facing the economy.

Figure 4.1: Alternative Scenarios for Real GNP



Both of these scenarios concentrate on uncertainties surrounding our assumptions on competitiveness. However, arguably the Irish economy is even more vulnerable to external shocks, as we discussed in some detail in the previous *Medium-Term Review*, and as witnessed by the current slowdown in the economy. The third scenario in this chapter looks at the likely consequences of a very sharp deflationary external shock. We assume that the dollar continues its recent depreciation to reach an annual average of \$1.40 per euro in 2004 and beyond, with negative implications for both Irish and European competitiveness. This knocks almost 1.5 percentage points per annum off the GNP growth rate between 2003 and 2006 relative to the *Benchmark* and causes a serious deterioration in the public finances.

The external shock was initially simulated using the NiGEM model. The results for the international environment are then used in the ESRI *HERMES* macro-economic model to determine the impact of the external shock on the Irish economy. The *HERMES* model is used in the same way to simulate the effects of the first two shocks which are purely domestic in origin. In each case the results are presented as changes compared to the *Benchmark*.

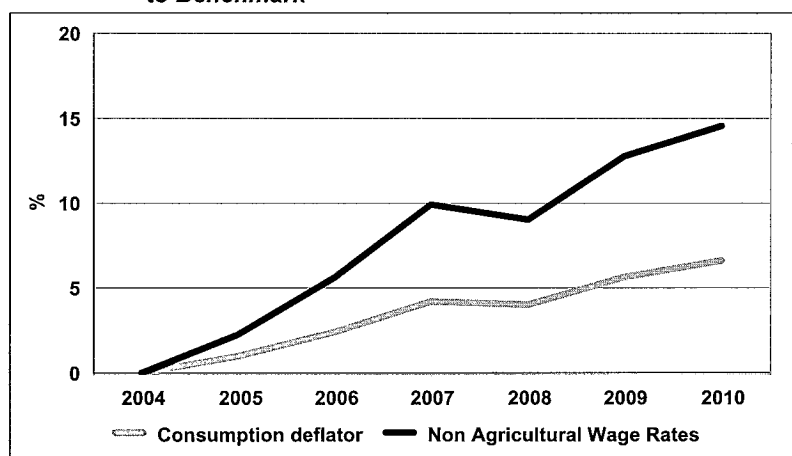
4.2 “Wasted Opportunity”: A Low-Growth Scenario

Maintaining competitiveness must be a key plank of domestic policy in ensuring that the economy can achieve its growth potential over the medium term. In recent years Irish competitiveness has deteriorated on a number of fronts. In the labour market the move to full employment heightened wage expectations and led to rapid increases in wage rates between 1999 and 2002. The very rapid growth in the economy in the 1990s has also led to significant shortages in physical infrastructure, in particular housing and transport infrastructure. There have been relatively big increases in some non-traded goods and services prices in sectors where there is a need for enhanced competition and regulatory reform.

The *Benchmark* forecast assumes that domestic policies will accommodate the objective of maintaining competitiveness over the medium-term; wage rates track productivity growth rates more closely than in the last three years; a major programme of public investment out to 2015 is sufficient to correct our infrastructural deficit; and measures are taken to improve competitiveness in the sheltered sectors of the economy.

To explore the sensitivity of Ireland's growth prospects to these assumptions we examine the possible effects of a higher rate of wage and price inflation than in the *Benchmark* forecast, together with a failure to deliver adequate infrastructural improvements. Beginning in 2005, in this scenario a more rapid rise in wage rates in the public and private sector is assumed than in the *Benchmark* (an additional 1 per cent per year on to the growth assumed in the *Benchmark*). Furthermore, it is assumed that infrastructural bottlenecks, especially in transport and housing, give rise to an increase in production costs in the tradable sector so that world demand for Irish output is 1 per cent per year lower than in the *Benchmark*. This would reflect the reduction in the attractiveness of Ireland as a location for investment.

Figure 4.2: Wasted Opportunity: Inflation and Wage Rates Compared to Benchmark



The growth in non-agricultural wage rates in the medium term at a rate well above that in the *Benchmark* would involve a serious loss of competitiveness. In addition, non-wage factors due to poor competitiveness pressures in the sheltered sector, are assumed to push up the consumer price level above the *Benchmark* level (Figure 4.2). After three years, in 2007, the level of consumer prices would be 4.3 per cent above the level in the *Benchmark*. In other words, inflation would on average be 1.4 per cent a year more than in the *Benchmark* over the years 2005 to 2007. This inflationary impulse would be aggravated by the assumption of inadequate investment in infrastructure. In turn, this would raise the domestic cost structure, putting further upward pressure on the consumer price level in the medium term. This would feed back on wage rates, which in this scenario would be almost 15 per cent above the *Benchmark* level by 2010.

In this scenario we have also assumed that the government would react to the adverse impact on the Budget arising from the loss of output by raising taxes to ensure that the borrowing requirement would be unchanged in the longer term compared to the *Benchmark*. These higher taxes would further increase pressures in the labour market, and further increase the loss of competitiveness. The increase in domestic cost inflation in this scenario is domestically generated through inappropriate policy, thereby leading to a steady deterioration in Ireland's competitiveness on world markets.

The sector most vulnerable to the loss of competitiveness would be manufacturing. Figure 4.3 shows the cumulative impact of the shock on output in the three manufacturing sectors. Food processing would be least affected, because of its dependence on the processing of domestically produced raw materials. In the case of the traditional manufacturing sector, output by 2010 would be down 5 per cent compared to the *Benchmark*.

However, the biggest impact would be on the high-technology sector, which would be gradually choked by the shortage of infrastructure and the mounting loss of competitiveness. In this illustrative scenario, compared to the *Benchmark*, output would be down more than 16 per cent by the end of the decade.

This reduction in manufacturing output would lead to a permanent reduction in the growth rate of the economy. In Figure 4.4 we show the impact on the level of GNP of the loss of competitiveness. On average the rate of growth between 2005 and 2010 would be 2.5 percentage points below that of the *Benchmark*, leaving the level of real GNP 14 per cent below the *Benchmark* by 2010. While population growth would also be slower, the overall impact of this shock would be to reduce GNP per capita by almost 10 percentage points by 2010.

Figure 4.3: Wasted Opportunity: Manufacturing Output Compared to *Benchmark*

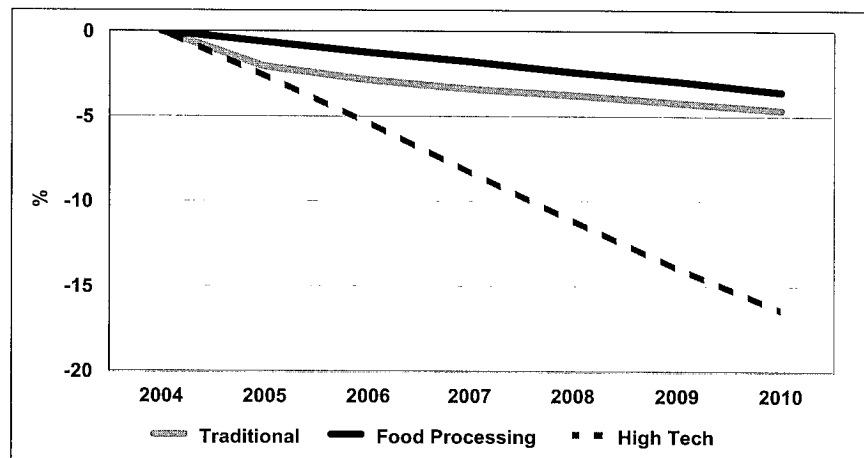
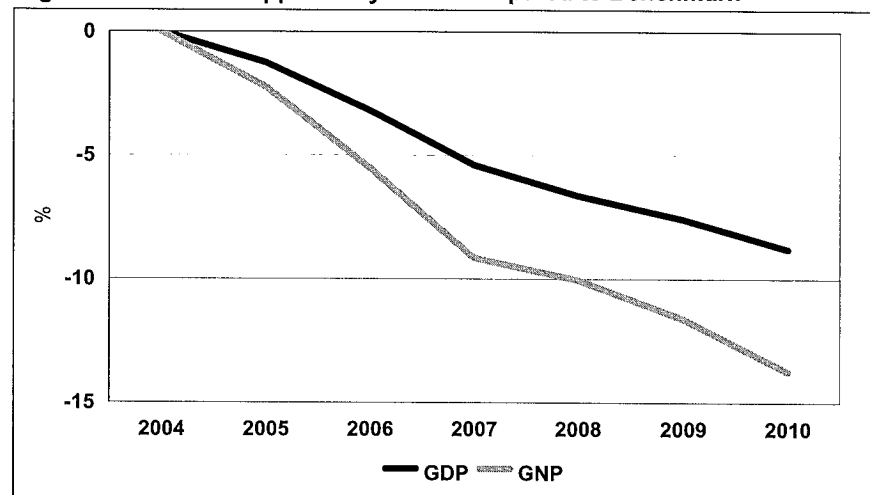


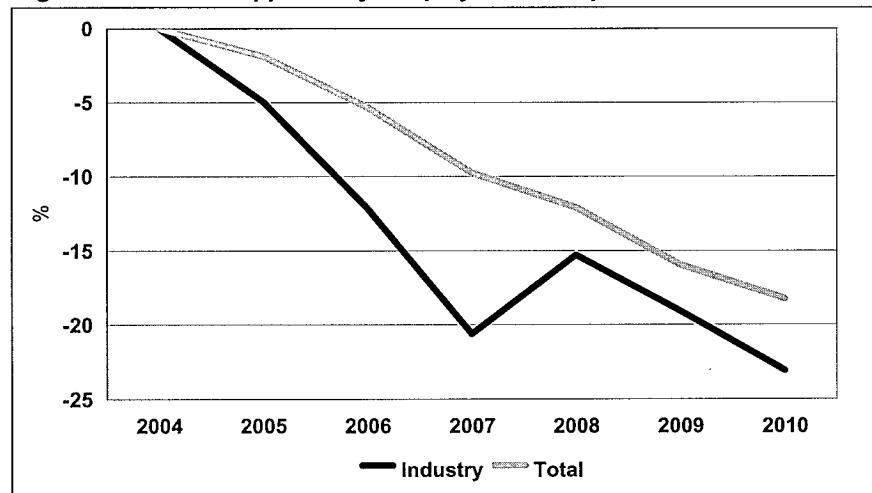
Figure 4.4: Wasted Opportunity: GNP Compared to *Benchmark*



The underperformance of the economy, especially the loss of output in the industrial sector, would seriously affect employment. By 2010 employment in industry would be 23 per cent below the *Benchmark* level, with total employment being 18 per cent down (Figure 4.5). The result would be that the unemployment rate by 2010 would be almost 8 percentage points above the *Benchmark*. This rise would occur in spite of a major reduction in immigration, and an eventual return to net emigration by the end of the forecast period.

Faced with this very unfavourable situation, we assume that the government would hold the borrowing requirement unchanged by raising the personal income tax rate. The position of the public finances would be further aggravated by the rise in unemployment transfers, and lower levels of employment, which reduce revenue. To keep the budget balance at the *Benchmark* level would require a massive increase of 15 percentage points in the average personal tax rate by 2010. This is a stylised assumption; in practice current expenditure would also need to be cut to balance the budget as reliance on tax measures alone would be clearly unsustainable.

Figure 4.5: Wasted Opportunity: Employment Compared to *Benchmark*



This scenario shows that there is no inevitability about the success of the Irish economy. Serious domestic policy errors, a failure of the labour market to adjust to changing circumstances, and a short-sighted “greedy” response to Ireland’s recent economic successes could mean that the economy would fail to reach its potential over the next decade. This failure would not only affect income per head, measured in terms of GNP; lower employment, higher unemployment and higher emigration would constitute an expensive and irreversible loss to society as a whole.

4.3 Higher Potential Growth

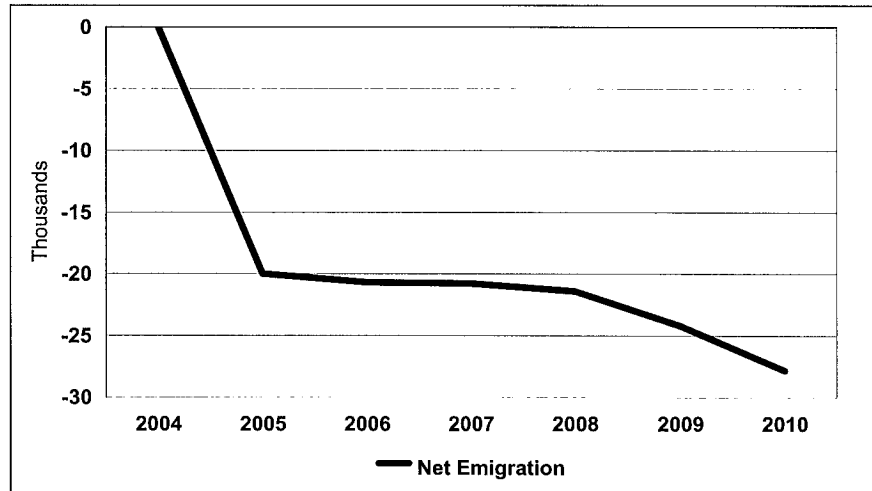
As discussed in Appendix 2, previous *Medium-Term Reviews* have in general tended to underestimate the potential growth of the economy. With this in mind it is important to explore the possibility that the estimate of the potential growth of the economy underlying the *Benchmark* forecast is too low. Here we describe the results of a simulation where the economy turns out to be more competitive than assumed in the *Benchmark*. This scenario is captured in the simulation by a higher level of world demand – assumed to be half a percentage point higher each year – with the additional labour input required to produce the additional output coming from higher, predominantly skilled, immigration.

An alternative to this simulation would be one where the higher growth was realised through a more rapid increase in productivity. Such a scenario would have the major advantage that it would put less stress on domestic infrastructure, as the higher output would be achieved with the same population and employment as in the *Benchmark*. It would also have significant beneficial effects in terms of a wider definition of economic welfare (lower congestion). However, productivity is not a variable directly amenable to policy. It is unclear how and why productivity, which is already growing more rapidly than in other OECD countries, could or would grow even faster than we have assumed. If policy measures could be identified

that could raise the growth in productivity, this would make such a desirable scenario seem more realistic.

In the absence of a more rapid increase in the productivity of labour, higher growth would require significantly higher net immigration than assumed in the *Benchmark*. As shown in Figure 4.6, net immigration over the rest of the decade would have to average more than 22,000 a year above that in the *Benchmark*. This would involve higher levels of net immigration than have ever been experienced before, amounting to over 1 per cent of the population by 2010. In addition, this immigration would have to be predominantly skilled labour if the assumed rate of productivity growth in the *Benchmark* were not to fall.

Figure 4.6: Higher Potential: Net Emigration Compared to *Benchmark*



In this scenario we assume that the investment in public infrastructure will be adequate to cope with the higher level of activity and the higher population. If this were not the case the direct effects of congestion, and its indirect effects working on the labour market, would prevent this scenario from being realised. As discussed below, this scenario also implies substantially greater investment in housing to cater for the higher population.

Figure 4.7: Higher Potential: GNP Compared to *Benchmark*

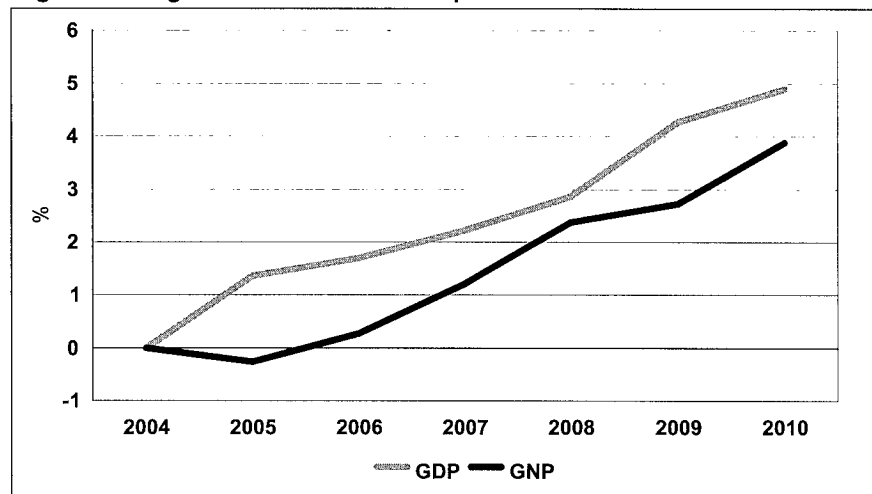
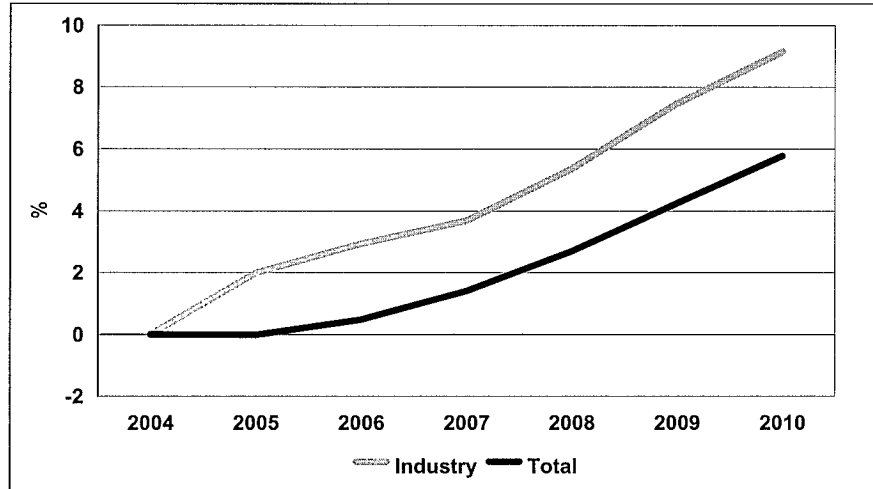


Figure 4.7 shows the level of GNP rising steadily compared to the *Benchmark* over the rest of the decade, as the more rapid increase in labour supply expands potential output. The additional growth in GNP would

amount to around 0.7 percentage points a year, with GNP per head up by just over 0.5 per cent by 2010 relative to the *Benchmark*. This would leave overall economic welfare, measured by GNP per head, higher as a result of the higher skilled immigration.

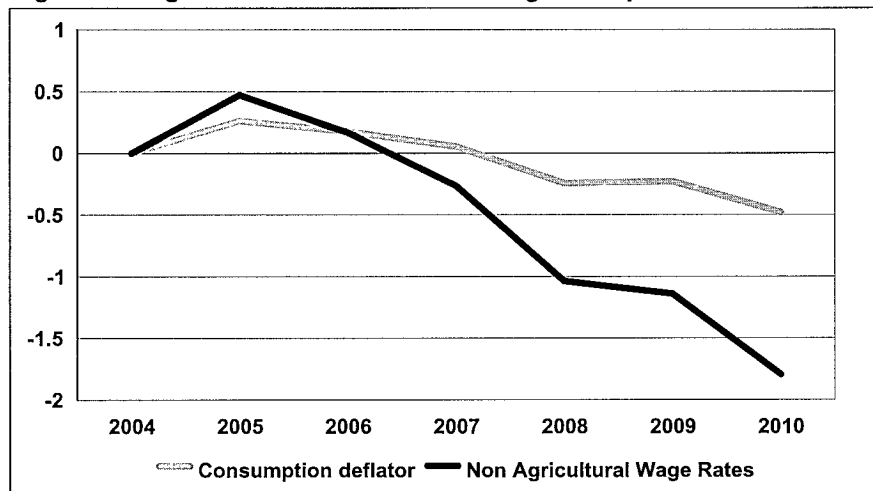
The substantially higher immigration and resulting higher population would require a much greater investment in housing. On average over the rest of the decade an additional 8,400 dwellings a year would be required to house the new arrivals, a major increase on the already substantial investment assumed in the *Benchmark* forecast. The additional demand for dwellings would put strong upward pressure on house prices. By the end of the decade they would be at least 10 per cent higher than in the *Benchmark*.

Figure 4.8: Higher Potential: Employment Compared to *Benchmark*



The level of employment would also rise more rapidly over the course of the decade (Figure 4.8). By 2010 it would be almost 6 per cent above the *Benchmark*. Higher net immigration would account for the bulk of the increase in employment but there would also be a further fall in the unemployment rate of 1 percentage point by the end of the decade.

Figure 4.9: Higher Potential: Inflation and Wages Compared to *Benchmark*



The improved competitive position is illustrated in Figure 4.9. The higher growth and employment levels would leave consumer prices slightly lower, while non-agricultural wage rates are almost 2 percentage points lower by 2010, reflecting the assumption of increased competitiveness. However, this

would not constitute a loss in real income for workers; the real after tax non-agricultural wage rate in this scenario would be more than 1.5 percentage points higher than in the *Benchmark* by 2010. This would be partly facilitated because the higher level of economic activity would allow for a reduction in average tax rates, and it would also be partly attributable to the lower rate of inflation.

As discussed in the Introduction, we consider that at the present time the upper bound on growth through improved competitiveness is relatively close to the *Benchmark*. This is because the Irish economy still has fairly low levels of unemployment, and because the current congestion problems facing the economy would only be exacerbated by further inflows of labour. Even assuming that the public investment programme is sufficiently adaptable to move up a gear in the face of higher demand, which might in itself be considered rather heroic, the economy would still be faced with a substantial rise in the price of housing due to increased rates of household formation. This substantially raised price level would obviously involve a welfare loss for the population already in Ireland who would need to be housed over the course of the decade, and would act as a brake on the flow of skilled migrants into Ireland.

4.4 Dollar Shock

In the last two *Medium-Term Reviews* we examined the impact on the Irish economy of a sharp slowdown in the US economy. In the first of these simulations in the *Review* in 1999, the slowdown was assumed to be the result of a sharp sustained fall in the value of US equities. In the last *Review* the US economy was viewed as exposed to a sharp currency depreciation given the size of the current account deficit. Our concern in this *Review* is similar to that in the 2001 *Review* in that this external imbalance still remains. The deficit rose to \$136 billion in the first quarter of 2003, equivalent to almost 5 per cent of GDP. In recent months there has been some depreciation of the dollar against the euro. Despite this, the size of the current account balance is such that uncertainty still surrounds the prospects for the US economy and the dollar exchange rate.

The simulation we describe here is designed to assess the short to medium-term impact of a further sharp reduction in the dollar-euro exchange rate. The results are very dramatic, suggesting that it would be difficult to extend the shock beyond a three-year horizon since, in such an eventuality, there would need to be some drastic action on the part of policy makers. As constructed here, the scenario combines the worst possible combination of circumstances. As such, it is unlikely to be realised in this form, but the effects discussed here give an indication of how the economy would be affected by a real shock combining some of the features considered here. For this reason, in this scenario we only discuss the impact of the shock over a three-year horizon from the first full year of the shock, assumed to be 2004.

Table 4.1: The External Dollar Shock

The External Shock:	2004	2006
Percentage change relative to the <i>Benchmark</i>		
Dollar exchange rate (\$/euro)	20.5	20.5
Sterling exchange rate (£/euro)	10.2	10.2
US GDP	-0.6	-1.9
EU GDP	-1.5	-1.3
US Consumer Prices	1.4	3.7
EU Consumer Prices	-1.7	-4.7

The *Benchmark* forecast is based on the assumption that the euro-dollar exchange rate settles between \$1.15 and \$1.20 over the forecast period. Even

with this assumption the US balance of payments deficit would still remain very substantial. Thus, to test the sensitivity of Ireland to a slowdown in the US economy, we assume that the extent of the imbalance in the US economy is sufficient to cause a further depreciation of the dollar to a long-run value of \$1.40 against the euro. The NiGEM model simulations would suggest that such a further depreciation of the dollar would lead to an improvement in the US current account deficit to under 3 per cent of GDP. The fact that the deficit would not be entirely eliminated would still leave an exposure to a further dollar shock.

This shock implies a 20 per cent depreciation of the dollar against the euro by 2004 relative to the *Benchmark*, with a consequent 10 per cent devaluation of sterling. Although the expectation would be a boost to US GDP growth as a result of enhanced competitiveness, this turns out not to be the case. Indeed, the result of this shock is in many ways a worst-case scenario for the Irish economy – lower US and lower European growth (see Table 4.1). In the first full year of the shock, 2004, US GDP would be 0.5 percentage points lower than the *Benchmark* forecast, by 2006 this widens to 1.9 percentage points.

The explanation for this rather surprising result is that the fall in the value of the dollar would lead to an upturn in US inflation. Measured by the consumer expenditure deflator, consumer prices in the US would be 1.4 percentage points higher in 2004 and 3.7 percentage points higher in 2005 relative to the *Benchmark*. As a consequence of the inflation assumptions in the NiGEM model the Federal Reserve would raise interest rates sharply. Rates would move higher in the second half of 2003 – up by 0.7 percentage points compared to the *Benchmark*. This tightening of monetary policy would continue in 2004 and 2005, with interest rates 1.5 percentage points higher than the *Benchmark*.

This assumed response by the Federal Reserve is probably too pessimistic. The rise in US inflation would be only temporary. In addition, the objective of the Federal Reserve in deciding monetary policy appears to give a higher weighting to deviations in domestic output from its potential than does the ECB.

The fall in the value of the dollar would have a negative impact on European competitiveness. The result of this would be that EU GDP would be 1.5 percentage points lower in 2004, the first full year of the shock, and the EU would experience a number of years of deflation where average prices, measured by the consumer expenditure deflator, would fall in each year, down 4.4 per cent relative to the *Benchmark* by 2006. In contrast to the US economy, European interest rates would be lower than the *Benchmark* from 2005 onwards, providing a boost to activity. However, because interest rates are already so low in the Euro area, they could not fall as much as the ECB's response function would suggest. This limits the degree of insulation that domestic monetary policy could provide in the Euro area.

This shock has a very negative impact on the world economy. Tight monetary policy in the US and deteriorating European competitiveness would reduce economy activity levels in the short run. An easing of European monetary policy would aid recovery in Europe, but the assumed priority given by the US authorities to controlling inflation would postpone any recovery in US growth. If US monetary policy adopted an easier stance the negative impact on the Irish economy would not be nearly as great.

The implications of this deflationary shock for the Irish economy are very dramatic, testament to our heavy exposure to the world economy, and in particular to events in the US. In Table 4.2 we present the likely immediate – 2004 – and medium term – 2006 – impact of the shock on some key economic aggregates. The effect on GNP and employment is very strong, both are down by more than 5 per cent relative to the *Benchmark* by 2006. The deflationary effect of the shock also shows up in the decline in non-

agricultural wages of almost 5 percentage points by 2006, while consumer prices would be 2.7 percentage points lower than in the *Benchmark*. The decline in wages assumes a level of flexibility in the labour market in the advent of a severe external shock. However, this measure of flexibility would not be nearly enough to reverse the negative impact on the labour market over the short to medium term. Research using quarterly data on the speed of adjustment of prices to exchange rate changes (Fitz Gerald and Shortall, 1998) indicates that the speed of adjustment of prices to such an exchange rate shock could be much more rapid than shown here, alleviating some of the sharp downward spin imparted to employment and output growth in this simulation.

Table 4.2: External Dollar Shock Simulation Results

The Simulation Results:	2004	2006
Percentage change relative to the <i>Benchmark</i>		
GNP	-1.9	-5.4
Total Employment	-1.9	-5.7
Non-Agricultural Wages	-1.9	-4.9
Consumer Prices	-0.9	-2.7
Absolute change relative to the <i>Benchmark</i>		
Unemployment Rate	1.3	3.8
Exchequer Borrowing Requirement	-1.8	-4.4
Debt-GNP Ratio	5.0	15.3

Arguably, however, the most dramatic effect of this shock is the very deleterious implications it has for the public finances. In this simulation we held tax and expenditure levels roughly unchanged in order to assess the likely consequences for the budget of such a shock. Looking at Table 4.2 it can be seen that the impact on the exchequer borrowing requirement after only three years is an increase in the deficit of 4.4 per cent of GNP, while the debt-GNP ratio is 15 percentage points higher than in the *Benchmark*. It is clear that tax increases alone would not be sufficient to deal with such a shock. There would also be a need to have a major downward adjustment in the volume of public expenditure if the economy were to avoid an even more drastic medium to long-term outcome.

This shock must be regarded as something of a doomsday scenario. It is likely that US authorities would make a more nuanced assessment of the inflationary risks in the face of such a slowdown. Furthermore, such a deep deflationary shock could well see a more rapid adjustment of wages and prices in Ireland. Nevertheless, this shock indicates fairly starkly the vulnerability of the Irish economy to an external downturn, and the exposure of the public finances in particular. While the change in the exchange rate that has already occurred is much milder than shown here, this simulation does indicate that the public finances could face unexpected problems over the coming eighteen months.

4.5 Conclusions

Given the uncertainty that surrounds any forecasting exercise it is always unwise to rely on a single projection for the future. Following on the *Benchmark* forecast presented in Chapter 3, in this chapter we explore a number of different scenarios that could alter the future course of the economy over the medium term. The first two scenarios concentrate on competitiveness on world markets, while the third looks at Ireland's vulnerability to a very sharp external deflationary shock.

In the first scenario we examine the likely consequences of a deterioration in our competitiveness through a combination of wage demands above productivity growth rates, a failure to address the current

infrastructural deficit. The additional wage inflation above the *Benchmark* would translate into significantly higher price increases in the non-traded goods and services sectors of the economy. The results suggest that there are significant downside risks over the medium term if policy does not focus on promoting competitiveness on world markets; growth and employment could fall significantly and living standards could be 10 per cent lower than in the *Benchmark* by 2010, a potentially unnecessary self-inflicted wound.

In the second scenario we consider the possibility that Ireland will be more competitive over the medium term than is assumed in the *Benchmark*. Successive *Medium-Term Reviews* have been too pessimistic about our future growth prospects, and this simulation suggests that GNP could grow at 0.7 per cent per year above the *Benchmark* growth rate under these circumstances. Because of the current congestion problems facing the economy we suggest that this represents a likely upward bound on the possible growth rate of the economy over the medium term.

Our third scenario looks at the possibility that the US dollar continues to depreciate very sharply against the euro to a value of \$1.40 by 2004. Furthermore, it suggests that this would lead to a slowdown in US growth with fairly dramatic negative consequences for the Irish and EU economies over the three-year horizon considered. Rapid deflation in this scenario, combined with much lower world demand, paints a worst-case scenario for the Irish economy. Output and employment would be significantly lower than in the *Benchmark* forecast, despite significantly lower wages and prices. There would be severe problems making the public finances add up in the face of a mushrooming deficit. This latter scenario would not be sustainable over the medium term, implying fairly severe consequences for government spending and taxations levels.

The analysis in this chapter highlights the importance of delivering the major increase in infrastructure that is needed to allow the economy to achieve its potential growth rate over the next decade. If infrastructural investment is undertaken sufficiently rapidly, there is the possibility that the economy could even exceed the parameters set out in the *Benchmark* forecast, as outlined in the second scenario.

There remains the possibility that the long-term growth potential of the economy could be permanently impaired through unwise domestic actions. Failure to undertake the necessary infrastructural investment, combined with a continuing loss of labour cost competitiveness, and a failure to improve competitiveness and regulatory reform in the sheltered sectors of the economy could cause a permanent loss in terms of both output and employment over the medium term.

5. CONCLUSIONS

In preparing this *Review*, with forecasts out to 2010, the focus of attention is on the longer-term processes driving the EU and the Irish economies. Deliberately we abstract from the immediate economic problems that so dominate our attention on a daily basis. The value of these forecasts is not so much that they provide certainty about the future, which they don't, but rather that they help identify the key strategic issues for policy makers that might be lost through undue concentration on today's issues.

The analysis in this *Review* confirms that the Irish economy has not achieved its potential over the last two years. While some of this underperformance has been due to inappropriate domestic policies, especially fiscal policy, the primary factor underlying the current and prospective low growth next year is the difficulties in the world, and especially in the Euro area economies. It was not within the powers of the Irish authorities to provide more than limited insulation from these economic tribulations outside our borders.

The factors that gave rise to the very rapid growth of the last decade are not yet exhausted, and the Irish economy still has the potential to grow at 5 per cent a year or more for another five years. As a result, after the current period of underperformance, there could be a corresponding period of catch-up, to return the economy to full employment. Once the unused potential is exhausted, possibly around the turn of the current decade, the Irish economy can then expect to revert to a more sedate US or European pace, growing at around 3 per cent a year.

5.1 Medium-Term Challenges

At the time of the last *Review* the authors were concerned about the serious imbalances within the US economy, as well as the short-term problems that most world economies were then experiencing. The fears expressed in that *Review* proved more than justified, and growth in Ireland's partner economies has been very limited now for two years. Also, the imbalances in the US economy pose continuing problems, especially through their effects on exchange rates.

Once the serious external economic problems are overcome, the world, and especially the Euro area economy, should return to its previous trend growth. While unexciting by recent Irish standards, it will provide a sufficiently favourable external environment for the Irish economy to return to the growth rates warranted by its underlying potential. In the meantime, policy in Ireland will need to guard against the current difficulties turning into serious long-term constraints on growth.

Looking further out to the end of the decade, the analysis in this *Review* indicates that the infrastructural constraints, apparent in the economy two years ago, have not gone away. Given that the economy still has the potential to grow quite rapidly to the end of the decade, the realisation of this potential will depend to a significant extent on tackling these constraints effectively. The basic strategy underlying the *National Development Plan* remains valid because the current economic difficulties should prove to be essentially temporary in nature.

The changing structure of the economy, discussed in Chapter 3, has implications for Irish development strategy. The strategy pursued over the last thirty years has been very successful in producing a very significant inflow of foreign direct investment into the manufacturing sector. While a continuing inflow of such investment will remain very important over the coming decade, the engine of growth is likely to switch more towards the market services sector, as in all the other most developed world economies. This has important implications for policy in a wide range of areas: industrial policy, training and education, provision of infrastructure, and spatial strategy.

Finally, while the demographic structure is currently very favourable, with a small proportion of old-age dependants and declining youth dependency, this will begin to reverse after 2020. Over the next twenty years the average age of the population, which is currently around 34.5, will rise to almost 38 years. After 2025 the problem of old-age dependency will become increasingly acute. Already attention has begun to be focused on how the costs of ageing will be financed. The analysis in this *Review* suggests that the appropriate method of financing this future burden needs further consideration as it involves complicated issues of intergenerational equity.

5.2 Euro Area Fiscal Policy

Relying on legislation, rather than electorates, to keep governments wise is not a recipe for long-term success. The Gramm-Rudman Act in the United States aimed to prevent budget deficits, yet it did not prevent governments running huge deficits in the 1980s. The Euro area's *Stability and Growth Pact* (SGP) is also looking increasingly likely to become a casualty of a recession mixed with political pressures. The requirement that fiscal policy be put on a sound footing for membership of monetary union, when tied to the credible threat of exclusion for non-compliance, was successful in the 1990s. However, today, without the presence of credible penalties or sound intellectual reasons for compliance, the SGP has lost its teeth. Under these circumstances it comes as no surprise that the President of the EU Commission was unhappy last year trying to enforce a set of rules that do not have a clear logic. It is damaging the Commission's credibility, without any prospective pay-off in terms of improved future economic performance.

More to the point, the focus on the SGP is distracting many EU governments from other more important issues concerning the appropriate stance of fiscal policy. By focusing public attention on whether governments are compliant or non-compliant, the SGP has tended to become the issue, rather than whether the broad stance of fiscal policy is appropriate. In Germany and some other key EU members economic debate is focusing on the problems posed by the SGP, rather than concentrating on the real economic problems of those economies. The uncertainty that this is creating in the countries affected is seriously affecting private sector sentiment and is contributing to the low expectations, and consequently low consumption and investment of the private sector in the Euro area.

While EMU was seen as having broadly favourable economic consequences by its founder members, the creation of the EMU changed the operating environment for all member economies by creating new channels through which the actions of individual members states could adversely affect the citizens of other members. It is this possibility of negative externalities for the union from fiscal policy in individual members (or a group of members) that required the addition of new rules for co-ordinating fiscal policy, leading to the agreement on the SGP.

The SGP as it stands is not firmly grounded in economic logic, making it an ineffective instrument for achieving the necessary co-ordination of fiscal

policy within the Euro area.¹ While this may not be the optimal time to change it radically, just when it is coming under political pressure due to unwise fiscal policies pursued in a number of member states, delay could be even more damaging.

In the medium term it seems sensible to seek a reform of the SGP within the existing treaties, even if this means that some unsatisfactory provisions of the SGP are left in place. The reforms should respect the principle of subsidiarity: the regulations should leave maximum powers to individual countries in the field of fiscal policy, subject to the need to ensure that unwise action by individual countries does not harm the interests of the EMU.

To prevent national governments becoming insolvent it is necessary to have some restriction on the level of debt relative to GDP. A sensible rule, suggested by Pisani-Ferry (2002) would specify that if the debt-GDP ratio for an individual country lay above a specified threshold (e.g. 60 per cent) then it would be necessary to have a borrowing rule to ensure that the country followed a sustainable path to bring it within that threshold. Below that threshold supervision by the Commission would not be necessary.

A modified version of the UK "Golden Rule" has been suggested by Blanchard and Giavazzi (2002) on borrowing by individual states. This would allow borrowing to fund net investment (net of depreciation) in public infrastructure so that in the very long run the public debt would be equal to the stock of public infrastructure. Unless there is a change in the Treaties, borrowing, as currently defined, would still have to be less than 3 per cent of GDP. However, if combined with a measure of fiscal stance based on the cyclically adjusted deficit, such a modified rule would deal well with the special problems of countries, such as Ireland, that have a large and pressing need to invest in infrastructure.

Co-ordination of fiscal policies to avoid inflationary pressure arising from a fiscal stimulus is probably less important than is commonly supposed. The occasions when action will be necessary to achieve such co-ordination will probably arise infrequently in the future. While the fiscal policies of a number of member states are likely to breach the requirements of the SGP this year, there is no suggestion that these policies are currently causing inflationary pressures within the EMU. On the contrary, the fiscal stance in the Euro area is probably contractionary. For the future, where inflationary pressures are present due to the combined fiscal stance of the EMU, it is probably wise to reserve the power to the Commission to require the member states pursuing the most stimulatory fiscal policy to mend their ways.

Bringing about a sensible change in the SGP will be difficult. Probably the best prospect lies for the Irish presidency. With Ireland in broad compliance with the SGP, proposals for reform from Ireland would be seen to be less self-serving than proposals from countries that are currently having difficulties with the pact. Nevertheless reform, along the lines proposed, would still be in Ireland's interests and as such might provoke unfavourable reaction. However, the same could probably be said for nearly all countries in the EU today, reflecting the underlying desirability of reform.

Whether or not the *Stability and Growth Pact* is to be reformed, it can be argued that by focusing undue attention on itself, it is distracting attention from consideration of the best economic approach to the difficulties of many Euro area economies. An extensive economic literature has developed considering fiscal adjustments around the world over the last thirty years. Alesina and Perotti (1995) after reviewing the available literature, including the evidence from Ireland in the 1980s, drew conclusions as to the best

¹ For a fuller discussion of the issues see: Fitz Gerald (2003).

approach to dealing with such problems. They concluded that when countries get into fiscal difficulties, urgent action, involving significant cuts in public expenditure, offers the best prospect of a return to growth. While tough action would undoubtedly deflate the relevant economy in the year it took place, the damage might be much less than would result from a fiscal war of attrition.² The Irish experience of the 1980s would tend to confirm this; so too would the dramatic turnaround in the Finnish economy in the early 1990s, following on an immediate and strong fiscal response to major shocks that hit that economy in 1989-1990.

A period of fiscal attrition leaves consumers and investors uncertain about the future, resulting in depressed consumption and investment levels. While a short sharp shock will undoubtedly depress demand even more in the year it takes place, it holds out the prospect that from that point onwards, things will continuously get better. Once consumers and investors respond, the public finances improve further and unemployment would begin to fall. Ireland experienced such a "virtuous circle" in the 1990s.

In the light of this literature it might be in the best interests of some key Euro area governments if they took urgent action to reduce their fiscal imbalances through cutting expenditure. The desirability of this course has nothing to do with the SGP, but stems rather from the depressing effect on private sector expectations of the continuing focus on fiscal problems and the continuing ineffectiveness of governments to deal with them. As in the Irish case in the 1980s, such a course of action could also mobilise a sense of urgency to deal with the wider problems affecting competitiveness in these economies. While the short-term cost, both economic and political, could be significant, it would probably hold out the best prospect for a rapid return to future growth. The effect of the debate on the SGP is to distract from the real issues for fiscal policy in individual countries and to promote the belief among consumers and investors that prospects are truly gloomy.

5.3 Domestic Fiscal Policy

Given the recent underperformance of the Irish economy relative to potential, it is not surprising that the public finances have moved into deficit. The problem with fiscal policy has been that it moved so rapidly from a large surplus to a deficit while the economy was still growing in 2000-2002, and that current expenditure was allowed to rise so rapidly in ways that were not provided for in successive budgets. This frittering away of the surplus was a serious wasted opportunity. In addition, the major fiscal stimulus provided over the period 2000 to 2002 greatly aggravated the inflationary pressures already present in the economy. This helped to raise labour costs to a level that now appears unsustainable, adversely affecting competitiveness. However, the public finances appear to be back in control on the expenditure side and the overall stance of fiscal policy now appears broadly appropriate to the current economic circumstances.

The continuing rise in house prices above a level that would be sustainable in the long run is a continuing cause for concern. While it seems very unlikely that the rise in prices will be punctured in the short term, there remains the danger that in the longer term a sudden downward adjustment in prices could destabilise the economy. Monetary policy, formulated by the ECB in the wider interests of the EMU is, if anything, aggravating this problem.

Under these circumstances, the role of fiscal policy in controlling domestic inflation becomes more important in the context of EMU. In addition to its potential effects through the labour market, fiscal policy can

² A succession of budgets has tried to deal with the ongoing public finance "crisis" in some of these countries.

also affect the allocation of resources within the economy by changing incentives. This enhanced role for fiscal policy within EMU was also recognised in the papers recently released by the UK Treasury on the UK's readiness for EMU.

Fiscal policy has generally not been used actively in Ireland to reduce demand for housing. However, fiscal policy could have a significant effect on the domestic housing market through changing household disposable income, and especially through changing the cost of capital for homeowners. Against the background of a deflationary shock from the recent change in exchange rates, if inflation in the housing market were to continue, it might be prudent to take fiscal action to halt the rise. When the pressures ease, such fiscal action could be unwound, providing support to a market where prices might have begun to fall.

Looking to the future, the analysis in this *Review* throws up a number of issues of concern for domestic fiscal policy. The first is the potential impact on the public finances of exchange rate changes, the scope for policy in the medium term when the economy returns to growth, and the third more long-term issue, dealt with later in this chapter, concerns the financing of the future rise in old-age dependency.

The simulation in Chapter 4 that examined the potential impact on the Euro area and on the Irish economy of the dollar slipping to \$1.40 per euro highlighted a serious exposure for the public finances. If such a scenario were to occur, the deterioration in the public finance situation would be very severe. The fall in output while the economy adjusted to the shock, combined with its deflationary effect, would impart a major downward adjustment to government revenue. While the deflator for expenditure would fall, its volume would remain fixed unless policy action were taken. The resulting deficit would be unsustainable.

The simulation also indicated that raising tax rates to deal with the deterioration would probably not deal with the problem. For a major shock of the kind considered, it would also be necessary to achieve a significant cut in the volume of public expenditure as well as a reduction in the rate of public sector wage inflation.

This scenario also highlighted the importance of achieving a rapid adjustment in the face of an exchange rate shock. If domestic prices and wages adjust very rapidly to the deflationary shock and the resulting loss of competitiveness, this would minimise the loss of output. In turn, this would minimise the effects on the public finances, obviating the need for drastic action in the form of cuts in expenditure.

The *Benchmark* forecast in Chapter 3 presents our best estimate of the likely medium-term prospects for the economy out to the end of the decade. While the public finance situation remains tight this year and next in the face of low growth, the situation is likely to be rather different once growth picks up again. If the economy returns to growth of 5 per cent a year or more, the growth in revenue would show a commensurate acceleration.

As discussed in Chapter 2, we have assumed that from 2005 to 2010 there would be some further limited growth in the volume of public investment from its current enhanced level. As it is beginning from a very high base, however, this growth would be much smaller than the growth that took place from 2000 to 2002. With dependency falling, the volume of transfers should also grow relatively slowly. The resulting easing in pressures would allow a substantial improvement in public services (through increased current expenditure on goods and services) while still gradually moving the government balance back into surplus by the end of the decade.

Provided the current relatively prudent fiscal policy is maintained, the *Benchmark* forecast holds out the prospect of achieving a significant improvement in public services in the second half of the decade, with only a

5.4 Restoring Competitiveness

limited increase in the tax burden and continued strong commitment to solving the problem of the infrastructural deficit.

The exchange rate simulation in Chapter 4, where there is relatively slow adjustment of domestic prices including wage rates, highlights the need for a speedy response by the economy to such shocks. The changes that have already occurred in the exchange rate have led to a significant deterioration in the competitive position of the economy. Anything that can be done to speed adjustment to the changed economic environment will minimise the costs in terms of lost output and employment.

In the case of prices, measures that enhance the competitive pressures across the range of goods and services sold in the economy could play an important role. In the case of the labour market, there is evidence that it is already relatively flexible, with wage rates rising rapidly in the face of labour market pressures between 1999 and 2002. The question is whether they will be equally flexible in the face of the deflationary shock that has already occurred. The Partnership process has proved especially valuable in the past in difficult times in helping all the social partners to understand the pressures facing the economy, and the difficult trade-offs facing individuals and companies. Hopefully it will play a similar constructive role over the next two years in bringing the economy through what is likely to be a temporary period of difficulty.

5.5 Infrastructure

The *Benchmark* forecast suggests that the economy has the potential to grow at roughly the same rate over the decade as was envisaged when the *National Development Plan* was drawn up in 1999/2000. Thus the pressing need for an improvement in the infrastructure of the economy has not changed, and the basic strategy underlying the *Plan* remains valid. Obviously the detailed provisions of the NDP are being reviewed as part of a mid-term evaluation process to assess how the changing economic environment affects priorities. In addition, the serious problem with inflation in construction costs over the first three years of the *Plan* need to be addressed.

Given that the economy's infrastructural needs have not changed, there is a concern that the problems of financing the investment could force a change in policy. If the *Benchmark* forecast is realised, the funding problems should ease towards the end of the Planning period. As discussed in Chapter 2, Ireland is already funding a major part of the very large programme of public investment directly out of taxation. This additional burden compared to that carried by countries such as Belgium, Denmark and the UK, amounts to around 3 per cent of GNP. The likely long-term return on investment has remained high, which would argue for leaving the investment profile broadly unchanged³ and, if necessary, funding it through some combination of additional taxation and some additional borrowing in the very short term.

5.6 Policy for a New Economy

As discussed in Chapter 3, the Irish economy will look very different in ten years time compared to today. While a very strong factor in the growth in the 1990s was the success of the high-technology manufacturing sector, it is likely to be significantly less important over the coming decade and beyond. The *Benchmark* forecast suggests that in the second half of the decade, allowing for profit repatriations, the sector would contribute about a quarter

³ However, the forces driving inflation in the construction sector also affect the optimal profile for investment. An alternative profile that could lead to lower prices could see the infrastructure being delivered at lower cost in the long term.

of the growth in the economy compared to around a third in the 1990s. This is reflected in the fact that currently 17 per cent of employment is in manufacturing while this could fall to 14 per cent in ten year's time. As shown in the *Benchmark* forecast, the gradual reduction in the contribution of manufacturing to growth will also be reflected in a gradual reduction in the wedge between the growth rates of GDP and GNP. Profit repatriations will play a decreasing role, in line with a decreasing contribution from high-technology manufacturing.

This change represents a maturing in the economy. The supply factors that allowed the economy to absorb so much FDI in the 1990s suggest a much more limited capacity for growth today. In addition, the changing nature of employment, with rising labour costs and rising skill levels mean that the sectors that will do well in the economy in the next decade may not be the same as for the last decade. The move up the "value-added chain" may see a movement away from the factory floor in manufacturing to the laboratory or the office in the services sector.

This shift to market services from manufacturing is a characteristic of most of the richest countries in the world. Skilled labour can earn more from the type of work characteristic of market services than from production-line operations. Ireland was already unusual in moving up so rapidly in output per head relative to the other richest countries in the world, fuelled by the contribution from manufacturing. The route followed by other economies at a similar stage of development has generally owed more to growth in the services sector.

However, even if the growth in manufacturing does gradually slow, it will, nonetheless, still be very important to the success of the economy out to 2010. To maintain its level of output will require a continuing inflow of new investment out to the end of the decade. In fact, in the *Benchmark* forecast, to maintain employment in this sector together with very high productivity will actually involve continuing rapid growth in output.

This changing role for manufacturing and FDI will require a gradual change in industrial policy. The focus on attracting manufacturing needs to evolve into a process of promoting skills and processes, such as research and development, that brings together skilled labour with profitable employment. This has major implications for policy in a wide range of fields: industrial policy; educational policy; policy on training; policy on research and development; policy on the provision of infrastructure. The kind of environment that will favour growth in services such as communications, business services, computer services and financial services is rather different than that for manufacturing. Such a change is already gradually taking place as the state agencies involved in industrial policy redefine their focus. It will also involve a gradual change in priorities across a range of other policy areas, including taxation.

The move away from dependence on large volumes of FDI will have particular implications for regional policy. It will no longer be possible to achieve regional balance through influencing the location of a diminishing flow of projects involving greenfield investment in manufacturing. Regional policy will have to focus much more on making key gateways attractive to skilled labour, and to the employers that provide a wide range of skill-intensive services.

Finally, competitiveness will need to be redefined to cover a much wider range of issues than in the past. While perhaps unexciting, issues concerning competition policy will grow in importance. Also the very complex task of achieving greater efficiency in delivery of services like health, energy, and education will be crucial, even if difficult to achieve.

5.7 Preparing for Old Age

The problem of the long-term rise in old-age dependency after 2025 has attracted increasing attention in recent years. As part of the process of preparing for the rising burden in the second quarter of this century, the government has established the National Pensions Reserve Fund. The current plan is to save 1 per cent a year of GNP out of the public finances and put it into the fund. The fund also includes privatisation receipts. The fund is being invested so that the proceeds will part-fund the state's pension liabilities after 2030.

At a time when the economy is enjoying what amounts to a "demographic dividend" it is certainly appropriate that prudent provision be made for adverse changes in demographic structure in future decades. However, there is a wider issue of intergenerational equity that is only beginning to be considered.

Today's generation are paying the pensions of their parents' generation through taxation and social insurance contributions. This burden is very light because the previous generation was decimated by emigration, leaving it very much smaller than today's cohort of working adults. Today's generation is now contributing towards its own pensions through the contribution from the Exchequer to the national pension fund. However, more importantly, today's generation of taxpayers are also funding the exceptional programme of investment in infrastructure out of taxation, representing a very high rate of saving by the public sector. Finally, today's generation are also paying the disruption costs inherent in putting in place the essential infrastructure.

The provision to save out of current income to part-fund the pensions of today's working generation seemed, at first sight, to be appropriate. To the extent that the generation that is working in twenty-five years time will be smaller than the current generation, the burden of a pay-as-you-go pension scheme will rise considerably. This would seem to be unfair to today's generation of children. By part-funding this future liability the burden of old age may be shared more equitably between the generations.

However, what these calculations have to date failed to take into account is that the current generation is also saving at such a high rate in the form of the surplus on current account in the public finances. The exceptionally heavy burden of infrastructure investment today is being funded almost entirely from taxation. The result is that, instead of the public sector saving 3 per cent of GNP, as is the case in mature economies such as Belgium, Denmark and the UK, the public sector in Ireland is saving around 6 per cent of GNP. This saving is going to finance a much higher public investment programme that is essential to build the infrastructure that is already in place in much of the rest of the EU.

By funding major investment in infrastructure out of taxation, the state over the last decade has been building up physical assets without offsetting financial liabilities. The benefits from the infrastructure will continue to flow long after the current generation have retired. Thus future generations will also be significant beneficiaries from these assets.

When the infrastructural programme is largely completed, probably some time in the next decade, the state will then have a large asset that will continue to provide services for future generations. In addition, most of the 5 per cent of GDP that is currently spent by the government on investment will then be available for other purposes. For example, it could be switched from physical investment to investment in financial assets to fund future pension liabilities.

If, as is assumed in the *Benchmark* forecast, Ireland's major programme of infrastructural investment were complete by 2015, and if the savings of 3 per cent a year by the public sector funding that investment were then redirected into a pension fund, the value of the fund by 2030 would probably be much greater than will be the value of the current pension fund derived from saving 1 per cent of GNP a year over the full thirty years. On

this basis it must be questioned whether the current approach to funding future pension liabilities is consistent with intergenerational equity.

This issue of intergenerational equity raises the question as to whether the *Stability and Growth Pact* is itself appropriate for all members of the Euro area. Its appropriateness will be questioned in a more acute form with enlargement, as many of the new EU members have very serious infrastructural deficits. Where very large programmes of infrastructural investment are undertaken by the State, intergenerational equity may suggest that a share of this investment be funded by borrowing.

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APPENDIX 1: THE ESRI MEDIUM-TERM ECONOMIC MODEL¹

A1.1 Introduction

Unbeknownst to most people they carry round with them in their head a model of the economy. Most non-economists have a clear understanding of some key economic relationships: higher income leads to higher consumption; falling output can jeopardize jobs. What a formal macro-economic model does is to make explicit in mathematical language a range of assumptions about how key relationships work – an “informal model”. These key relationships, when formulated as equations, can then be tested statistically. When put together, the different key economic relationships then form a model of how the economy works.

Such macro-economic models provide an important tool in expanding our understanding of how the economy works. The key relationships in the model can interact in unexpected ways, helping us understand the complexity that is a real economy. They allow us to test our prejudices and confirm or often reject them. They also help in quantifying how important different factors may be in determining the course of the macro-economy. Finally, they provide a framework for testing new ideas, ensuring that the wide range of factors affecting economic outcomes is handled within a consistent framework.

Most of the economic forecasting reported regularly in the media is of the short-term variety. Attention is focused on the demand-side of the economy, and on the incomes generated by expenditures on consumption, investment, trade, etc. Production capacity is regarded as fixed, the short-term issue being the rate of capacity utilization. Attention to public policy tends to focus on the immediately preceding and/or anticipated budget. This type of forecasting depends on a few key relationships and the “informal model” or simple mathematical models are most suitable for this type of work.

When one moves further into the future, the situation becomes much more complicated. Investment activities can change the productive capacity of the economy; some sectors may decline, others may grow; policy changes which have only minor short-term implications can have major long-term consequences. In short, everything becomes mutually interdependent, and the ultimate consequences of policy or other shocks become difficult to disentangle using judgement or *ad hoc* methods. Under these circumstances a formal macro-economic model is essential to ensure coherence and internal consistency in forecasts. However, the forecasts themselves are the result of economists working with models, not independent products of the models themselves. The use of a formal model is absolutely essential when it comes

¹ An earlier version of this chapter appeared as an article by J. Bradley and J. Fitz Gerald (1991).

to simulating the effects of alternative policies or shocks that may affect the economy in the future.

Ever since data on the economy became widely available (an important by-product of the development of Keynesian macroeconomics in the 1930s and 1940s), economists have attempted to test their theories by constructing formal quantitative models (i.e., models that tell you the magnitude as well as the direction of any given result). The early models displayed their Keynesian origins in their focus on the demand side of the economy with little attention paid to the supply side.

However, as the world changed in ways that were not anticipated by Keynesian economists, ideas and theories of how the economy functioned also changed, albeit with a delay. For example, during the 1970s the world economy was hit by a series of massive supply-side shocks (energy shortages, oil and other commodity price rises), which opened up serious weaknesses in the demand-side underpinnings of most operational economic models then being used. For a time modelling went out of fashion, since it provided a poor guideline on how to grapple with a supply-side recession (referred to popularly as *stagflation*; low growth combined with high inflation).

Underpinning all aspects of the ESRI medium-term model are the insights derived from neo-classical economics – prices matter. Firms and households both respond to changes in relative prices through changing their consumption patterns (households) or changing their level of output and demand for inputs (firms). Higher relative prices mean less consumption of a good or service by households. Higher prices for inputs (e.g. labour, capital, energy) relative to the prices firms can charge also adversely affects firms' output. In turn, changes in the relative cost of inputs may change the optimal mix of inputs used by firms. Changes in the cost of production in one region or country can also affect the location of production.

A central feature of this approach is the estimation in a consistent manner of a model of how firms in different sectors are likely to respond to changes in the prices of their inputs and the price of their output. In the 1970s the big changes in relative prices caused by the oil price shocks had substantial implications for the profitability of firms and their long-term output levels. Over the following decade this drove extensive research by economists into the economics of production.

The late 1970s and the 1980s saw the emergence of conflicting viewpoints and theories of how economies work. Three main schools emerged:

- (a) *The New Classical School*: These economists hold that, contrary to the old Keynesian assumptions, markets do clear very quickly (i.e. prices and wages adjust to ensure that supply equals demand in each market) and that people form their expectations rationally, i.e., using all available information. They provide little or no role for public policy in boosting output or reducing unemployment, even in the short term.
- (b) *The Monetarist School*: These economists believe that while the economy has a natural tendency to move towards equilibrium, this can take a long time since prices and wages only adjust very slowly. They believe that only inflation results from government boosts to demand, and that no attempt should be made to “fine-tune” the economy using discretionary policy actions. Rather, policy makers ought to adhere to stable and robust policy rules that are announced well in advance.
- (c) *The New Keynesian School*: This is the lineal descendant of the original Keynesian economics of price rigidity and non-clearing markets, updated with a more sophisticated modelling of expectations, wage-price rigidity and supply-side responses. It holds that although markets may clear in the very long run, there is at least some role for public counter-cyclical policy.

It is from the latter New Keynesian school that the ESRI medium-term model draws its inspiration, building on the earlier Keynesian model developed in the Central Bank and the Department of Finance in the 1970s, (see Bradley *et al.*, 1978 and Fitz Gerald and Keegan, 1981) and incorporating much new research on the production side of the economy. This new model of the Irish economy was originally part of an EU-wide system of macroeconomic models – *HERMES* – that were specifically designed to deal with supply-side issues. The *HERMES* model structure was designed to answer problems arising from the oil price shocks of the 1970s, problems that earlier models could not hope to tackle. The Irish version of *HERMES* was modified to deal with the special circumstances of the Irish economy. It was described in detail in Bradley *et al.*, 1993. This version of the *HERMES* model was used in the *Medium-Term Reviews*, covering the periods 1987-92 and 1989-94.

In order to model the effects of the EU Structural Funds and the effects of the completion of the Single Market the model was developed further in 1990-91. The *HERMES* model took on its present form as a result of this research, with significant further elaboration of the supply side to deal with eleven sectors of the economy and the complexity of the processes driving these eleven sectors.

This chapter aims to provide a non-technical introduction to the present revised and extended version of the ESRI medium-term model. In Section A1.2 we give an overview of the key mechanisms in the model, and follow in sections A1.3 – A1.7 with more detailed descriptions of the main subsectors: manufacturing, services, and the public sector, and of the labour supply and the expenditure (or absorption) sides of the model. Section A1.8 provides a description of the energy sub-model, which is embedded within the medium-term model. Throughout the 1990s there was a monetary – exchange rates section of the model, but the advent of monetary union means this no longer plays a role. We conclude with an impression of how we think the model provides a guide to the future evolution of the economy and how it helps present starkly some central policy dilemmas.

A1.2 An Overview of the Model

Economists have three different ways of looking at the behaviour of the economy. They examine what is produced (for example, output from the industrial sector); what is spent (e.g., private consumption, investment, etc.); and the incomes earned by the factors of production (e.g., the industrial wage bill, profits, etc.).

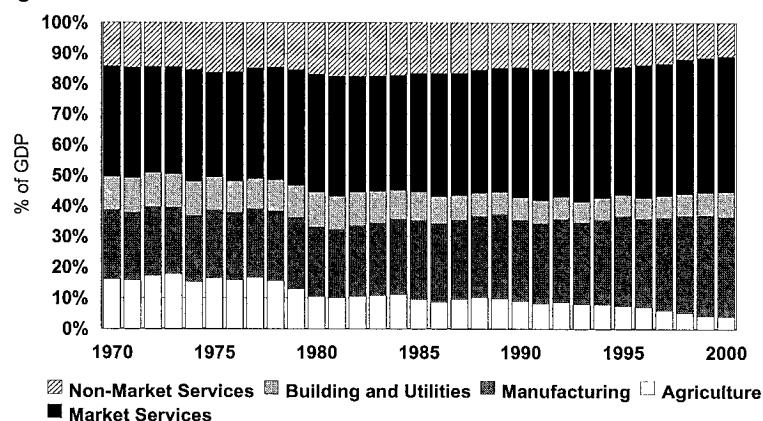
Each approach (output, expenditure and income), should lead to an identical measure of gross domestic product (GDP), being the conventional aggregate measure of activity in the entire economy. Short-term forecasts (such as those published regularly in the ESRI's *Quarterly Economic Commentary*) focus on expenditure-income relations. The ESRI *Medium-Term Review* adopts a longer time horizon of five or more years. With this medium-term orientation in mind, the ESRI economic model of the Irish economy focuses initially on the output (or production) relationships, and examines the downstream expenditure and income consequences. The key mechanisms within the model are shown in the box.

- (1) The exposed sector is driven by world demand, elements of domestic demand, and cost competitiveness.
- (2) The sheltered market sector (services and building) is driven by domestic demand.
- (3) The public sector is policy-driven, with treatment of borrowing and debt accumulation.
- (4) Wages are determined in a bargaining model, and influenced by the factors that affect the supply and demand for labour – e.g. prices, taxes, and unemployment.
- (5) The labour market is open and influenced by conditions in the UK labour market.

An initial distinction can be made between those sectors of the economy that are exposed to the competitive world trading environment (the internationally traded sector – henceforth referred to more simply as the *traded* sector) and those sectors that are sheltered from direct exposure to international competitive trade (referred to more simply as the *non-traded* sector). Broadly speaking, the traded sectors consist of manufacturing, most of agriculture, and an element of market services (e.g., financial services, software, tourism, etc). The non-traded sectors comprise the rest (i.e., utilities, building services, most of market services and all public or non-market services). The relative sizes of these sectors, in terms of added value, are shown in Figure A1.1.

Given the extreme openness of the Irish economy (the total of imports and exports is expected to be 230 per cent of GNP in 2003), we give primacy to the traded sector as the main engine of sustainable growth in the Irish economy. In the case of manufacturing, there are two key determinants of growth: the state of world demand² and the level of Irish cost competitiveness relative to its trading partners.³ Hence, the two external forces driving the Irish manufacturing sector's output are the rate of world growth (which is more-or-less-transmitted one-for-one to Ireland) and the level of world cost competitiveness, which Ireland must at least match in order to grow as fast as the world economy. Any gain in competitiveness results in an increase in market share and growth faster than the world economy. Any loss of competitiveness reverses this process.

Figure A1.1: Sectoral Share of Gross Domestic Product



² We use the term "world" somewhat loosely in this Appendix, where a more correct usage would consist of a trade-weighted measure of activity in a range of countries in Ireland's trading sphere.

³ In some subsectors, we shall see that the state of domestic demand also plays a role, but one which is subsidiary to world demand.

Obviously the decisions on the optimal level of output in Ireland are implemented through investment decisions by individual firms – either investing to build new plant or decisions to close existing plant. In the case of the high technology sector the bulk of the new investment comes from foreign firms and takes the form of foreign direct investment (FDI).⁴ Thus the level of foreign direct investment into Ireland is seen as ultimately a function of the world demand for the relevant product and the competitiveness of the Irish economy as a location from which to supply that world market.

Given the level of output in manufacturing, the manner in which it is produced is then determined in the model. Firstly, arising as a consequence of its exposure to world competitive forces, Irish manufacturing output prices are determined primarily in the world market place and cannot easily be altered to respond to Irish cost conditions. In other words, Irish firms trading internationally tend to be “price takers”. The appropriate mix of labour, capital and material inputs depends on their relative prices. For example, if wage inflation outstrips rises in the cost of capital, there is some scope for substituting capital for labour in the medium-term production process. In addition to relative price terms, there is also a systematic trend in the use of some factor inputs due to “technical progress”. For example, in manufacturing there is a tendency towards “labour saving technical progress”, i.e., less labour is needed each year to produce the same level of real output. The determinants of technical progress are a complex mixture of catch-up factors, human capital, physical infrastructure, business efficiency, and policies targeted at innovative firms.

Developing on the above outline, the ESRI model contains equations describing the determination of manufacturing output and factor inputs, in terms of external forces (world output and world competitiveness) and domestic forces (mainly Irish wage costs, with some role for domestic demand). Since output prices and the prices of material inputs and capital are largely determined externally, attention is focused on the determination of wage rates.

Wage rates are modelled as the outcome of bargaining between trades unions and employers, with the frequent intervention of the government through the tax and welfare systems. The factors driving employers in bargaining include the price they can get for their product or service, their competitiveness in their key markets, the taxes they pay, and the productivity of the individual firm. The price that employers obtain for their product clearly influences the price at which they can profitably purchase factor inputs, like labour. The price they are prepared to pay for labour in Ireland is also affected by the price they would have to pay for labour elsewhere.

Employees are assumed to bargain in terms of their real after tax wage. They bargain with employers and, when the rate of pay is agreed, employers are then assumed to choose their optimal employment level. Their take home pay is clearly affected by consumer prices and the taxes that they pay on their earnings. As discussed later, migration is itself directly affected by labour market conditions in Ireland relative to other countries. This affects the wage bargaining process, directly through changing domestic labour supply, and indirectly through affecting the expectations of Irish employees.

In bargaining, employees are also concerned about what they could get by working for other employers, or what they would receive if they lost their job altogether. Thus the unemployment rate (and possibly rates of benefit) can also play a significant role in determining employees’ expectations and their bargaining behaviour. Economists call the effect of unemployment on wages the “Phillips curve”; it basically states that the tighter the labour

⁴ For the traditional manufacturing sector and the food processing sector a higher proportion of the total investment is accounted for by domestic firms.

market, the higher will be wage settlements, and vice versa. However, in the case of Ireland, because of the integration of the labour market into the broader EU labour market through migration, the unemployment rate may not be a good indicator of the labour market circumstances that individual workers face. They may not remain unemployed in Ireland but may prefer to emigrate. The bargaining power of individual workers will also be affected by the degree of unionisation in the Irish market. Finally, the productivity effect comes as workers try to participate in the benefits of real growth – they will attempt to bargain to maintain their share of value added.

In such models, wages are determined by a range of explanatory variables including: output prices, the “wedge” driven by taxes between the wage denominated in the employer’s (output) price and the take home consumption wage enjoyed by workers; the rate of unemployment; and labour productivity; the returns to working outside Ireland, the cost of employing labour outside Ireland, and unionisation.

Turning now to the non-traded sector, consider the behaviour of the large market services sector. Leaving aside tourism and other traded services – a growing fraction of the total – output in market services is driven mainly by domestic demand. So, for example, private consumption will contain a certain element of services sector output (transport and communication, recreation, professional services, etc.), and any change in consumption will impact on the demand for services sector output accordingly.

Services sector output is assumed to be produced by firms in a way that minimizes the costs of production. Hence the mix of capital and labour inputs is sensitive to the relative prices of the inputs, as in manufacturing. However, given its insulation from world competition, prices in the services sector tend to be determined as a mark-up on input costs. Hence, if these services are required as inputs into manufacturing, a loss in industrial competitiveness can result if the price of Irish services rise excessively.

It is the balance between the traded and the non-traded sectors that makes the Irish economy (and, consequently its modelling) interesting and more complex than the highly stylised “small open economy” model that is developed in economics’ textbooks. Indeed, the export-oriented development of the Irish manufacturing sector through multinational foreign direct investment makes the Irish economy quite unique among the EU peripheral members.

A1.3 The Manufacturing Sector

The 1980s version of the ESRI model contained an aggregate industrial sector, comprising manufacturing, utilities and building. Experience with that model pointed to the need to disaggregate the sector into five subsectors: a separate treatment of utilities and of building, and a three-way breakdown of manufacturing.

Examination of manufacturing illustrated that there were three quite separate components in terms of how the subsectors functioned. First, a high-technology sector could be identified, which was largely foreign owned, almost 100 per cent export oriented, was capital and R&D intensive, and which had a high propensity to repatriate its profits out of Ireland. Second, the food processing sector had a unique dependence on domestic agricultural production (mainly of cattle and milk), and fell under the influence of the EC Common Agriculture Policy (CAP), with its price and quota rules. Finally, the traditional manufacturing sector covering a diverse area of drink, textiles, clothing, wood, paper, publishing, etc., was mainly in domestic ownership, tended to be more labour intensive than the other sectors, and was less export oriented (but still trades over 60 per cent of its output).

The three subsectors of manufacturing differ in terms of their driving forces. The high-technology sector is driven by world demand (with no

domestic demand influence) and international competitiveness. Output in the food processing sector is constrained by Irish agricultural production within the CAP. In the third – traditional – sector, both world and domestic demand play a role, together with international competitiveness.

The factor inputs were modelled in a way that recognised that the capital stock could only be varied slowly over time, whereas the other inputs (labour, energy and other materials) could be varied more rapidly in response to changes in relative prices. A full technical description of the findings concerning the underlying technologies of the three sectors is available, see Bradley, Fitz Gerald and Kearney (1993).

Briefly, it was found that the possibilities of substituting the different factor inputs (labour, capital, materials) were more restricted than might apply in a larger, less open, economy such as the USA, Germany or the UK. In the case of the high-technology sector, the low possibilities of factor substitution within Ireland are in stark contrast to the greater possibilities of relocating the entire production process out of Ireland, if international competitiveness is lost.

A1.4 The Market Services Sector

The first version of the ESRI model contained an aggregate market services sector based on the very limited data available at the time from the CSO. The very heterogeneous nature of the sector made the construction of an aggregate model very difficult to justify, and the *ad hoc* model lacked any firm foundation in economic theory. The advent of the Single European Market in 1992 made it imperative to understand the behaviour of the market services sector, since this sector was likely to bear some of the burdens of rationalisation within the single European market (e.g., rationalisation of distribution and opening up of financial markets).

In the present version of the ESRI model market services are split three-ways: distribution (wholesale and retail), transport and communications, and other (professional, financial, personal) services. In each case, the scale of output is determined in the model by a suitably weighted measure of final demand (e.g., the weights determining, say, distribution output reflect the distribution content of consumption, etc.).

The special nature of the transport and communications sector is recognised in the model, where the capital stock varies very slowly over time and was subject to public sector influences over much of the last thirty years (e.g., the massive investment in telecommunications during the first half of the 1980s). However, in the other two sectors the mix of capital and labour is sensitive to factor prices. In addition, “technical progress” was found to be labour using in other services (i.e., over time output becomes more labour intensive in other services). A full technical description of the market services sector is available in Bradley, Fitz Gerald and Kearney (1991).

A1.5 The Supply of Labour

The demand for labour is determined in the production block of the model, as a derived demand, and is influenced by the scale of output, prices (including the wage rate), and trend terms capturing technical progress. The supply of labour consists of a series of relationships determining population of working age, participation in full-time education, participation in the labour force, and migration.

Underlying the medium-term model specification is a much more detailed demographic model developed by the ESRI. This model is used to estimate the likely natural increase in the underlying population of working age. Because of the different pattern of labour market participation for males and females, the supplies of female and male labour are modelled separately. The model is driven by the educational attainment of the population. The final educational of each cohort is assumed to be determined at age 20. Then the

numbers with each of the four levels of education in each cohort are determined by ageing, by deaths and by migration. In turn, female participation rates are determined by the educational attainment of the cohort. This labour force participation ratio is determined by such factors as the probability of obtaining work; the returns to employment; and slowly changing sociological factors.

The final chain in the determination of labour supply is migration. Net outwards migration is determined by the relative attractiveness of alternative labour markets, proxied by the United Kingdom. For example, if the returns from working in Ireland improve because the Irish rate of unemployment falls relative to the UK there will be a tendency for inflows of migrants to start up or accelerate. In addition, if the returns to working in Ireland improve relative to the UK, measured in terms of relative real after tax earnings, a further tendency to immigration will be created.

The migration mechanism is one of the more crucial relationships in the model but the changing character of migration – the growing numbers of non-Irish citizens in the migration flows – means that past behaviour may be a less reliable guide to future population movements than it was over the last decade. In addition, issues, such as the cost of housing and relative congestion levels, may also affect choices on migration, even though they are not currently captured in the model.

To ignore the possibility of migration (i.e., to assume that the Irish labour market is “closed”) would be to commit a serious error, leading to an overestimate of the forces operating between higher unemployment and wages in the Phillips curve (see above), driving down wages and pricing labour back into jobs. However, too high a model sensitivity of migration outflows to any deterioration in the Irish labour market leads to a serious underestimate of the equilibrating powers of higher unemployment on wages. On balance, we feel that the long-run migration relation is adequately captured in the model, but the timing of short-run responses may not be handled satisfactorily by our approach. However, as the increasing integration of the Irish and the broader EU labour markets continues, there may be a change in the sensitivity of migration movements to labour market conditions over the coming decade.

A1.6 The Public Sector

Although we could attempt to explain public sector behaviour in terms of the implicit or explicit objectives that a society may set itself, most conventional economy-wide models take the key decisions of the public sector as determined by forces not explained within the model. So, for example, the numbers employed in the public sector, tax rates and rates of income support are taken as given. Of course, one may manipulate such policy instruments in order to achieve different outturns, but the policy settings (public employment, tax rates, etc.), are not on “auto-pilot”, and can be changed arbitrarily by the policy maker, within the bounds of political and financial feasibility.

The output measure of public sector activity is essentially determined by public employment inputs, and appears in the model on the expenditure side of the national accounts as public consumption. Financing public consumption represents ultimately a burden on the rest of the economy, a burden that can only be delayed if resort is made to debt rather than tax financing.

A wider measure of the size of the public sector in the economy consists of total public expenditure, obtained by adding public consumption, subsidies, current and capital transfers (such as unemployment benefits and IDA grants to industry), national debt interest payments and public investment expenditures (such as housing, roads, etc.). These additional expenditure items are also included in the ESRI model as the product of

some notional "rate" applied to a notional "base" (e.g., expenditure on unemployment income support transfers is determined as the product of an average rate of income support – a policy instrument – by the numbers unemployed and entitled to benefit (determined elsewhere in the model). The main tax revenues are similarly determined as the product of an average tax "rate" by a notional tax "base" (e.g., VAT receipts are determined as the product of an average VAT rate – a policy instrument – by the VAT base, being essentially the value of consumption expenditures).

The exchequer surplus is the difference between tax and other revenue and current expenditure. While theoretically any level of public expenditure could be financed by raising taxes and keeping the exchequer surplus/borrowing requirement (EBR) roughly in balance, in fact resort was made both to tax financing and to borrowing during the 1970s and 1980s. During the 1980s, financing the burgeoning EBR required the state to borrow both domestically and abroad, and to accumulate a large national debt. Domestic borrowing is set in the model as a proportion of domestic savings, and the residual deficit is financed by foreign borrowing. A useful measure of the debt-servicing capacity of a nation is the accumulated national debt as a proportion of GNP (the "debt/GNP" ratio), a variable also determined within the model.

Finally, there are two options included in the public sector that facilitate the use of the model to explore the possible effects of changes in public policy and different scenarios involving variations in the underlying macro-economic assumptions.

The rates of taxation and government expenditure are suitably indexed so that changes in the assumptions affecting the rate of inflation can directly affect government expenditure and revenue.

There is an option to impose an unchanging government borrowing requirement in the face of the different scenarios. This option is similar to one used in the IMF *MULTIMOD* world model, where it is also used to explore alternative macro-economic scenarios. This option is implemented by making the rate of direct taxation change to ensure that the borrowing requirement remains at a preordained level, in spite of the changing macroeconomic environment.⁵

A gap in the model structure is the absence of any mechanism to prevent the balance of payments deficit or surplus growing monotonically in the face of shocks. Ideally there should be a wealth effect, which would ensure long-run equilibrium. For example, if the model showed an ever-increasing surplus, the build up of foreign assets, which this would represent, should ultimately affect domestic consumption through its effect on wealth. In practice, this issue must be dealt with directly by users of the model outside of the model structure.

A1.7 National Expenditure

The expenditure side of the national accounts consists of private and public consumption and investment, stock changes, exports and imports. Certain key elements of expenditure in the ESRI model should be emphasised.

The quest for a stable and robust model of private consumption behaviour has taxed, and continues to tax, the brains of economic modellers both in Ireland and abroad. Over the past decade our approach has been to use the very simplest model where consumers are assumed to be liquidity constrained. This implies that consumption is determined by current personal

⁵ Alternatively, one of the components of government expenditure, such as public employment, can be assumed to vary to ensure that the borrowing requirement remains unchanged compared to the predetermined level.

disposable income, excluding any wealth effects. However, the current version of the model also includes a housing wealth effect in the consumption function, which proved significant when the data for the 1990s were included in estimation. This implies that when real housing wealth rises, for example because real house prices rise, there is a positive effect on consumption. International evidence also supports the existence of a “wealth effect”, see for example Case, Quigley and Schiller (2001).

Private investment is determined on the supply side of the model, described above, as a derived factor demand into the production process.⁶ So, investment is determined initially by sector, and the aggregate sectoral investment is split between its two main components: machinery and equipment, and building and construction. The public elements of consumption and investment are used as policy instruments in the model. The exception is investment in housing which uses a model derived from work by Murphy and Brereton, 2001. In the model demographic factors, income, and the real cost of housing (including interest rates) all affect housing demand. Housing supply is affected by the profitability of house building, proxied by the price of houses relative to the cost of producing them. An overview of the housing section of the ESRI macro-model is given in Duffy (2002).

Industrial exports are determined in a supply function in terms of sectoral manufacturing output, where the marginal propensities to export the output of each sector are estimated, and corrected by a time-trend, permitting the export share of output to rise over time. Because of the importance of foreign direct investment in Ireland, we model separately profit repatriations by foreign multinationals. The level of repatriations by these firms is a function of their profitability operating in the Irish economy.

Finally, there is no conventional demand for imports equation in our model. Rather, we determine all the separate sectoral components of output, and all the elements of final demand. Imports are determined as a “residual”, i.e., as the difference between output and final demand.

If Ireland faced a binding balance of payments constraint (like many third world countries), the ability to import would be constrained by the ability to finance the balance of payments deficit. In practice our approach simply imposes consistency between domestic supply (determined in the production block) and domestic demand (determined in the absorption block).

A1.8 The Energy Model

The energy sub-model is used to produce consistent forecasts of energy demand and of greenhouse gas emissions from energy. The modelling framework makes it possible to simulate the effects of alternative policies on reducing greenhouse gas emissions, see Bergin, Fitz Gerald and Kearney, 2002.

The energy model is built up as four separate, though interrelated, blocks.⁷ The model examines the demand for six types of primary energy: coal, oil, peat, gas, electricity and renewables by six sectors of the economy: industry, households, services (commercial and public), agriculture, transport and energy. The demand for energy in the various sectors is modelled in the first block of the model. In each sector, electricity demand is modelled separately from the “rest of energy” and then the “rest of energy” category is broken down between the different fuels. The electricity demand from all sectors is then aggregated to give total electricity demand.

⁶ Private housing investment is determined separately as a function of real disposable income, and the real cost of borrowing.

⁷ A complete description of the model is available in ESRI Working Paper 146.

Given the demand for energy, the second block then covers the electricity generation sector, based on a series of exogenous engineering relationships. A separate electricity model examines how these engineering relationships determine the optimal fuel mix in the sector. The results of this electricity model are used as an input into the wider energy model.

The third block of the energy model generates the carbon dioxide emissions associated with the levels of energy consumption. Since each fuel will release a different amount of CO₂ when burned, the aggregate emissions from energy are obtained by multiplying the estimate of consumption of each fuel by an appropriate emissions factor.

Finally the fourth block of the energy model develops a series of relationships that provide a direct link between the energy model and the medium-term model. Price determination for different fuels is included within this block. The price determination takes account of the possible impact of a carbon tax (or of tradable emissions permits). Given the mix of fuels used in each sector, and allowing for the distribution margin, the price of energy used by each sector is derived.

With the introduction of the new energy model the specification of the utilities sector, which is the domestic producer of energy, has been changed. It is through the equations in this sector that the engineering data on the consumption and production of energy measured in tonnes of oil equivalent (TOEs) from the energy model are converted into economic variables determining output, inputs and prices in the utilities sector. Furthermore in the determination of household consumption, the consumption of energy has been separated from non-energy consumption, and a personal consumption deflator for energy is derived.

A1.9 The Model as a Guide to the Future

Economic models are used in two different but related situations: forecasting and policy analysis. If one requires simply to forecast aggregate Irish GNP forward a year or two, a simple approach based on extrapolating recent past GNP trends, adjusted by a study of likely future world trends, and applied with a dash of common sense will probably out-guess any large structural economic model! However, if a series of detailed sectoral forecasts, based on a range of different world scenarios and domestic policy stances, is required, the simple isolated time-series approach becomes less relevant.

In such a situation, a large-scale structural model has its own set of problems. For example, the so-called "Lucas critique" (after the Nobel prize-winning US economist of the New Classical school, Robert Lucas) holds that model-based policy analysis is invalid since the model's structural parameters (the numbers obtained from statistical analysis of past data) cannot be assumed to remain unchanged in the face of policy regime shifts. However, it is generally accepted that the force of the Lucas critique is greatest in the case of "reduced form" models, i.e., small-scale models whose equations represent a mixture of behavioural, policy reaction and *ad hoc* elements. Nevertheless, even for structural models, care must be taken to ensure that one does not stray into configurations of the economy which are very different to those which characterised the years used for model calibration.

Another aspect of modelling concerns the formation of expectations. Most conventional models (including the ESRI model) use adaptive or extrapolative expectations mechanisms, which basically say that future performance of a particular variable is affected only by its past. A more recent development uses "rational" expectations mechanisms, which assume that people form their view of the future by taking account of all available information, including available economic model forecasts. This approach is particularly important when modelling the behaviour of interest rates and

exchange rates. However, with membership of monetary union, this section of the model is now replaced by the NiGEM world model.⁸ The NiGEM model builds in such forward-looking behavior. In other areas it is possible that “rational expectations” could play a significant role (for example in the housing market) and the incorporation of such forward-looking behaviour into the model is on the future research agenda for the ESRI.

The model can be used to develop medium-term forecasts, conditional on judgemental assumptions concerning the world economy and domestic policy. It provides an essential accounting and economic framework within which to formulate and evaluate forecasts. Over the last decade the most frequent application of the model has been to carry out a form of policy and scenario analysis. For example, the model has been used to examine the likely implications for Ireland of EMU, of a minimum wage, of benchmarking, the effects of investment funded by the EU, and to help develop the priorities for future public investment. In addition, it has been used extensively to examine scenarios involving alternative assumptions about the external environment facing the economy. Examples of this latter kind of analysis are included in Chapter 4 of this *Review*. Ideally, such scenarios should not differ massively from the historical inputs. In practice one pushes the model to its limits and beyond, and must adjust one’s evaluation of the validity of the results accordingly.

⁸ The UK National Institute for Economic and Social Research (NIESR) *Global Econometric Model* (NiGEM). We are very grateful to Ray Barrell and Ian Hurst of NIESR for their assistance in using the NiGEM model.

APPENDIX 2: FORECASTING

RECORD OF THE *MEDIUM-TERM*

REVIEW 1986 TO 2001

A2.1 Track Record

There have been eight *Medium-Term Reviews* (MTRs) published over the period 1986 to 2001, a timeframe that has witnessed extraordinary changes in both the structure and macroeconomic performance of the Irish economy. As documented in this *Review*, the Irish economy has undergone a transition over the last two decades that has involved exceptionally high rates of output growth by international standards. As a consequence there is a significant potential for error in forecasting the main indicators of economic performance.

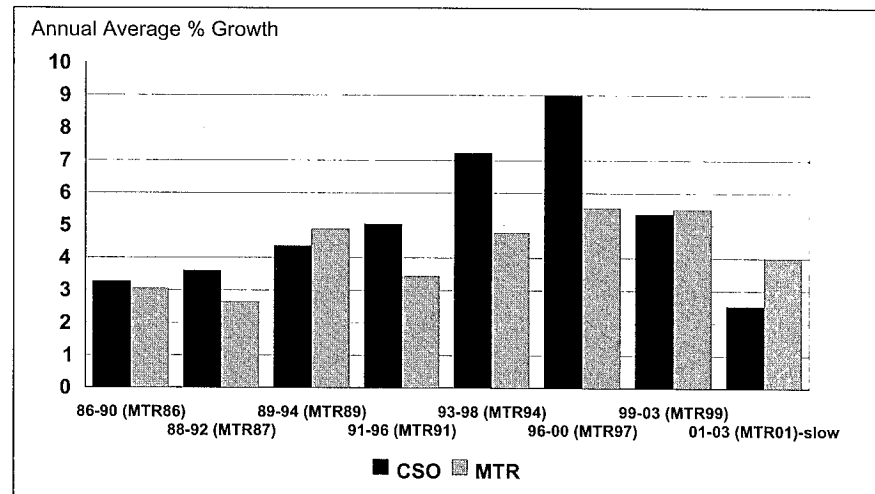
The last MTR was released in September 2001. The detailed analysis in MTR01 was undertaken before the appalling attacks on the USA on September 11th of that year, but because of the uncertainty that already existed two scenarios were considered: a relatively benign scenario, the *Benchmark*, and an alternative *Slowdown* scenario. Given the exceptionally uncertain environment created by the events of September 11th, the *Benchmark* scenario was acknowledged to be too benign while the more pessimistic *Slowdown* scenario was explicitly viewed to be more likely to reflect reality. For the purpose of comparison with actual outturns, and with previous MTRs, in the analysis in this Appendix we use the forecasts contained in the *Slowdown* scenario from MTR01.

There has been a tendency in the MTRs to underestimate output growth in terms of Gross National Product measured in volume terms. The comparison between actual real GNP growth rates and their MTR forecasts is illustrated in Figure A2.1. Most MTRs, with the exceptions of the MTR89 and MTR01, have been pessimistic on the actual growth of real GNP. The MTR89 failed to predict the slowdown in output growth in 1991-93 that occurred throughout the EU as a result of the interest rate rises which followed German reunification. Likewise the forecast in MTR01 was too optimistic on real GNP growth, given the international slowdown that has emerged over the last two years. The predicted average real GNP growth of 4 per cent between 2001 and 2003 is above the current forecast of average growth of 2.5 per cent for this period.¹ The gap between outturn and forecast grew from 1.6 percentage points in the MTR91 to 2.5 percentage points in the MTR94, peaking at just under 3.5 percentage points in the MTR97 as the boom took hold and was roughly on target in MTR99. The gap of 1.5 percentage points for the last MTR is broadly in line with the average absolute error of previous MTRs of 1.4 percentage points.

The MTR forecasts of employment growth, and the contrast with actual outturns, are set out in Figure A2.2. The pattern shows that, without exception, past *Reviews* have underestimated employment growth. The rate of employment growth at the start of the 1990s had been rather low, in what was referred to as a "jobless growth" era, but this gave way to exceptionally high rates of growth for the remainder of the decade. As a consequence, the MTR89 came closest to predicting actual employment growth, with an error

¹ The "outturn" data for 2002 and 2003 in this Appendix are based on the latest estimates and forecasts contained in the *Quarterly Economic Commentary*, Summer 2003.

Figure A2.1: MTR Growth Forecasts vs. Outturn



of just 0.14 percentage points over the forecast period from 1988 to 1994. The average difference for the previous eight *Reviews* is 1.1 percentage points, although the MTR94 was more than 2 percentage points below the actual outturn. *Review* forecasts gradually became more accurate with MTR99 underestimating employment growth by just 0.6 percentage points. Employment growth in 2001-03 is currently expected to be considerably higher than that forecast in MTR01 by about 1 percentage point.

Forecasts of the unemployment rate in the *Reviews* have also tended to be higher than the outturns, as set out in Table A2.1. The exception was the MTR89, when the actual unemployment rate was underestimated by an average of 1.7 percentage points over the forecast horizon. The average absolute error has been about 1.5 percentage points for the last eight *Reviews*. The largest gap in the unemployment forecast occurred in the MTR88 when the error was 3.3 percentage points. The MTR97 and MTR99 both forecast very sharp decreases in the unemployment rate, yet the actual unemployment rate fell by even more. The forecast gap between these two MTRs narrowed from 1 percentage point to just 0.4 percentage points. The high margin of error in forecasting unemployment rates reflects the difficulties involved in forecasting migration flows. Relative to the size of the population, migration flows of the magnitudes experienced in recent years make it difficult to forecast the unemployment rate of an economy like Ireland with such mobile labour. The unemployment rate in Table A2.1 is measured using Principal Economic Status (PES) definitions. The MTR01 forecast the unemployment rate to be 7.1 per cent over the period 2001-2003, while the current expectation is that it will be 6.4 per cent, implying a gap of 0.7 percentage points, which is significantly lower than average absolute error in previous *Reviews*.

Rather than focusing on the accuracy of period averages, Table A2.2 outlines how individual year growth forecasts have performed against outturns. This can shed light on how forecasts have tracked "turning points" in the economic cycle. The evidence is quite mixed. The currency crisis of 1992 had negative implications for growth, and was not foreseen in MTR91. As a result, GNP growth was overestimated for 1992 and 1993. However, the subsequent upturn in GNP growth was forecast in each of the successive *Reviews*, although the actual strength of this growth was underestimated. And while the MTR01 underestimated the real GNP growth for 2000 and overestimated the following three years, it tracked the turning point in the economy successfully.

Figure A2.2: MTR Employment Growth Forecasts vs. Outturn

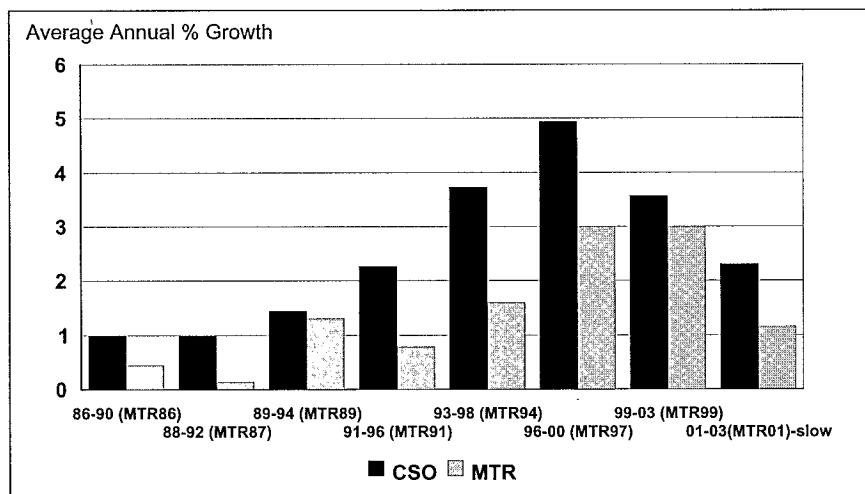


Table A2.1: Unemployment Rate (PES): Forecast vs. Outturn

Period	MTR Forecast	Actual Outturn	Forecast Error
1986-1990	17.9	16.1	1.7
1988-1992	18.7	15.4	3.3
1989-1994	13.8	15.4	-1.7
1991-1996	15.9	15.0	0.9
1993-1998	15.7	13.3	2.4
1996-2000	10.7	9.7	1.0
1999-2003	7.1	6.7	0.4
2001-2003-slow	7.2	6.4	0.8

Given the nature of the uncertainty associated with such a forecasting exercise, a number of scenarios around the central forecast are undertaken in this *Review* to give an indication of the possible margin of error in our medium-term forecast.

Table A2.2: Comparison of Forecasts for GNP Growth Rate

	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	2000	2001	2002	2003
MTR1986	2.5	3.3	3.5	3.0	3.0													
MTR1987			-0.4	3.0	3.3	3.7	3.6											
MTR1989				4.0	7.1	5.6	4.6	4.8	3.2									
MTR1991						2.0	3.7	4.3	3.3	3.6	3.7							
MTR1994								2.4	4.3	6.9	5.7	4.6	4.8	4.7	4.5			
MTR1997											6.4	5.7	5.9	5.3	4.5	3.7		
MTR1999													7.9	6.3	5.8	5.5		
MTR2001 - slow															9.9	6.0	1.8	4.2
Actual*	-0.2	3.3	1.5	5.0	6.9	2.3	2.3	3.4	6.3	8.3	7.8	9.5	8.2	8.8	10.7	4.6	0.6	2.4

* GNP growth rates: There is a discontinuity in 1991 due to methodological revisions.

APPENDIX 3: DETAILED TABLES

BENCHMARK FORECAST

Table A3.1: Expenditure on GNP

	2002	Volume	Price	2003	Cont. to	Volume	Price	2004	Cont. to
	€m	%	%	€m	Growth	%	%	€m	Growth
					%				%
Personal Consumption	59,378	2.0	3.5	62,697	1.2	3.0	2.0	65,882	1.8
Public Consumption	17,265	1.0	8.5	18,922	0.2	1.4	6.1	20,353	0.2
Fixed Investment	28,535	-0.5	3.3	29,325	-0.1	1.2	2.4	30,389	0.3
Building	19,898	-1.6	4.2	20,409	-0.2	0.2	3.0	21,057	0.0
Machinery	8,638	1.0	2.2	8,917	0.1	2.5	2.1	9,333	0.2
Final Domestic Demand	105,179	1.3	4.2	110,944	1.3	2.3	2.7	116,624	2.3
Stock Building	41			255	0.2			191	-0.1
Total Domestic Demand	105,220	1.4	4.2	111,199	1.4	2.3	2.7	116,815	2.3
Total Exports	119,123	0.1	-2.7	115,920	0.1	2.7	0.3	119,313	3.4
Merchandise	90,393	-1.2	-4.8	85,052	-1.2	2.2	-0.6	86,376	2.1
Services	28,730	4.4	2.9	30,868	1.3	4.3	2.3	32,937	1.3
Total Demand	224,343	0.7	0.6	227,119	1.5	2.5	1.5	236,128	5.6
Total Imports	95,287	-1.3	-2.4	91,771	-1.4	1.2	1.6	94,358	1.2
Gross Domestic Product	129,308	2.6	2.0	135,286	3.2	3.1	1.3	141,296	3.9
Net Factor Income	-24,944	3.3	-2.7	-25,059	-0.8	3.8	0.3	-26,071	-0.9
Gross National Product	104,364	2.4	3.1	110,226	2.4	3.0	1.5	115,225	3.0

	2004	Volume	Price	2005	Cont. to	Volume	Price	2006	Cont. to
	€m	%	%	€m	Growth	%	%	€m	Growth
					%				%
Personal Consumption	65,882	2.9	3.2	69,990	1.8	3.8	2.8	74,699	2.3
Public Consumption	20,353	4.0	2.8	21,755	0.6	4.0	2.2	23,107	0.6
Fixed Investment	30,389	4.7	1.7	32,345	1.1	5.7	1.7	34,782	1.3
Building	21,057	3.6	1.9	22,224	0.5	4.4	2.0	23,665	0.6
Machinery	9,333	6.1	2.2	10,118	0.6	7.4	2.1	11,100	0.7
Final Domestic Demand	116,624	3.5	2.8	124,090	3.4	4.3	2.4	132,588	4.2
Stock Building	191			350	0.1			630	0.2
Total Domestic Demand	116,815	3.6	2.8	124,440	3.6	4.5	2.4	133,217	4.4
Total Exports	119,313	8.8	1.8	132,166	11.2	9.1	1.7	146,645	12.0
Merchandise	86,376	9.0	1.3	95,382	8.7	9.2	1.4	105,584	9.3
Services	32,937	8.2	3.2	36,784	2.5	8.6	2.8	41,061	2.7
Total Demand	236,128	6.5	2.0	256,607	14.8	7.1	1.8	279,862	16.4
Total Imports	94,358	7.0	1.9	102,878	7.1	7.8	1.9	112,990	8.1
Gross Domestic Product	141,296	6.1	2.2	153,256	7.7	6.6	1.9	166,399	8.3
Net Factor Income	-26,071	11.7	1.8	-29,639	-2.9	9.7	1.7	-33,070	-2.6
Gross National Product	115,225	4.7	2.4	123,617	4.7	5.7	2.0	133,329	5.7

Table A3.1 (continued): Expenditure on GNP

	2006	Volume	Price	2007	Cont. to	Volume	Price	2008	Cont. to
	€m	%	%	€m	Growth	%	%	€m	Growth
					%				%
Personal Consumption	74,699	3.8	3.0	79,919	2.2	4.0	3.2	85,784	2.3
Public Consumption	23,107	3.9	3.2	24,781	0.6	3.9	3.6	26,689	0.6
Fixed Investment	34,782	6.1	2.0	37,656	1.4	5.7	2.1	40,633	1.3
Building	23,665	4.7	2.5	25,386	0.6	4.5	2.6	27,195	0.5
Machinery	11,100	7.9	2.0	12,222	0.8	7.2	2.0	13,365	0.7
Final Domestic Demand	132,588	4.4	2.9	142,356	4.2	4.4	3.0	153,106	4.2
Stock Building	630			839	0.2			1,037	0.1
Total Domestic Demand	133,217	4.5	2.8	143,195	4.4	4.5	3.0	154,143	4.3
Total Exports	146,645	7.4	1.8	160,287	10.0	7.3	1.9	175,256	10.1
Merchandise	105,584	7.5	1.4	115,038	7.8	7.4	1.4	125,342	7.9
Services	41,061	7.0	3.0	45,249	2.3	6.9	3.2	49,915	2.3
Total Demand	279,862	6.2	2.1	303,482	14.4	6.2	2.3	329,399	14.4
Total Imports	112,990	6.5	1.9	122,567	6.8	6.5	1.9	133,002	6.9
Gross Domestic Product	166,399	5.9	2.4	180,441	7.6	5.9	2.6	195,924	7.5
Net Factor Income	-33,070	7.2	1.8	-36,077	-2.0	6.3	1.9	-39,090	-1.8
Gross National Product	133,329	5.6	2.5	144,365	5.6	5.7	2.7	156,833	5.7

	2008	Volume	Price	2009	Cont. to	Volume	Price	2010	Cont. to
	€m	%	%	€m	Growth	%	%	€m	Growth
					%				%
Personal Consumption	85,784	4.2	3.4	92,427	2.4	3.8	3.2	98,980	2.1
Public Consumption	26,689	3.9	4.0	28,850	0.6	3.9	4.7	31,396	0.6
Fixed Investment	40,633	4.5	1.9	43,300	1.0	3.9	2.0	45,917	0.9
Building	27,195	3.4	2.5	28,817	0.4	3.0	2.5	30,442	0.4
Machinery	13,365	5.9	2.0	14,432	0.6	5.0	1.9	15,442	0.5
Final Domestic Demand	153,106	4.3	3.1	164,577	4.0	3.8	3.2	176,293	3.6
Stock Building	1,037			1,232	0.1			1,420	0.1
Total Domestic Demand	154,143	4.3	3.1	165,809	4.1	3.9	3.1	177,713	3.7
Total Exports	175,256	6.8	2.0	190,855	9.6	6.6	1.9	207,282	9.4
Merchandise	125,342	7.0	1.4	135,996	7.5	6.7	1.4	147,215	7.4
Services	49,915	6.3	3.4	54,859	2.1	6.1	3.2	60,067	2.1
Total Demand	329,399	5.8	2.3	356,664	13.7	5.5	2.3	384,995	13.1
Total Imports	133,002	6.4	1.9	144,182	6.9	6.2	1.9	156,041	6.8
Gross Domestic Product	195,924	5.3	2.7	212,009	6.9	5.0	2.7	228,480	6.4
Net Factor Income	-39,090	6.3	2.0	-42,370	-1.8	5.5	1.9	-45,530	-1.6
Gross National Product	156,833	5.1	2.9	169,639	5.1	4.8	2.9	182,950	4.8

Table A3.2: Output

	2002 €m	Volume %	Price %	2003 €m	Cont. to Growth %	Volume %	Price %	2004 €m	Cont. to Growth %
Agriculture	3,741	7.1	1.4	4061	0.4	-6.4	2.4	3,891	-0.3
Industry	49,516	2.4	0.5	50,929	1.2	2.7	2.1	53,388	1.4
Manufacturing	39,625	2.6	0.5	40,888	1.2	3.0	2.5	43,139	1.3
Utilities	1,387	5.1	2.1	1,489	0.1	8.0	2.3	1,645	0.1
Building	8,504	-0.5	1.1	8,553	0.0	-1.0	1.6	8,604	-0.1
Market Services	52,704	2.0	1.3	54,436	0.9	3.2	0.1	56,273	1.5
Distribution	11,756	2.4	1.6	12,230	0.3	2.7	0.3	12,600	0.3
Transport & Communications	6,216	2.4	1.6	6,467	0.2	2.7	0.3	6,662	0.2
Other Market Services	34,732	1.7	1.2	35,739	0.5	3.6	0.0	37,011	1.0
Non-Market Services	13,968	1.1	6.4	15,019	0.1	1.5	3.3	15,753	0.2
Health & Education	9,947	1.0	6.4	10,693	0.1	1.3	3.3	11,186	0.1
Public Administration	4,021	1.1	6.4	4,326	0.0	2.2	3.3	4,567	0.1
Adjustment for Financial Services (-)	3,967	2.0	3.0	4,169	0.1	2.0	6.0	4,508	0.1
GDP at Factor Cost	115,710	1.9	2.0	120,339	2.2	3.0	1.1	125,271	3.3
Taxes on Expenditure	16,047	6.2	1.5	17,307	1.0	3.0	3.0	18,355	0.5
Subsidies	2,450	-4.6	1.0	2,360	-0.1	-4.4	3.3	2,330	-0.1
GDP at Market Prices	129,308	2.6	2.0	135,286	3.2	3.1	1.3	141,296	3.9
Net Factor Income	-24,944	3.3	-2.7	-25,059	-0.8	3.8	0.3	-26,071	-0.9
GNP at Market Prices	104,364	2.4	3.1	110,226	2.4	3.0	1.5	115,225	3.0

	2004 €m	Volume %	Price %	2005 €m	Cont. to Growth %	Volume %	Price %	2006 €m	Cont. to Growth %
Agriculture	3,891	0.8	2.1	4,004	0.0	0.8	1.9	4,112	0.0
Industry	53,388	6.9	0.3	57,247	3.6	7.5	1.5	62,462	4.0
Manufacturing	43,139	7.6	0.3	46,550	3.4	8.2	0.7	50,708	3.8
Utilities	1,645	8.4	-16.3	1,493	0.2	9.0	10.5	1,798	0.2
Building	8,604	0.8	6.1	9,204	0.0	0.9	7.2	9,956	0.0
Market Services	56,273	7.4	1.5	61,312	3.4	7.6	1.4	66,848	3.6
Distribution	12,600	5.8	2.7	13,700	0.7	6.5	2.7	14,980	0.7
Transport & Communications	6,662	5.7	2.9	7,247	0.4	6.9	1.6	7,870	0.5
Other Market Services	37,011	8.4	0.6	40,365	2.3	8.2	0.8	43,998	2.3
Non-Market Services	15,753	4.2	4.2	17,106	0.5	4.2	3.3	18,420	0.5
Health & Education	11,186	4.0	4.4	12,147	0.3	4.0	3.5	13,080	0.3
Public Administration	4,567	4.8	3.6	4,959	0.2	4.7	2.8	5,340	0.2
Adjustment for Financial Services (-)	4508	8.3	1.4	4,949	0.3	8.6	1.7	5,466	0.4
GDP at Factor Cost	125,271	6.5	1.4	135,193	7.2	6.8	1.7	146,850	7.8
Taxes on Expenditure	18,355	2.9	8.1	20,425	0.5	3.9	3.4	21,950	0.6
Subsidies	2,330	1.2	0.2	2,362	0.0	1.6	0.1	2,401	0.0
GDP at Market Prices	141,296	6.1	2.2	153,256	7.7	6.6	1.9	166,399	8.3
Net Factor Income	-26,071	11.7	1.8	-29,639	-2.9	9.7	1.7	-33,070	-2.6
GNP at Market Prices	115,225	4.7	2.4	123,617	4.7	5.7	2.0	133,329	5.7

Table A3.2 (continued): Output

	2006	Volume	Price	2007	Cont. to	Volume	Price	2008	Cont. to
	€m	%	%	€m	Growth	%	%	€m	Growth
					%				%
Agriculture	4,112	0.8	0.9	4,184	0.0	0.8	2.4	4,318	0.0
Industry	62,462	6.3	1.7	67,512	3.4	6.2	1.7	72,881	3.4
Manufacturing	50,708	6.7	0.9	54,643	3.2	6.9	0.7	58,824	3.3
Utilities	1,798	9.0	-0.6	1,949	0.2	3.5	5.9	2,135	0.1
Building	9,956	0.7	8.9	10,920	0.0	0.6	8.5	11,922	0.0
Market Services	66,848	7.2	1.9	72,990	3.4	6.9	2.2	79,806	3.4
Distribution	14,980	6.5	2.6	16,369	0.8	6.6	2.5	17,875	0.8
Transport & Communications	7,870	6.6	1.7	8,539	0.5	6.5	2.4	9,316	0.5
Other Market Services	43,998	7.5	1.6	48,082	2.2	7.2	2.1	52,616	2.1
Non-Market Services	18,420	4.2	4.5	20,063	0.5	4.2	5.0	21,943	0.5
Health & Education	13,080	4.0	4.7	14,247	0.3	4.0	5.2	15,582	0.3
Public Administration	5,340	4.7	4.1	5,816	0.2	4.7	4.5	6,361	0.2
Adjustment for Financial Services (-)	5,466	7.8	2.1	6,017	0.3	7.6	2.4	6,625	0.3
GDP at Factor Cost	146,850	6.1	2.1	159,205	7.0	6.0	2.4	172,797	7.0
Taxes on Expenditure	21,950	3.9	3.8	23,675	0.6	4.0	4.0	25,619	0.6
Subsidies	2,401	1.5	0.1	2,439	0.0	1.5	0.7	2,492	0.0
GDP at Market Prices	166,399	5.9	2.4	180,441	7.6	5.9	2.6	195,924	7.5
Net Factor Income	-33,070	7.2	1.8	-36,077	-2.0	6.3	1.9	-39,090	-1.8
GNP at Market Prices	133,329	5.6	2.5	144,365	5.6	5.7	2.7	156,833	5.7

	2008	Volume	Price	2009	Cont. to	Volume	Price	2010	Cont. to
	€m	%	%	€m	Growth	%	%	€m	Growth
					%				%
Agriculture	4,318	0.8	2.6	4,463	0.0	0.8	2.2	4,599	0.0
Industry	72,881	6.2	1.5	78,556	3.4	6.1	1.4	84,518	3.4
Manufacturing	58,824	6.8	0.9	63,402	3.3	6.7	0.8	68,202	3.3
Utilities	2,135	3.5	4.5	2,310	0.1	3.5	6.4	2,544	0.1
Building	11,922	0.7	7.0	12,844	0.0	0.6	6.6	13,773	0.0
Market Services	79,806	5.4	2.7	86,418	2.7	4.5	2.9	92,948	2.2
Distribution	17,875	6.0	2.5	19,409	0.7	3.9	2.4	20,653	0.5
Transport & Communications	9,316	5.6	3.3	10,159	0.4	4.9	4.0	11,078	0.4
Other Market Services	52,616	5.1	2.8	56,849	1.6	4.7	2.8	61,216	1.4
Non-Market Services	21,943	4.2	5.3	24,081	0.5	4.2	5.3	26,419	0.5
Health & Education	15,582	4.0	5.5	17,100	0.3	4.0	5.5	18,760	0.3
Public Administration	6,361	4.6	4.9	6,981	0.2	4.6	4.9	7,659	0.2
Adjustment for Financial Services (-)	6,625	6.8	2.5	7,255	0.3	6.3	2.5	7,906	0.3
GDP at Factor Cost	172,797	5.4	2.5	186,737	6.3	5.0	2.5	201,053	5.8
Taxes on Expenditure	25,619	4.2	4.2	27,823	0.6	3.8	4.0	30,041	0.6
Subsidies	2,492	1.6	0.8	2,551	0.0	1.4	1.0	2,613	0.0
GDP at Market Prices	195,924	5.3	2.7	212,009	6.9	5.0	2.7	228,480	6.4
Net Factor Income	-39,090	6.3	2.0	-42,370	-1.8	5.5	1.9	-45,530	-1.6
GNP at Market Prices	156,833	5.1	2.9	169,639	5.1	4.8	2.9	182,950	4.8

Table A3.3: National Income and National Product, Current Prices, € million

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Agricultural Incomes	3,141	3,261	3,391	3,492	3,585	3,642	3,760	3,888	4,007
Non-Agric. Wage Income	51,008	53,860	56,216	60,363	64,247	69,347	74,600	80,553	86,690
Non-Agric. Profits Net	52,901	53,815	55,948	61,064	68,074	74,505	81,786	88,582	95,487
Non-Agric. Profits Gross	51,951	53,796	56,398	61,496	68,519	74,951	82,260	89,072	96,001
Adjustment for Stock Appreciation	-950	-19	450	431	445	446	473	490	513
Adjustment for Financial Services	3,967	4,169	4,508	4,949	5,466	6,017	6,625	7,255	7,906
Domestic Income	103,082	106,767	111,048	119,970	130,440	141,477	153,520	165,768	178,279
Depreciation	12,628	13,571	14,223	15,223	16,409	17,728	19,277	20,969	22,774
GDP (Factor Cost)	115,710	120,339	125,271	135,193	146,850	159,205	172,797	186,737	201,053
Taxes on Expenditure	16,047	17,307	18,355	20,425	21,950	23,675	25,619	27,823	30,041
Domestic	15,222	16,412	17,365	19,354	20,800	22,442	24,295	26,403	28,517
EC	826	895	990	1,072	1,150	1,234	1,324	1,420	1,524
Subsidies (-)	2,450	2,360	2,330	2,362	2,401	2,439	2,492	2,551	2,613
Domestic	1,100	1,160	1,230	1,292	1,361	1,429	1,512	1,601	1,693
EC	1,350	1,200	1,100	1,070	1,040	1,010	980	950	920
GDP (Market Prices)	129,308	135,286	141,296	153,256	166,399	180,441	195,924	212,009	228,480
Net Factor Income	-24,944	-25,059	-26,071	-29,639	-33,070	-36,077	-39,090	-42,370	-45,530
Gross National Product	104,364	110,226	115,225	123,617	133,329	144,365	156,833	169,639	182,950

Table A3.4: Personal Income and Personal Expenditure, Current Prices, € million

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Agricultural Incomes	3,141	3,261	3,391	3,492	3,585	3,642	3,760	3,888	4,007
Non-Agric. Wage Income	51,008	53,860	56,216	60,363	64,247	69,347	74,600	80,553	86,690
Transfer Income	13,736	14,177	14,957	15,781	16,528	17,496	18,721	20,105	21,652
Domestic	13,386	14,047	14,757	15,568	16,304	17,260	18,471	19,838	21,368
Foreign	350	130	200	213	224	236	250	267	283
Other Personal Income	13,627	15,644	15,634	15,935	17,213	18,555	20,208	21,537	22,981
Non-Agricultural Profits	51,951	53,796	56,398	61,496	68,519	74,951	82,260	89,072	96,001
Adjustment for Financial Services (-)	3,967	4,169	4,508	4,949	5,466	6,017	6,625	7,255	7,906
National Debt Interest	1,957	2,150	2,299	2,521	2,678	2,812	2,890	2,940	2,957
Net Factor Income	-24,944	-25,059	-26,071	-29,639	-33,070	-36,077	-39,090	-42,370	-45,530
Government Trading & Investment Income (-)	2,150	1,700	1,900	2,038	2,199	2,380	2,586	2,797	3,017
Other Private Income	22,846	25,018	26,219	27,390	30,462	33,289	36,847	39,590	42,505
Undistributed Profits (-)	9,219	9,373	10,584	11,455	13,249	14,734	16,639	18,053	19,524
Personal Income	81,513	86,943	90,199	95,571	101,573	109,040	117,289	126,082	135,329
Taxes on Personal Income	14,744	15,325	15,752	16,931	18,111	19,745	21,441	23,385	25,352
Personal Disposable Income	66,769	71,618	74,448	78,640	83,462	89,295	95,848	102,697	109,977
Personal Consumption	59,378	62,697	65,882	69,990	74,699	79,919	85,784	92,427	98,980
Personal Savings	7,391	8,921	8,566	8,650	8,764	9,376	10,064	10,270	10,998
Tax Ratio (% Personal Income)	18.1	17.6	17.5	17.7	17.8	18.1	18.3	18.5	18.7
Savings Ratio (% of Disposable Income)	11.1	12.5	11.5	11.0	10.5	10.5	10.5	10.0	10.0

Table A3.5: Balance of Payments, Current Prices, € million

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Exports – Total	119,123	115,920	119,313	132,166	146,645	160,287	175,256	190,855	207,282
Merchandise	90,393	85,052	86,376	95,382	105,584	115,038	125,342	135,996	147,215
Services	28,730	30,868	32,937	36,784	41,061	45,249	49,915	54,859	60,067
Imports – Total	95,287	91,771	94,358	102,878	112,990	122,567	133,002	144,182	156,041
Balance of Trade	23,837	24,148	24,955	29,289	33,655	37,720	42,254	46,673	51,241
as % of GNP	22.8	21.9	21.7	23.7	25.2	26.1	26.9	27.5	28.0
International Transfers									
EC Subsidies	1,350	1,200	1,100	1,070	1,040	1,010	980	950	920
EC Taxes (-)	826	895	990	1,072	1,150	1,234	1,324	1,420	1,524
Government Payments (-)	612	600	540	577	624	675	729	790	860
Government Receipts	620	450	420	451	486	526	572	618	667
Private Transfers	350	130	200	213	224	236	250	267	283
Net International Transfers	882	285	190	85	-24	-136	-250	-376	-513
Factor Income Flows	-24,944	-25,059	-26,071	-29,639	-33,070	-36,077	-39,090	-42,370	-45,530
National Debt Interest (-)	1,136	1,158	1,183	1,449	1,564	1,657	1,732	1,780	1,795
Profits etc. Outflows (-)	26,325	26,860	27,841	31,046	34,460	37,481	40,546	43,939	47,270
Other Factor income	2,516	2,959	2,954	2,856	2,954	3,060	3,188	3,350	3,536
Current Account Balance	-225	-626	-926	-265	5,61	1,507	2,914	3,927	5,198
as % of GNP	-0.2	-0.6	-0.8	-0.2	0.4	1.0	1.9	2.3	2.8
Capital Transfers	622	532	480	430	380	330	280	280	0
Effective Current Balance	397	-94	-446	165	941	1,837	3,194	4,207	5,198
as % of GNP	0.4	-0.1	-0.4	0.1	0.7	1.3	2.0	2.5	2.8

Table A3.6: National Debt, Current prices, € million

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Total Government Securities	22,721	22,722	37,722	37,906	38,102	38,296	38,496	38,688	38,870
Other Borrowing from Central Bank	10,487	12,392	411	0	0	0	0	0	0
Small Savings	4,195	4,193	4,191	4,197	4,197	4,197	4,197	4,197	4,197
Total Debt Held Domestically	22,735	24,638	12,656	12,281	12,324	12,365	12,412	12,450	12,479
Total IRE Debt	37,403	39,306	42,324	42,103	42,299	42,493	42,693	42,885	43,067
Foreign Debt:									
Foreign Currency	715	694	662	3,925	6,273	7,708	8,577	8,740	8,791
Government Securities	14,668	14,668	29,668	29,821	29,975	30,128	30,282	30,435	30,588
Total Foreign Debt	15,383	15,362	30,330	33,747	36,248	37,836	38,858	39,175	39,380
Total National Debt	38,119	40,001	42,986	46,028	48,572	50,200	51,270	51,625	51,858
General Government Debt	41,566	43,449	46,434	49,476	52,020	53,648	54,718	55,073	55,306
Other Bank Borrowing	-3,265	-3,265	-3,265	-3,503	-3,778	-4,091	-4,445	-4,807	-5,185
Debt Ratios (% of GNP)									
Total National Debt	36.5	36.3	37.3	37.2	36.4	34.8	32.7	30.4	28.3
General Government Debt	39.8	39.4	40.3	40.0	39.0	37.2	34.9	32.5	30.2
Total Domestic Debt	21.8	22.4	11.0	9.9	9.2	8.6	7.9	7.3	6.8
Total Foreign Debt	14.7	13.9	26.3	27.3	27.2	26.2	24.8	23.1	21.5
Total IRE Debt	35.8	35.7	36.7	34.1	31.7	29.4	27.2	25.3	23.5
Total Foreign Currency Debt	0.7	0.6	0.6	3.2	4.7	5.3	5.5	5.2	4.8
Debt Ratios (% of GDP)									
Total National Debt	29.5	29.6	30.4	30.0	29.2	27.8	26.2	24.4	22.7
General Government Debt	32.1	32.1	32.9	32.3	31.3	29.7	27.9	26.0	24.2
Total Foreign Debt	11.9	11.4	21.5	22.0	21.8	21.0	19.8	18.5	17.2

Table A3.7: Public Authorities Accounts, Current Prices, € million

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Taxes on Income and Wealth	19,557	20,390	20,917	22,343	24,069	26,516	28,841	31,501	34,133
Company	4,816	5,068	5,168	5,415	5,961	6,775	7,404	8,119	8,786
Personal	14,741	15,322	15,749	16,928	18,107	19,741	21,437	23,381	25,347
Taxes on Expenditure	15,222	16,412	17,365	19,354	20,800	22,442	24,295	26,403	28,517
Gross	15,891	17,151	18,199	20,269	21,793	23,519	25,463	27,667	29,885
EC Budget Contribution (-)	669	739	834	915	993	1,077	1,167	1,264	1,368
Net Trading & Investment Income	2,150	1,700	1,900	2,038	2,199	2,380	2,586	2,797	3,017
Transfers From Abroad	620	450	420	451	486	526	572	618	667
Total Current Receipts	37,551	38,954	40,605	44,188	47,557	51,868	56,298	61,323	66,339
Subsidies	1,100	1,160	1,230	1,292	1,361	1,429	1,512	1,601	1,693
National Debt Interest	1,957	2,150	2,299	2,521	2,678	2,812	2,890	2,940	2,957
Other Transfer Payments	13,998	14,647	15,297	16,145	16,929	17,935	19,199	20,628	22,228
Foreign	612	600	540	577	624	675	729	790	860
Residents	13,386	14,047	14,757	15,568	16,304	17,260	18,471	19,838	21,368
Public Consumption	17,265	18,922	20,353	21,755	23,107	24,781	26,689	28,850	31,396
Total Current Expenditure	34,320	36,879	39,179	41,713	44,074	46,957	50,290	54,020	58,275
Public Authorities Savings (net)	3,231	2,076	1,425	2,476	3,482	4,911	6,008	7,304	8,064
as % of GNP	3.1	1.9	1.2	2.0	2.6	3.4	3.8	4.3	4.4
Total Capital Receipts	2,297	1,868	1,905	1,947	1,983	2,030	2,082	2,139	2,196
Grants – Housing	49	44	45	45	47	48	50	51	51
Grants – Industry	50	45	47	51	56	61	66	72	77
Investment	5,528	5,472	6,053	6,481	6,939	7,430	7,957	8,521	9,126
Other Capital Expenditure	1,174	1,232	807	888	977	1,035	1,098	1,163	1,233
Total Capital Expenditure	6,801	6,792	6,952	7,465	8,018	8,575	9,170	9,807	10,488
Borrowing for Capital Purposes	-4,504	-4,924	-5,047	-5,519	-6,035	-6,545	-7,088	-7,668	-8,292
Total Borrowing	-1,273	-2,848	-3,622	-3,043	-2,553	-1,634	-1,080	-364	-228
as % of GNP	-1.2	-2.6	-3.1	-2.5	-1.9	-1.1	-0.7	-0.2	-0.1
Budgetary Definitions									
Exchequer Surplus	109	-1,882	-2,985	-2,406	-1,916	-997	-443	273	409
as % of GNP	0.1	-1.0	-2.6	-1.9	-1.4	-0.7	-0.3	0.2	0.2
Current Budget Surplus	5,416	3,769	3,155	4,205	5,212	6,640	7,738	9,034	9,794
as % of GNP	5.2	3.4	2.7	3.4	3.9	4.6	4.9	5.3	5.4
EU Definitions									
General Government Balance	-115	-945	-1,694	-1,115	-625	294	848	1,564	1,700
as % of GDP	0.1	0.7	1.2	0.7	0.4	-0.2	-0.4	-0.7	-0.7
as % of GNP	0.1	0.9	1.5	0.9	0.5	-0.2	-0.5	-0.9	-0.9

Table A3.8: Employment and the Labour Force, Thousands, Mid-April

	2002	2003	2004	2005	2006	2007	2008	2009	2010
Agriculture	115	113	112	109	106	103	100	97	94
Industry	480	476	482	478	478	478	478	476	473
Manufacturing:									
Traditional	99	98	99	98	98	97	96	95	94
Food Processing	45	45	46	46	46	46	46	46	46
High Technology	145	142	148	149	151	153	154	156	158
Manufacturing	289	285	292	293	294	295	296	297	298
Utilities	12	12	12	12	12	11	11	11	11
Building	180	179	177	173	172	171	170	167	164
Market Services	715	738	749	782	814	849	872	897	916
Distribution	245	245	245	250	259	266	275	281	282
Transport & Communications	109	109	109	111	114	117	120	123	126
Other Market Services	362	384	395	421	440	466	477	494	509
Non-Market Services	369	373	379	394	410	426	443	461	479
Health & Education	283	285	289	301	313	325	338	352	366
Public Administration	87	88	90	93	97	101	105	109	113
Total Employment	1,680	1,700	1,721	1,763	1,806	1,855	1,893	1,931	1,963
Unemployment	116	130	137	135	135	128	128	124	125
Labour Force	1,796	1,830	1,858	1,898	1,941	1,983	2,020	2,055	2,088

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