QUARTERLY ECONOMIC COMMENTARY

Winter 2006

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The forecasts in this Commentary are based on data available by mid-December 2006

Special Articles

Evaluating *Transport 21* – Some Economic Aspects
by
Sean D. Barrett

To What Extent Has Finance Been a Driver of Ireland's Economic Success?
by
Patrick Honohan

Electricity Shortages in Ireland: Probability and Consequences
by
Laura Malaguzzi Valeri and Richard S.J. Tol

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CONTENTS

SUMMARY TABLE

	2004	2005	2006	2007
OUTPUT				
(Real Annual Growth %)				
Private Consumer Expenditure	3.8	6.6	6.8	7.8
Public Net Current Expenditure	1.8	4.6	4.5	4.5
Private Investment	7.4	12.8	8.3	6.5
Exports	7.3	3.9	6.0	5.1
Imports	8.6	6.5	7.4	6.9
Gross Domestic Product (GDP)	4.3	5.5	5.8	5.4
Gross National Product (GNP)	3.9	5.3	6.2	5.3
PRICES				
(Annual Growth %)				
Consumer Price Index (CPI)	2.2	2.5	3.9	3.9
Wage Growth	6.4	5.6	5.3	5.8
LABOUR MARKET				
Employment Levels (ILO basis (000s))	1,865	1,952	2,042	2,120
Unemployment Levels (ILO basis (000s))	87	89	93	97
Unemployment Rate (as % of Labour Force)	4.4	4.4	4.4	4.4
PUBLIC FINANCE				
Exchequer Balance (€m)	33	-500	1,854	1,023
General Government Balance (€m)	2,166	1,745	3,980	3,845
General Government Balance (% of GDP)	1.5	1.1	2.2	2.0
General Government Debt (% of GDP)	29.7	27.4	23.8	21.2
EXTERNAL TRADE				
Balance of Payments Current Account (€m)	-869.0	-4,200.0	-6042.5	-9,314.5
Current Account (% of GNP)	-0.7	-3.1	-4.0	-5.6
EXCHANGE AND INTEREST RATES (end of year)				
US$/€ Exchange Rate	1.24	1.24	1.30	1.32
STG£/€ Exchange Rate	0.69	0.68	0.68	0.68
Main ECB Interest Rate	2.00	2.25	3.50	3.75

SUMMARY

The year 2006 will have been another year of strong economic growth. Our forecast for real GNP growth is 6.2 per cent. For 2007, we are forecasting a continuation of this strong performance with real GNP growth expected to be 5.3 per cent.

Exports are expected to grow by 6 per cent in 2006 while consumption should grow by 6.8 per cent. For 2007, we expect higher growth in consumption but lower growth in exports, with exports growing by 5.1 per cent and consumption growing by 7.8 per cent.

This forecast of higher consumption growth in 2007 relative to 2006 is based on the combined impact of SSIAs, the decisions in the Budget on taxation and social welfare, employment growth and nominal wage growth. Our forecasts for lower exports growth in 2007 relative to 2006 are influenced by the slowdown in the US economy and by the depreciation in the dollar.

These US-related features of the international economy are important direct determinants of potential developments in Ireland. They may also have an indirect impact through the decisions of the European Central Bank (ECB) on interest rates. While it appears likely that the ECB will continue to increase Euro Area interest rates in 2007, the extent of these moves may be more limited than otherwise if the dollar continues to weaken. With rates in the US thought likely to fall, further rate rises in Europe could lead to a further strengthening in the euro with negative consequences for Euro Area exports.

The end of the year has brought both the Budget and more complete data on tax returns for 2006. Both have given rise to many interesting points. The tax take for 2006 looks set to be much higher than was anticipated, both at the time of the Budget in 2005 and throughout most of the year. As expenditure was also lower than anticipated, a higher than expected general government surplus of 2.2 per cent of GDP is now expected for 2006, almost 3 percentage points above the deficit of -0.6 per cent planned in December 2005. With the economy growing above trend, a fiscally neutral Budget would have required a higher surplus for 2007. The Minister has planned for a surplus of 1.2 per cent of GDP, well below what would be considered prudent. However, our tax forecasts suggest that the General Government Balance (GGB) is more likely to be in the range of 2 per cent.

Employment will grow by 4.6 per cent in 2006 and by 3.9 per cent in 2007. Net inward migration will be almost 87,000 in 2006 and 72,000 in 2007. Despite the continued large inflow of migrants, the rate of employment growth is such that we expect the participation rate to grow by 1.2 percentage points this year and by 1.1 percentage points next year.

In the general assessment, we draw attention to three issues. First, the deficit on the current account of the balance of payments is growing and the implications of this, in the context of monetary union, need to be explored and understood. Second, the need for government to pursue value for money in its spending choices is just as strong at a time of buoyant public finances. Third, developments in the US must be watched closely because further moves towards slowdown and/or dollar depreciation could be critical for Ireland.

PRELIMINARY NATIONAL ACCOUNTS 2005

A: Expenditure on Gross National Product

	2004	2005	Change in 2005				
		Preliminary	€m		%		
	€m	€m	Value	Volume	Value	Price	Volume
Private Consumer Expenditure	68,719	74,114	5,395	4,563	7.9	1.1	6.6
Public Net Current Expenditure	20,785	22,952	2,167	966	10.4	5.5	4.6
Gross Fixed Capital Formation	36,243	43,582	7,338	4,626	20.2	6.6	12.8
Exports of Goods and Services (X)	124,049	131,001	6,951	4,812	5.6	1.7	3.9
Physical Changes in Stocks	248	98	-150	-82			
Final Demand	**250,045**	**271,746**	**21,700**	**14,885**	**8.7**	**2.6**	**6.0**
less:							
Imports of Goods and Services(M)	102,096	110,553	8,457	6,614	8.3	1.7	6.5
less:							
Statistical Discrepancy	380	30	-350	117			
GDP at Market Prices	**147,569**	**161,163**	**13,594**	**8,154**	**9.2**	**3.5**	**5.5**
less:							
Net Factor Payments (F)	-23,215	-25,248	-2,033	-1,575	8.8	1.8	6.8
GNP at Market Prices	**124,354**	**135,914**	**11,561**	**6,578**	**9.3**	**3.8**	**5.3**

B: Gross National Product by Origin

	2004	2005	Change in 2005	
		Preliminary		
	€m	€m	€m	%
Agriculture, Forestry, Fishing	2,904	3,399	496	17.1
Non-Agricultural: Wages, etc.	58,844	65,272	6,428	10.9
Other:	53,702	57,380	3,678	6.8
Adjustments: Stock Appreciation	-309	-578		
Statistical Discrepancy	380	30	-350	-92.2
Net Domestic Product	**115,521**	**125,503**	**9,982**	**8.6**
less:				
Net Factor Payments	-23,215	-25,248	-2,033	8.8
National Income	**92,306**	**100,254**	**7,949**	**8.6**
Depreciation	15,037	16,657	1,620	10.8
GNP at Factor Cost	**107,343**	**116,911**	**9,568**	**8.9**
Taxes less Subsidies	17,011	19,003	1,992	11.7
GNP at Market Prices	**124,354**	**135,914**	**11,561**	**9.3**

C: Balance of Payments on Current Account

	2004	2005	Change in 2005
		Preliminary	
	€m	€m	€m
Exports (X) less Imports (M)	21,953	20,447	-1,506
Net Factor Payments (F)	-23,215	-25,248	-2,033
Net Transfers	393	601	208
Balance on Current Account	**-869**	**-4,200**	**-3,331**
as % of GNP	-0.7	-3.1	-2.4

FORECAST NATIONAL ACCOUNTS 2006

A: Expenditure on Gross National Product

	2005	2006	Change in 2006				
	Preliminary	Forecast	€m		%		
	€m	€m	Value	Volume	Value	Price	Volume
Private Consumer Expenditure	74,114	81,924	7,810	5,040	10.5	3.5	6.8
Public Net Current Expenditure	22,952	25,361	2,410	1,033	10.5	5.7	4.5
Gross Fixed Capital Formation	43,582	50,473	6,891	3,600	15.8	7.0	8.3
Exports of Goods and Services (X)	131,001	142,164	11,164	7,833	8.5	2.4	6.0
Physical Changes in Stocks	98	108	10	10			
Final Demand	**271,746**	**300,030**	**28,284**	**17,498**	**10.4**	**3.7**	**6.4**
less:							
Imports of Goods and Services (M)	110,553	122,057	11,503	8,160	10.4	2.8	7.4
less:							
Statistical Discrepancy	30	30	0	-13			
GDP at Market Prices	**161,163**	**177,944**	**16,781**	**9,351**	**10.4**	**4.4**	**5.8**
less:							
Net Factor Payments (F)	-25,248	-26,200	-952	-952	3.8	0.0	3.8
GNP at Market Prices	**135,914**	**151,744**	**15,829**	**8,409**	**11.6**	**5.1**	**6.2**

B: Gross National Product by Origin

	2005	2006	Change in 2006	
	Preliminary	Forecast		
	€m	€m	€m	%
Agriculture, Forestry, Fishing	3,399	3,603	204	6.0
Non-Agricultural: Wages, etc.	65,272	71,966	6,694	10.3
Other:	57,380	62,561	5,181	9.0
Adjustments: Stock Appreciation	-578	-200		
Statistical Discrepancy	30	30	0	0.0
Net Domestic Product	**125,503**	**137,959**	**12,456**	**9.9**
less:				
Net Factor Payments	-25,248	-26,200	-952	3.8
National Income	**100,254**	**111,759**	**11,505**	**11.5**
Depreciation	16,657	18,051	1,394	8.4
GNP at Factor Cost	**116,911**	**129,810**	**12,899**	**11.0**
Taxes less Subsidies	19,003	21,934	2,931	15.4
GNP at Market Prices	**135,914**	**151,744**	**15,829**	**11.6**

C: Balance of Payments on Current Account

	2005	2006	Change in 2006
		Forecast	
	€m	€m	€m
Exports (X) less Imports (M)	20,447	20,108	-340
Net Factor Payments (F)	-25,248	-26,200	-952
Net Transfers	601	50	-551
Balance on Current Account	**-4,200**	**-6,042**	**-1,842**
as % of GNP	-3.1	-4.0	-0.9

FORECAST NATIONAL ACCOUNTS 2007

A: Expenditure on Gross National Product

	2006	2007	Change in 2007				
	Forecast €m	Forecast €m	€m Value	€m Volume	% Value	% Price	% Volume
Private Consumer Expenditure	81,924	91,363	9,439	6,349	11.5	3.5	7.8
Public Net Current Expenditure	25,361	28,151	2,790	1,141	11.0	6.2	4.5
Gross Fixed Capital Formation	50,473	56,510	6,037	3,282	12.0	5.1	6.5
Exports of Goods and Services (X)	142,164	152,605	10,441	7,255	7.3	2.1	5.1
Physical Changes in Stocks	108	119	11	11			
Final Demand	**300,030**	**328,747**	**28,717**	**18,037**	**9.6**	**3.4**	**6.0**
less:							
Imports of Goods and Services (M)	122,057	134,169	12,113	8,412	9.9	2.8	6.9
less:							
Statistical Discrepancy	30	30	0	5			
GDP at Market Prices	**177,944**	**194,548**	**16,604**	**9,621**	**9.3**	**3.7**	**5.4**
less:							
Net Factor Payments (F)	-26,200	-27,800	-1,600	-1,600	6.1	0.0	6.1
GNP at Market Prices	**151,744**	**166,748**	**15,004**	**8,007**	**9.9**	**4.4**	**5.3**

B: Gross National Product by Origin

	2006	2007	Change in 2007	
	Forecast €m	Forecast €m	€m	%
Agriculture, Forestry, Fishing	3,603	3,747	144	4.0
Non-Agricultural: Wages, etc.	71,966	79,298	7,332	10.2
Other:	62,561	67,161	4,601	7.4
Adjustments: Stock Appreciation	-200	-200		
Statistical Discrepancy	30	30	0	0.0
Net Domestic Product	**137,959**	**150,036**	**12,077**	**8.8**
less:				
Net Factor Payments	-26,200	-27,800	-1,600	6.1
National Income	**111,759**	**122,235**	**10,476**	**9.4**
Depreciation	18,051	19,439	1,388	7.7
GNP at Factor Cost	**129,810**	**141,674**	**11,864**	**9.1**
Taxes less Subsidies	21,934	25,074	3,140	14.3
GNP at Market Prices	**151,744**	**166,748**	**15,004**	**9.9**

C: Balance of Payments on Current Account

	2006	2007	Change in 2007
	Forecast €m	Forecast €m	€m
Exports (X) less Imports (M)	20,108	18,436	-1,672
Net Factor Payments (F)	-26,200	-27,800	-1,600
Net Transfers	50	50	0
Balance on Current Account	**-6,042**	**-9,315**	**-3,272**
as % of GNP	-4	-6	-1.6

The International Context

The following broad points summarise the current key developments in the international environment:

- The dollar has depreciated against the euro in recent months. It fell by about 6 per cent between the middle of October and the middle of December. It is now 10 per cent lower against the euro relative to twelve months ago (see Figure 2).
- The ECB increased the main refinancing rate to 3.5 per cent in the first week of December, the sixth 25 basis points increase since December 2005. We expect that rates will rise by another 25 basis points in the first quarter of 2007 and stabilise thereafter (see Figure 1).
- Although the US economy is slowing, the Euro Area continues to perform well, as do the UK and Asia. On balance, the world economy continues to grow strongly, with world growth forecast by the National Institute of Economic and Social Research[1] to be 5 per cent in 2006 and 4.5 per cent in 2007.

United States

The US economy grew at an annual rate of 2.2 per cent in the third quarter, down from 2.6 per cent in the second quarter. This confirms the emerging slowdown in the US economy, where the GDP growth rate is expected to fall from 3.3 per cent in 2006 to 2.4 per cent in 2007. The main reason for this slowdown is a fall in residential construction. The fall is forecast to be 4.1 per cent in 2006 and 13.5 per cent in 2007. The causes of the slowdown are thought to be the higher interest rates, oil prices and the unsustainability of previous growth rates. The most recent indicators of activity are suggesting that the slowdown may not be severe but more time is needed to assess how the situation will unfold.

In spite of the slowdown in economic activity, core inflation remains high, with forecasts of 2.3 per cent in 2006 and 2.4 per cent in 2007 (core PCE deflator). In addition, unemployment has not increased and actually fell to a cyclical low of 4.4 per cent in October. This combination of slowing activity and yet higher-than-desired inflation presents the Federal Reserve with a dilemma over interest rates. The consensus view would appear to be that the slowing economy will lead to reduced price pressures and so interest rate cuts appear more likely than interest rate rises. According to the OECD, financial markets expect the federal funds rate to fall to 4.5 per cent by early 2008, down from the current rate of 5.25 per cent. As the dollar has been weakening in recent weeks, interest rate falls in the US could compound this trend, with negative implications for the US's trading partners. There would also be implications for the ECB because a strengthening euro relative to the dollar may act to constrain further Euro Area interest rate rises.

[1] *National Institute Economic Review,* No. 198, October 2006, London: NIESR.

Euro Area

The data emerging from the Euro Area continue to provide good news and lead to the view that the recovery has now firmly taken hold. GDP grew by 2.7 per cent in the third quarter compared to the same quarter in the previous year and growth for 2006 is now forecast to be 2.6 per cent and 2.2 per cent in 2007. The improved economic climate is reflected in the labour market with unemployment projected to fall from 8.6 per cent in 2005 to 7.9 per cent in 2006 and to 7.4 per cent in 2007. At the earlier stage of the recovery, exports played the dominant role but the recovery has broadened out to investment and also, but to a lesser extent, to consumption. Investment is forecast to grow by 4.6 per cent in 2006 and by 4.2 per cent in 2007. The corresponding figures for consumption are 1.8 per cent and 1.7 per cent.

The on-going recovery has led to improved fiscal positions for many Euro Area governments. It has also contributed to on-going interest rate rises on the part of the ECB, with the ECB's main refinancing rate rising to 3.5 per cent on December 7. Our view remains that rates will rise by another 25 basis points in the first quarter of 2007 but that they will then stabilise. Our reasoning is partly related to the movements in the dollar, discussed above.

Turning to some individual countries within the Euro Area, Germany is posting a very strong economic performance in 2006 with growth now forecast to be 2.6 per cent. German exports continue to perform strongly and are expected to grow by over 10 per cent in 2006. In 2005, exports were by far the largest contributor to growth but in the current year, investment is also contributing with growth of 5.3 per cent now expected. While consumption is growing more strongly in 2006 relative to the recent past, the growth rate is still only likely to be 0.8 per cent. In addition, some of this growth is thought to be related to the VAT increase which will come into effect on January 1 2007. In 2007, consumption growth is forecast to fall back to 0.3 per cent. GDP growth next year is forecast to be 1.8 per cent.

France posted a rapid expansion in the second quarter of the year with a quarter-on-quarter growth rate of 1.2 per cent. By contrast, the third quarter was disappointing, with zero growth recorded, quarter-on-quarter. For the year as a whole, GDP growth is forecast to be 2.1 per cent in 2006 and 2.2 per cent in 2007. Unlike the German situation, consumption in France is growing at a faster pace than overall GDP growth, with growth rates of 2.6 per cent and 2.5 per cent forecast for 2006 and 2007 respectively. Unemployment is also falling in France, from a rate of 9.9 per cent in 2005 to forecast rates of 9.1 per cent in 2006 and 8.5 per cent in 2007.

TABLE 1: Short-term International Outlook

	GDP Output Growth			Consumer Price Inflation			Hourly Earnings Growth			Unemployment Rate %			Current Account Balance % of GNP		
Country	**2005**	**2006**	**2007**	**2005**	**2006**	**2007**	**2005**	**2006**	**2007**	**2005**	**2006**	**2007**	**2005**	**2006**	**2007**
UK	1.9	2.6	2.6	2.0	2.2	2.0	4.6	5.1	4.1	4.8	5.5	5.7	-2.2	-2.4	-2.0
Germany	1.1	2.6	1.8	1.9	1.7	1.9	-0.3	1.1	2.8	9.1	8.0	7.7	4.2	4.0	4.8
France	1.2	2.1	2.2	1.9	2.0	1.4	2.7	3.1	3.4	9.9	9.1	8.5	-1.6	-1.7	-1.8
Italy	0.1	1.8	1.4	2.2	2.2	1.9	2.8	3.4	2.5	7.8	7.1	6.8	-1.6	-2.2	-2.6
Euro Area	1.5	2.6	2.2	2.2	2.2	1.9	2.0	2.6	3.4	8.6	7.9	7.4	0.0	-0.3	-0.1
USA	3.2	3.3	2.4	3.4	3.3	2.3	3.8	6.3	4.7	5.1	4.6	4.8	-6.4	-6.6	-6.5
Japan	2.7	2.8	2.0	-0.6	0.3	0.3	1.2	1.1	2.4	4.4	4.2	3.9	3.7	3.8	4.5
China	10.2	10.6	10.3	1.8	1.4	1.0							7.2	8.3	8.5
OECD	2.7	3.2	2.5	2.1	2.2	2.2				6.5	6.0	5.8			
Ireland	5.5	5.8	5.4	2.5	3.9	3.9	5.6	5.3	5.8	4.4	4.4	4.4	-3.1	-4.0	-5.6

Source: *National Institute Economic Review*, October 2006; *OECD Economic Outlook*, No. 80, November 2006.

Italy is experiencing an economic rebound in 2006, with GDP growth for the year now forecast at 1.8 per cent following virtual stagnation in 2005. Exports have contributed significantly to the improved performance, with growth forecast to be 5.1 per cent in 2006, relative to 0.7 per cent in 2005. Investment is also picking-up, with a growth rate of 3.7 per cent forecast for 2006, relative to a 0.4 per cent decline in 2005. Economic prospects for 2007 are weaker, with growth in GDP forecast to be 1.4 per cent. Part of the reason for the slowdown is a fiscal adjustment, through which the Italian government is trying to reduce the fiscal deficit, estimated to be 4.8 per cent of GDP in 2006.

United Kingdom

After the relatively slow economic performance in 2005, with growth of 1.9 per cent, the UK is experiencing strong growth in 2006 with GDP forecast to grow by 2.6 per cent this year. For 2007, a continuation of the strong performance is forecast, with growth of 2.6 per cent expected. Strong investment growth is playing a significant role, with growth rates forecast of 5.4 per cent in 2006 and 6.2 per cent in 2007.

The Bank of England increased interest rates by 25 basis points in August and in November, bringing the repo rate to 5 per cent. These moves were made in the context of rising inflation and also in the context of renewed buoyancy in the housing market. Future moves on interest rates are difficult to predict, partly because immigration is making it more difficult to understand trends in the UK economy. Although both the economy and employment are growing, so too is unemployment. In 2006, employment is forecast to grow by almost 1 per cent but the rate of unemployment is forecast to rise from 4.8 per cent in 2005 to 5.5 per cent. It is thought that immigration partly explains this pattern.

Interest rates would usually be increased in the context of rising inflation and increasing employment. However, to the extent that immigration is easing tightness in the labour market and increasing the potential growth rate, such increases may not be needed. As with the ECB, the Bank of England may be more reluctant to raise interest in the context of a weakening dollar and so we may see UK rates being held where they are.

Asia

The recovery in Japan continues, with growth forecast to be 2.8 per cent in 2006 and 2 per cent in 2007. Increased profitability and capacity utilisation are translating into increased investment. Consumption is also growing, partly due to a reduction in the savings ratio and partly in response to rising wages. The unemployment rate, at 4 per cent, is now at its lowest level since 1998 and is forecast to continue declining.

In spite of this growth, inflation remains negative under some measures. For example, the private consumption deflator is forecast to be -0.4 per cent in 2006. The Bank of Japan did raise interest rates

by 25 basis points in July but further rises seem unlikely until the deflationary threat has passed.

For China, the recent fast pace of economic growth is continuing. GDP is forecast to grow by 10.6 per cent in 2006 and by 10.3 per cent in 2007. At the same time, inflation remains subdued, with the overall consumer price index increasing by only 1.5 per cent in the first three quarters of 2006. The potential Chinese influence on world economic matters may have been seen recently in the context of the weakening dollar, discussed above. A senior Chinese official suggested that China might diversify its foreign reserve holdings away from the dollar and some attributed part of the dollar's slide to this suggestion.

International Outlook and Context for Ireland

With world growth expected to remain strong in 2006 and 2007, the overall situation for Ireland is positive. However, developments in the US remain troubling. As noted above, the US economy is slowing and it is as yet unclear how deep and prolonged the slowdown will be. The fall in the dollar is potentially a more immediate risk and serves as a reminder of one of the core messages in the Institute's *Medium-Term Review* of last year, namely, the risk of an adjustment in the US and the impact on Ireland. One possible further implication of the dollar is that it might contribute to a pause in the ECB's moves towards higher interest rates.

Figure 1: Interest Rates

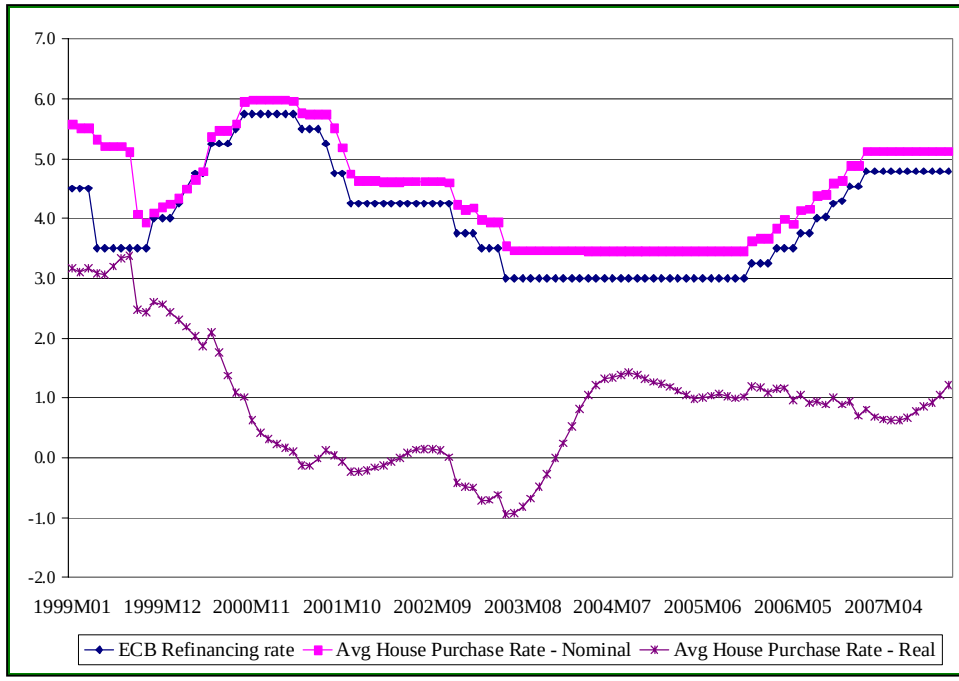
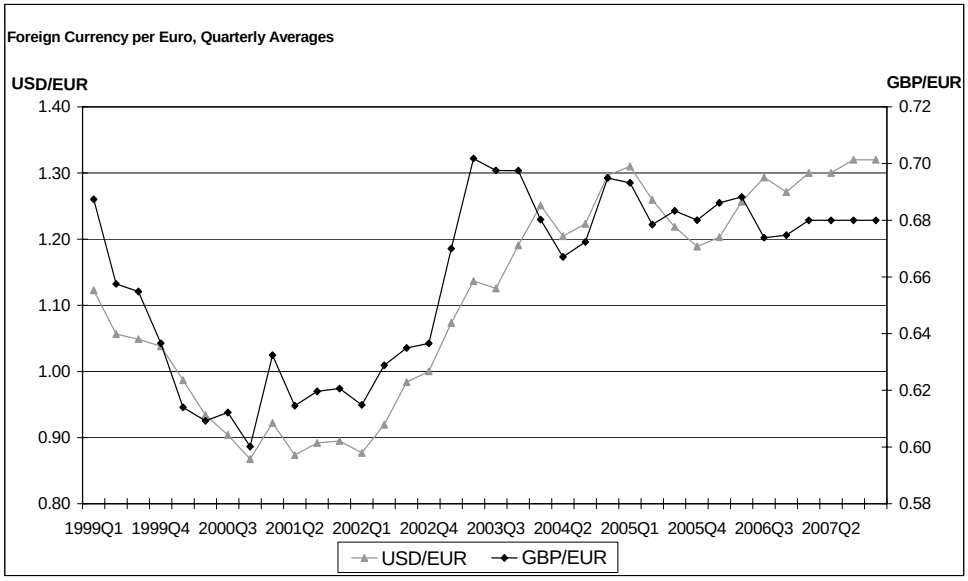


Figure 2: Exchange Rates



The Domestic Economy

General

This year will be another year of strong economic growth. Our forecast for real GNP growth is 6.2 per cent, with growth being well balanced across the main expenditure categories this year. For 2007, we are forecasting a continuation of this robust performance with real GNP growth expected to be 5.3 per cent. Consumption growth is expected to outpace growth in exports in that year.

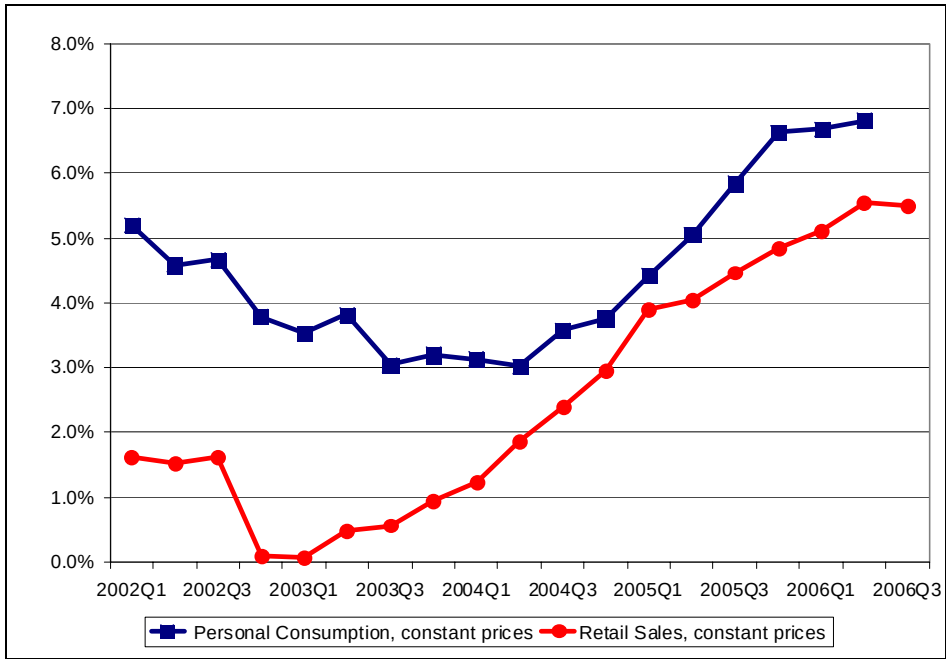
Employment continues to grow strongly, and our forecasts suggest further strong growth over the forecast horizon, of 4.6 per cent in 2006 and 3.9 per cent in 2007. Net inward migration could reach 87,000 in 2006 and 72,000 in 2007. Despite the continued large inflow of migrants, the rate of employment growth is such that we expect the participation rate to increase by 1.2 percentage points this year and by 1.1 percentage points next year.

Recent data on tax returns for 2006 as well as the release of *Budget 2007* have given rise to a number of interesting points. First, the tax take for 2006 looks set to be much higher than was anticipated, both at the time of *Budget 2006* and throughout most of the year. As expenditure was also lower than anticipated, a higher than expected general government surplus of 2.2 per cent of GDP will be recorded for 2006. With the economy growing above trend, a fiscally neutral Budget would have required a higher surplus for 2007. The Minister has planned for a surplus of 1.2 per cent of GDP, well below what would be considered prudent. However, our tax forecasts suggest that the GGB is more likely to be in the range of 2 per cent.

Consumption

The *Quarterly National Accounts* for the second quarter of 2006 show that consumption has continued to grow at a strong pace up to the middle of the year. The four-quarter moving average growth rate for the volume of consumption was 6.8 per cent in the second quarter, up from 5.1 per cent a year earlier and 3.0 per cent in 2004 (see Figure 3).

Figure 3: Annual Growth Rates in Personal Consumption and Retail Sales



In addition, all indicators point to continued growth in consumption for the remainder of the year. Retail sales expanded by 5.5 per cent in September[2] relative to a year earlier. This compares to 4.5 per cent growth for September 2005 or 2.4 per cent for September 2004. Trips overseas by Irish residents rose by 10.8 per cent in the year ended September on the same period of 2005, while purchases of new private cars increased by 7.4 per cent. Consumer sentiment also remains favourable. According to the IIB/ESRI *Consumer Sentiment Index*, consumer sentiment improved in November relative to a month earlier. According to the survey, consumers have become more positive in their outlook for the economy and the labour market.

The strong growth in consumption has been driven in part by strong employment gains and wage increases. With employment and incomes growth displaying continued strength, we anticipate that consumption will register sustained growth over the remainder of this year and in 2007. While interest rate increases are likely to dampen consumer confidence to some extent, we do not expect any

[2] Measured as a four quarter moving average. Unless otherwise stated annual growth rates refer to the latest twelve months or four quarters relative to a year previously.

significant negative impact over the forecast horizon. Our forecasts are for a 6.8 per cent volume growth this year and 7.8 per cent in 2007. The jump in consumption in 2007 will be driven by both the likely once-off effects of the maturation of the SSIA accounts as well as the changes contained in *Budget 2007* that will impact positively on consumption spending.[3]

Investment

Investment grew by 6.9 per cent in volume terms in the year ended the second quarter 2006. This follows growth of 8.6 per cent for the same period of 2005. Indicators of investment activity suggest that investment continued to perform strongly in recent months. House completions data point to continued growth in housing output. In the first ten months of 2006, 75,056 units were completed suggesting that the total for 2006 is likely to hit record highs of close to 90,000 units. However, as discussed in previous *Commentaries*, over the medium term we do not see this rate of output as sustainable. Indeed the first signs of a slowdown are emerging with the number of commencements for the first nine months of the year down 3.4 per cent on a year earlier. We expect total housing investment in 2007 to grow by 1 per cent in volume terms, down from 4 per cent in 2006. However, most of this growth is expected to be driven by SSIA monies that are more likely to increase investment in home improvements rather than new house completions.[4]

Turning to prices, the Permanent TSB/ESRI house price index has recorded an increase in the rate of house price inflation throughout 2006. Between December 2005 and October 2006, new house prices rose by 8.8 per cent. We expect that the impact of current and anticipated interest rate increases should contribute to a moderation in inflation relative to recent months. We therefore assume that new house prices will increase by a rate of 10 per cent in 2006 and 6 per cent in 2007.

Investment in Machinery and Equipment is expected to continue to grow strongly over the forecast horizon, driven in part by further aeroplane investment by Aer Lingus and Ryanair. We estimate that these purchases could account for up to 1.8 percentage points of total investment growth in 2006 and 2007. In total, machinery and equipment investment is expected to grow by 12 per cent this year and 10 per cent in 2007. Investment in other building and construction has continued in recent months and it is anticipated that this will play an ever-increasing role in driving total investment growth out to 2007. In particular the new National Development Plan (NDP) 2007-2013, which is due to be published in January, is likely to contribute significantly to non-residential building and construction investment in 2007. The recently published Budget

[3] For more detail see *Quarterly Economic Commentary,* Summer 2006.
[4] See Summer *Quarterly Economic Commentary 2006* for details.

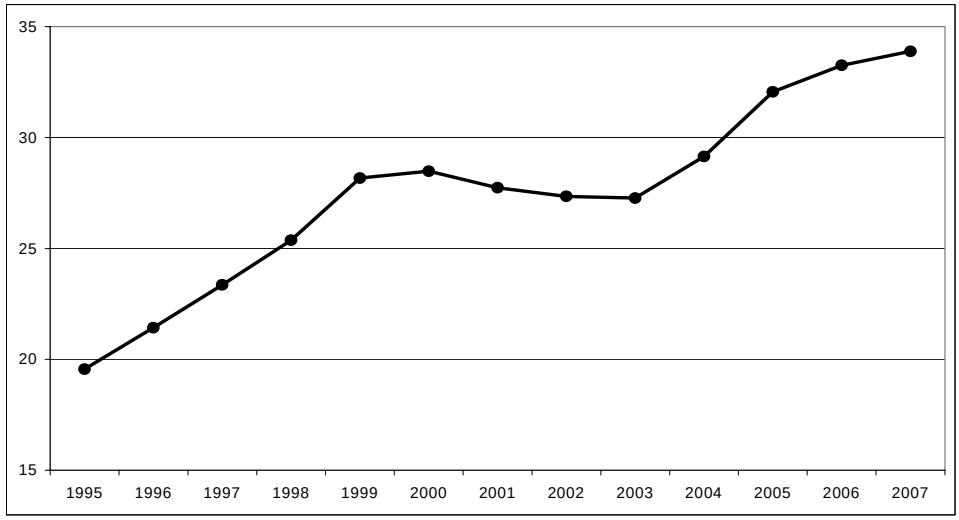
TABLE 2: Gross Fixed Capital Formation

	2004 €m	% Change in 2005 Volume	% Change in 2005 Value	2005 €m	% Change in 2006 Volume	% Change in 2006 Value	2006 €m	% Change in 2007 Volume	% Change in 2007 Value	2007 €m
Housing	16,958	12.6	23.2	20,890	4.0	14.4	23,898	1.0	7.1	25,586
Other Building	10,057	6.5	12.2	11,279	12.0	18.2	13,327	12.0	18.7	15,822
Building and Construction	27,014	10.4	19.1	32,169	6.9	15.7	37,225	5.1	11.2	41,407
Machinery and Equipment	9,229	19.8	23.7	11,413	12.0	16.1	13,247	10.0	14.0	15,102
Total	**36,243**	**12.8**	**20.2**	**43,582**	**8.3**	**15.8**	**50,472**	**6.5**	**12.0**	**56,509**

figures suggest growth in exchequer capital expenditure of over 13 per cent and in public gross fixed capital formation of 14.9 per cent in 2007. Such rates are significantly above the recommended growth rate in the recent *ex-ante* evaluation of the NDP[5]. Our forecasts point to volume growth of 12 per cent both this year and next in other building and construction.

Combining our forecasts for investment in housing, machinery and equipment and other building and construction leads us to growth in total investment of 8.3 per cent in 2006 and 6.5 per cent in 2007, implying a further increase in the share of total investment in GNP (Figure 4).

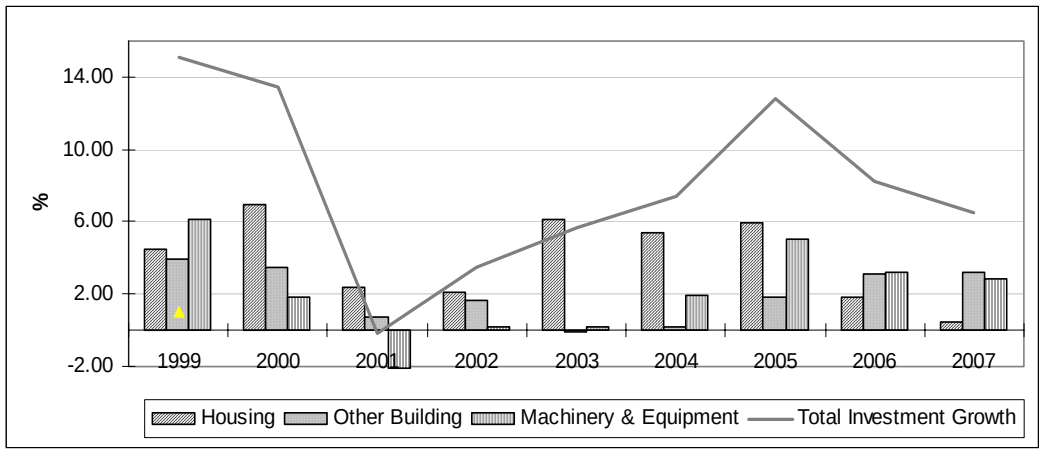
Figure 4: Investment/GNP Ratio



These forecasts suggest a shift in the drivers of total investment growth over the forecast horizon. Figure 5 shows total investment growth since 1999 and our forecasts for 2006 and 2007. The columns show the contributions of the three investment components to this growth. Since 2000, housing investment made the largest contribution to total investment growth and in 2003, was responsible for almost all of the growth in investment. However, our forecasts for 2006 and 2007 point to a reversal of this trend, and by 2007, housing investment will make only a small positive contribution to total investment growth.

[5] E. Morgenroth and J. Fitz Gerald (eds.), 2006. *Ex-Ante Evaluation of the Investment Priorities for the National Development Plan 2007-2013*. Policy Research Series No. 59, Dublin: The Economic and Social Research Institute.

Figure 5: Total Investment Growth and Component Contributions, 1999 to 2007 (Including Forecasts for 2006 and 2007)



Government Spending and the Public Finances

The November exchequer returns together with revised figures for current expenditure and capital borrowing indicate that the exchequer balance in 2006 is now likely to be €1,854 million, equal to 1.2 per cent of GNP. This is significantly higher than the -€416 million figure that we forecast in the Autumn *QEC*. The difference of €2,271 million is almost equally split between an overestimate of current expenditure (€695 million) and the capital balance (€528 million) and an underestimate on tax revenues of €1,048 million. Focusing on the element for which we produce our own forecasts, i.e. taxation, our forecast of tax revenues was €1 billion lower than the likely outturn for 2006. For several individual tax revenue categories our forecasts were broadly on target, however, we underestimated corporation tax by €600 million and capital gains tax by €521 million. In November 2006 corporation tax revenues grew by 54 per cent (€1.1 billion) relative to November 2005 and this scale of growth was wholly unexpected in both official budget day forecasts and our forecasts in September 2006. Our second major forecast error was in relation to capital gains tax that remains largely a black box within our tax-forecasting model (see Box below for details).

The estimated 2006 General Government Balance of €4 billion has dramatically changed the opening position for *Budget 2007*. Pre-Budget estimates published by the Department of Finance suggested that the GGB could rise by €450 million in 2007, while the post-Budget estimate is a fall of €1.7 billion, suggesting a Budgetary injection of €2.2 billion, or 1.3 per cent of GNP. What is the make-up of this injection? The Budget book indicates that current transfers to the personal sector will rise by 15.3 per cent in 2007. This is a very significant real increase in transfer payments; our own estimates

based on current demographics suggest that with full indexation[6] transfer payments would rise by 6.6 per cent. The implied discretionary injection on transfer payments amounts to €1.6 billion. Together with this there has been a significant give-away on income tax, the official figures suggest this could be in the order of €750 million with some clawback through VAT and excise.

Typically, the December *QEC* uses Budget day forecasts of tax revenues, however in this *QEC* we have decided to use our own forecasts of individual tax categories for 2007 based on our macroeconomic forecasts for 2007 (see Box for details). The difference with official figures is striking; we forecast tax revenue to be €1.6 billion higher than the official figure. This difference is mainly due to our much higher forecast for stamp duties, capital gains tax and corporation tax. Notably, our forecast for income tax is lower than official estimates.

This means that in our forecasts the GGB in 2007 barely changes, falling by a mere 0.2 per cent of GDP. Why do we remain concerned about some elements of the Budget? First, there are the direct consequences of this Budget in 2007. It increases personal disposable income leading to an increase in consumption. This is at a time when consumption is growing well above trend due to the SSIA monies coming on stream. Furthermore, it increases inflation, both directly through excise taxes on tobacco, but also indirectly through higher consumption and wage growth. Second, and more importantly from a medium-term perspective, the economy is currently growing above capacity. Recent estimates of potential GNP growth in Ireland suggest a rate of approximately 4.4 per cent between 2005 and 2010.[7] Currently, the economy is growing above that rate and is expected to continue to do so in 2007. In such circumstances the GGB should be rising as a percentage of GNP, as it did in 2006 by 1.3 percentage points. For it to fall in such circumstances implies a significant loosening of fiscal policy. Third, and arguably most importantly, the structure of tax revenues in recent years has shifted towards increasing reliance on stamp duties and capital taxes (over one-quarter of the increase in tax revenues since 2000 has come from stamps and capital taxes). This leaves the public finances exposed to a dramatic slowdown in revenues when the property market slows. In these circumstances, any reduction of the income tax rates is unwise.

[6] This calculation is based on full indexation of unemployment transfers, pensions and child benefit to wage growth, with other transfers indexed to the government consumption deflator.

[7] *Medium-Term Review 2005-2012,* p. 42, Dublin: The Economic and Social Research Institute.

Box: Forecasting Tax Revenues

During the course of 2006 we have been developing a number of simple forecasting rules to forecast individual tax heads. These consist of a series of elasticities linked to an endogenous macroeconomic variable within the QEC forecasting framework as follows:

a. Corporation tax driven by nominal GDP. For 2007 we make a downward adjustment to our forecast due to once-off effects of changes in payment schedules.
b. Income tax is driven by non-agricultural employment. We first adjust the income tax numbers to remove the effect of Special Investigations revenues and SSIA contributions, both of which are included by the Revenue Commissioner in the income tax category.
c. Customs driven by the value of merchandise imports.
d. Excise taxes driven by volume personal consumption.
e. Stamp duties are sub-divided:
    i Residential stamp duty is driven by the value of investment in housing (an indicator of activity in the property market).
    ii Non-residential stamp duty is driven by the value of investment in building and construction excluding roads.
    iii Non-property stamp duties driven by the value of personal consumption.
f. VAT driven by the value of personal consumption.
g. Capital Gains Tax and Capital Acquisitions Tax forecasts are based on recent trends and latest Exchequer figures, the model has no satisfactory indicator for these.

The table below gives an overview of the 2006 and 2007 exchequer balance forecasts. The first column shows our initial forecasts for 2006 based on the *Budget 2006* book forecasts. The second column shows the Autumn 2006 *QEC* forecasts. These forecasts are made using the forecasting rules described above, and were based on eight months of Exchequer Returns data. The third column shows the preliminary outcome for 2006 announced in *Budget 2007*. The last two columns show the 2007 forecasts from the *Budget 2007* booklet and this *QEC's* forecasts.

The initial Winter 2005 *QEC*, which used budget day forecasts, underestimated current revenues by €3.8 billion, equivalent to 8 per cent of the estimated outturn. By September, incorporating eight months of tax returns and using our own tax forecasting rules described in this box, this error has shrunk to €1 billion, or 2 per cent of the estimated outturn. Turning to individual tax forecasts, on all but two categories our forecasts in September were very close to the estimated outturn. These are all items where the monthly exchequer returns are an invaluable interim indicator – income tax, customs, excise, stamp duties, VAT, capital acquisitions tax. The two items with large forecasting errors were corporation tax and capital gains tax, both of which are mainly paid in the November exchequer returns.

For 2007 we have decided to use our forecasting model immediately, and hope to monitor (and where necessary revise) its performance relative to the exchequer returns throughout the year. This means a break with tradition, where typically the *QEC* has used official revenue forecasts at budget time. We hope in this way to improve the consistency of our estimated GGB with our macroeconomic forecasts.

	QEC Winter 2005	***QEC Autumn 2006***	***Budget 2007***	***Budget 2007***	***QEC Winter 2006***
	2006f	2006f	2006e	2007f	2007f
Growth Rates:					
Total Tax Revenue	6.0	13.1	15.8	8.0	10.8
Corporation Tax	10.2	10.7	21.6	-0.4	4.9
Income Tax	3.6	9.2	9.2	10.2	7.5
Customs	6.7	17.8	15.0	9.6	12.0
Excise	4.9	8.4	7.1	8.3	9.9
Stamp Duties	2.1	38.3	35.8	6.1	25.9
VAT	8.0	10.5	11.3	10.5	12.7
Capital Gains Tax	3.6	31.6	58.2	7.9	20.0
Capital Acq. Tax	4.0	40.1	40.6	7.1	20.0
Levels:					
Current Revenue	42,220	44,971	46,019	49,640	51,209
Current Expenditure	37,824	37,823	37,128	41,590	41,590
Current Surplus	4,397	7,148	8,891	8,050	9,619
Capital Account Balance	-7,324	-7,564	-7,036	-8,597	-8,597
EBR	-2,927	-416	1,855	-547	1,023
GGB	-1,040	1,863	3,980	2,276	3,845
EBR Underestimate:	-4,782	-2,271			
of which:					
Current Expenditure Underspend	-696	-695			
Capital Balance Underspend*	-288	-528			
Current revenue underestimated	-3,799	-1,048			
of which:					
Corporation Tax	-650	-600			
Income Tax	-490	3			
Customs	-20	7			
Excise	-114	70			
Stamps	-1,015	70			
VAT	-360	-92			
Capital Gains Tax	-1,065	-521			
Capital Acq. Tax	-90	-1			

**QEC* Autumn used revised capital revenue figures from Dept. of Finance.

TABLE 3: Public Finances

	2005	% Change	2006	% Change	2007
Current Revenue	39,849	15.5	46,019	11.3	51,209
Current Expenditure	33,496	10.8	37,128	12.0	41,590
Current Surplus	**6,353**	**40.0**	**8,891**	**8.2**	**9,619**
Capital Receipts	995	86.9	1,859	-20.2	1,483
Capital Expenditure	7,847	13.4	8,896	13.3	10,080
Capital Borrowing	**-6,852**	**2.7**	**-7,036**	**22.2**	**-8,597**
Exchequer Balance	**-500**		**1,854**		**1,023**
as % of GNP	-0.4		1.2		0.6
General Government Balance	**1,745**		**3,980**		**3,845**
as % of GDP	1.1		2.2		2.0
General Government Debt as % of GDP	**27.4**		**23.8**		**21.2**

Exports

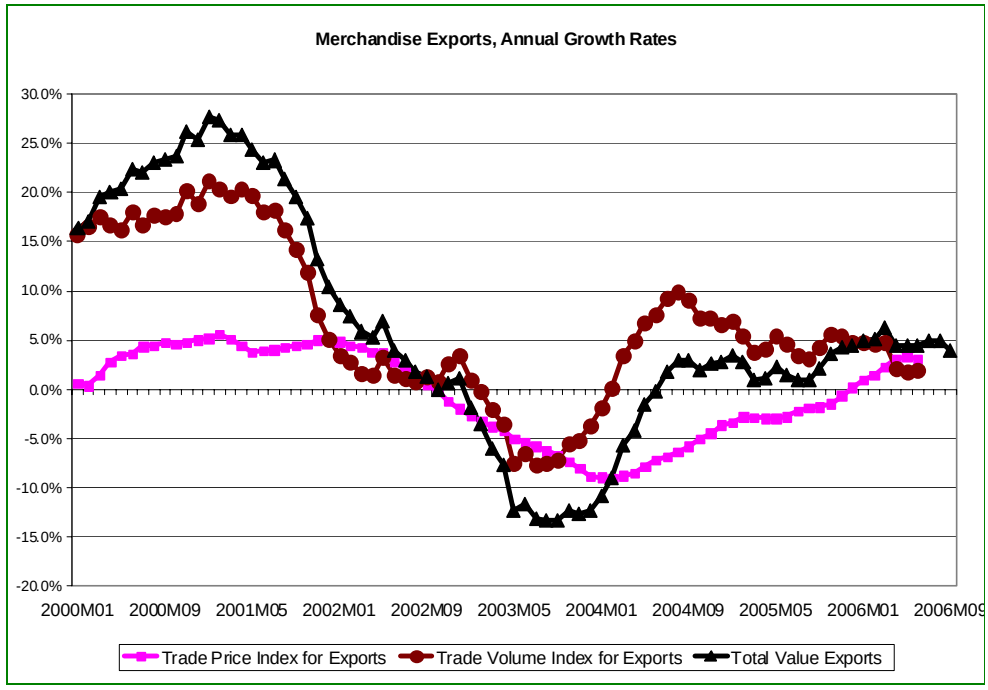
Exports performed poorly in 2005, with volume growth of 3.9 per cent and value growth of 5.6 per cent. The most recent data for 2006 suggest some recovery in growth rates. The *Quarterly National Accounts* for the second quarter 2006 estimate the volume growth rate at 5.6 per cent and the value growth at 8.2 per cent in the year ending the second quarter of 2006. According to the *Balance of Payments*, which only provides data in current prices, this growth was largely due to strong growth in services exports, with non-tourism services exports growing by 15.7 per cent and tourism exports at 8 per cent. The growth in merchandise exports was significantly lower at 4.5 per cent.

While these figures suggest the performance of merchandise exports remains disappointing, there is nevertheless a recovery underway from the sluggish growth rates of recent years. For example, the last time the *Balance of Payments* recorded growth in merchandise exports exceeding 4.5 per cent was in the first quarter of 2002. This trend is confirmed if we examine the *External Trade* statistics. Figure 6 shows the annualised growth rates in the volume and value of exports from the trade statistics since 2000. While current growth rates are far below the heady days of 2000 when growth exceeded 25 per cent, there is a clear recovery from the negative growth rates recorded in 2003 and 2004. Because of this underlying trend we forecast merchandise exports to grow at a rate of 5 per cent for 2006. This is directly linked to our forecast recovery in the industrial sector in 2006 as discussed below. The growth rate in merchandise exports is expected to be lower at 4 per cent in 2007 because the predicted slowdown in the US economy (discussed in the *International* section above) will impact negatively on the demand for Irish exports. Given recent increases in wholesale manufacturing prices (1.6 per cent in year ended October 2006) we forecast export merchandise prices to grow by 1.5 per cent in 2006, easing to below 1 per cent in 2007.

As discussed in previous *QECs* there has been a strong trend in recent years for services exports to drive total export growth and we

expect this to continue in 2007. In 1998 services exports accounted for less than 20 per cent of total exports, we expect this to have risen to 40 per cent by 2007. In relation to tourism exports we forecast a growth rate of 12 per cent for 2006 as a whole. While this is above the second quarter growth rates, it is consistent with the latest data on overseas trips to Ireland and also allows for once-off and spin-off effects of the Ryder Cup.

Figure 6: Annualised Growth In Exports



The latest data suggest that almost half of the growth in services exports in 2006 is concentrated in business services. Business services exports in particular have seen phenomenal growth in the past five years; in 2000 they accounted for under 10 per cent of total services exports, in 2005 over 26 per cent. Financial services exports also recorded double-digit growth in the first two quarters of 2006, while growth in computer services exports – which grew by over 50 per cent per annum between 1998 and 2004 – has been sluggish since the beginning of 2005. Based on current trends and our forecast of services growth in 2007, we forecast very strong growth in non-tourism services exports of 15 per cent for 2006 and 13 per cent in 2007.

TABLE 4: Exports of Goods and Services

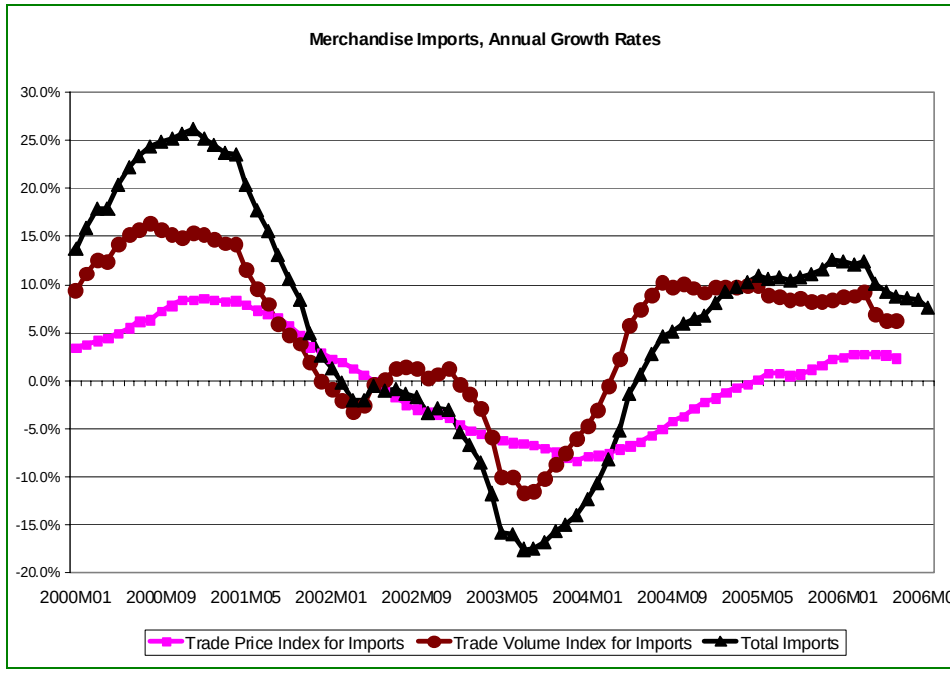
	2004 €m	% Change in 2005 Volume	% Change in 2005 Value	2005 €m	% Change in 2006 Volume	% Change in 2006 Value	2006 €m	% Change in 2007 Volume	% Change in 2007 Value	2007 €m
Merchandise	**80,544**	**2.6**	**3.9**	**83,692**	**3.4**	**5.0**	**87,877**	**3.1**	**4.0**	**91,392**
Tourism	3,536	6.6	7.8	3,813	8.2	12.0	4,271	6.3	10.0	4,698
Other Services	38,888	6.3	8.8	42,304	10.7	15.0	48,650	8.7	13.0	54,974
Exports of Goods and Services	**122,968**	**3.9**	**5.6**	**129,809**	**6.0**	**8.5**	**140,797**	**5.1**	**7.3**	**151,063**
FISIM Adjustment	1,081			1,192			1,367			1,542
Adjusted Exports	**124,049**	**3.9**	**5.6**	**131,001**	**6.0**	**8.5**	**142,164**	**5.1**	**7.3**	**152,605**

Our forecast for 2006 is for 6 per cent growth in the volume of exports of goods and services, falling to 5.1 per cent in 2007. In value terms we forecast growth of 8.5 per cent in 2006 and 7.3 per cent in 2007.

Imports

The volume of imports of goods and services grew by 6.5 per cent in 2005, while the total value of imports rose by 8.3 per cent. The most recent data for 2006 suggest higher growth rates in imports in 2006. The *Quarterly National Accounts* estimate volume growth at 7.5 per cent and value growth at 10.6 per cent in the year ending Q2 2006. The *Balance of Payments* data suggest that this growth was largely due to strong growth in services imports, with non-tourism services imports growing by 13.0 per cent and tourism exports at 16.2 per cent. The growth in merchandise imports was significantly lower at 8.0 per cent.

Figure 7: Annualised Growth In Imports



The pattern of export growth rates over the past five years discussed above is mirrored in import growth rates. Figure 7 shows the annualised growth rates in the volume and value of imports from the trade statistics since 2000. There is a clear recovery from the negative growth rates recorded in 2003 and 2004. Most notably recent growth in merchandise imports exceeds export growth rates, feeding into a narrowing of the merchandise trade balance, discussed below. In the first eight months of 2006 there was strong growth in imports of computer equipment, petroleum and related products and

TABLE 5: Imports of Goods and Services

	2004 €m	% Change in 2005 Volume	% Change in 2005 Value	2005 €m	% Change in 2006 Volume	% Change in 2006 Value	2006 €m	% Change in 2007 Volume	% Change in 2007 Value	2007 €m
Merchandise	**49,122**	**9.2**	**10.1**	**54,086**	**6.3**	**9.0**	**58,954**	**5.4**	**8.0**	**63,670**
Tourism	4,184	14.4	16.7	4,882	12.9	16.0	5,663	12.9	16.0	6,569
Other Services	48,441	2.8	6.0	51,325	8.1	11.5	57,227	8.0	11.5	63,809
Imports of Goods and Services	**101,747**	**6.5**	**8.4**	**110,293**	**7.4**	**10.5**	**121,844**	**6.9**	**10.0**	**134,048**
FISIM Adjustment	349			260			212			121
Adjusted Imports	**102,096**	**6.5**	**8.3**	**110,553**	**7.4**	**10.4**	**122,057**	**6.9**	**9.9**	**134,169**

road vehicles. China once again increased its share of total imported goods, accounting for 7 per cent in the first eight months of 2006 compared with 6 per cent in the same period of 2005. The US share fell from 14 to 12 over the same period while imports from the EU continue to average close to 60 per cent.

We forecast volume import volume growth of 7.4 per cent in 2006 driven by strong growth in consumption and a recovery in merchandise exports. In 2007 this falls slightly to 6.9 per cent due entirely to a slowing of merchandise imports growth. This slowdown reflects the forecast slowdown in merchandise export growth. We have revised upwards our estimate of import price inflation, as the latest *Quarterly National Accounts* suggest an annualised inflation rate of 2.9 per cent. This means volume growth of 7.4 per cent in 2006 and 6.9 per cent in 2007.

Balance of Payments

Our forecasts of merchandise exports and imports for 2006 and 2007 lead to a further narrowing of the merchandise trade surplus in those years. Despite a slight narrowing of the service trade deficit, this means that the trade surplus narrows further in 2006 and 2007. This is a continuation of a trend that began in 2003 and reflects the poor performance of the external sector in driving total demand in the economy. This forecast trade balance is equivalent to 10 per cent of GNP, down from a peak of 20 per cent just five years ago in 2002.

In relation to net factor flows, we forecast a small increase of 3 per cent in 2006. This is a significant downward revision from the Autumn *QEC*, based on the latest data from the *Balance of Payments* and the *Quarterly National Accounts*, both of which suggest negative growth of -0.8 per cent in net factor income in the year ended Q2 2006. This is driven by several factors. First, within the growth in total debit flows there was a surge in repatriated profits, this may be partly linked to the change in US tax laws under the American Jobs Creation Act, 2004. However, the more important factor income outflow was under portfolio and other investment income which grew by almost 50 per cent in the year ended Q2 2006. On the credit side almost all of the growth in the year ended Q2 2006 was also under portfolio and other investment income.

Despite the relatively slow growth in net factor income outflows in 2006, our forecasts imply a current account deficit of 3.8 per cent of GNP in 2006. With a further narrowing of the trade balance and a forecast growth of net factor flows of 5.3 per cent in 2007 this rises sharply to 5.4 per cent in 2007. As can be seen from Table 6 this implies a very rapidly emerging balance of payments deficit which, as we have argued previously, we consider to be an important indicator of the growing imbalances in the economy.

TABLE 6: Balance of Payments*

	2004 €m	Change %	2005 €m	Change %	2006 €m	Change %	2007 €m
Merchandise Trade Balance	**31,422**	**-5.8**	**29,606**	**-2.3**	**28,923**	**-4.2**	**27,722**
Service Trade Balance	-10,201	-1.1	-10,090	-1.2	-9,970	7.4	-10,706
Trade Balance in Goods and Services on BOP basis	**21,221**	**-8.0**	**19,516**	**-2.9**	**18,953**	**-10.2**	**17,016**
Total Debit Flows	57,450	18.0	67,765	19.1	80,732	19.5	96,494
Total Credit Flows	34,968	24.2	43,447	28.2	55,687	25.9	70,114
Net Factor Flows	**-22,482**	**8.2**	**-24,318**	**3.0**	**-25,045**	**5.3**	**-26,380**
Net Current Transfers	**393**	**52.9**	**601**	**-91.7**	**50**	**0.0**	**50**
Balance on Current Account	**-868**		**-4,201**		**-6,042**		**-9,315**
Capital Transfers	279	-4.7	266	12.8	300	0.0	300
Effective Current Balance	**-589**		**-3,935**		**-5,742**		**-9,015**

*This table includes adjustments to Balance of Payments basis.

Gross National Product and Gross Domestic Product

The volume of GNP grew by 7.6 per cent in the year ended the second quarter of 2006. This was greater than the 5.8 per cent GDP growth recorded, suggesting a fall in the proportion of the economy being repatriated by non-residents. We expect this robust growth to continue over the remainder of the year and in 2007. In particular we forecast that GNP will increase by 6.2 per cent this year and by 5.3 per cent in 2007, while GDP will register growth of 5.8 per cent and 5.4 per cent respectively. Gross National Disposable Income (GNDI), which is a better measure of the economic well-being of Irish residents as it takes account of terms of trade effects and international transfers, is expected to expand by a healthy 5.3 per cent in 2006 and 4.6 per cent in 2007. The forecast expansion in the economy will continue to be driven by domestic demand over the forecast horizon, with the external sector expected to continue to make a negative contribution to the economy.

Agriculture

According to the *Quarterly National Accounts* for the second quarter, the average annual growth rate in agriculture for the four quarters ended Q2 2006 was 7.1 per cent. This figure is somewhat distorted by changes which were made in the system of support payments, whereby volume growth in 2005 was recorded at 11.2 per cent, vastly in excess of the 2004 figure of 1.7 per cent.

For 2006 and 2007, we expect to see a continuation in the trend of agriculture declining as a share of the economy with a 5 per cent volume growth in 2006 and a 3 per cent volume increase in 2007. There is one other minor point worth mentioning with regard to agriculture. After a period of sustained job losses, agriculture has now posted four quarters of job gains. While the gains are small, by September 2006 there were almost 2 per cent more people working in agriculture relative to the same period of 2005.

Industry

In the year ended the second quarter of 2006, the *Quarterly National Accounts* show industry (including building) growing by 4.8 per cent up from 3.7 per cent in the first quarter. However, as noted in previous *Commentaries* this can hide important differences between construction and non-construction activities.

In 2005, non-construction industry growth was weak at 1 per cent during the year, while building and construction grew by 9.3 per cent. In the latest Central Statistics Office's (CSO) *Industrial Production and Turnover* release, which provides data for non-construction activity only, the picture that emerges looks somewhat healthier. According to the industrial production figures, output grew by 5.9 per cent in the year ended September 2006 across all industries and by 6 per cent in manufacturing.

Within the "modern sector", the growth figure for the year ended October was 6.7 per cent; for "all other sectors" it was 4.3 per cent. The latest NCB Purchasing Managers' Index (for November) registered a value of 51.6, above the critical value of 50 that separates growth from contraction. However, the value was down on the October reading of 53.2.

As noted in the employment section, job creation within other productive industries is essentially flat. In the year ended Q3 2006, employment grew by only 2000 or 0.7 per cent. With output growth rates in the order of 6 per cent, this points to a strong productivity performance in the non-construction elements of industry. By contrast, the productivity performance in construction appears to be poor. For 2006, we estimate that productivity will decline by 2.8 per cent.

For 2006, we expect industry (non-construction) to grow by 4 per cent in volume terms and for building and construction to grow by 6.9 per cent. For 2007, our forecasts are for 3 per cent growth in industry and 5.1 per cent in building and construction, both in volume terms.

Services

The *Quarterly National Accounts* for the second quarter show the annual average growth rate in services for the four quarters ended Q2 2006 was 6.5 per cent. The corresponding figure for distribution, transport and communications was 4.8 per cent; for public administration and defence the annual average growth rate was 1.7 per cent; for other services, the figure was 7.6 per cent. If we compare the annual average growth rate in industry (4.8 per cent) and in services (6.5 per cent), we see the continuation of the trend that influences our thinking on future trends in the Irish economy whereby the economy becomes more services-intensive, as is the case with other developed economies.

According to the most recent NCB Purchasing Managers' Index for Services, the sector continued to expand. The PMI reading was 58.1, above the expansion/contraction critical value of 50. While expansion is still occurring, the November 2006 reading was the lowest since February 2005.

We expect the services sector to grow by 6.5 per cent in 2006, in volume terms, and again by 6.5 per cent in 2007. As just discussed, such growth rates are consistent with, and influenced by, our view of the continuing rise in services as a share of total output relative to industry. In 2006, services will account for 61.8 per cent of output; in 2007, this is forecast to be 62.6 per cent.

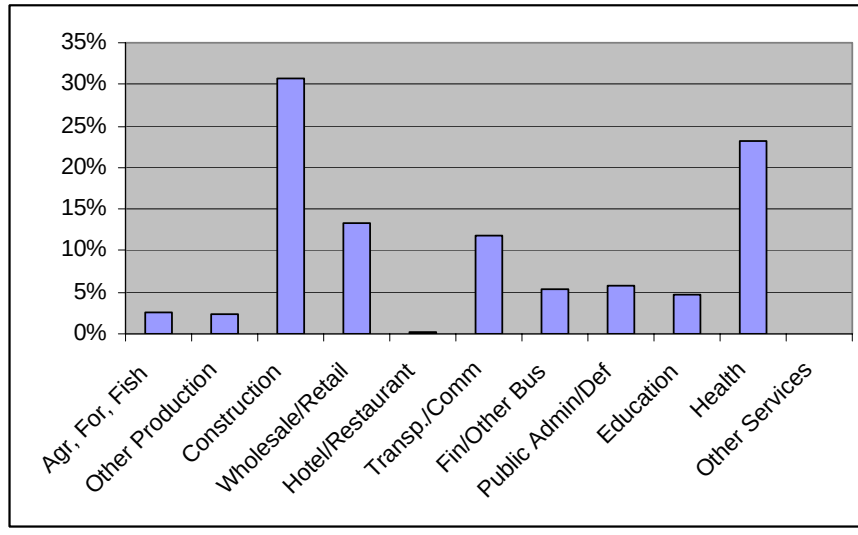
Employment

According to the latest *Quarterly National Household Survey* (QNHS, Q3) the numbers employed rose by 83,500 over the previous year, an increase of 4.2 per cent. While this is lower than the annual growth rate of 5.1 per cent in the same quarter of last year, it still points to a labour market that is extremely buoyant. The unemployment rate (seasonally adjusted) is 4.5 per cent, essentially unchanged since the previous quarter.

The labour force grew by almost 92,000 in the year ended Q3 2006. The participation rate of the population aged 15 years and over, seasonally adjusted, is now 63 per cent. This is unchanged from the previous quarter although it is almost a percentage point higher than in the same period last year. In terms of absolute numbers, this change in participation amounts to an extra 22,000 in the labour force relative to the same period last year. The remaining 70,000 extra people in the labour force comprise immigrants (almost 49,200) and younger people entering the labour force for the first time (20,800).

While the aggregate increase in the numbers employed remains impressive, the sectoral distribution of the increase remains a concern. Over 30 per cent of the annual increase was in construction. A further 23 per cent was in health, with 13 per cent of the extra jobs being created in the wholesale/retail sector. As all of these sectors can be thought of as non-traded, the concentration of employment increases in them points to an economy with difficulties competing on world markets.

Figure 8: Sectoral Breakdown of Total Employment Growth



As mentioned already, net inward migration accounted for almost a half of the increase in the labour force. Similarly, almost half of the extra 83,500 jobs created in the year ended Q3 2006 were filled by immigrants (40,500 jobs). Of the 2.073 million people employed in Ireland now, almost 200,000 are non-Irish nationals. With the unemployment rate essentially unchanged over the last two years, it appears that the Irish labour market has shown a capacity to absorb immigrants with limited impact on natives, on average in terms of employment/unemployment. Given the UK experience of increasing employment and unemployment in the context of high inward migration, the Irish situation appears to represent an interesting case study of success in absorbing immigrants. As we have argued previously,[8] this may be because of greater wage flexibility in Ireland, whereby the impact of immigrants is felt through wages and not employment.

For 2006, we forecast employment to reach 2.042 million, on an annual average basis, an increase of 90,000 or 4.6 per cent. For 2007, the corresponding forecasts are for employment to grow by 84,000 or 3.9 per cent. As regards migration, we expect a net inflow of almost 86,900 in 2006 and 72,000 in 2007. Based on these projected inflows and on our forecasts for employment growth, we also expect the participation rate to rise this year by 1.2 percentage points, with an increase of 1.1 expected for 2007.

TABLE 7: Employment and Unemployment

	Annual Averages 000s			
	2004	**2005**	**2006**	**2007**
Agriculture	117	115	118	116
Industry	516	539	557	572
Services	1,232	1,298	1,367	1,432
Total at Work	**1,865**	**1,952**	**2,042**	**2,120**
Unemployed	87	89	93	97
Labour Force	**1,952**	**2,041**	**2,135**	**2,217**
Unemployment Rate %	4.4	4.4	4.4	4.4
Net Migration	31.6	53.4	69.9	55.0
of which: Inward Migration	50.1	70.0	86.9	72.0
Change in Participation Rate*	0.4	1.7	1.2	1.1

* *Note*: Participation rate measured as share of population aged 15-64 years.

Incomes

Non-agricultural wages grew by 10.9 per cent in 2005. For 2006 and 2007, we forecast strong employment growth, as discussed above, and wage growth of 5.3 per cent and 5.8 per cent respectively. Based on these forecasts, we expect the non-agricultural wage bill to rise by 10.3 per cent in 2006 and by 10.2 per cent in 2007. Our expectation of further large increases in nominal wage rates comes from two angles. First, with CPI inflation averaging 3.9 per cent in both 2006 and 2007, there is likely to be upward pressures on nominal wages as employees seek to achieve real wage increases.

[8] See *Quarterly Economic Commentary*, Spring 2006.

TABLE 8: Personal Disposable Income

	2004	Change		2005	Change		2006	Change		2007
	€m	%	€m	€m	%	€m	€m	%	€m	€m
Agriculture, etc.	2,904	17.1	496	3,399	6.0	204	3,603	4.0	144	3,747
Non-Agricultural Wages	58,844	10.9	6,428	65,272	10.3	6,694	71,966	10.2	7,332	79,298
Other Non-Agricultural Income	16,544	2.5	412	16,956	7.2	1,217	18,172	9.0	1,639	19,811
Total Income Received	**78,292**	**9.4**	**7,335**	**85,627**	**9.5**	**8,115**	**93,741**	**9.7**	**9,115**	**102,856**
Current Transfers	15,609	13.0	2,024	17,633	6.7	1,190	18,823	15.3	2,871	21,694
Gross Personal Income	**93,901**	**10.0**	**9,359**	**103,260**	**9.0**	**9,304**	**112,564**	**10.6**	**11,986**	**124,549**
Direct Personal Taxes	17,953	9.1	1,625	19,578	9.0	1,757	21,335	9.3	1,975	23,310
Personal Disposable Income	**75,948**	**10.2**	**7,733**	**83,682**	**9.0**	**7,547**	**91,229**	**11.0**	**10,011**	**101,239**
Consumption	68,719	7.9	5,395	74,114	10.5	7,810	81,924	11.5	9,439	91,363
Personal Savings	**7,229**	**32.4**	**2,339**	**9,568**	**-2.8**	**-263**	**9,304**	**6.1**	**572**	**9,877**
Savings Ratio	**9.5**			**11.4**			**10.2**			**9.8**
Average Personal Tax Rate	**19.1**			**19.0**			**19.0**			**18.7**

Second, with unemployment remaining low, there is likely to be on-going tightness in the labour market that will tend to lead to upward wage pressures. Continued strong inward migration could help to offset some of this upward pressure but we still foresee nominal wages increases of over 5 per cent in 2006 and 2007.

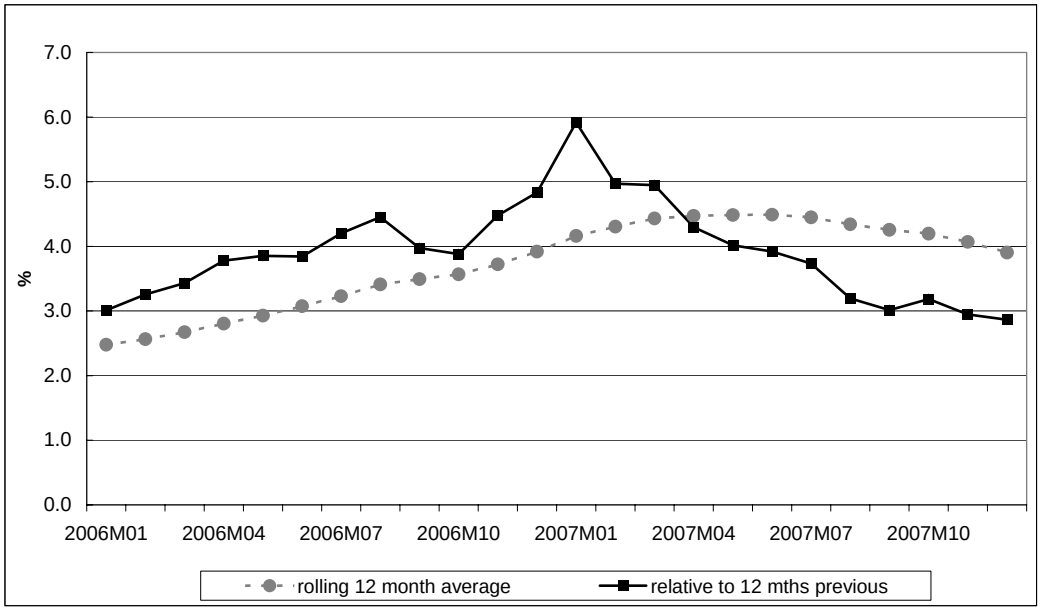
Transfers are forecast to grow by 6.7 per cent in 2006 but this growth rate needs to be understood in the context of an unusually high growth in transfers in 2005. Under Eurostat guidelines, all of the money that the government estimated would have to be paid out in respect of nursing home charges, i.e. €1 billion, was added to transfers in 2005. This artificially boosted transfers in 2005 and so leads to an understatement of the true underlying growth rate in 2006. For 2007, the generous increases in social welfare payments announced in the recent Budget lead to a forecast growth rate in transfers of 15.3 per cent.

Based on our forecasts for consumption and for incomes, we also expect a decline in the savings rate in 2006 and in 2007.

Consumer Prices

The annual rate of inflation registered in November was 4.4 per cent relative to November 2005, up from an annual rate of 3.9 per cent in October and 4.0 per cent in September. The twelve-month moving average increase in the Consumer Price Index (CPI) in November, at 3.7 per cent, is greater than the 2.4 per cent recorded in the same period of 2005. The rolling average has increased consistently since the end of 2005 (see Figure 9) and looks set to increase further until the middle of 2007, having important implications for Ireland's competitiveness over the forecast horizon.

Figure 9: Inflation Profile 2006-2007 (including forecasts for 2006 M11 onwards)



External forces were again the main driver of the recent inflation hike. In particular, administered interest rate increases meant that the Mortgage Interest component of the index accounted for about half of the annual inflation rate in the month. Gas and energy prices also exerted an upward pressure in the index, each directly accounting for around 4 per cent of total inflation. On domestic prices, the Hotels and Restaurants component of the index, which includes items like catering services and alcohol sold on licensed premises, accounted for almost 16 per cent of the total annual inflation rate in November, pointing to a surge in domestic price pressures in this area.

Looking ahead over the next few months, the annual inflation rate is likely to reach record highs last seen around the end of 2000. In particular, the ESB price hike, due to be implemented in January 2007, coupled with a further interest rate effect and the impact of indirect tax measures contained in the Budget,[9] are likely to push annual inflation close to 6 per cent in January. Thereafter, given our forecasts for stability in interest rates, annual inflation is likely to recede, though nonetheless remaining at over 2.5 per cent each month. Our forecasts are for an annual average inflation rate of 3.9 per cent in both 2006 and 2007. Coming from an already high price base, inflation of this magnitude will continue to impact adversely on competitiveness.

Inflation as measured by the Harmonised Index of Consumer Prices (HICP) shows that Ireland's 12 month moving average inflation rate, at 2.6 per cent in October, was higher than the average increase of 2.2 per cent in the Euro Area, and ranks Ireland fifth highest in the Euro Area. The HICP covers around 91 per cent of the basket of goods and services in the CPI, and excludes items like mortgage interest, insurance and motor taxes.

General Assessment

All the indications point to 2006 as another year of strong growth in the Irish economy. With GNP set to grow by 6.2 per cent and employment growth in the region of 90,000, it is clear that the economy is performing strongly. This is, of course, to be welcomed. However, it is important that some of the challenges facing the economy be set out so that any sense of complacency can be avoided. We will briefly consider the balance of payments, the management of the public finances and the fall in the value of the dollar.

Starting from a position of a small deficit in 2004, the deficit on the current account of the balance of payments rose to 3.1 per cent of GNP in 2005. According to our forecasts, this will rise to 4 per cent of GNP in 2006 and to 5.6 per cent in 2007. Others, such as the Department of Finance, are also forecasting an increase in the size of the current account deficit.

[9] The increase in excise on tobacco is estimated to add about 0.35 percentage points to inflation over the year.

The precise implications of a current account deficit on the balance of payments in the context of a monetary union are not entirely clear. One view is that the current account deficit is the result of investment exceeding savings in Ireland. Investment is certainly high in Ireland due to our infrastructural needs in the areas of housing and roads. It could be that the current account deficit will reduce in the years ahead without any negative consequences arising through an adjustment process.

An alternative view of the current account deficit sees it as a consequence of the economy growing above trend, with international borrowing funding the deficit. In this situation, rising indebtedness on international markets will eventually translate into higher risk premia on loans in Ireland. Through the mechanism of higher borrowing costs, debt-financed spending will be reduced and through this route, growth will be reduced.

It is not clear which process is in operation in Ireland and elements of both could be at work. Either way, it is desirable that the underlying causes and implications of the deficit be understood and it is our intention to return to this issue in future *Commentaries*.

Regarding the management of the public finances, our concerns about the recent Budget have been set out above. Among the issues that we raise are the generally expansionary nature of the Budget and also the reduction in the top rate of income tax at a time when questions are growing about the sustainability of recent increases in other taxes, in particular property-related taxes. In addition to these, we would also echo the concerns raised in the ESRI's recent report on public investment priorities, published in October[10] regarding the evaluation of public spending. These same points are also raised in the article by Sean Barrett, which is published along with this *Commentary*. At a time when public revenues are buoyant, a degree of discipline may be lost in pursuing value for money in the use of public funds. With current spending set to grow by 12 per cent next year, there is an onus on the Government to ensure that this extra money, and the existing funds, are spent with best effect. One challenge that will arise for the Government in this context in 2007 is with regard to the report of the Public Service Benchmarking Body. Wage rises in the economy have been exceeding productivity growth in recent years. For this reason, it would be preferable for wage rises in the public sector to be constrained so that additional upward pressures on private sector wages can be avoided as the private sector competes for employees in the labour market.

Our final concern relates to the recent downward movement in the dollar and the possible consequences for Ireland. The ESRI's *Medium-Term Review* published last year showed the critical importance of developments in the US on Ireland's economic prospects. If the recent slide in the dollar, along with the slowdown in growth in the US, is an early indication of the onset of the long awaited adjustment to the US current account deficit, then our

[10] Morgenroth, E. and J. Fitz Gerald (eds.), 2006. *Ex-Ante Evaluation of the Investment Priorities for the National Development Plan*, ESRI Policy Research Series Paper No. 59, Dublin: The Economic and Social Research Institute.

forecasts for 2007 will be in doubt. As shown in the *Medium-Term Review*, a change in circumstances in the US which is consistent with a sustainable current account deficit has the potential to reduce growth in Ireland from a rate of around 5 per cent to a rate of around 3 per cent. The knock-on effects in terms of the public finances and employment are significant and so a close eye on developments in the US will be required for 2007.

SPECIAL ARTICLES

Evaluating *Transport 21* – Some Economic Aspects

by

Sean D. Barrett

To What Extent Has Finance Been a Driver of Ireland's Economic Success?

by

Patrick Honohan

Electricity Shortages in Ireland: Probability and Consequences

by

Laura Malaguzzi Valeri and Richard S.J. Tol

EVALUATING *TRANSPORT 21*- SOME ECONOMIC ASPECTS

Sean D. Barrett[1]

1. Introduction

Transport 21 is a large transport investment programme launched by the government of Ireland in November 2005. It provides for the expenditure of €34.4 billion on road and rail projects between 2006 and 2015 inclusive. In the absence of a comprehensive evaluation of the projects in *Transport 21* it is useful to examine the principles that would underpin an appropriate analysis of the projects in question and to assess some of the projects in *Transport 21* with reference to the principles.

Section 2 of this paper sets out the investments included in *Transport 21*. Section 3 describes the principles involved in evaluation of these investments. Sections 4, 5 and 6 examine respectively the impact of *Transport 21* on rail, bus and road. Section 7 contains a summary and conclusions.

2. Expenditure under *Transport 21*

Table 1 shows the contents of *Transport 21*. Table 2 shows the completion dates for selected major projects.

Table 1: Statistics of *Transport 21*

- €9.4 million a day for transport for the next 10 years.
- 175 million extra public transport users.
- 75 million extra suburban rail passengers.
- City Centre to Dublin Airport in 17 minutes by Metro.
- 80,000 more bus passengers per day.
- 80 million Luas and Metro passengers per annum.
- 7 new Luas projects.
- Dublin rail journeys – DART, Luas, Metro, Suburban – in zero or one change of train.

[1] Department of Economics, Trinity College, Dublin.

Quarterly Economic Commentary, Winter, 2006, pp. 36-58.

Table 1: Statistics of *Transport 21* (Contd.)

- Doubling of park and ride sites in Dublin to 74.
- 70 kilometres of QBC in Cork.
- 187 new rail carriages.
- A train on the hour from Dublin to Cork.
- A train every hour at peak from Dublin to Galway.
- A train every hour at peak from Dublin to Limerick.
- A train every two hours off peak from Dublin to Galway.
- A train every two hours from Dublin to Sligo.
- A train every two hours from Dublin to Waterford.
- Four trains a day from Dublin to Westport, Ballina and Rosslare.
- Train service from Ennis to Claremorris.
- Galway: Commuter train service every day from Athenry to Galway City.
- Cork: Commuter train service every day from Midleton to Cork City.
- Cork: Commuter train service every day from Mallow, Blarney, Dunkettle and Kilbarry to Cork City.
- €9 million per annum for Rural Transport Initiative, serving 500,000 passengers plus.
- A saving of up to 39 minutes by car from Dublin to Galway.
- A saving of up to 41 minutes by car from Dublin to Cork.
- A saving of up to 56 minutes by car from Dublin to Waterford.
- A saving of up to 17 minutes by car from Dublin to Limerick.
- 850 kilometres of dual carriageway, 2+1 and single carriageway roads.
- Atlantic Corridor: Connecting the Gateways of Letterkenny, Sligo, Galway, Limerick and Waterford.

Source: Department of Transport, November 2005.

Table 2: *Transport 21:* Completion Dates for Selected Major Projects

2006	Introduction of hourly services on Dublin-Cork rail route; Opening of Dublin Port Tunnel.
2007	Portlaoise train depot; Delivery and introduction to service of 120 Intercity railcars; MI motorway; M50 Upgrade (phase 1).
2008	Joining of Tallaght and Sandyford Luas lines in city centre; Luas extension from Connolly to Docklands; Luas extension Tallaght to Citywest (subject to developer contributions); Cork commuter rail service to Midleton; Ennis-Athenry rail line (Western Rail Corridor).
2009	Dublin City Centre rail resignalling project; M3 Motorway; Phase 1 of Navan Rail Link; Opening of new Dublin City Centre rail station; Limerick Southern Ring Road; Waterford City Bypass; Galway-Athenry commuter rail services.

Table 2: *Transport 21:* Completion Dates for Selected Major Projects (Contd.)

2010	Metro Phase 1 Tallaght to Clondalkin; Kildare rail upgrade; Sandyford Luas extension to Cherrywood; Dublin-Cork Interurban Motorway; Dublin-Limerick Interurban Motorway; Dublin-Galway Interurban Motorway; Dublin-Waterford Interurban Motorway; M50 Upgrade (Phase 2).
2011	Metro West Phase 2 Clondalkin to Lucan; Athenry-Tuam rail line (Western Rail Corridor).
2012	Metro North; Luas extension from city centre to Liffey Junction; Metro West Phase 3 Lucan to Blanchardstown.
2013	Lucan to city centre Luas; Rail Safety Programme completed.
2014	Metro West Phase 4 Blanchardstown to Ballymun; Tuam-Claremorris rail line(Western rail Corridor).
2015	Interconnector completed; Extend electrification to Balbriggan, Maynooth, Navan, Hazlehatch; Phase 2 of Navan rail link; Luas extension Cherrywood to Bray.

Note: The 2011-2015 road programme will involve the development of approximately 150 kilometres of dual carriageway, 400 kilometres of 2+1 roads and 300 kilometres of single carriageway. The sequencing of projects for implementation post-2010 will be decided by the National Roads Authority at a later date.

Source: Department of Transport, November 2005.

3. The Evaluation of Transport Investments

The welfare criterion for a public investment is that the discounted value of the benefits from a project should exceed its costs thus enhancing the welfare of society as a whole. The future stream of benefits is quantified using shadow prices to value externalities, neighbourhood effects, spillovers and third party impacts where market prices are inadequate or do not exist in product and factor markets. The rate of return on a project is compared to a range of alternatives. Sensitivity tests are undertaken in order to test the sensitivity of the rate of return estimates to changes in the underlying assumptions, shadow prices, or the relative performance of the alternative projects. The results are presented in terms of the internal rate of return on the project, its ratio of discounted benefits to costs and its net present value. A caveat in using the net present value calculation is that in measuring benefits minus costs it favours large over small projects.

In transport projects such as those comprising *Transport 21* the typical quantified economic benefits are time savings, accident reductions and vehicle cost savings. Studies of environmental impacts such as noise, air and water pollution, visual intrusion, heritage buildings and sites, flora and fauna are also prepared.

Cost benefit analysis assesses a project from the perspective of society as a whole rather than from the perspective of merely sectoral beneficiaries and project insiders and must, therefore, supply information, research and data for society as a whole.

Mulreany (2002) and Morgenroth and Fitz Gerald (2006) provide useful examples of project evaluation in Ireland.

By contrast the evaluation of *Transport 21* is made difficult by the manner in which it was presented to the public. No research, studies, evaluations, or documentation other than shown in Tables 1 and 2 have been published. We do not know what cost benefit appraisals determined the investment choices made or rejected.

On the cost side of *Transport 21* individual project costings have not been published. *Transport 21* is presented as a package which in total costs €34.4 million. This bundling will hinder the monitoring of the ability of individual projects to remain within the allocated budget. During the National Development Plan 2000-2006 there were frequent cases of inability to deliver projects within the initial published costings.

On the benefit side we do not know the shadow prices used in the bundle as a whole or in the case of individual projects. These shadow prices should be published. The absence of published shadow prices by central government runs the risk that by default the use of shadow prices may devolve to sectoral studies and that the shadow prices used may not be robust. For example, the Booze Allan Hamilton *Strategic Rail Review* (2003) shadow price for time savings was more than twice average earnings in 2002. The rail safety programme costing €1.2 billion used a shadow price of fatalities over a hundred times greater than used in other safety projects and cited in the *Strategic Rail Review*.

The net benefits from a project depend crucially on the alternatives with which it is compared. For example, the spillover benefits of railways in urban areas in a "with and without" appraisal are heavily influenced by whether in the absence of railways people remained on public transport in buses or transferred to cars. The assumption in "Appendix J" of the *Strategic Rail Review* (2003) that rail passengers would transfer to cars rather than buses was crucial. The *Review* estimated that rail passengers' "car resource savings" were 47 per cent of the total benefits for ten rail projects examined. The *Review* did not examine what proportion of car resource savings attributed to the railways might also be achieved if a competitive bus sector would emerge in the absence of protectionist policies towards the railways. There is ample evidence that a competitive bus market would bring much lower fares and higher frequency to the benefit of users and would eliminate, or significantly reduce, the large subsidy and investment grant costs of the present railway policy.

4. Railway Investment in *Transport 21*

The first *Transport 21* project to get under way, the Metro rail link to Dublin Airport/Swords illustrates several of the difficulties discussed in Section 3 above. The cost has not been published either in *Transport 21* or in the announcement of the chosen route. The disparity between the cost estimates of the Chairman of the Rail Procurement Agency, at over €6 billion and by Professor M. Melis of Madrid at €1.2 billion require public analysis. The evaluation examined the choice of one of three Metro routes to the

Airport/Swords but not the more crucial question of whether there should be an Airport/Swords Metro at all. The route selected in October 2006 was the alternative central route via Drumcondra and Ballymun in preference to the west route (via Broadstone and Finglas), the central route (via Glasnevin and Ballymun) and the east route (via Drumcondra and Santry). The announcement makes no statement of the costs of the four options and the benefits are not quantified.

To assume the result of a cost benefit analysis, as *Transport 21* does in relation to the Airport/Swords Metro, involves the taxpayer in serious risks. A major investment of this kind, the Heathrow Express, had a market share of 8.4 per cent of passengers in 2001. The other shares were car 35.6 per cent, car hire 3.2 per cent, taxi/minicab 26.6 per cent, underground 13.1 per cent and bus/coach, 13.0 per cent. (British Airports Authority, 2002). Railway shares of airport traffic elsewhere in the UK are declining. For example, at Gatwick the railway share of passengers declined from 38 per cent in 1978 to 20 per cent in 1998 when the railway share at Manchester was 6 per cent. (Civil Aviation Authority, 1999). At Dublin Airport the AerDart bus service connecting the airport with its closest railway station at Howth Junction by QBC, with through ticketing from Dundalk, Maynooth, Greystones and intermediate stations to Dublin Airport failed because of lack of demand.

No origination and destination or purpose of journey survey has been published of potential airport Metro traffic. These studies should examine whether airport passengers and workers have origins or destinations close to railway stations and the extent to which residences and commercial activities are no longer clustered in central business districts but have dispersed to lower density suburban areas near motorways and airports. The growing leisure air travel market may be difficult to divert to railway systems because of the problems of transferring luggage between home and railway station, and between railway and airport with possible interchange connections en route and between airport, railway station, and hotel or guest house for visiting traffic.

In contrast the opening up of Aircoach high frequency bus service from south Dublin, Cork and Belfast to Dublin Airport and other direct services from Galway, Waterford, Dundalk and Letterkenny to Dublin Airport, have rapidly improved bus services at Dublin Airport with lower fares, higher frequencies and 24 hour operation without government subsidy. Dublin Bus has also expanded its direct services to the airport on several routes. The options of bus services using the Port Tunnel and QBCs for quick airport access both from the centre of Dublin and directly from the greater Dublin area rather than routing passengers through the city centre should be examined before any more commitments to the Airport Metro are made. Swords is already served by a motorway and QBC and has a rail service close by at Malahide.

The Airport/Swords Metro is a combination of two project types in the Dublin area, which had a combined cost overrun of €1.2 billion that is Luas and the Port Tunnel. The failure to publish

ex post cost benefit analyses of these projects increases the taxpayer risk in further tunnel and rail transport projects. The Port Tunnel and Luas projects were characterised by wide disparities in initial cost estimates and actual costs, inability to deliver projects on time, and failure to specify the benefits sought and to consider the alternatives available.

The wider pro-railway emphasis in *Transport 21* is illustrated in Table 1 in the target of 75 million extra suburban rail and 80 million extra Luas passengers in a total public transport target of 175 million extra public transport users. This allocates 89 per cent of all additional public transport trips to the railways in contrast to their present share of under 8 per cent. The pro-railway emphasis is also seen in the sectoral breakdown of the 29 projects listed in Table 1 comprising 20 rail projects, 3 bus projects and 6 road projects. Rail, with the lowest share of public transport passengers (7.6 per cent) and the lowest share of passenger expenditure on public transport (16.4 per cent) is given priority in *Transport 21* over a bus sector which carries 93 per cent of passengers and attracts 84 per cent of passenger public transport receipts.

The pro-railway emphasis of *Transport 21* may be justified by cost-benefit analysis but, as we have seen, no analysis or research informing *Transport 21* has been published. Whatever benefits *Transport 21* assumes to derive from heavy rail investments may be offset in whole or in part by the following published data:

(i) Declining productivity: Between 1996 and 2001 Irish railway staff numbers increased by 35 per cent. Traffic units increased by 9 per cent with the result that traffic units per staff member fell by 19 per cent.

(ii) Declining yields: In the decade to 2001 real average rail fares declined by 10 per cent and 13 per cent and freight yields by 25 per cent. This followed declines of 16 per cent for passengers and 14 per cent for freight in the 1980s.

(iii) Despite, or perhaps because of, heavy investment programmes railways have not been able to reduce their dependence on large operating subsidies. Indecon (2005) noted that a €377.4 million investment in Dublin Suburban Rail between 2000 and 2004 brought an increase in passenger numbers from 22.5 million to 23.9 million, an investment cost of €270 per incremental passenger carried (52/54). On the Ballina/Westport route an investment programme costing €55.3 million attracted an extra 79,000 passengers, an investment cost of €700 per incremental passenger (85).

(iv) Railways have not been able to match either the fares or frequencies of unsubsidised bus companies. This is unlikely to change despite large rail investments under *Transport 21*. On intercity bus routes with competition the bus frequencies per day in each direction are: Dublin-Belfast 35 a day compared to 7 in 2004 when the route was a monopoly; Dublin-Galway 34 compared to 1 as a

monopoly; Dublin-Waterford 20 and Dublin-Cork 14 compared to 6 in 2004 when the route was a monopoly. Intercity rail passenger numbers were static at 11.3 million in the three years 2002-2004 when personal consumption rose by 11 per cent in constant prices.

(v) Railways rely on increasing and high levels of state subsidy. In 2004 the operating deficit was €239 million, which was 60 per cent of costs with users paying only 40 per cent. The subsidy cost per passenger was €6.83 compared to 40c and 27c respectively per Dublin Bus and Bus Eireann passenger. The total state funding to the CIE group in 2004 was €417 million comprising €268 million for operational costs and €149 million investment grants. The independent bus sector is excluded from these payments. Despite this competitive disadvantage of €417 million in competition with CIE the independents had customer receipts in 2003, which were 2.24 times the passenger railway receipts, 1.78 times the receipts of Dublin Bus and 1.41 times the receipts of Bus Eireann.

(vi) Despite heavy subsidisation and investment grants railways have a poor consumer image. Table 3 illustrates the high level of dissatisfaction with passenger rail services in a survey of members by the Chambers of Commerce of Ireland (2005).

Table 3: Chambers of Commerce Survey of Satisfaction with Passenger Rail Services, 2005

Very Satisfied	1
Satisfied	17
Neither satisfied nor dissatisfied	30
Dissatisfied	30
Very Dissatisfied	22

Source: Chambers of Commerce of Ireland, Transport Users Survey (2005), p. 20. (Research by MORI in 600 interviews in eight regions using the Kompass list of companies and the Market Research Society guidelines.)

Table 3 indicates a serious consumer problem for railways in Ireland. Less than one respondent in five, only 18 per cent, expressed satisfaction with railway services. Those who feel intensely dissatisfied with rail passenger services outnumber those who are very satisfied by 17 to 1. While railways have many strongly committed supporters among the wider public they face persistent image problems with passengers. Attley *et al.* (2001) criticised the policy of selling more tickets than seats available. "The consequences include overcrowding and all its associated impacts on customer service, company image etc." The *Strategic Rail Review* (2003) noted the failure to deliver reduced journey times. "Current intercity rail journey times are, in many cases, longer than journey times achieved more than a decade ago." Indecon note that from a 1999 baseline, "the Belfast, Cork, Tralee, Limerick and Galway lines actually experienced deteriorations in their journey times, at least up to 2006" p.77. The poor results of the significant investment in the

railways in the recent past were noted also by Booz Allan Hamilton (2003).

The Oireachtas Joint Committee (1995) found that the quality of catering on trains "…diverges greatly, it is either extremely high or low, but rarely in between." These consumer problems are long-standing. McKinsey (1980) found that 43 per cent of rail passengers chose the train because they had no alternative means available. This response significantly outweighed those who chose rail because of speed (11 per cent), less tiring than driving (11 per cent), and comfort (10 per cent). The improvements sought by most passengers were cheaper fares (32 per cent) and cleaner trains (15 per cent). Better catering and more trains were each requested by 12 per cent of respondents. The request of a third of rail passengers for lower fares and the choice of 10 per cent of rail passengers of trains because they are "more economical/less expensive" than other modes illustrate a further consumer problem in this area. Trains are not "more economical/less expensive" than buses or planes, as Table 4 indicates. Trains cost about 2.5 times as much as bus. Rail passengers pay only 40 per cent of the costs. The decline in railway labour productivity and the large capital requirements of railways plus the failure of *Transport 21* to analyse these investments make the aspiration of cheaper rail fares unrealistic. The problems of large rail investments are illustrated by examining the Dublin-Cork rail line for which *Transport 21* proposes an hourly train service in competition with fourteen buses and ten flights daily and a motorway between the cities.

WHY INVEST IN THE DUBLIN-CORK RAIL ROUTE?

The introduction of hourly services between Dublin and Cork in 2006 is the first major project to be completed under *Transport 21* as shown in Table 2. The costs involved are not stated nor is there any estimate of the expected benefits. There are, however, data on the alternatives with which the rail investment will have to compete. Table 4 shows the results of a survey of travel modes between Dublin and Cork in February 2006.

Table 4: Competing Public Transport Modes between Dublin and Cork, 2006

	Fare-One Way €	Comfort Rating
Plane-Ryanair	53.15	5/5
Train-Iarnrod Eireann	54.50	4/5
Bus-Bus Eireann	10.00	3/5

Source: Irish Farmers Journal, 18 February 2006.

Table 4 indicates the difficulties faced by the railways in competing on this route since the market entry of both Ryanair and Aircoach in 2005. Ryanair in the survey was both cheaper and had a higher comfort rating as well as being faster than the railway. The bus fare was only 18 per cent of the train fare. Air travel between Dublin and Cork and the competing Aircoach service are not subsidised. The introduction of the ATR 72 aircraft by Aer Arann and 737-800 by Ryanair has doubled the air seat availability on the Dublin-Cork route on ten flights daily. Table 5 indicates that bus

capacity on the Dublin-Cork route has increased by 2.3 times since deregulation in 2005.

While Bus Eireann receives a large subsidy not related to individual routes the company claims that its intercity services do not receive any subsidy. While individual route results are not published by the railways the overall railway finances required a subsidy in 2004 which was 60 per cent of operating costs and almost 1.5 times user receipts. The subsidy may be greater on Dublin-Cork given evidence that the losses on heavily invested mainline railway lines tend to be higher than on lines, which are less heavily invested. On the basis of the information currently available to the public any success of extra train frequency between Dublin and Cork in increasing rail traffic at the expense of air and bus will increase the cost of travel to society as a whole because of the passenger transfer from unsubsidised modes, bus and air, to a heavily subsidised mode, the railway. Table 5 shows the change on the bus market between Dublin and Cork with the introduction of competition in 2005.

Table 5: The Impact of Competition on Dublin-Cork Bus Route, 2005

	2004 Monopoly	2005 Competition	Index 2004=100
Fare Single	€ 20.5	€7.0	34
Return	€33.0	€12.0	36
Frequency per day	6	14	233

Source: Bus Eireann; Aircoach.

Transport 21 also provides for a reduction of 41 minutes in car journey times between Dublin and Cork by 2010 further weakening the prospects of a return on railway investment on the route while increasing bus speeds. The *Strategic Rail Review* found that the Dublin-Cork line had an average trip length of 43 per cent of the route length, the lowest of all the lines examined. The case for investing in Dublin-Cork rail frequency appears to be weakening since the recent arrival on the route of competing bus companies with much lower fares and competing airlines with similar fares, shorter journey times and higher comfort ratings. More efficient airports at Dublin and Cork will also increase the competitiveness of air travel between the cities.

OTHER RAIL INVESTMENTS IN *TRANSPORT 21*

Of the eleven other rail routes in Table 1 on which frequency increases are proposed by *Transport 21*, only two, Galway and Waterford, already have bus competition. The likely entry of new bus operators on all the train routes and a low cost airline on the Dublin-Kerry route should be included in any risk assessment of the investment in greater frequency in the rail routes shown in Table 1. The road time savings of 39 minutes to Galway, 56 minutes to Waterford and 17 minutes to Limerick by 2010 should also be included in a risk assessment of railway investments on these routes.

The resignalling of Dublin City Centre railways is proposed for completion in 2009. This should be examined in view of the cost

overrun from €17.8 million to €63.5 million on a previous resignalling programme on lightly used lines. The investigation by an Oireachtas Committee could not continue because of the High Court decision in the Abbeylara case that the Oireachtas could not investigate matters where individuals might be found culpable.

Table 2 also lists the rail safety programme for completion in 2013. This programme cost €648 million between 1999 and 2003 and was to be followed by a second programme costing in excess of €500 million over the years 2004 to 2008. As with the rest of *Transport 21* no costings are available. The *Strategic Rail Review* states that there were eight fatalities on the railways over the years 1991-2001. Barrett (2003) states that "…with a rail safety programme costing €1.2 billion over a decade, the cost of the project, the massive shadow price of fatalities assumed at over a hundred times higher than in other safety budgets, and the absence of any measured benefits from the programme to date, all indicate that the rail safety programme should be reassessed." *The Mid-Term Evaluation of the National Development Plan* (Fitz Gerald *et al.*, 2003) recommended on the rail safety and mainline track renewal that there should be "…no further commitment without proper economic cost-benefit analysis."(p. 126). Indecon (2005) in its examination of safety indicators noted that "…the number of animals killed on the line fell from 165 in 1997 to 42 in 2003" (p. 76). No estimate of the railway safety programme's benefits to humans is shown. The *Transport 21* decision to continue a further tranche of investment in the rail safety programme is therefore a surprise. The *Transport 21* completion date for the rail safety programme in 2013 is five years after the original target date for a ten-year programme, which will now take fifteen years.

A further questionable rail investment is the Dublin Interconnector tunnel due for completion in 2015. The object of the Interconnector is to link the Sligo, Belfast and Rosslare lines to the remainder of the railway network. The lines are presently connected by a double track tunnel under the Phoenix Park, resleepered and used for freight, service trains and occasional passenger trains. The *Strategic Rail Review* dismisses the line as offering "…no real opportunities for beneficial passenger services…passengers who currently alight at Heuston are unlikely to be attracted by an extra 15 minute trip to Spencer Dock Station, particularly when the Luas system service is operating from Heuston Station to Connolly Station." Passengers using the bus connection between the stations were advised in the Railway Timetable to "…allow at least one hour transfer time between Connolly and Heuston Station." The Luas (light rail) connection in the Heuston to Connolly direction is likely to require standing and may be difficult for passengers with luggage. A fifteen-minute train connection using the existing double track railway is thus more attractive now than when the *Strategic Rail Review* reported. *Transport 21*, therefore, proposes a third rail connection between Heuston station and the remainder of the railway network but does not evaluate the three railway alternatives, Luas, Interconnector, Phoenix Park Tunnel, or the bus alternative using a QBC from

Heuston to the city centre. The latter option will be enhanced when trucks currently using the city quays are rerouted through the Port Tunnel.

The reluctance to run passenger trains between Heuston and Connolly on the existing line is a producer rather than a consumer decision. There is little to lose by testing the market before embarking on the tunnelling project. The informal claims by the railway authorities that the existing tunnel line is too slow and is otherwise unsuitable require independent evaluation. There is an apparent contradiction in the endorsement by *Transport 21* of the use of the Cork City Tunnel both for extra Cork suburban trains and mainline trains from Dublin while refusing to analyse services through a similar railway tunnel in Dublin. Both railway tunnels are double track and are in daily use without any reported difficulties. The decision in *Transport 21* to have further tunnelling in Dublin both for the airport Metro and the Heuston Interconnector exposes taxpayers to risk because of the failure to analyse the economics of the Dublin Port Tunnel's cost overrun from €257.4 million to €792 million for 2.6 kilometres underground plus 3 kilometres open excavation.

Railway electrification is also proposed for four routes by 2015 but there is no analysis of the last electrifications to Greystones and Malahide or of the relative costs of electric and diesel powered trains. In addition to the capital costs required for electrification of Irish railways there are higher fuel costs. Electricity costs in Ireland in 2005 were 53 per cent higher, than in France and 51 per cent higher than in the UK. (Forfás *Annual Competitiveness Report,* 2005, p. 44). The fuel cost on the largely electrified Iarnrod Eireann suburban rail division in 2004 was 11.4 per cent of revenue compared to 10.6 per cent of revenues on the mainline rail division, which is not electrified.

No post-project cost-benefit analysis of the Luas lines to Tallaght and Sandyford has been published. This is required under the Department of Finance guidelines (McCarthy, 2005). This is a serious shortcoming given the increase in cost from an estimate of €290 million at 1995 prices to an estimated completion cost of €750 million. The Indecon Report finds that the Sandyford Route is carrying 70 per cent more passengers than forecast while the Tallaght route is carrying 30 per cent less than forecast. This would indicate better results from converting old railway lines than from on-street trams. The scope for other rail line conversions is limited. Watt (2006) estimates a social cost of €6 per Luas passenger journey and that this level of external benefit was assumed rather than analysed in the promotion of the project.

Seven new Luas lines are included in *Transport 21* as shown in Tables 1 and 2. The new Luas lines include some extensions of existing lines and the Citywest and Cherrywood projects will involve assistance from developers. The Lucan Luas requires special evaluation because the route is presently served by two QBCs on both the new and old roads from Lucan to Dublin. Table 6 shows that large sections of the Lucan QBC have faster speeds than the Tallaght Luas now. Both Lucan QBC routes have significant spare

capacity and the case for triplicating two underused QBCs by a light railway remains to be seen.

The final rail project is the Metro West railway route from Tallaght to Ballymun to be built between 2010 and 2014. No origin and destination survey appears to have been conducted into this project. It is a matter of concern that the route is at present unable to support even a bus service in either the private or the public sector between the points. This calls into question whether the passenger volumes on the route will sustain a Metro railway or a Luas link. No estimates of the cost of Metro West have been published.

5. Bus Projects Included in *Transport 21*

Despite the dominant role played by buses in public transport in Ireland only three bus projects are included in the 31 items in Table 1. No bus project is included in Table 2. The three bus projects in *Transport 21* are:

(i) an additional 80,000 bus passengers per day,
(ii) an additional 70 kilometre of QBCs in Cork and;
(iii) €9 million per year to be spent on the "Rural Transport Initiative".

The key economic features of the bus sections of *Transport 21* are the marginal role for bus services as a whole compared to railways and within the bus sector an overwhelming reliance on state at the expense of private bus companies. The bus passenger target of 80,000 passengers a day increase is only 11 per cent of the total public transport increase with 89 per cent of the target public transport increase to be delivered in rail passengers. The 11 per cent bus share of extra public transport passengers in *Transport 21* is allocated overwhelmingly to the public sector despite the record of limited deregulations to date in delivering both large fare cuts and increases in frequency.

Transport 21 was published eleven months after the Goodbody Report (2005) on the independent bus sector, which estimated the receipts for the sector in 2003 at €307 million. This is 77 per cent more than Dublin Bus, 41 per cent more than Bus Eireann and 124 per cent more than railway passenger receipts. The total bus and train passenger market expenditure was €835 million with market shares of 36.7 per cent for independent bus, 26.1 per cent for Bus Eireann, 20.7 per cent for Dublin Bus and 16.4 per cent for railways. Assuming that the independent bus revenues translate into passengers at the same rate as CIE gives an estimated 187 million passengers on these services compared to 150 million on Dublin Bus, 90 million on Bus Eireann and 35 million on rail. The independent bus operators are ignored in *Transport 21* in contrast to the essential and standard consideration of alternatives in a cost benefit analysis. They are excluded from public subsidies and investment grants, and, overwhelmingly from route licences. Goodbody found that the private bus fleet of 4,859 vehicles was almost double the combined Dublin Bus and Bus Eireann fleet. and had 6,000 employees. The private bus fleet expanded by 91 per cent between 1992 and 2003 and invested €304 million in fleet over the

five years 1999-2003. In contrast with the weak consumer support for the railways as shown in Table 3 the same Chamber of Commerce survey showed 86 per cent support for liberalisation of the bus market.

The treatment of the independent bus sector under *Transport 21* is currently being investigated by the EU Competition Policy directorate. Heretofore, the EU has heavily financed the favourable treatment of state over independent bus companies. The Indecon Report noted that 'state expenditure on the favoured modes exceeded the planned budget between 2000 and 2004 and that the ERDF made a budget contribution to that excess'. "The National Public Transport Measure has received over €1 billion over the period – 23 per cent above target. The European Regional Development Fund (ERDF) contributed €64 million which was almost four times the forecast figure." (p.91). The goal of ERDF funding is that "…financial assistance from the ERDF is mainly targeted at supporting small and medium enterprises, promoting productive investment, improving infrastructure and furthering local development"(Railway Procurement Agency, 2004). In the Irish bus sector monopoly is supported by both the ERDF and the Irish government to the detriment of small and medium bus companies and the productive investments of these companies is undermined by government and ERDF expenditures, which significantly exceed forecast budget allocations. The Small Business Forum Report, *Small Business is Big Business* (2006) states that "*Transport 21* is welcome" notwithstanding the threat it presents to 1,800 small bus businesses in addition to the policy bias against this sector since 1932 without support from small or large business organisations. The MVA Report (2006), commissioned by Dublin Bus, notes 'the decline in its ratio of fare revenue to costs from 90 per cent in 1998 to 76 per cent in 2000, to 68 per cent in 2004'. Public policy increased the subsidy rapidly rather than address market access for alternative service providers.

Transport 21 also restricted the development of the state's own bus companies. Dublin Bus has sought extra buses but these were not included when *Transport 21* was launched in November 2005. *Transport 21* did not make provision for the fleet requirements needed to carry its target of an additional 80,000 passengers a day. The omission was addressed on September 29, 2006 the Department of Transport announced the allocation of €30 million to Dublin Bus for the purchase of 100 additional buses and €50 million to Bus Eireann for the purchase of 160 buses by Bus Eireann. The private sector in the Dublin area was permitted to operate 100 extra buses on new routes with a later target of 200 buses or 15 per cent of the city's fleet. No provision was made for any further private sector participation in bus markets outside Dublin. The announcement also quantified for the first time the cost of bus investments under *Transport 21* at €770 million comprising €530 million in the greater Dublin area and €240 million in the rest of the country. This follows the investment by the state in its bus companies of €543 million under the National

Development Plan 2000-2006 and annual operating subsidies, which cost €77 million in 2003.

The second bus project in *Transport 21* is an additional 70 kilometres of QBC in Cork. The experience of Dublin QBCs, notably the Stillorgan QBC, has been positive in generating public transport time savings and frequency increases at lower capital costs than rail-based alternatives. The flaws in relation to QBCs in *Transport 21* are its failures to:

(i) contrast the cost-benefit performances of QBCs and rail alternatives;
(ii) to examine the amount of spare capacity in the existing Dublin QBC system;
(iii) and to coordinate the supply of QBCs by local authorities with the plans for their use by both state and independent bus companies.

In an examination of nine QBCs from 1997 to 2004, MVA finds that at the Dublin cordon the number of bus passengers increased by 50 per cent while the number of cars declined by 21.4 per cent (p.43). It notes that the Malahide Road "QBC has the highest share for buses with over 63 per cent of people travelling on this route by bus compared to 25 per cent by car" (p. 46). MVA propose that peak frequency on existing QBCs should increase from 2.4 to 2.1 minutes on existing routes and from 7 minutes to 5 on new proposed routes. In regard to Express/Limited Stop services MVA state "…bus-based rapid transit services can provide frequency equal to that on the Tallaght Luas line and better than that offered by heavy rail" (p.60).

The advantages of bus over fixed track in urban commuting lie in better residential street access closer to passengers' homes, and better access to the central business district closer to offices and shops. Rail's advantage on the line haul part of the journey is enjoyed by those who both live and work near stations. However, the heavy rolling stock used with consequent acceleration and deceleration problems and frequency of stations diminish this advantage of rail. In a study of Toronto for example, Dewees found that for journeys of four miles from the downtown area "…the commuter railroad is completely dominated in both monetary cost and time performance by all express bus systems. The railroad's faster line haul speed is more than offset by its poor suburban distribution and its inability to provide access to a wide area of the CBD (central business district). Express buses operating locally in a suburban area, travelling along an expressway and then making a number of stops in the downtown area, offered a substantially better performance by any measure." The problems of railways may also be exacerbated by the circuitous routings of some rail journeys such as Dublin-Bray. Appendix 1 compares average speeds on three DART routes and three Luas routes with average speeds on Dublin QBCs. Five QBC sections in 2004 had average speeds greater than the 35.5 kilometres per hour on DART. Thirty-three QBC sections had average speeds faster than the 19.6 kilometres per hour of the Tallaght Luas. The obstacles to generating greater speeds over the entire QBC network include the short length of many QBCs and

the lack of bus priority at intersections. The ability of QBCs to increase their market share further is limited by the lack of state investment in the public bus fleet and the policy against licences for the independent bus sector.

The third bus project in *Transport 21* provides €9 million per annum for the "Rural Transport Initiative" serving 500,000 passengers. This is a subsidy of €18 per trip or €36 for round trips to local towns from rural areas not served by public transport. Based on the Dublin-Cork bus fare of €12 for a 330 miles round trip the €36 subsidy for rural transport initiative passengers would purchase 990 miles of bus travel in the open market. To pay €36 for, say, a ten-mile trip to a local town or village without a competitive market is hugely inefficient. The state since 1932 has restricted independent bus operators thus creating a shortage of public transport in many areas. Rather than deregulate the market, *Transport 21* finances an "initiative" at a cost per passenger mile as much as a hundred times more expensive than open market bus services. A cost benefit framework would have contrasted a range of alternatives to this expenditure.

6. Road Projects in *Transport 21*

Table 2 shows the Motorway projects in *Transport 21*. They include the M1, M3, and the M50 and the interurban motorways from Dublin to Cork, Limerick, Galway and Waterford. The Mid-Term Evaluation of the NDP (Fitz Gerald *et al.*, 2003) warned against investments in motorways on routes where volumes were significantly below the motorway capacity of 55,000 vehicles per day. *Transport 21* nonetheless makes such investments between Kilcullen and Waterford and Portaloise and Cork. The capacity of 55,500 vehicles a day between Kilcullen and Waterford (N9) and Portlaoise and Cork (N8) was found by the evaluation to be eleven times the actual 2001 volumes on sections of the N9 and an average of eight times the actual volumes on 48 per cent of the route length of the N8. The evaluation states that "…the *Roads Needs Study* did not recommend motorway, or even dual carriageway, for the sections in question, and no economic analysis has been offered to our knowledge to justify the design inflation which appears to have occurred." The Comptroller and Auditor General estimated that the decision in favour of a Kilcullen-Waterford motorway added €455 million at 2002 prices to the cost of the route compared to the *Road Needs Study*. This author's estimate is that the additional cost of the motorway decision on the Portlaoise-Cork route is €1 billion. In addition to this problem of "gold-plating" *Transport 21* faces problems concerning the reliability of its costings, inherited from the 2000-2006 National Development Plan.

In the 2000-2006 NDP the budget allocation of €5.6 billion for primary roads increased by 2003 to €16.4 billion with only 50 per cent of the projects completed by the expiry of the NDP at the end of 2006. The Comptroller and Auditor General's analysis of the cost overruns found that:

(i) 40 per cent of the price escalation was caused by price movements with a quarter of this due to underestimation of prices at the beginning of the programme.
(ii) A further 16 per cent of the increase was due to systematic failure to cost certain elements of schemes at the planning stage.
(iii) Changes in the scope of projects and new works accounted for around 20 per cent of the increase.
(iv) The balance of the cost-escalation is due to project specific increases and increases in the cost of projects with non-standard features such as the Dublin Port Tunnel and that part of the M50 known as the South Eastern Motorway.

(Comptroller and Auditor General, 2004, p. 8).

The overall cost overrun on the NDP package of national primary road projects was 193 per cent that is a €10.8 billion overrun on an estimated cost of €5.6 billion. Applying the Comptroller's analysis above to this 193 per cent increase in the cost of the programme yields the following findings:

(v) The unit costs of the programme rose by 77.2 per cent that is 40 per cent of the 193 per cent cost escalation. Overall inflation in the economy between 1999 and 2003 was 20 per cent
(vi) 46 per cent of the cost escalation was due to failures in the initial specifications of projects such as failure to use accurate prices at the beginning (10 per cent), to cost certain elements at the planning stage (16 per cent) and to specify adequately the scope of the project (20 per cent).
(vii) 24 per cent of the overall overrun costs were due to non-standard features.

The Comptroller noted that design and management costs increase as the project costs increase. The scale of fees for contracts in excess of €25.4 million is €162,000 plus 4 per cent of the cost of the works. This is paid in three instalments, 35 per cent based on the estimated cost, 35 per cent based on the tender sum and 30 per cent of the final cost. This provides an incentive for cost escalation at each stage in order to increase the incomes of the design and management teams. The Comptroller notes that "…the capacity of the NRA to move to fixed price contracts is limited since current arrangements with the industry do not permit the fixing of prices for terms exceeding eleven months" (p. 34).

The "non-standard features" explanation for cost overruns in the programme illustrates unsatisfactory features from an economics perspective. The Comptroller's report cites the South Eastern Motorway as "non-standard" due to land costs, litigation costs and archaeology at Carrickmines castle. The Dublin Port Tunnel is also cited as "non-standard" but how it differs from other tunnels and the knock-on implications for further tunnel projects are not examined. "Appendix F" of the Comptroller's report lists nine further "non-standard" projects, which had a 2000 estimate of €387 million and a 2002 estimate of €1,111 million, a 187 per cent increase. The "non-standard" cost escalations include M50

improvements, €190 million to €562 million; Naas road widening €56 million to €196 million; Ballincollig bypass, €78 million to €225 million; Edgeworthstown bypass €12 million to €46 million; Ballinteer-Wyckham €7 million to €17 million; Celbridge interchange €7 million to €14 million; and Leixlip/M50 €21 million to €41 million.

The Comptroller does not state what non-standard features apply to such a range of projects. The non-standard cost escalations call into question the initial designation of standard costs. In a more rigorous definition of standard costs it might be expected that cost underruns and overruns would be similar and would cancel each other out. Standard cost estimates for ten projects which within two years cover only 30 per cent of the project costs, are systematically understating outturn costs. Standard costings should be revised upwards to cover the actual standard costs. The more projects which can secure non-standard designations, the less useful standard costings are in appraising a road investment programme. In the Comptroller's Appendix F the cost overruns on ten non-standard projects were a combined total of €1.468 million in 2002 on a 2000 estimate of €747 million. On only one project, the resurfacing of the Cork southern ring road was the outturn, €6 million, lower than the standard-cost estimate of €13 million. This cost underrun of €7 million was only 0.48 per cent of the cost overruns totalling €1,468 million.

The Committee on Public Accounts examined the national roads budget on May 12, 2005. Further overruns were noted such as the Drogheda bypass, opened in 2003, at €244 million compared to the original estimate of €112 million and the Youghal bypass with an outturn of €43.5 million compared to an estimate of €10.7 million. Youghal was completed "…under a more stringent design and build contract". The Committee's attempt to estimate relative overruns on PPP projects was frustrated by the denial of information on the grounds of confidentiality. The Chairman of the Committee stated that the Department had contributed to cost overruns by dividing projects into phases in order to discourage overseas contractors. In June 2006 it emerged that the fixed price contract of €123 million for the construction of the Ennis bypass had increased to €138 million. On June 19, 2006, the Minister of State for Transport officially opened the Edgeworthstown bypass stating that at a cost of €14 million it was "within budget" (Department of Transport, 20 June). This contrasts with "Appendix F" of the Comptroller's report, which examined a cost escalation of the Edgeworthstown bypass from €12 million to €46 million.

The Comptroller notes the cost escalation of the Dublin Port Tunnel from €220 million in 2000 to €580 million in 2002. The project is due to open in late 2006 at a cost of €792 million. The underground section is 2.6 kilometres with a further 3 kilometres constructed using open excavation which was subsequently covered. (Kelly, 2005, p. 141). The decision in *Transport 21* to proceed with further tunnelling projects in the Dublin area without evaluating the experience of the overrun on the Dublin Port Tunnel exposes taxpayers to increased risk.

The Comptroller notes that "…the traditional procurement method employed by the NRA involved retention of most risks and paying for them to the extent that they occurred and were measured." The prevention of further cost escalations will require a transfer of risk from the state and taxpayer to the infrastructure sector and the imposition of penalties for non-performance. There is also a need to further free trade in this and other service sectors.

7. Improved Evaluation of Transport Projects in Ireland

The development of economic appraisal capability in transport in Ireland should include *ex ante* and *ex post* evaluation of major projects. The evaluations should not be carried out by either promoting agencies or their consultants or nominees. The evaluations should include a full set of shadow prices for all projects independent of promoting bodies and their agents; a range of alternatives to be included in each project evaluation including market-based alternatives; the estimation of internal rates of return and benefit/cost ratios for all projects and a series of sensitivity tests. There should be full publication of this material. The minimal information and research available on *Transport 21* costing €34.4 billion contrasts with the prospectus for the Aer Lingus. Initial Public Offering Prospectus (2006), which provided prospective investors with over 200,000 words of analysis of their investment. The information required to support investment choices is higher in the public sector because of the wider range of factors involved in considering investments from the perspective of society as a whole.

Without economic expertise and full publication of economic research the initiative in public policy making will shift to producer groups, lobbyists, and rent seekers. For example, the Oireachtas Committee on Commercial State-Sponsored Bodies (1995) found that CIE had 59 engineers and only 16 people with business or commerce qualifications at senior management level. Attley *et al.* (2001) developed the point further. "The history of Iarnrod Eireann has produced a managerial culture that is strongly male-dominated and engineering oriented and one that still embodies many of the weaknesses of a non-commercial monopoly, with an ethos of administration rather than of management." Lack of economics expertise, and engineer dominance are common features of the three major spending agencies in *Transport 21*, Iarnrod Eireann, the Rail Procurement Agency and the National Roads Authority. The Luas and Metro recruitment advertisements in the media in April 2006 sought to recruit fourteen categories of engineer and design staff and an archaeologist, but no economists.

Transport 21 does not address the lack of a "value for money" focus which was a major problem in the transport sections of the *2000-2006 National Development Plan*. Flyvbjerg, Bruzelius and Rothengatter (2003) examine a worldwide megaprojects problem. While cost overruns and benefit shortfalls are widespread more and bigger megaprojects are being planned and built. The incentive structure favours the suppliers of projects which have cost overruns and there are no penalties for overestimating use and benefits. There is also scope for rent-seeking by interest groups and vote-

seeking by politicians especially in cases where the user charges of a megaproject are a small or nil proportion of the project cost and where costs can be transferred to society as a whole including to future generations. By bundling projects in a €34.4 billion package rather than publishing individual cost benefit analyses *Transport 21* exposes the taxpayer to megaproject risk. In a cost-benefit framework the high opportunity costs of megaprojects in a full employment economy such as Ireland would be apparent. McCarthy (2005) notes a coalition of supporters of large transport investment projects including existing operators in the sector, equipment suppliers and construction companies, politicians representing beneficiary geographical areas and "nature's optimists." Table 6 lists some proposed reforms in the appraisal of transport projects in Ireland in the light of research for this paper, the experience of the *2000-2006 National Development Plan* and the content of *Transport 21*. Templates of this type are important in the context of the next National Development Plan, due to be launched in January 2007.

Table 6: Proposed Reforms in the Appraisal of Transport Projects in Ireland

1. Greater economic expertise in the Department of Transport, its agencies, and local authorities.
2. Reinstatement of the Department of Finance's role in ensuring value for money in public expenditure. This could be complemented by a Central Office of Project Evaluation, a National Audit Office/Public Expenditure Commissioner and enhanced powers for the Comptroller and Auditor General.
3. *Ex Ante* independent evaluations of all major investment and subsidy proposals before they gain any momentum on the basis of inadequate costings.
4. Publication of evaluations for public debate.
5. Designation of a common set of shadow prices for each assumed failure in product and factor markets.
6. Inclusion of a range of alternatives in each project appraisal including market based alternatives and alternatives proposed by other agencies.
7. Restricting "do nothing" alternatives in cost benefit analysis to the minimum. A high "do nothing" cost reduces the apparent costs of the additional investments being appraised.
8. Estimation of Internal Rate of Return and Benefit/Cost ratios for all alternatives rather than Net Present Value which favours large projects.
9. Inclusion of a range of sensitivity tests on each alternative appraised.
10. Publication of *ex post* cost benefit analyses of all major transport investments.
11. Measures to transfer risk from state to the construction sector such as fixed price contracts, enforcement of standard costings, cost overrun penalties, abolition of fee income on cost overruns and international competition in the infrastructure sector.

CONCLUSION: THE FUTURE OF *TRANSPORT 21*

This paper has examined the lack of published economic analysis to support the large public expenditure programme in *Transport 21* and proposed remedial measures. The lack of an evaluation culture permeates *Transport 21* in crucial choices between and within the investment categories proposed. The immediate danger of *Transport 21* is that binding contractual commitments at large cost to taxpayers will be entered into by the promoting agencies before the necessary project appraisals are carried out and that *Transport 21* as launched would provide "letters of comfort" for the beneficiary spending agencies.

A cost-benefit analysis framework for large spending projects and evaluation culture is required in the Irish public because, as Barry (2005) points out, "…one further danger worth alluding to concerns the end to EU oversight of national investment policy when Ireland's right to EU regional aids ends in 2006." Barry also notes that "…other observers however are fearful that, governments in the absence of EU oversight may again find themselves so beholden to regional and interest group pressures that national priorities are lost sight of." Fitz Gerald (1998) states that "…the involvement of EU Commission officials helped nudge domestic decision makers towards measures which were desirable on economic criteria" while Fitz Gerald and Hegarty (2000) stated that the "…development of such an evaluation culture and capacity will be one of the lasting benefits of the Structural Funds programme to Ireland." The sheer cost of the investments *Transport 21* proposes, the uncertainty surrounding the costs and the lack of evidence concerning the benefits sought indicate the urgency of developing and strengthening an Irish public sector evaluation culture.

AER LINGUS, 2006. *Initial Public Offering Prospectus*, Dublin.

ATTLEY, W., K. BONNER and J. DUNNE, 2001. *Iarnrod Eireann*: *The Way Forward*, Report of Review Group established by the Minister for Public Enterprise, Dublin.

BARRETT, S.D., 2003. "The Irish Strategic Rail Review: A Critique", *Quarterly Economic Commentary*, Autumn, pp. 40-58, Dublin: The Economic and Social Research Institute.

BARRETT, S.D., 2004. Bus Competition in Ireland-The Case for Market Forces, *Quarterly Economic Commentary*, Autumn, pp. 69-88, Dublin: The Economic and Social Research Institute.

BARRETT, S.D., 2005. "The Role of Airports in the Transport Chain, in Airports as Multimodal Interchange Nodes", ECMT Round Table 126, Paris: OECD, pp. 41-66.

BARRY, F., 2005. "Future Irish Growth: Opportunities, Catalysts, Constraints", *Quarterly Economic Commentary*, Winter, pp. 34-58.

BOOZ ALLAN HAMILTON, 2003. *Strategic Rail Review*, Dublin: Government Publications.

BRITISH AIRPORTS AUTHORITY, 2002. *Heathrow-Delivering for London and the regions*.

CHAMBERS OF COMMERCE OF IRELAND, 2005. *Transport Users Survey*.

CIVIL AVIATION AUTHORITY, 1999. *Passengers at Gatwick, Heathrow and Manchester Airports in 1998*, CAP 703.

COMPTROLLER AND AUDITOR GENERAL, 2004. *The National Roads Authority Primary Routes Improvement Programme*, Dublin:

DEPARTMENT OF TRANSPORT, 2005. Annual Report, 2004, Dublin:

DEPARTMENT OF TRANSPORT, 2005. *Transport 21*, Dublin:

DEWEES, D., 1976. "Urban Express Buses and Railroads", *Journal of Transport Economics and Policy*, January, pp. 16-25.

DUBLIN TRANSPORTATION OFFICE, 2004. *QBC Monitoring Report*, Dublin:

FITZ GERALD, J., 1998. "An Irish Perspective on the Structural Funds", *European Planning Studies*, Vol. 6, No. 6, pp. 677-694.

FITZ GERALD, J., C. McCARTHY, E. MORGONROTH and P. O'CONNELL, 2003. *The Mid Term Evaluation of the NDP and the Community Support Framework for Ireland 2000-2006*, Policy Research Series No. 50, Dublin: Economic and Social Research Institute.

FITZ GERALD, J. and D. HEGARTY, 2000. "*Ex Ante* Evaluation Process for the 2000-2006 Period in Ireland", unpublished ms.

FLYVBJERG, B., N. BRUZELIUS and W. ROTHENGATTER, 2003 *Megaprojects and Risk*, Cambridge: Cambridge University Press.

FORFÁS/NATIONAL COMPETITIVENESS COUNCIL, 2005. *Annual Competitiveness Repor,* Dublin: Forfás.

GOODBODY ECONOMIC CONSULTANTS, 2005. *The Private Bus and Coach Sector in Ireland*, Dublin: Goodbody Economic Consultants.

INDECON, 2005. *Economic and Social Infrastructure Operational Programme (ESIOP) Update Evaluation*, Dublin: INDECON.

KELLY, N., 2005. "The Economics of Road Use and Investment" , M.Litt. Thesis, Dublin: Trinity College.

McCARTHY, C., 2005. "Evaluating Large Urban Transport Projects", Dublin Economic Workshop Policy Conference, Kenmare, October.

McKINSEY INTERNATIONAL, 1980. *The Transport Challenge* Dublin: Government Publications.

MORGONROTH, E., and J. FITZ GERALD (eds.), 2006. *Ex-Ante Evaluation of the Investment Priorities for the National Development Plan 2007-2013*, Policy Research Series, No. 59, Dublin: The Economic and Social Research Institute.

MULREANY, M. (ed.), 2002. *Cost Benefit Analysis Readings*, Dublin: Institute of Public Administration.

MVA, 2006. *Dublin Bus Network Review*, March, Dublin: Bus Atha Cliath.
OIREACHTAS JOINT COMMITTEE ON COMMERCIAL STATE-SPONSORED BODIES, 1995. Fourth Report, Iarnrod Eireann.
REPORT OF THE SMALL BUSINESS FORUM, 2006. Dublin: Forfás.
WATT, R., 2006. "The Economics of Transport in Dublin", Dublin Economic Workshop Policy Conference, Kenmare, October.

Appendix 1: Speeds on Dart, Luas and QBCs, Dublin 2004

Dart Route	Km	Journey Time (mins.)	Speed (kmh)
Howth	14.3	23	37.3
Malahide	14.3	22	39.0
Bray	19.1	38	30.1
Average			35.5
Luas			
Tallaght	15.0	46	19.6
Sandyford	9.0	22	24.5
Cherrywood*	7.6	19	24.0

QBC Route	Section	Kmh
(a) Faster than DART average of 35.5 kilometres		
Lucan	Chapelizod-Colbert Road	56.90
Blanchardstown	Ashtown-New River Road	47.95
Blanchardstown	Coolmine-Main St.	37.69
Malahide	Priorswood-Greencastle	36.45
Malahide	Casino-Fairview	35.88
(b) Faster than Tallaght Luas average of 19.6 kilometres above 5 sections plus		
Lucan	Foxhunter-M50	34.24
Tallaght	Terenure Road-Rathgar Road	32.25
Lucan	Colbert Road-Huston Station	30.93
Swords	Main Street-Airside Park	27.56
Tallaght	Oldbridge-Fortfield	27.48
Swords	Airport-Omni Park	27.05
Clondalkin North	SCR-Mount Brown	24.99
Tallaght	Main Street M50	24.95
Tallaght	M50-Oldbridge	24.33
Lucan	Conyngham Road-Parkgate Street	23.77
Lucan	Chapelizod-Conygham Road	23.58
Swords	Airside-Cloghran	23.40
Malahide	Clare Hall-Priorswood	23.06
Clondalkin North	Fonthill Road	22.76
Swords	Co. Council-Cloghran	22.49
Blanchardstown	Ashdown-Rathoath Road	22.39
Blanchardstown	Town Centre	22.20
Stillorgan	Mount Merrion Ave-Donnybrook	21.45
Lucan	M50-Palmerstown	21.27
Stillorgan	Plunkett Road-Abbey Road	20.87
Rathfarnham	Bishop Street-Stephen Street	20.76
Malahide	Fiarview-Amiens Street	20.52
Stillorgan	Foxrock Church-Mt Merrion Avenue	20.25
Blanchardstown	Coolmine Road	20.03
Tallaght	FortfieldRoad-Rathdown Park	19.85
Lucan	Colbert Road Ellis Quay	19.72
Blanchardstown	Coolmine-River Road	19.72
Clondalkin North	Kylemore Road-Emmet Road	19.65

QBC sections faster than Dart: 5.
QBC sections faster than Tallaght Luas: 33.

Source: Dart Timetable; Department of Transport *Annual Report 2004,* Table 9. Rail Procurement Agency, April 2006; Dublin Transportation Office, *QBC Monitoring Report,* November 2004, Table 11.

TO WHAT EXTENT HAS FINANCE BEEN A DRIVER OF IRELAND'S ECONOMIC SUCCESS?

Patrick Honohan[1]

One of the most striking and perhaps surprising econometric findings in the literature on economic growth has been the apparently robust relationship identifying financial sector development as a strong and significant causal factor for long-term economic growth (an extensive literature is reviewed by Levine, 2005). This was a surprising finding since a majority of economists (in the decades preceding the availability of cross-country data on economic growth) had regarded finance as a handmaid of the real sector, rather than a driving force. Making sure that finance was supportive of the economic growth process was usually considered a negative task. It would, in that view, be enough to ensure that things did not go wrong, for example, through inflation and exchange rate depreciation getting out of hand, through a crisis of intermediary insolvency, or by transmitting a wider loss of confidence throughout the economy. This old thinking has been superseded by evidence that an efficient financial system is a positive driver of growth. The new view has become quite fashionable worldwide, apparently striking a chord as much with observers close to the market as with aficionados of the econometrics of cross-country panel data.

But when it comes to accounts of *Ireland*'s outstanding economic performance, these do not stress financial sector aspects. Has Ireland's growth really not been strongly attributable to financial sector development; or could students of Ireland's economy have missed something?

[1] This is revised from a talk presented to the Dublin Economic Workshop Policy Conference, Kenmare, October, 2006. Thanks to participants at that conference and to an anonymous referee for helpful comments and suggestions. The views expressed are personal.

Fifty years after the great crisis of 1956, which was triggered and accentuated by monetary policy errors (Honohan and Ó Gráda, 1998) and which resulted in the greatest burst of emigration of the last century, it is timely to look at this issue. Have Ireland's distinctive financial structure and the policies adopted in relation to finance helped or hindered growth in Ireland. In particular did the Celtic Tiger have some special financial fuel in its tank?

Today there are some distinctive – even world-beating – features of Irish finance. But, despite the emergence of the International Financial Services Centre (IFSC) as a leading player in some subsectors of offshore finance; despite the high profitability and unusually high percentage of the banking system not domestically controlled; and despite the absence of any significant bank failures for over a century; there is little evidence to suggest either that recent Irish growth has been finance-rich in the sense understood by the literature, or that the previous low-growth experience was explicable in terms of a weak financial system.

This paper sketches some of the relevant considerations for both long-term economic convergence and short-term macroeconomic fluctuations. The role of Irish finance in long-term growth appears muted when placed in international comparison. However, it is essential to take proper account of the long-established integration between Irish and global finance. Quietly the rest of the world has taken up the slack in facilitating the financing of the larger companies operating in Ireland and also in easily financing surges in credit demand.

While Irish corporates have drawn on foreign finance, the Irish financial system inclusive of the IFSC has been a significant exporter of financial services. There have been no adverse shocks from intermediary failure. But finance has had an important influence on short-term fluctuations, especially as a macro watchdog. Recently, the watchdog role has been muzzled by the arrival of the single currency, so the financing, currently of mortgage demand, has persisted further than it would have in the past.

1. Long-term Growth

In order to detect the link between financial development and growth in cross-country data, it is preferable to average the data over several years. This is because in shorter timescales the long-term effects can be hard to detect among the cyclical and random factors. For instance a credit-led consumption boom can obviously have a short-term (but often unsustainable) impact on year-to-year economic growth: that is not the kind of effect that is alleged in the finance-growth literature. Time-averaging over a business-cycle duration washes out such short-term effects, but also reduces the number of available observations for any given country – hence the need to broaden the dataset to include cross-country variation. Even in annual data though finance does not always lead growth. For Ireland, Hosford (2002) looked at credit depth-GDP relationship 1971-1998 and found causality from GDP to finance.

Figure 1(a) shows a scatterplot comparing average GDP growth with financial depth (private credit to GDP ratios) 1980-2003 across all countries for which the data is available. A clear upward-sloping relationship is evident. Figure 1(b) repeats the exercise, but this time shows residuals of the same variables from preliminary regressions, showing how an upward-sloping relationship does persist even when it is adjusted for other likely explanatory factors.

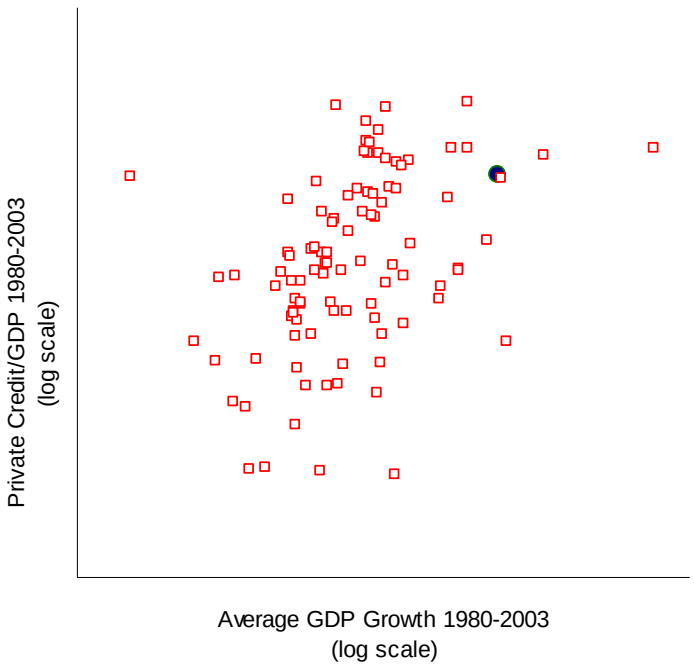
Ireland is below the regression line, showing that there is still a sizable gap to be explained after account is taken of financial depth. Note also that in the time period shown (and as discussed further below) Ireland has been an offshore centre and from that point of view would be expected to be an outlier well *above* the line (the offshore activities generating an exaggerated measure of financial depth). On this evidence, financial depth falls well short of explaining Ireland's exceptional growth.

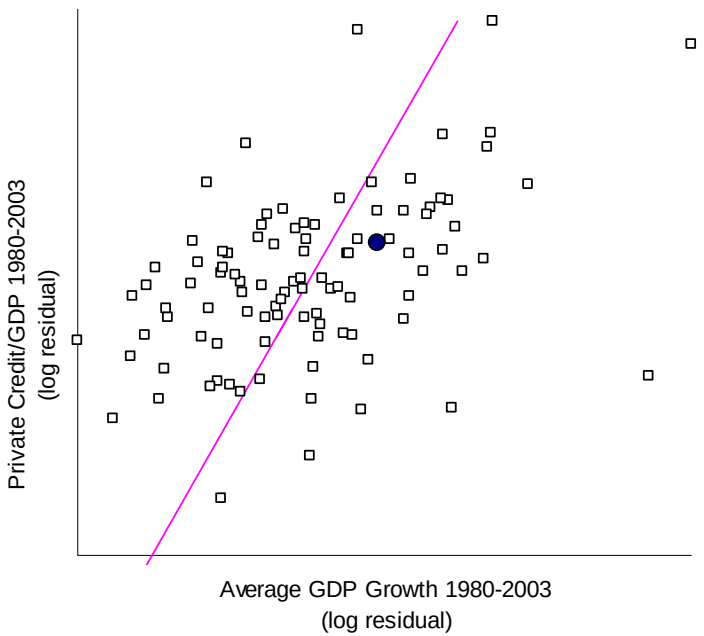
In seeking to understand why an efficient financial system might have a positive effect on growth, researchers have pointed to two key mechanisms. Of the fundamental functions of the finance system (effecting payments, mobilising funds, pooling and redistributing risk, appraising creditworthiness and monitoring the use of funds) it seems that the last-mentioned two are crucial for the growth link. There is plenty of evidence now that quality not volume of financing is what matters. Thus, contrary to the emphasis of an earlier generation of finance-and-growth enthusiasts, it is not the amount of savings that the financial system mobilises that counts as much as its effectiveness of ensuring that the funds are "well spent".

How good a job does the Irish financial sector do at credit appraisal and monitoring? Pretty good, if we take the *negative* evidence of some spectacular Irish corporate failures. When the Goodman empire collapsed in 1990, it turned out that the Irish banks were comparatively speaking, little exposed. Likewise the failure in 1992 of GPA's initial public offering and the subsequent dismembering of that company left mainly foreign banks sweating. Even Irish Shipping (failed in 1984) was indebted mainly to foreign entities. (Of course it had already managed to offload its dud insurance arm, ICI – which subsequently failed in 1985 – to AIB; remembering also PMPA, which failed in 1983, perhaps insurance underwriting is just not a natural Irish strength.)

Here we begin to see the importance of the global financial system in providing financial services to Ireland. Indeed, it is not only the duds that have been financed abroad. Although the non-financial business sector in Ireland has a sizable, though not excessive, debt-to-GDP ratio of 95 per cent (2005), the Central Bank of Ireland's recent *Financial Stability Report* observes that most of this corporate debt is borne by a small number of large international firms, who have sourced their debt abroad.

Figure 1: Growth and Financial Depth: Ireland in International Comparison





Source: Based on results in Beck (2006).

At the large scale, then it seems that external access could be the secret ingredient, which explains how Ireland could have scored more highly on the growth dimension than appears warranted by its financial depth as measured by domestic credit to the private sector.

Before looking more closely at internationalisation of debt flows and stocks in Ireland, though, it is worth taking a brief look at data on access at the *small* scale.

2. Household Access to Financial Services

Although there is so far little evidence of a macroeconomic impact on growth or indeed on inequality of differential rates of access to financial services for low-income households and SMEs, there is much practical interest in ways of enhancing such access and reducing "exclusion" from financial services.

We might cosily suppose that Ireland scores well in this dimension, not least because of the noteworthy success of the credit union movement in recent years. Indeed, a recent book on financial inclusion worldwide cites the Irish loan funds, dating back to the time of Jonathan Swift, as pioneers in providing credit to the poor (Helms, 2006; cf. Hollis and Sweetman, 1998).[2]

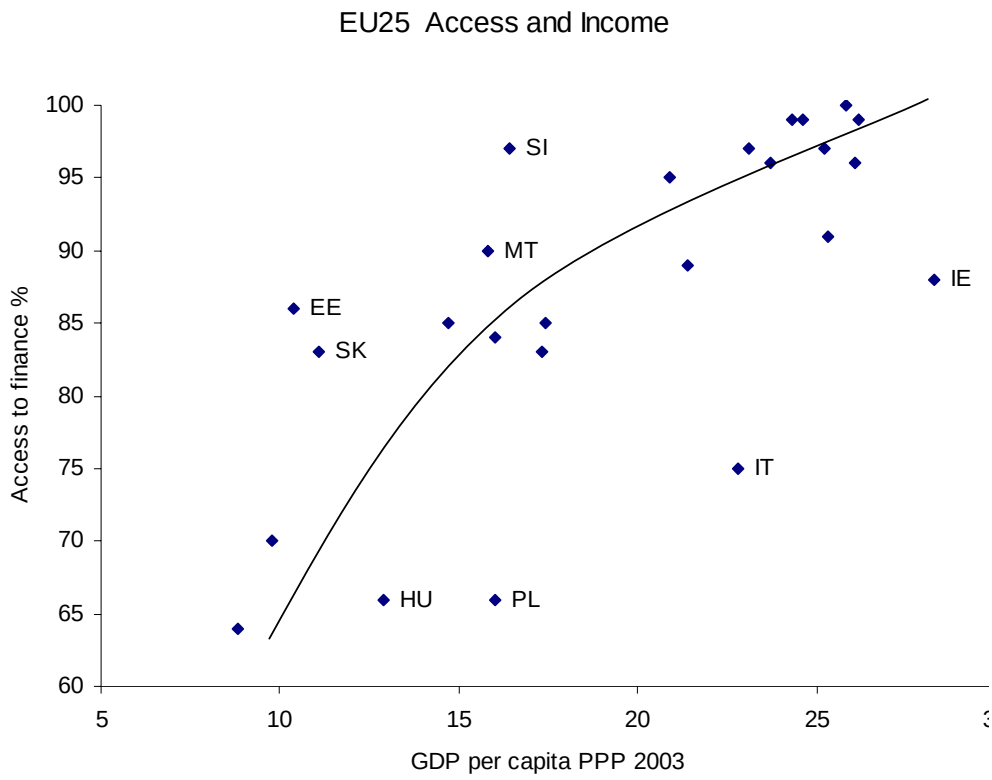
Over the past twenty years, though, spurred perhaps by their exemption from the DIRT tax on deposit interest, Irish credit unions have grown rapidly to the point where credit union penetration is almost the highest in the world.[3] Combine this with the vigorous building society movement – albeit now largely demutualised – and one might expect a relatively high percentage of Irish households to report having access to financial services. Yet this is not what survey evidence shows. A special tabulation prepared by Eurostat from their Eurobarometer survey suggests when plotted against GDP per capita that Irish households have lower access than a regression line drawn through the plot would predict (Figure 2).[4] Immigration could contribute to this, given the

[2] It seems more likely that the Irish loan funds have come to historical prominence due to available records more than genuine priority, and the account by Guinnane (1994) of how the Raiffeisen credit union model, successful in other countries, failed to take root when first introduced in Ireland a century ago, has the more authentic ring of failure about it!

[3] At end-2004, the number of credit union membership accounts in Ireland was given by the World Council of Credit Unions as 2.9 million equivalent to 107 per cent of the economically active population. This "penetration ratio" is used by the WOCCU in its international comparisons. The Irish figure is second only to that of tiny Dominica in the list of 53 countries – most of them former British colonies – members, affiliates or associates of the WOCCU. The average penetration for these countries is only 10 per cent. However, other countries enjoy different forms of microfinance and or mutualist financial intermediaries such as caisses d'épargnes, credit mutuels etc. (http://www.woccu.org/_assets/documents/publications/2005 StatisticalReport_English.pdf)

[4] *Source*: Access based on *Eurobarometer 230* (European Commission, 2005). Access percentages are 100 less the percentage reporting none of 14 listed financial products, less the percentage reporting "don't know". GDP per capita measured in thousands of Euro.

Figure 2: EU Countries: Access to Financial Services and Per Capita Income



Source: Based on data provided by European Commission.

practical difficulties many migrants seem to have in opening accounts. (So does Ireland have a financial service exclusion problem, and if so what needs to be done? This dangles as a tantalising question.)

3. Globalisation of Finance for Ireland

The new surveys of international investment positions show just how exceptionally globalised Irish finance is. For instance, consider a key measure of financial globalisation, namely the sum of external assets and liabilities as a percentage of GDP. Lane and Milesi Ferretti (2006) show that the average of this indicator for industrial countries is about 330 per cent. For Ireland it is 1,700 per cent of GDP (CSO, International Investment Position, 2005 and National Income Expenditure, 2005): more than five times the average. The excess is largely due to the IFSC, whose existence greatly complicates the analysis of how Irish finance contributes to the local economy, presenting some traps for the unwary. Using CSO

Note: the Commission services specifically caution against relying on these numbers as adequate measures of access, as the underlying survey was not designed with access questions in mind; nevertheless the data does provide some indication of cross-country variation.

data to net out the effect of IFSC results in a figure for onshore Ireland of just 380 per cent; close to the average. Paradoxically, even if the gross figure for Ireland exaggerates the stock, it understates the rapid recent rate of growth of the onshore economy's net external liabilities, as can be seen in Figures 3(a) and (b).

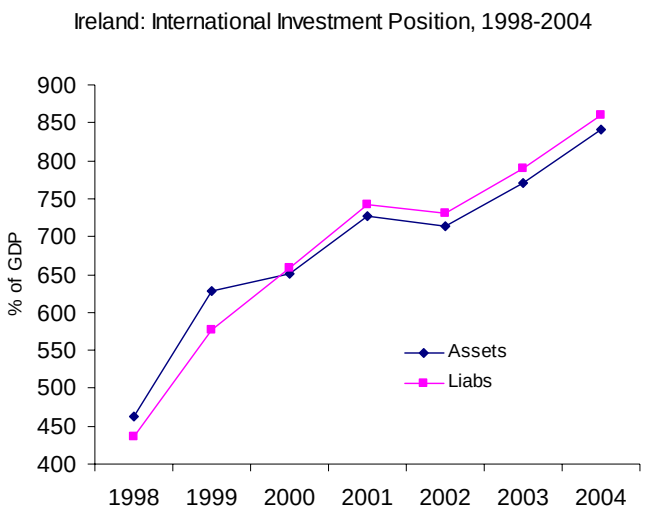
Stock exchange data is also complicated by globalisation. Takeovers of Irish companies by multinationals who replaced the target's Irish Stock Exchange (ISE) listing with a secondary listing of their own make a nonsense of attempting to compare the market capitalisation of the ISE in an international comparison. For example, three such companies, Aviva, Diageo and Tesco, are in the top four firms listed in the ISE and account for almost half of the market capitalisation, even though they are not in practice traded on the ISE. The ISE have dealt with this by leaving these companies out of its main index (ISEQ), the market capitalisation of which can be considered a reasonable proxy for market capitalisation of actively traded stocks. At the same time, most of the major ISE companies also have listings, or at least depository receipt listings, in other markets.

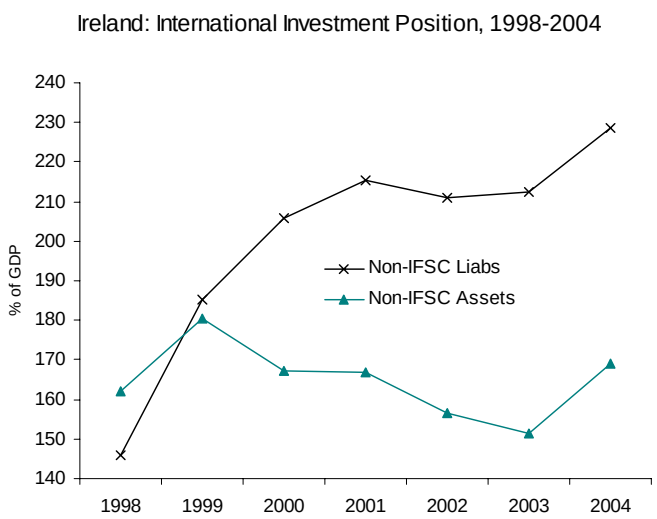
ISEQ capitalisation at end-2005 was 58 per cent, only a moderate figure and placing Ireland firmly in the "bank-led" category, being in the bottom 10 per cent of countries for which bank credit and stock market capitalisation is available. This might be thought a bit surprising, given that the Anglo Saxon legal and regulatory tradition in which it is embedded has always been associated with "market-led" finance. However, it is again a function of globalisation and reflects the fact that so many of the larger businesses producing in and for Ireland are foreign-owned. But a low market-to-bank ratio does not mean an under-performing financial system; extensive research has failed to establish an unqualified superiority of either approach. Markets and banks excel at different functions and, therefore, under different informational conditions. A well-based economy will find the balance it needs for its own purposes.

Taking account of the IFSC and more generally of Ireland's export business in financial services is not quite straightforward. (How, to take one case, are we to deal for statistical purposes with the largest Irish-licensed bank by total assets, namely Depfa Bank, once owned by the German government (under the name Deutsche Pfandbriefe Bank) and still doing comparatively little business with Irish customers?)[5] Even for long-established Irish banks, participation in global finance has been an important contributor to their activities and profitability. For example, participation in globally syndicated loans has been a profitable activity for them given the tax advantages of operating with the low Irish corporate tax rates previously within the IFSC, and now generally applicable.

[5] The Central Bank of Ireland includes this bank under the heading of those with "predominantly Irish business". But according to its annual accounts, Irish assets account for less than 20 per cent of the total.

Figure 3: Ireland: International Investment Position: Total and Non-IFSC



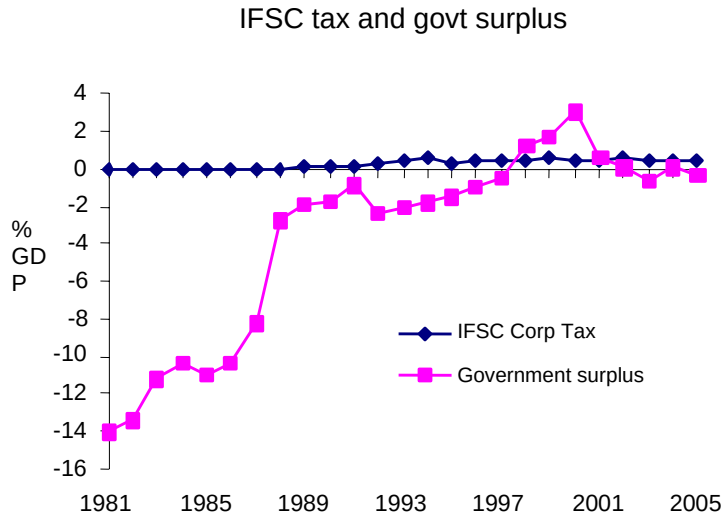


Source: Author's estimates based on CSO data.

Has the IFSC been the making of the Celtic Tiger, then? Of course, the contribution of finance as an export sector is not what the literature on finance and growth is talking about. Nevertheless, this dimension is very important in some countries, especially a handful of small offshore islands and also, of course, in Luxembourg.

I do not want to minimise the commercial success of the IFSC, which is envied around the world by other would-be offshore centres, both in rich and in poor countries, and remains, no doubt, a bugbear of some national tax administrations abroad. But the degree to which it has been a driver of the wider economy's huge growth success does have to be kept in perspective. Thus, although overall, IFSC employment at end-2005 amounted to around 20,000, or almost 40 per cent of employment in financial services in Ireland, this still amounted to barely one per cent of total employment in the economy as a whole. The tax dimension is more impressive: corporation tax yield from the IFSC in 2005 was €755 million, or 14 per cent of total corporate tax revenue. This is an appreciable sum, but still less than 2 per cent of total tax revenue. It is evident from Figure 4 that it IFSC tax revenue had nothing to do with the consolidation of the public finances and has only played a supporting role in keeping those accounts healthy. Of course there are additional spin-offs from the IFSC – important ones, considering the high-end legal and accounting services, for example, which are provided by Irish law firms and not all of which, I think, are counted in the above data. The fiscal privileges previously enjoyed by the IFSC (relative to domestic financial services provision) have expired since the start of 2006, but the lowering of the general corporation tax rate has meant that the sector remains tax-competitive.

Figure 4: IFSC Corporation Tax Revenue and Government Fiscal Surplus as a Percentage of GDP



Source: Based on data from IFSC.

4. Crises and Volatility

Apart from being a long-term support and driver of growth, finance can, in the short run be a source, an amplifier, or a stabiliser and absorber of shocks. The performance of Irish finance in this area is more widely studied, and on the whole it has been a positive performance.

Very few shocks have actually initiated in the sector. In contrast to a large majority of other countries, there have been few problems of intermediary insolvency. Indeed, Ireland does not even appear in the World Bank's database of systemic crises.[6,7]

But finance has also served as a watchdog (or a canary in the coalmine). Perhaps it has been a hyperactive watchdog. The Humean discipline of the fixed exchange rate regime certainly punished policy errors in 1955-56, when the Dublin authorities tried to hold interest rates down when they were rising in London. And in the adjustable peg system offered by the EMS between 1979 and 1993, the financial sector was Latin in its skittish response to fiscal excess and competitiveness threats (especially around a few poorly handled realignment events, culminating in the famous September-1992-January 1993 episode).[8] Of course a financial system, which reacts quickly to policy deviations can be a great discipline on governments that learn to anticipate these reactions and stay on the straight and narrow path. The question is whether this disciplining, watchdog effect has now been lost with the adoption of the single currency? The narrow yield range, within which EMU government paper trades, almost impervious to posted credit ratings, suggests so.

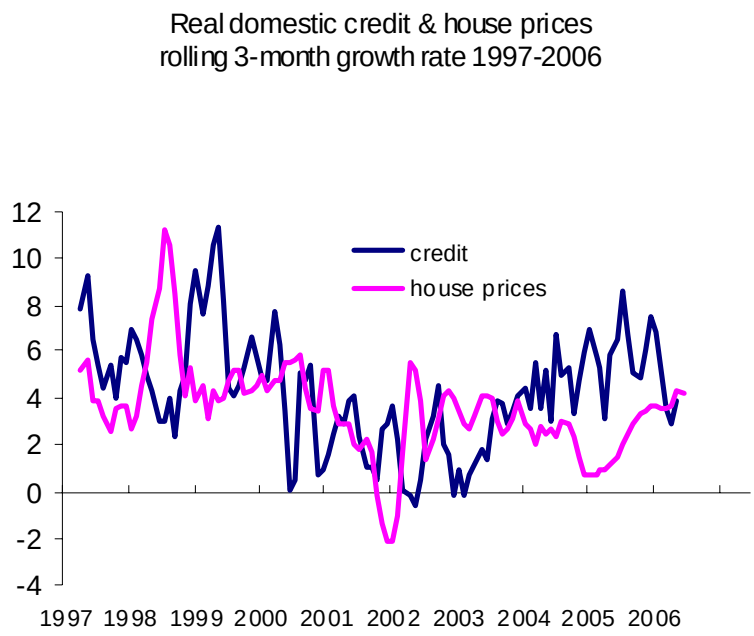
[6] See Caprio *et al.* (2005) – though the AIB-ICI affair was cited in the IMF's 1997 list of crises. A few other noteworthy incidents, such as the failure of PMPA insurance in 1983 and the Rusnak affair in 2002, were easily contained.

[7] Irish banks are also reasonably efficient. Fitzpatrick and McQuinn's (2005) econometric production function estimates suggest that they are mid-way in efficiency between UK and Canadian banks (if their underlying assumption that a common production technology is available to all banks is tenable).

[8] Nominal interest rates were very high in the early 1980s, with wholesale rates exceeding 20 per cent for months on end during 1982. Contributing factors included high inflation fiscal pressures. Superimposed on these were waves of speculation about imminent devaluations. For instance, interest rates jumped in the weeks before the general realignments of March 1983 and April 1986 (but the unilateral August 1986 devaluation was not accompanied by any interest rate movement). An episode of high interest rates in late 1989 was likely attributable to exchange rate speculation despite the fact that no realignment ensued. The biggest interest rate surge in the extended 1992-93 crisis was in the first week of January 1993 and followed a forthright ministerial statement on the possibility of devaluation. Evaluation of the performance of monetary policy in the period 1981-86 might reveal technical deficiencies in what was, admittedly, a difficult period (cf. Honohan and Conroy, 1994).

Figure 5: Growth in Real Domestic Credit and House Prices 1997-2006

Rolling 3-month rates



Source: Based on data from Department of the Environment, Heritage and Local Government; Central Bank of Ireland.

5. King Charles's Head

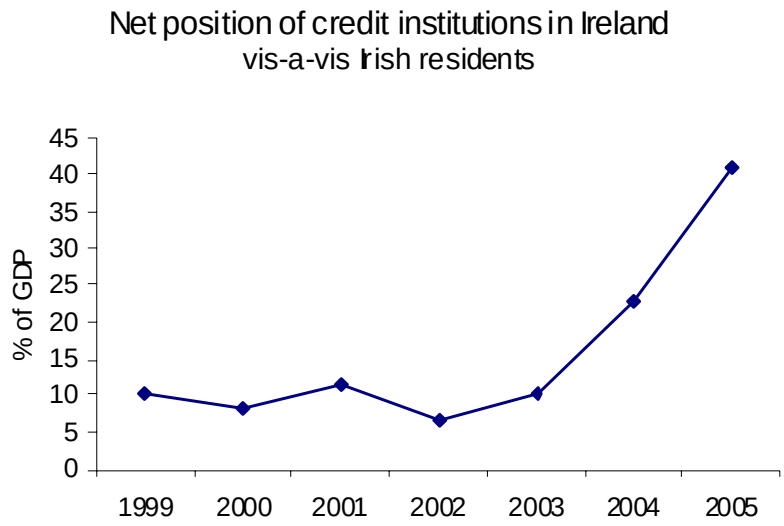
If the watchdog is silent, is there a risk that macro conditions could deteriorate badly without the usual warning signs? Here the King Charles's Head of Irish macroeconomic and financial analysis can no longer be avoided, and it leads us back to the globalisation link. The property boom is *financed* by credit.[9] To what extent is it *caused* by credit; and does the financial sector know any more where to draw the line?

A thorough review of the evidence by Murphy (2005) suggests that standard economic theory can explain much of the house price increase in terms of interest rate movements and other elements of the user cost of capital, the stock of houses, the young adult population and real per capita income. But an unexplained residual of about 35 per cent had emerged by 2004. To what extent has a shift in the supply conditions for mortgage finance (possibly associated in part with new lending entrants) contributed to this 35 per cent unexplained house price rise?

[9] Of course much of the funds are now going into the housing market. The IMF's recent stability assessment (2006) pointed out that residential mortgages comprised 37 per cent, commercial property 17 per cent, and construction 5 per cent, respectively, of total bank lending at end-2005.

Certainly, there has been a remarkable growth in the ratio of private credit to personal income from 48 per cent in 1995 to 132 per cent in 2005 – about 82 per cent of the latter figure relating to housing finance. Household mortgage borrowing amounted to less than 12 per cent of the total value of the housing stock in 1999; by 2005 this ratio had jumped to 18 per cent (based on data in Kelly, 2006). The jury is still out on whether this credit growth is an autonomous driver of house prices or the response of a globalised credit supply to demand from house-buyers. Some interesting patterns emerge from Figure 6 showing credit and house-price growth. Spikes in house price inflation preceded credit growth before 2004, but the latest price surge might have been preceded by credit growth.[10,11]

Figure 6: Net Lending by Credit Institutions in Ireland to Irish Residents



Source: Based on data from Central Bank of Ireland.

Where did the money come from to fund this credit growth? A very large quantity came from abroad, because the Irish banks still have ready recourse to external sources when necessary. The econometric analysis of Hosford (2002) showed causality from credit growth to banks' accumulation of foreign liabilities, and this is a pattern, which has been evident for most of the period since at least the end of the First World War. But now the scale has become huge. In net terms, about 15 per cent of credit institutions

[10] Econometric analyses such as Fitzpatrick and McQuinn (2004) have proved inconclusive on this point. They find contemporaneous correlation only between credit and prices on quarterly data, a finding that is fully consistent with credit being demand-driven.

[11] A complication in this data is that some of the lending by credit institutions is securitised by them, taking it off their balance sheet (even though some contingent claim may remain). About 6 per cent of mortgages were securitised by 2005 (Kelly, 2006).

overall resources were sourced from abroad by 2005. Put more dramatically, the net import of funds credit institutions doing business in Ireland to lend to Irish residents amounted to 41 per cent of GDP by the end of 2005. This has changed with astonishing speed (up from about 10 per cent at end 2003) (Figure 6). This shows the extent to which it is global finance, and not solely the Irish financial system, that is providing finance to Irish borrowers.

6. Implications

Despite the striking achievements of the IFSC, there is little evidence that Irish finance made the leading contribution to the twenty-year growth success of the economy. But this should not cast doubt on the importance of putting in place the underlying policies, legal, informational and regulatory, that help make finance effective. Arguably, Ireland has fostered many of these underlying strengths. One way or another, the economy has relied heavily on external providers of finance to supplement what locally controlled intermediaries can do.

In moments of dangerous fiscal excess and competitiveness pressures, the financial system did in the past act as a watchdog; a canary in the mine. If, in the past, the watchdog was prone to bark too readily (or have a canary), thereby creating unnecessary currency crises, it is muzzled today, given EMU membership. Meanwhile the miners still toil ceaselessly and with unprecedented vigor, to import funds for on-lending to the property market, especially in the past two or three years. The King Charles's head of current Irish macroeconomic discussion thus forces itself once more to the surface.

BECK, THORSTEN, 2006. "Creating an Efficient Financial System: Challenges in a Global Economy", World Bank Policy Research Working Paper 3856.

CAPRIO, GERARD, DANIELA KLINGEBIEL, LUC LAEVEN and GUILLERMO NOGUERA. 2005. "Banking Crisis Database" in Patrick Honohan and Luc Laeven (eds.), *Systemic Financial Crises,* New York: Cambridge University Press.

CENTRAL BANK OF IRELAND. 2005. *Financial Stability Report 2005*, Dublin: Central Bank of Ireland.

EUROPEAN COMMISSION, 2005. "Public Opinion in Europe on Financial Services", *Eurobarometer 230* (Special issue).

FITZPATRICK, TREVOR and KIERAN MCQUINN, 2004. "House Prices and Mortgage Credit: Empirical Evidence for Ireland", Dublin: Central Bank of Ireland Research Technical Paper 5/RT/04.

FITZPATRICK, TREVOR and KIERAN MCQUINN, 2005. "Measuring Bank Profit Efficiency", Dublin: Central Bank of Ireland Research Technical Paper 3/RT/05.

GUINNANE, TIMOTHY W., 1994. "A Failed Institutional Transplant: Raiffeisen's Credit Cooperatives in Ireland, 1894-1914", *Explorations in Economic History*, Vol. 31, No. 1, pp. 38-61.

HELMS, BRIGIT, 2006. *Access for All: Building Inclusive Financial Systems,* Washington DC: CGAP.

HOLLIS, AIDAN and ARTHUR SWEETMAN, 1998. "Microcredit in Pre-Famine Ireland", *Explorations in Economic History*, Vol. 35, pp. 347-380.

HONOHAN, PATRICK, 2006. "Household Financial Assets in the Process of Development", World Bank Policy Research Working Paper 3965.

HONOHAN, PATRICK and CHARLES CONROY. 1994. *Irish Interest Rate Fluctuations,* General Research Series No. 165, Dublin: The Economic and Social Research Institute.

HONOHAN, PATRICK and CORMAC Ó GRÁDA. 1998. The Irish Macroeconomic Crisis of 1955-56: How Much Was Due to Monetary Policy?" *Irish Economic and Social History*, Vol. 25, pp. 52-80.

HOSFORD, FRASER. 2002. "A Time Series Analysis of Finance and Growth in Ireland", Paper presented to the Irish Economic Association Meeting.

INTERNATIONAL MONETARY FUND, 2006. *Ireland: Financial System Stability Assessment Update*. http://www.imf.org/external/pubs/cat/longres.cfm?sk=19522.0

KELLY, JOHN, 2006. "The Net Worth of Irish Households", *Central Bank of Ireland Quarterly Bulletin,* Vol. 3, pp. 79-92.

KELLY, JOHN and MARY EVERETT, 2004. "Financial Liberalisation and Economic Growth in Ireland", *Central Bank of Ireland Quarterly Bulletin* Autumn.

LANE, PHILIP R. and GIAN MARIA MILESI-FERRETTI, 2006. "The External Wealth of Nations Mark II," Trinity College Dublin: Institute for International Integration Studies, Discussion Paper 126.

LANE, PHILIP R. and FRANCES RUANE, 2006. "Globalisation and the Irish Economy", Dublin: TCD Institute for International Integration Studies, Occasional Paper.

LEVINE, ROSS, 2005. "Finance and Growth: Theory and Evidence" in Philippe Aghion and Steven Durlauf (eds.), *Handbook of Economic Growth,* The Netherlands: Elsevier Science. http://www.econ.brown.edu/fac/Ross_Levine/Publication/Forthcoming/Forth_Book_Durlauf_FinNGrowth.pdf

MURPHY, ANTHONY, 2005. "Modelling Irish House Prices: A Review and Some New Results", Nuffield College Oxford. *mimeo*. http://www.nuff.ox.ac.uk/Users/MurphyA/Irish%20House%20Prices.zip

ELECTRICITY SHORTAGES IN IRELAND: PROBABILITY AND CONSEQUENCES[1]

Laura Malaguzzi Valeri and Richard S.J. Tol

1. Introduction

In Ireland electricity demand is at its peak in the winter months, when the days are short and the weather is cold. This causes the likelihood of electricity shortages to peak at the same time. We define a shortage as any instance where demand for electricity is larger than supply. In such cases, the system operator typically implements "load shedding" in order to curb peak demand. This is done by disconnecting sections of consumers for a few hours, while enforcing any interruptible tariff contract previously put in place.[2] This allows electricity to flow undisturbed to the rest of the country. In this paper, we estimate the probability and the consequences of a shortage. We also discuss causes and countermeasures, both short term and long.

The Irish economy has grown very rapidly, and total electricity demand has grown by some 3.6 per cent a year between 1998 and 2005, while peak demand has grown by 5.0 per cent a year.[3] The supply of electricity has had difficulty keeping up. Partly, this is due

[1] We had useful discussions on this subject with Eleanor Denny, Niamh McCarthy, John Fitz Gerald, Michael Kelly, Edgar Morgenroth, Pieter Schipper and Adele Slater. Funding by the Energy Policy Research Centre of the Economic and Social Research Institute (ESRI) is gratefully acknowledged.

[2] Interruptible tariff contracts offer discounts on the cost of electricity to those companies that agree to decrease their use of electricity when requested to do so by the system operator.

[3] ESB at http://www.esb.ie/main/about_esb/grid_growth.jsp and EirGrid at http://www.eirgrid.com/EirgridPortal/DesktopDefault.aspx?tabid=System%20Operations

to the scale of the needed investment, but partly it is also due to existing policy objectives. The Electricity Supply Board of Ireland (ESB) dominates the electricity sector, with 83 per cent of installed generation capacity.[4] The Irish government wants to reduce this dominance without breaking up the ESB, and has been reluctant to approve new ESB power plants. Other companies may hesitate to invest in a market where they would have a small market share of a small and isolated market. When potential entrants are interested, they prefer to invest in base-load capacity that tends to provide higher returns than much needed peak-load capacity. The result is an increasingly tight market – and an increasing probability of shortages.

2. The Probability of a Shortage

There are 54 power-generating units in Ireland providing about 6,000 MW of installed capacity, in addition to a few combined heat and power units and more than 60 wind farms that contribute about 670 MW of capacity.[5] As with all equipment, power generating units are subject to unexpected mechanical failure, causing unplanned outages. The yearly probability of an unplanned outage can be measured by the Forced Outage Rate (FOR), which is defined as the fraction of time that a unit cannot be used, excluding time spent on scheduled maintenance. For Ireland, the FORs range from 1 per cent to 12 per cent.[6] These are a yearly average of probabilities, however. In practice, at the end of November 2006, 18 per cent of the generation capacity was unavailable because of forced outages.[7] In part this reflects the fact that maintenance and repair efforts reached their historic peak in 2006 in order to enter the winter with a more reliable plant portfolio (EirGrid, personal communication, December 2006).

The probability that no power is generated equals the product of the FORs for all existing plants. This probability is vanishingly small: $1.7\ 10^{-79}$. At the other extreme, the probability that there is full capacity (5,892 MW), excluding wind power, is also small: 8.5 per cent. Wind power has a separate set of problems, not related to mechanical failure, but rather to the variability of wind itself. In the winter of 2006/7, the median wind supply (wind generation is expected to be smaller or equal to this for 50 per cent of the time) is expected to be 283 MW, but it ranges between 51 MW to 556 MW for 80 per cent of the time. For the whole electricity generation system of the Republic of Ireland, the median capacity during the

[4] Department of Enterprise, Trade and Employment at http://www.entemp.ie/publications/trade/2005/electricitymarket.pdf

[5] EirGrid, at http://www.eirgrid.com/EirgridPortal/uploads/Regulation and Pricing/Connected(Wind)Nov06.pdf

[6] Commission for Energy Regulation (CER) and Northern Ireland Authority for Energy Regulation at http://www.allislandproject.org/AIP-SEM-82-05.xls

[7] EirGrid, at http://www.eirgrid.com/EirgridPortal/DesktopDefault.aspx?tabid=SO%20-%20Generation%20System%20Availability&TreeLinkModID=1451&TreeLinkItemID=12

upcoming winter is expected to be 5,990 MW – if all plants are operational.

Given the FORs and the existing capacity, we can compute the probability that the electricity supply exceeds any given demand *D*. We do this through a Monte Carlo analysis, which allows us to calculate the probability we are interested in by simulating what happens in reality given the information we have on the probability of forced outages. In each run there is a different realisation of the (uncertain) levels of power generation and wind generation that will be available. The probability of supply exceeding demand is then calculated as the average of all the Monte Carlo runs. In mathematical (and more concise) form, this can be expressed as follows:

$$P(C > D) = \frac{1}{MC}\sum_{i=1}^{MC} I\left\{\left(W_i + \sum_{j=1}^{N} C_j \cdot I\left\{U_{i,j} > FOR_i\right\}\right) > D\right\} \quad (1)$$

where C is total available capacity, D is demand, MC is the number of Monte Carlo runs, indexed by i, W is the wind power, N is the number of plants, indexed by j, U is a random number uniformly distributed between 0 and 1, and C_j is the capacity of plant j; $I\{\cdot\}$ is the indicator function, $I\{\text{true}\}=1$ and $I\{\text{false}\}=0$.[8]

The results are shown in Figure 1, as a function of the size of demand. The winter 2006/2007 peak demand will probably be around 5,000 MW. If we assume that 200 MW of electricity will be imported from Northern Ireland, 4,800 MW will need to be generated in the Republic of Ireland. The probability of supply exceeding 4,800 MW equals 99.91 per cent when all plants are available. This is a reassuringly high probability.

Unfortunately, not all power plants are fully operational. Ireland's generation plant portfolio is older than average, which leads to one of the lowest average availability rates in Europe. One of the ageing oil-fired units at Poolbeg is in extensive maintenance.[9] This reduces capacity by 240 MW, or 3.5 per cent of total installed capacity (including maximum wind). The other two steam units at Poolbeg (220 MW, 3.3 per cent of total installed capacity), the units at Great Island (216 MW, 3.3 per cent of capacity) and at Tarbert (589 MW, 9.1 per cent of capacity) are old and historically unreliable – although they are supposed to work at times of high demand and are operational in December 2006 (EirGrid, personal communication, 2006).

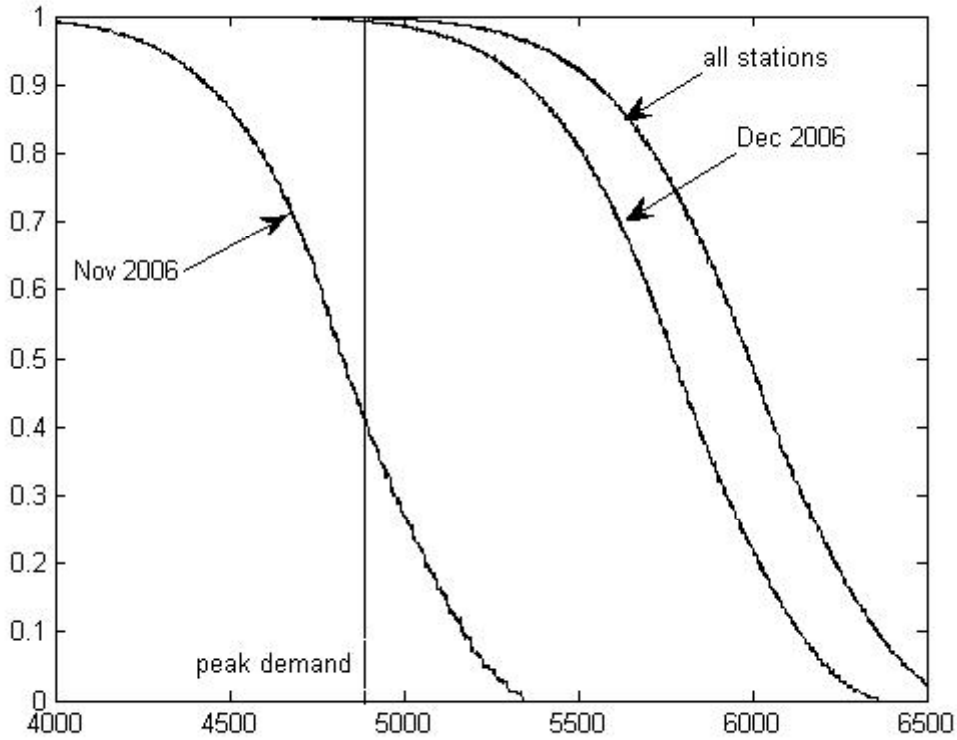
Figure 1 also shows the survival probabilities (i.e. the probability that no shortage will occur) of total capacity if availability of plants is limited. If a 240 MW peak plant is out, the probability that

[8] Wind and other sources of electricity are included simultaneously in the Monte Carlo analysis. The empirical probability density function of wind is approximated by the 20 mid-points of the 5th percentile ranges, each occurring with a 1/20th chance.

[9] The other two steam units that were also under maintenance (*The Irish Times*, 3 November 2006) are now back in operation (Kelly, personal communication, 2006).

available supply will be sufficient to cover expected demand falls to 99.5 per cent. With 460 MW out, this chance falls to 98.5 per cent, and with 580 MW out, to 95.8 per cent. In the event that 1,260 MW of ageing plants (equivalent to the size of Poolbeg, Great Island and Tarbert together) could not be switched on, this probability would decrease to 53.5 per cent. That is, the probability of a shortage would be 47 per cent.

Figure 1: Survival Probability as a Function of Demand for Electricity Supply in the Republic of Ireland



Note: "All stations": all stations available; "December 2006": without the largest Poolbeg steam unit, the situation in December 2006"; "November 2006": without the Poolbeg (steam), Great Island and Tarbert stations, the situation in November 2006. For comparison, the likely peak demand in 2006 (minus imported electricity) is also shown.

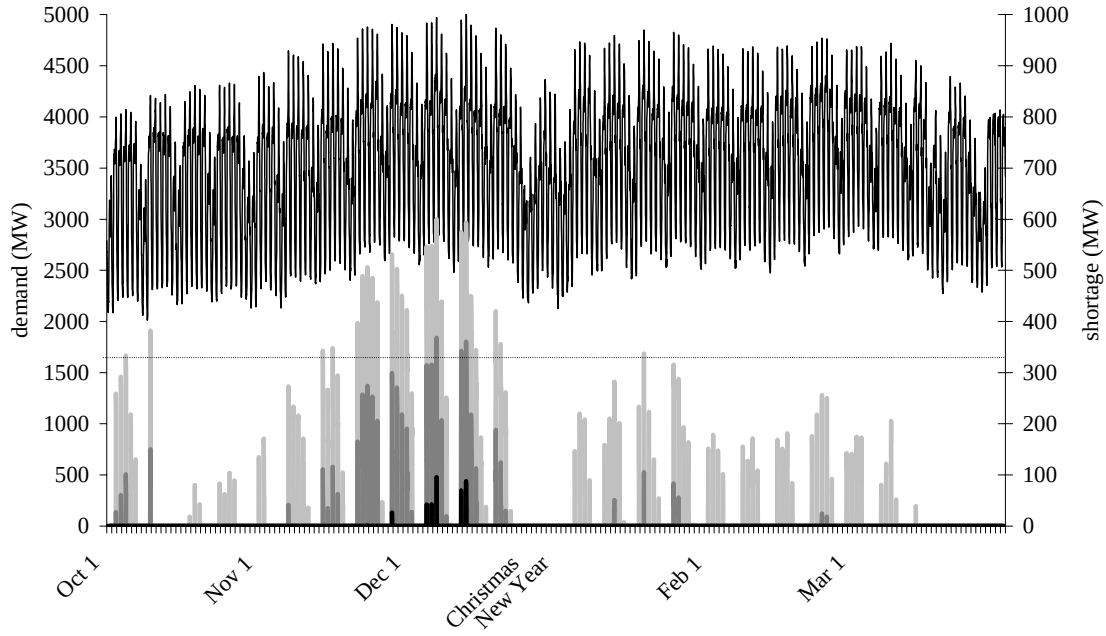
3. The Consequences of a Shortage

Figure 2 shows a hypothetical scenario of electricity demand for the winter of 2006/2007. It also shows the amount of shortage for six different cases: a mildly pessimistic scenario, interacted with three levels of wind, and a very pessimistic outage scenario, again interacted with the three wind levels. The three wind levels are low (wind is expected to be lower than this amount for only 10 per cent of the time), middle (wind is expected to be lower than this amount for 50 per cent of the time) and high (wind is expected to be lower than this amount for 90 per cent of the time).

In the top panel, all stations except Poolbeg (steam), Great Island and Tarbert are operational, so we are also along the line that

denotes the most pessimistic scenario in Figure 1 (with Poolbeg, Great Island and Tarbert out of order, but all other plants operational). In terms of generation availability this is equivalent to having Tarbert available, but other plants of the same size out of order. Figure 2 shows that, with all stations except the three ageing ones of Poolbeg (steam), Great Island and Tarbert, there is a good chance of getting through the winter without shortages – provided that the wind blows when demand peaks. Even with a low level of wind the largest shortage is 120 MW, an amount that may easily be imported. In this scenario, there are 8 hours at risk of a shortage.

Figure 2: Hypothetical Electricity Demand (line, left axis) and Potential Electricity Shortage (bars, right axis) in the Republic of Ireland for Winter 2006/7



Note: In the top panel, all power generating units except Great Island, Tarbert, and the steam units at Poolbeg are operational. In the bottom panel, all of Poolbeg (including the CCGT plant) is switched off together with Great Island and Tarbert. Shortages are shown for three different levels of wind: low (10th percentile, light grey), middle (50th percentile, dark grey), and high (90th percentile, black). The import capacity for electricity from Northern Ireland is 330 MW.

In the bottom panel, all of Poolbeg – including its Combined Cycle Gas Turbine (CCGT) plant – is out, as well as Great Island and Tarbert.[10] That is, we are around the median along the most pessimistic line shown in Figure 1. In this scenario, with an additional big power plant out of order, even the strongest winds and maximum electricity imports on the interconnector will not prevent a shortage. The shortage may go up to 600 MW, while the

[10] We take the Poolbeg CCGT plant as representative of any large (480 MW) plant. This scenario is identical to one where the Poolbeg CCGT plant is operational but any other 480 MW plant (or combination of plants) is out of order.

interconnector capacity is only 330 MW. In this case there are 166 hours at risk of shortage with low winds, 72 hours with middle winds, and 5 with high winds. With low winds, the shortage exceeds the maximum interconnector capacity for 43 hours; with medium winds, for 1.5 hours.

What would be the consequences of a shortage? In the current market, there would be limited changes in the price of electricity. Most of the consequences would derive from the unavailability of electricity. Electricity demand peaks in the late afternoon/early evening, as it gets dark and people are still at work or shopping while others have started cooking. A benign shortage would be limited in time and space; some people would be inconvenienced, a few businesses would be interrupted, and shopkeepers would grumble about lost custom. In the most pessimistic scenario, the model has shortages for up to 5.5 hours. Hospitals and large businesses have historically received priority dispatch, so they would not be affected. Households, small business, and – importantly – traffic signals are the most likely to be disrupted.

4. Discussion and Conclusion

What could be done to avoid this? The probability of a shortage depends crucially on the power units in Poolbeg, Great Island and Tarbert. If these work, as is the case in early December 2006, chances are there will be no shortages. Maintenance of these units is therefore a great priority. Agreements between the Commission for Energy Regulation and the ESB, aimed at reducing the ESB's market power, will likely involve the closure of the Poolbeg steam plants, Great Island and Tarbert by 2010.[11] However, until reliable alternatives to these plants are built and commissioned, they need to be kept in good working order. The alternative is to have a substantial risk of a shortage.

The capital cost of replacing 1,200 MW of peaking capacity is currently estimated to be around €480 million.[12] This level of investment would allow the system to be consistently on the right-most line in Figure 1. It is also likely to be smaller than the cost of shortages to the Irish economy, although quantifying these costs precisely is difficult.

Given the need for new and reliable generation capacity in Ireland, it is paramount that the new All-Island market provide the correct incentives for new investment, particularly in peak capacity, and that permission to build be granted. However, it should be noted that this might further enhance the market power of the ESB. The Irish government clearly prefers a decrease in ESB's market share, and is therefore considering two alternative solutions: forcing the ESB to divest some of its generation capacity or dividing it into two or three separate businesses.

[11] CER, press release, 29 November 2006.

[12] Assuming a cost of €40 per kW of installed capacity, in line with the assumptions made in the All Island Project.

However, this does not affect the coming winter, and not even the winter after that. The only alternative to increasing supply is to reduce demand. The Power-of-One campaign may be successful in this. It would probably be more effective, however, if in the short term the system operator were able to call on large offices and factories to curb their demand in periods of extremely high demand. This could be done fairly easily by reducing the temperature inside buildings by one or two degrees centigrade for a few hours, or having the cooling units in supermarkets run more intensively at off-peak times. For next winter, more interruptible power contracts may be put in place. In addition, the North-South interconnector should be available to be used to its maximum extent.

EirGrid has contingency plans in place for controlled power interrupts that were initially set up in the 1970s and 1980s, when rolling black-outs were more common. Such contingency plans should also prepare the population to deal with cases of shortages lasting a few hours, so as to minimise accidents and disruptions. In the past the system operator warned in advance those segments of the population (and areas of the country) that were at highest risk of losing power and this is still likely to happen in the event of imminent power cuts. Crucial services (e.g., hospitals) should be encouraged to check their back-up power generation. Finally, special instructions on how to deal with non-functioning traffic lights should be prepared. Currently there are no such instructions, which is likely to lead to traffic chaos in cities, in the event of power outages.