Irish Fiscal Advisory Council

Fiscal Assessment Report

April 2013

Report 13/01

Assessment of Macroeconomic Forecasts

Contents

1. ASSESSMENT OF MACROECONOMIC FORECASTS

SUMMARY

- Economic growth in the Euro Area and the United Kingdom appears likely to be weaker than anticipated in *Budget 2013*. While recent National Accounts data point to a tentative stabilisation of domestic demand in the latter part of 2012, more recent high frequency data paint a mixed picture. The combined early-year developments suggest downside risk to achieving the Department of Finance's forecast of 1.5 percent real GDP growth in 2013.

- The Council continues its examination of past growth forecast errors in this report by decomposing overall errors into domestic demand and net export components. A pattern of significant over-prediction of domestic demand and under-prediction of net exports emerges. This suggests that forecasters appear to have underestimated the severity of the "balance sheet recession" that followed the bursting of Ireland's property/credit bubble.

1.1 INTRODUCTION

This chapter assesses the Government's macroeconomic forecasts. The Council's assessment approach involves a number of steps: (i) official forecasts for 2012 are compared with actual outturns (Section 1.2); recent macroeconomic developments are reviewed (Section 1.3); and the macroeconomic forecasts underpinning *Budget 2013* are examined and compared with the contemporaneous forecasts of other agencies, together with a discussion of the uncertainty surrounding current forecasts (Section 1.4). Box A continues the Council's examination of past forecast errors with a decomposition of recent forecast errors into domestic demand and net export components. As a special feature of this report, a brief summary of forecasting methods used by the Department of Finance, is provided in Section 1.5.

1.2 THE OUTTURN FOR 2012 COMPARED TO EARLIER FORECASTS

The first estimates of the 2012 growth outturn were published by the Central Statistics Office (CSO) in March 2013 and showed that real GDP grew by 0.9 percent.[1] The latest revised forecast contained in *Budget 2013* (December 2012) for real GDP growth was also 0.9 percent and so matched the outturn. The official forecast for 2012 real GDP had fluctuated somewhat between

[1] As in other countries quarterly national accounts estimates are published with a substantial lag and are often subject to extensive further revision.

Budget 2012 and *Budget 2013*. As shown in Table 1.1, the forecast from *Budget 2013* was slightly less than the official forecast of a year earlier (1.3 percent) but marginally higher than that provided in April 2012 (*SPU 2012*). The outturn for nominal GDP in 2012, however, was higher than was estimated by the Department of Finance in *Budget 2013*.

The outturn for real GNP was substantially higher than the forecast in *Budget 2013*. Real GNP is estimated to have grown by 3.4 percent in 2012 as against the most recent Department of Finance forecast of just 1.4 percent. This reflected, in part, the difficulty in estimating net factor income flows.

In Table 1.1 the outturns in the labour market for 2012, relative to previous forecasts, are shown. Employment contracted by 0.6 percent last year and the rate of unemployment averaged 14.7 percent. In December 2011, the Department of Finance had expected employment to fall by 0.2 percent and unemployment to average 14.1 percent. However, employment growth did resume in the second half of the year. Further details of the forecasts and outturns for 2012 are provided in Appendix Tables A1 and A2.

TABLE 1.1: DEPARTMENT OF FINANCE FORECASTS FOR 2012 VERSUS THE OUTTURN

% change unless otherwise stated	*Budget 2012*	*SPU* 2012	*Budget 2013*	Outturn
	Dec 2011	Apr 2012	Dec 2012	CSO
Real GDP	1.3	0.7	0.9	0.9
Nominal GDP	2.5	1.6	2.6	2.9
Nominal GDP (€bn)	159.1	158.9	163.2	163.6
Real GNP	0.7	-0.2	1.4	3.4
Nominal GNP	1.9	NA	3.0	5.0
Nominal GNP (€bn)	128.8	NA	130.9	133.4
Employment	-0.2	-0.4	-0.7	-0.6
Unemployment Rate	14.1	14.3	14.9	14.7

Note: The employment growth figure is average annual growth in 2012 compared to 2011 based on QNHS data. The unemployment rate is the annual average in 2012 compared to 2011 based on QNHS data.

1.3 RECENT MACROECONOMIC DEVELOPMENTS

The discussion that follows should be viewed against the background of some deterioration in the world economic outlook in recent months (Table 1.2). The European Commission (EC) estimated in its February 2013 forecasts that Euro Area economic activity contracted by 0.6 percent in 2012.

This was weaker than their previous forecast of a decline of 0.4 percent, issued in November 2012. At that time, the EC was forecasting growth of 0.1 percent for the Euro Area in 2013 but this has now been cut to -0.3 percent. The Office for Budget Responsibility—the official forecasting agency in the UK—now predicts that the UK economy will grow by only 0.6 percent in 2013, a halving of its previous growth forecast.

TABLE 1.2: EXTERNAL ASSUMPTIONS: % GROWTH IN GDP

2012	*SPU 2012*	OECD	EC	*Budget 2013*	EC
	Apr 2012	Nov 2012	Nov 2012	Dec 2012	Feb 2013
USA	2.3	2.2	2.1	2.2	2.2
Euro Area	-0.3	-0.4	-0.4	-0.4	-0.6
UK	0.8	-0.1	-0.3	-0.4	0.0
Advanced Economies*	NA	1.4	NA	1.4	NA
2013					
USA	2.0	2.0	2.3	2.1	1.9
Euro Area	0.9	-0.1	0.1	0.2	-0.3
UK	2.0	0.9	0.9	1.1	0.9
Advanced Economies*	NA	1.4	NA	1.5	NA

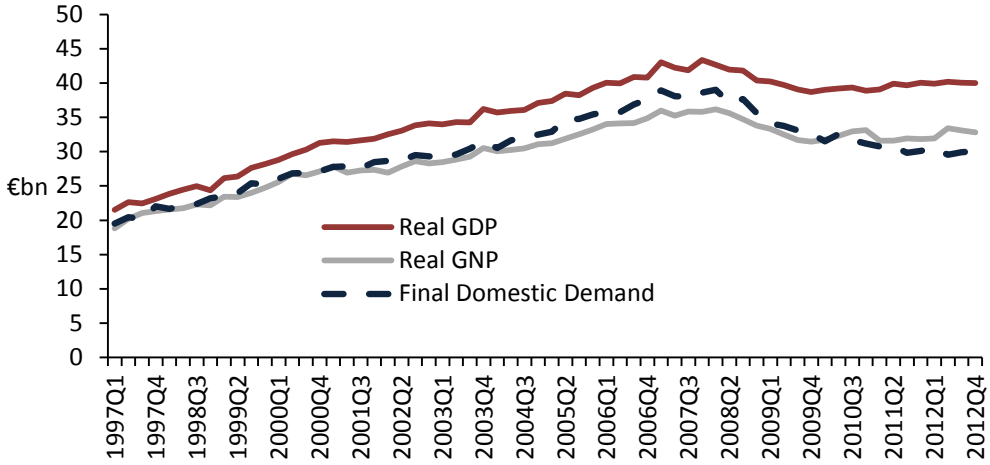
Note: The external assumptions used in Budget 2013 are based on the IMF World Economic Outlook, October 2012.
**In Budget 2013, this refers to the G20 which include several major emerging market countries. In OECD forecasts it refers to all OECD countries.*

A further area of concern relates to recent upward pressure on the exchange rate. In the three-month period to February 2013, the nominal Harmonised Competitiveness Indicator appreciated by just over 2 percent compared to the previous three-month period. [2] This partly reflected the appreciation of the euro against sterling. Currency appreciations have a negative impact on net export performance. In Ireland's case, the sterling/euro rate is important in terms of the number and type of the exporters that are most severely affected. As domestic exporters tend to be more exposed to the UK market relative to foreign multinationals, the effect of the currency appreciation is more concentrated in that sector.

[2] The nominal Harmonised Competitiveness Indicator is a trade-weighted exchange rate and is published by the Central Bank of Ireland.

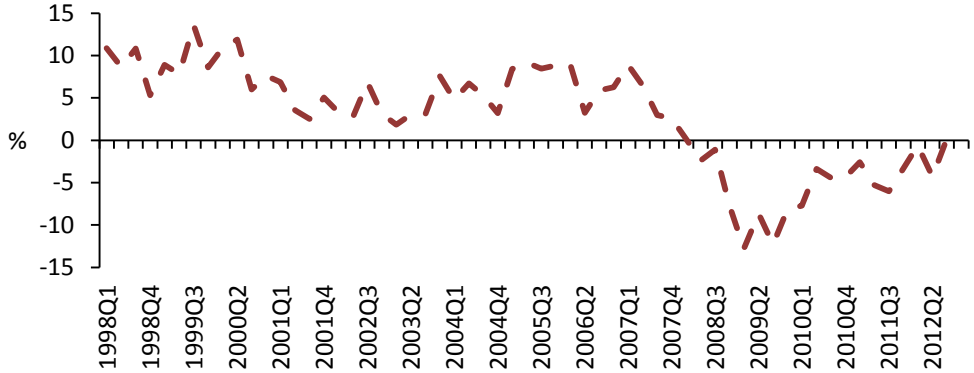
In spite of the weak external conditions, there are signs of a broad pattern of stabilisation in the Irish economy (see Figure 1.1). One encouraging development has been real GDP growth in 2012, albeit at a modest pace, for the second year running. An important contribution was the apparent stabilisation of domestic demand, notwithstanding significant headwinds from budgetary adjustments, weak credit growth and ongoing balance sheet repair (see Figure 1.2). The latest *Quarterly National Household Survey* for Q4 2012 showed an annual increase in employment, albeit of a small amount (+1,200) (see Figure 1.3). The unemployment rate (seasonally adjusted) fell over the course of 2012, from 15 percent in Q1 to 14.2 percent in Q4.

FIGURE 1.1: QUARTERLY MACROECONOMIC PERFORMANCE, 1997Q1-2012Q4



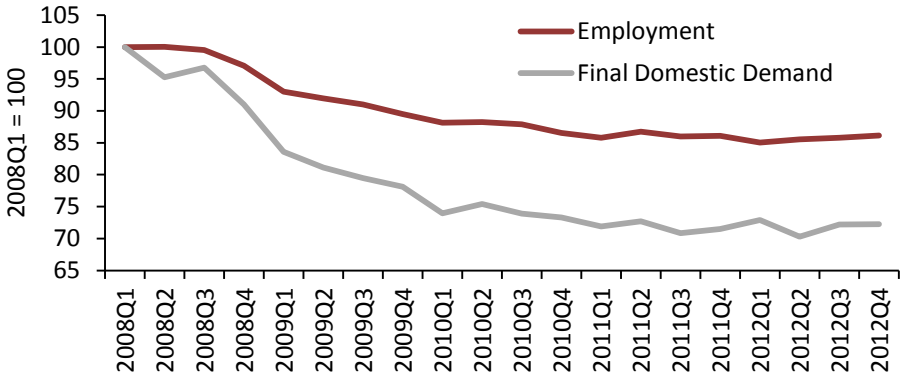
Source: CSO, QNA.
Note: Constant Prices (Chain Linked 2010), Seasonally Adjusted.

FIGURE 1.2: GROWTH RATE OF FINAL DOMESTIC DEMAND, PERCENTAGE CHANGE FROM SAME QUARTER IN PREVIOUS YEAR



Source: CSO, QNA.
Note: Constant Prices, Non-Seasonally Adjusted.

FIGURE 1.3: INDICES OF EMPLOYMENT AND FINAL DOMESTIC DEMAND, 2008Q1-2012Q4



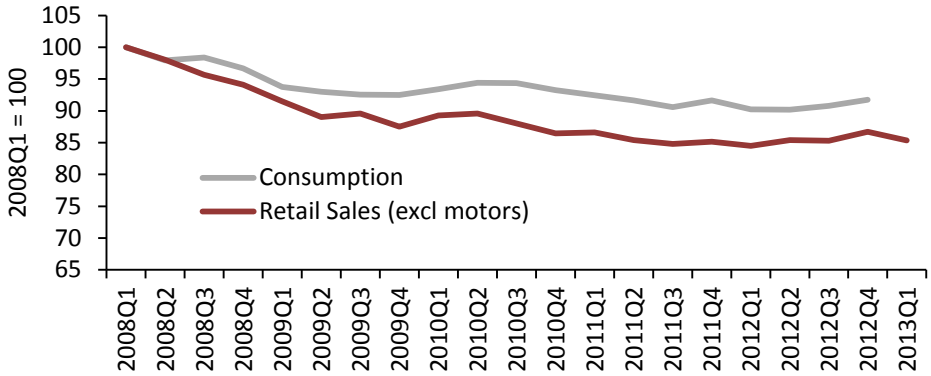
Source: CSO. Note: Persons 15 and Over in Employment, Quarterly National Household Survey. Total Domestic Demand, Constant Prices, Seasonally Adjusted, Quarterly National Accounts.

More recent higher frequency indicators paint a mixed picture. The volume of retail sales (excluding motor vehicles) had broadly stabilised towards the end of 2012, although the first months of 2013 have shown renewed weakness (see Figure 1.4). Exchequer returns for the first quarter show income tax receipts are up 1.7 percent and VAT receipts are up 0.2 percent on the same quarter in 2012.[3] However, while income tax is broadly on profile (-0.3 percent), VAT receipts are 2.1 percent behind profile, suggesting continued weakness in consumer spending. The pace of decline in house prices has continued to slow over the past twelve months, with clearer evidence of stabilisation in the Dublin market (see Figure 1.5). One unknown element, however, is the extent to which incentives for first-time buyers in 2012 influenced activity in 2012.[4] Having shown weakness in the latter part of 2012, the seasonally adjusted volume of industrial production rose by 6.7 percent in the three months to February, reflecting mainly positive developments in the multinational sector. Industrial production in February was just slightly above its level in February 2012 (0.1 percent).

[3] On an underlying basis income tax was up 7.9 per cent in the first quarter of 2013. This adjusts primarily for a reclassification of PRSI/income tax receipts affecting the comparison with 2012.

[4] New incentives were also provided for first-time buyers in *Budget 2013* in the form of property-tax relief.

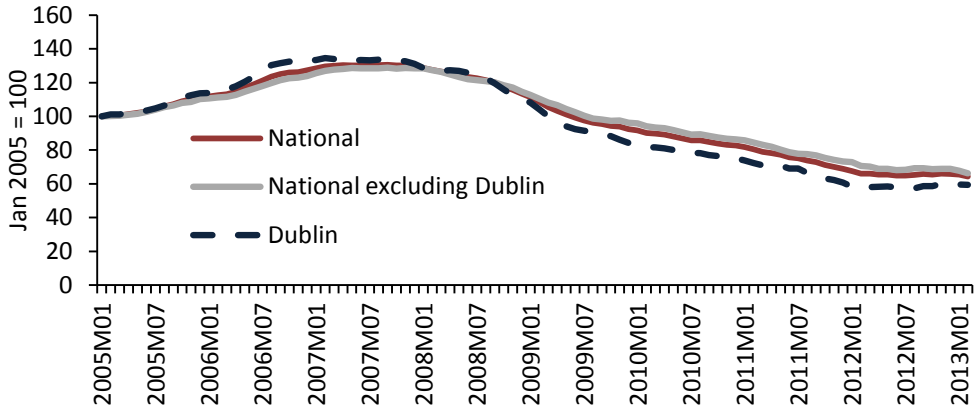
FIGURE 1.4: INDICES OF REAL PRIVATE CONSUMPTION AND VOLUME OF RETAIL SALES



Source: CSO.

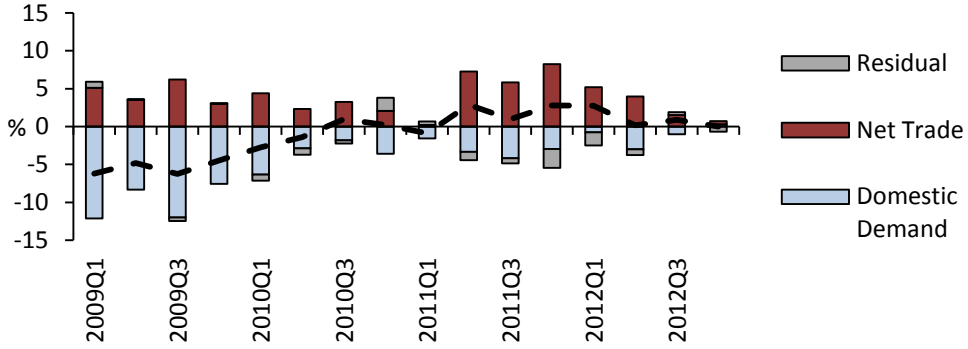
Note: Volume of Monthly Retail Sales (Excluding Motor Vehicles) data is the seasonally adjusted quarterly average. The quarterly average for 2013Q1 is based on January and February data only. Personal Expenditures on Consumer Goods and Services is in constant prices and is seasonally adjusted.

FIGURE 1.5: INDICES OF ALL RESIDENTIAL PROPERTY PRICES



Source: CSO.

FIGURE 1.6: CONTRIBUTIONS TO REAL GDP GROWTH



Note: The contributions are weighted by their share of GDP in the corresponding period of the preceding year.

Figure 1.6 shows the evolving contributions to GDP growth over recent quarters. The performance of real GDP since the beginning of 2011 had generally reflected strong positive contributions to growth from net exports offset by significant negative contributions from domestic demand. Box A describes how export growth had generally exceeded forecasts in recent years while domestic demand had tended to disappoint. The composition of growth has changed in recent quarters. The slower recent growth in net exports reflects, in part, weakness in the Euro Area and United Kingdom economies. The expiration of key patents in the pharmaceutical sector was also a contributing factor, although the performance of service exports has remained strong. The trend towards stabilisation in domestic demand has reduced the drag on growth from this component, leading to broadly stable real GDP over the second half of 2012.

1.4 An Assessment of Forecasts Contained in *Budget 2013*

1.4.1 *Budget 2013* Forecasts Compared with Other Agencies

The *Budget 2013* forecast for real GDP growth in 2013 is 1.5 percent. Real GNP is projected to grow by 0.9 percent. It is anticipated that growth will be underpinned by net exports, although the balance between net exports and domestic demand is expected to shift due to weakness in the international economy and tentative signs of stabilisation in components of domestic demand. Table 1.3 shows approximately contemporaneous forecasts for other official international and domestic agencies (for more detail, see Appendix Table A3). The *Budget 2013* forecasts for real GDP were the highest of the five agencies, but broadly in line with those of the ESRI and the CBI.[5]

The consensus among agencies is for a further boost in real growth in 2014-2015 (see Table 1.4). While a turnaround in domestic demand is generally foreseen, there is some variation with respect to its component sources as between the Department of Finance and other agencies (Appendix Tables A4 and A5). The anticipated recovery in growth is expected to boost employment somewhat, although all agencies are forecasting that the unemployment rate will average over 13 percent in 2015.

[5] *Budget 2013* forecasts were released prior to the release of the *Quarterly National Accounts* for Q3 2012 in December 2012.

TABLE 1.3: MACROECONOMIC FORECASTS FOR 2013

% change unless otherwise stated	Budget 2013	ESRI	CBI	EC	IMF
	Dec 2012	Jan 2013	Jan 2013	Feb 2013	Apr 2013
Real GDP	1.5	1.3	1.3	1.1	1.1
Nominal GDP	2.8	3.0	2.4	2.4	2.3
Nominal GDP (€bn)	167.7	168.1	166.9	166.9	166.7
Real GNP	0.9	-2.0	0.5	NA	0.1
Nominal GNP	2.3	-0.7	1.6	NA	NA
Nominal GNP (€bn)	133.9	131.1	133.0	NA	NA
Employment	0.2	0.0	0.3	0.1	0.1
Unemployment	14.6	14.6	14.5	14.6	14.6

Note: The EC nominal GDP figure is derived.

TABLE 1.4: MACROECONOMIC FORECASTS FOR 2014 AND 2015

% change unless otherwise stated	*Budget 2013*	ESRI	CBI	EC	IMF
	Dec 2012	Jan 2013	Jan 2013	Feb 2013	Apr 2013
2014					
Real GDP	2.5	2.3	2.5	2.2	2.2
Nominal GDP	3.8	5.2	3.5	3.6	3.7
Nominal GDP (€bn)	174.1	176.7	172.7	173.0	172.8
Real GNP	1.7	1.4	1.4	NA	1.5
Nominal GNP	2.9	4.0	2.3	NA	NA
Nominal GNP (€bn)	137.8	136.4	136.1	NA	NA
Employment	0.9	0.4	1.2	0.9	0.9
Unemployment	14.1	14.3	13.9	14.1	14.1
2015					
Real GDP	2.9	NA	NA	2.8	2.7
Nominal GDP	4.2	NA	NA	4.5	4.3
Nominal GDP (€bn)	181.4	NA	NA	180.5	180.3
Real GNP	2.1	NA	NA	NA	2.2
Nominal GNP	3.3	NA	NA	NA	NA
Nominal GNP (€bn)	142.3	NA	NA	NA	NA
Employment	1.3	NA	NA	2.0	1.9
Unemployment	13.1	NA	NA	13.1	13.3

Note: EC forecasts for 2014 were published in the European Economic Forecast, February 2013. EC forecasts for 2015 were published in the Economic Adjustment Programme for Ireland, Autumn 2012 Review, January 2013. The EC nominal GDP figure for 2014 is derived.

1.4.2 Uncertainty Surrounding Forecasts

Although there are signs that domestic demand is stabilising, the complex dynamics of household, business, bank and government balance-sheet repair mean that an unusual degree of uncertainty surrounds current projections. This uncertainty is compounded by an increasingly uncertain picture on the prospects for growth in key trading partners.

One indicator of the uncertainty surrounding growth forecasts for Ireland is the large discrepancy in the composition of real GDP growth seen by domestic agencies. Despite the identical real GDP growth forecasts for 2013 from the CBI and ESRI, the compositions of their forecasts differ markedly (see Appendix Table A3). From the low base of domestic investment reached in 2012, the ESRI projects growth of 3.1 percent in 2013; the equivalent forecast from the CBI is just 0.6 percent.[6] For exports, the ESRI anticipates growth of 3.9 percent, just under a percentage point higher than the CBI (3.0 percent). However, the ESRI foresees imports growing significantly by 4.3 percent, 2.4 percentage points higher than the CBI. The forecasts of both agencies are broadly similar for private and public consumption.[7]

Of course, substantial uncertainty surrounds growth projections even in more tranquil macroeconomic times. A useful way to represent this uncertainty is through the use of fan charts.[8] A fan chart for real GDP growth based on past forecast errors between 1996 and 2005 is presented in Figure 1.7. The red line shows the central real GDP growth forecasts published in *Budget 2013* (CSO data is used for 2009 -2012).[9] The immediately surrounding dark blue areas represent the range of outcomes with a probability of 10 percent on either side of this forecast. Each of the successively lighter blue areas represents a further increase of ten percentage points in cumulative probability. The range of possible outcomes widens as the forecast horizon lengthens since the historical forecast errors tend to rise with the forecast horizon.

[6] The Department of Finance's forecast in *Budget 2013* is almost identical to that of the ESRI at 3.2 percent.

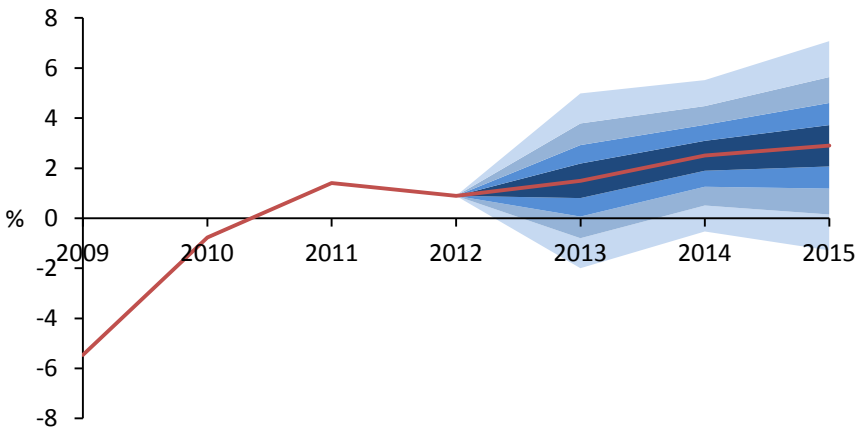
[7] The ESRI sees private and public consumption contracting by 0.5 and 1.5 percent respectively. The equivalent figures for the CBI are 0.4 and 1.6 percent. In *Budget 2013*, the Department of Finance foresaw a contraction of 0.5 percent in private consumption and 2.7 percent in public consumption.

[8] The fan chart shows 80 percent of the distribution around real GDP. The fan chart is based on the Department of Finance's real GDP forecast errors for one-, two- and three-year ahead forecasts between 1996 and 2005. The period after 2005 is omitted because it is thought that the forecast errors that occurred during the crisis were caused by rare and extreme events. The fan chart methodology is discussed in further detail in IFAC (2012b, pp. 71-73).

[9] As discussed in Chapter 2, nominal GDP is the more relevant aggregate for the performance of the public finances.

The fan chart shows estimated probability ranges for possible outcomes**.** For example, based on past forecast errors, there is an estimated 30 percent probability that real GDP growth will be below 1.2 percent in 2015 (relative to the *Budget 2013* forecast of 2.9 percent). With limited margins for meeting deficit limits under current growth projections, these uncertainties highlight a need for prudence in planning the medium term fiscal stance. The uncertainties surrounding the fiscal projections are examined in Chapter 2. The implications for the fiscal stance are examined in Chapter 4.

FIGURE 1.7: FAN CHART FOR REAL GDP GROWTH



Source: Budget 2013, QNA and IFAC calculations.

The observations on the emerging stabilisation in the economy suggest that modest growth is achievable this year. However, *Budget 2013* forecasts were undertaken prior to the worsening situation in the Euro Area/UK economies and the recent exchange rate appreciation. Achieving the Department of Finance's forecast of 1.5 percent real GDP growth in 2013 will be challenging in this environment, notwithstanding the tentative signs of stabilisation in domestic demand. The Department of Finance's macroeconomic forecasts will be updated as part of the *SPU* later in April.

Looking ahead to 2014 and 2015, there is a clear downside risk based on the recent pattern of forecast revisions that the upturn in the economy may not materialise at the pace forecast by the Department of Finance and other agencies. The Department of Finance forecasts of real GDP growth of 2.5 percent in 2014 and 2.9 percent in 2015 essentially repeat the two- and three-year ahead forecasts that have been present in most forecasting reports since 2010. As discussed in previous *Fiscal Assessment Reports*, the prolonged nature of the economic downturn has meant that the anticipated return to higher levels of growth has been continually pushed out.

BOX A: A DECOMPOSITION OF FORECAST ERRORS

The outturns for real GDP (and employment) have often differed from official forecasts in recent years. Such divergences are a regular and normal feature of forecasting. However, Figures A1–A3 seek to shed further light on whether certain tendencies in the sources of GDP forecast errors can be identified, in the case of current, one-, and two-year-ahead Department of Finance forecasts respectively.[10]

Although the errors in forecasting the components have often been quite large, they have tended to offset each other. A clear pattern is apparent—there has been a systematic tendency to overestimate domestic demand. The opposite holds true for net exports. This pattern may be of some surprise. Weak growth in both the UK and the Euro Area has sometimes been suggested as the source of Ireland's sluggish overall performance, contributing to a disappointing export performance relative to forecasts. However, Figures A2 and A3 show that net exports were actually overperforming relative to forecasts in contrast to domestic demand which has underperformed due to factors such as low consumer confidence and the personal debt burden.

The final strand in our look behind the forecasts of the Department of Finance considers employment forecasts. It can be seen from Figure A4 that employment levels between 2008 and 2012 have been consistently overestimated.[11,12] This reflects, to a large extent, the fact that GDP growth has lagged behind expectations.

[10] The years on the horizontal axis refer to the year for which the forecast is published. Forecasts are taken from Budget publications. Current year forecasts for 2012, for example, were published in December 2012. By that stage, a considerable amount of economic data for 2012 was available. Thus, the "forecast" is a combination of estimation and forecasting. The forecasts for 2012 that were made one-year-ahead were published in December 2011.

[11] For example, the one-year-ahead forecast for 2009 (i.e., the forecast made in 2008) overestimated the rate of employment by almost 7 percent.

[12] The outturn is the *QNHS* average annual growth rate of persons aged 15 years and over in employment. The forecast error is calculated as the difference between actual growth in employment and the employment growth rate forecast by the Department of Finance. Thus, a positive forecast error indicates that the outturn was greater than the forecast.

FIGURE A1: CONTRIBUTION TO THE DEPARTMENT OF FINANCE REAL GDP FORECAST ERRORS: FORECASTS MADE IN THE CURRENT YEAR

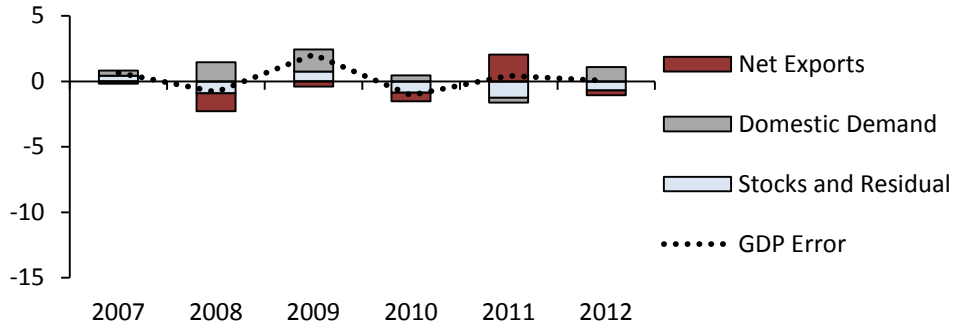


FIGURE A2: FORECASTS MADE ONE YEAR AHEAD

FIGURE A3: FORECASTS MADE TWO YEARS AHEAD

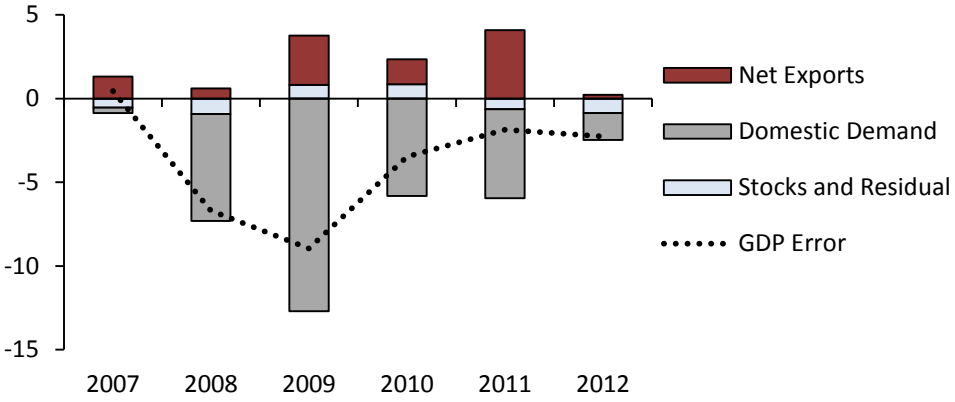
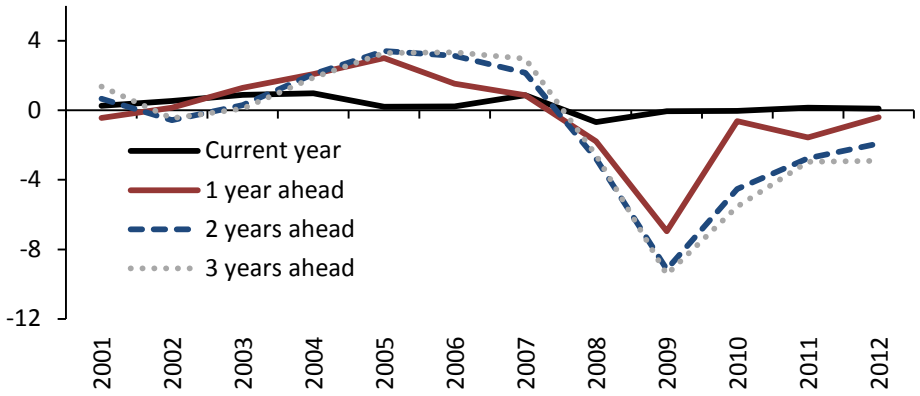


FIGURE A4: EMPLOYMENT FORECAST ERRORS



Note: The labels on the horizontal axis refer to the year for which the forecast is published.

1.5 FORECASTING METHODS

1.5.1 INTRODUCTION

This section provides the results of an exercise undertaken to establish the methods used by the Department of Finance in arriving at its macroeconomic forecasts. One objective was to provide a better basis for assessing the appropriateness of the forecasting methods.

1.5.2 THE APPROACH

Representatives from the Council met with a relevant official in the Department of Finance so that the process could be explained. Discussions were also held with the CBI and the ESRI so that comparisons could be made. The description that follows is based on these discussions.

1.5.3 THE DEPARTMENT OF FINANCE'S SHORT-TERM FORECASTING METHODS

The Department of Finance forecasts are prepared by a small team of about four economists.[13] Publications such as the *SPU* contain the Department's forecasts with a four year time horizon. For example, in *SPU 2012*, forecasts for 2012, 2013, 2014 and 2015 were provided. Forecasts for 2013, 2014 and 2015 were published in *Budget 2013*. The forecasts for the current year and the subsequent year are considered "short-term", while the forecasts for the later years are "medium-term". For the three Irish forecasting agencies considered here, the approach to short-term forecasting can be characterised primarily as being judgement based rather than model based.

[13] Similarly sized teams produce the short-term forecasts in the ESRI and the CBI.

In the case of short-term forecasting, the Department of Finance begins by examining the national accounts expenditure breakdown of consumption, investment, government spending on goods and services and exports minus imports. Exports are the first component to be considered. Values for key exogenous variables such as oil prices, exchange and interest rates are taken from various external sources. Most variables are forecast in real terms, with (forecast) deflators applied to arrive at nominal values.

EXPORTS

To generate a forecast of exports, assumptions regarding economic growth in Ireland's major trading partners are needed. The Department of Finance, in preparing its forecasts in the spring of each year for *SPU* purposes, uses the latest projections for the international environment available from the European Commission. When the autumn forecasts are being prepared for the Medium-Term Fiscal Statement and the Budget, the Department has greater flexibility and often chooses the most recently published set from across the international agencies.

The Department's forecasting team employ a relatively simple, single-equation model that relates trends in exports of goods and services to trends in import growth in the major trading partners and in competitiveness in Ireland. The estimated coefficients of this model can be used to produce forecasts for exports assuming values for the independent variables. This output is used as a guide and is supplemented by elements of judgement before arriving at an overall forecast. For example, if the Department is aware of sizeable additional foreign direct investment (FDI) in a particular year, this will influence its view on possible export growth in the following and subsequent years.

The forecasting process is highly iterative, with all elements of the exercise interacting with each other. For example, forecasts of employment growth will typically impact upon those for wage growth and, hence, competitiveness. This also needs to be fed back into the outlook for exports. This iterative process should be kept in mind throughout this description.

INVESTMENT

In contrast to exports, no statistical model is used in forecasting the volatile investment component. Instead, the basic approach is to combine the latest data with judgements on likely future trends.

Two components of investment are analysed separately – building/construction and machinery/equipment. For building and construction, data such as those on housing starts provide useful and timely information. The *Public Capital Programme* is also an important input. Forecasts for machinery and equipment take into account factors such as business confidence indicators. Given the size of the Irish economy, certain "lumpy" investments can have a significant impact on the forecast; the purchase of airplanes is the best example. The same is true in the case of specific large prospective FDI inflows that may be known in advance.

The distinction between foreign multinationals and domestic small and medium sized enterprises (SMEs) also matters. As foreign multinationals typically have access to capital outside of Ireland, they are not affected by whatever credit constraints may exist in Ireland, unlike in the case of domestic SMEs.

CONSUMPTION

The basic forecasting tool used for consumption is a relatively simple model that relates consumption to disposable income. As with the exports equation described above, the model is employed as an anchor, with supplementary judgements applied. The forecasts for aggregate disposable income are broken up into three separate components: labour income; profits; and transfers/taxes.

The forecasts for labour income are derived from a parallel exercise that involves forecasts for other labour market variables such as employment, participation and unemployment (see below). Profits are forecast in a broader framework that takes account of output and wages and, perhaps to a greater extent than other variables, is linked to the overall exercise iteratively. Data on taxes and transfers are provided by the relevant government departments and agencies.

Judgement is then applied to the model based forecast to account for the fact that the long-run average relationship between consumption and disposable income might not be valid in any particular period. For example, a specific issue that is particularly relevant in current circumstances is the uncertainty surrounding movements in the savings rate. This partly reflects deleveraging on the part of households. To the extent that changes in the savings rate are in turn related to changes in consumer confidence, measures of the latter provide some input, although these indicators may have limited predictive power.

GOVERNMENT SPENDING

The forecasts for government expenditure on goods and services do not involve any modelling and are treated as exogenous. Total expenditure is broken up into two components: the public sector pay bill; and other expenditure on goods and services. Forecasts for the nominal pay bill are taken directly from the Department of Public Expenditure and Reform. The non-pay element of government expenditure is forecast on the basis of information provided by the Department of Public Expenditure and Reform and the Department of Social Protection. This is then deflated using forecasts for the Harmonised Index of Consumer Prices (HICP). Although government expenditure is considered exogenous, there is an iterative process as regards the outlook for taxes and transfers, which in turn affects the forecasts for disposable income.[14]

IMPORTS

As was the case with exports and consumption, a model of import demand is used as an input into the forecasts for imports. The model relates imports to consumption, investment in machinery and equipment and exports. The estimated coefficients, along with forecasts for the independent variables involved, generate forecasts for imports. As with other variables, these forecasts are modified to take account of particular developments not captured by the model, such as tax policy changes.

GDP AND GNP

Summing the forecasts for exports, investment, consumption, government expenditure and subtracting imports, generates a forecast for GDP. However, if the value for GDP that emerges from this process is implausible (on the basis of the most recent trends or forecasts from other agencies), the forecasts will typically be reassessed and the components of expenditure revised as appropriate.

In order to provide a forecast for GNP, forecasts for net factor income flows are required. Gross outflows are forecast partly with reference to forecasts for exports from the multinational sector, due to the relationship between these exports and profits remitted from the sector. On the debit side, interest on the public debt is a large component currently.

[14] The Fiscal Unit is a separate economic unit within the Department of Finance, responsible for producing forecasts for the public finances.

INCOMES AND THE LABOUR MARKET

The macroeconomic identity that expenditure equals income equals output is a useful framework within which to assess the internal consistency of forecasts. While the Department of Finance does not provide forecasts from the output side, income forecasts are prepared. As the largest component of incomes is wages and salaries, forecasts involving the likely trends in the labour market are required, a process that involves several rounds of analysis and iteration.

The starting point is a demographic model that is used to see how the working age population is likely to change each year. Gross outflows from the labour force through retirements can be estimated, together with gross inflows through assessing the likely number of people who will exit the educational system and enter the labour force. Judgemental elements play a role, for example, in the current recession many younger people are delaying entry into the labour force.

In addition to ageing, the other key demographic driver of changes in the labour force is migration. Previously, the Department of Finance forecasters had tended to assume (in line with practices elsewhere) that differences between the unemployment rates in the UK and Ireland were a reliable predictor of net population flows to and from Ireland. However, the large inflows in the mid-2000s could not be explained by such a model and forecasts of net migration currently rely much more on broader judgements.

By analysing demographic influences on labour force growth and labour force participation rates, a supply-side view of the labour market is developed. A demand side perspective of the labour market is also formed. First, the GDP forecast (described above) provides some guidance on employment changes. However, in order to output changes to the demand for labour, a view on productivity growth is needed. Changes in productivity are typically related to the stage of the business cycle (for example, at the outset of a downturn, labour is not immediately released and so productivity falls). The Department of Finance aims to arrive at a forecast for employment that is consistent with the forecast for GDP growth and trends in productivity.

Forecasts for migration, the labour force, and employment in turn generate a forecast for unemployment, subject to the iterative process already described.

The final major element in this part of the process is wages. Forecasts for wages in the public sector are provided by the Department of Public Expenditure and Reform. For private sector wages, the

conceptual framework used is essentially a Phillip's Curve approach that assumes that the change in average wages is negatively related to the rate of unemployment. While this framework provides a view of possible changes in wages, there are also many other considerations that influence the forecast.

PRICES AND DEFLATORS

A complete set of macroeconomic forecasts includes forecasts for overall prices (such as CPI or HICP) and for deflators of all individual components as well as for GNP and GDP. The Department's forecasts for HICP are broken up into six separate parts. One major component is energy prices which are heavily influenced by international developments.

1.5.4 SHORT-TERM FORECASTING BY THE OTHER IRISH AGENCIES

As regards short-term forecasting methods used by the CBI and the ESRI, the most striking point to emerge was the similarities between their approach and that of the Department of Finance. Both of these agencies also adopt heavily judgement based iterative approaches as opposed to model driven methods. Their processes also take the international environment as a starting point, with exports the first component of demand to be forecast. Thereafter, their broad approach (as well as the resources devoted to forecasting) is similar to that of the Department of Finance.

While the ESRI described their short-term forecasts as being primarily judgement based, their macroeconomic model (*HERMES*) is used to provide a benchmark for their forecasts and also to undertake simulations. The *HERMES* model provides a framework to consider structural aspects of the economy and the relationships between various sectors. The ESRI approach contrasts somewhat with that of the Department of Finance where the forecasting exercise has a more directly operational purpose, closely linked to the preparation of the annual Budget. The ESRI approach also relies heavily on an internal peer review process.

All three domestic agencies are cognisant of the volatility of data such as the quarterly national accounts. To address this aspect, the CBI has undertaken work on what is referred to as "now-casting" – a process whereby the most recent indicators of economic activity and sentiment are combined to provide a GDP estimate in advance of the official estimates (see d'Agostino *et al*. (2008) and Liebermann (2012)).

1.5.5 Medium-Term Forecasting in Ireland

Only one of the three agencies concerned, namely, the ESRI, conducts medium-term forecasting using a macroeconomic model. The CBI does not produce medium term macroeconomic forecasts. The Department of Finance does provide medium term forecasts (*Budget 2013* contained forecasts out to 2015) but the methodology employed is less developed than that used in short-term forecasting. The Department takes a view on potential output and potential output growth, on the basis of the methodology used by the EC (see Chapter 4 for a fuller discussion of this approach). Subsequently, the likely speed with which the economy will converge towards potential is assessed.

The ESRI uses its *HERMES* model for medium term forecasting. This is a large-scale structural model with 150 behavioural equations (of which 25 are core) estimated using annual data. The model has been designed with an emphasis on capturing the key role of trade and competitiveness in the economy. World demand is a key driver, as are Irish relative costs. *HERMES* also includes a detailed demographic model. [15]

The model was originally developed in the 1980s with inputs from the Department of Finance, the CBI and the ESRI itself. In recent years, the ESRI has taken sole responsibility for updating and maintaining the model although the outputs of the model are used by the Department of Finance. For example, sensitivity analyses using *HERMES* are reported upon in official publications such as the annual Budget.

1.5.6 Ongoing Developments

The ESRI and the CBI have recently embarked on a joint research programme with the goal of developing a suite of economic models that can be used for both forecasting and policy analysis. The programme involves the development and modification of the *HERMES* model. It is also intended that a different form of macro model will be developed alongside the *HERMES* model. Macro-modellers internationally have increasingly devoted resources to the development of Dynamic Stochastic General Equilibrium (DSGE) models, in which more microeconomic theoretical considerations (including rational expectations) are built into the structure of the model. There are plans to develop a DSGE model for Ireland, together with a number of "satellite" models that will focus on specific issues such as fiscal aggregates and the labour market.

[15] The *HERMES* model does not contain a financial sector.

APPENDIX A: MACROECONOMIC FORECASTS TABLES

TABLE A1: DEPARTMENT OF FINANCE MACROECONOMIC FORECASTS FOR 2012 VERSUS THE OUTTURN FOR 2012

% change unless otherwise stated	*Budget 2012*	*SPU* 2012	*Budget 2013*	Outturn
	Dec 2011	Apr 2012	Dec 2012	CSO
Real GDP	1.3	0.7	0.9	0.9
Real GNP	0.7	-0.2	1.4	3.4
Consumption	-1.3	-1.7	-2.0	-0.9
Investment	-1.0	-2.5	-3.8	1.2
Government	-2.2	-2.2	-4.0	-3.7
Exports	3.6	3.3	3.0	2.9
Imports	1.6	1.4	0.0	0.3
Current Account (% GDP)	1.7	1.1	3.4	4.9
Employment	-0.2	-0.4	-0.7	-0.6
Unemployment Rate (%)	14.1	14.3	14.9	14.7
HICP	1.9	1.8	2.1	2.0
GDP Deflator	1.1	0.9	1.7	1.9
Nominal GDP (€ billions)	159.1	158.9	163.2	163.6
Nominal GDP	2.5	1.6	2.6	2.9
Nominal GNP (€ billions)	128.8	NA	130.9	133.4
Nominal GNP	1.9	NA	3.0	5.0

Note the employment growth figure is average annual growth in 2012 compared to 2011 based on QNHS data. The unemployment rate is the annual average in 2012 compared to 2011 based on QNHS data.

TABLE A2: DETAILED MACROECONOMIC FORECASTS FOR 2012

% change unless otherwise stated	*Budget 2013*	ESRI	CBI	EC	IMF
	Dec 2012	Jan 2013	Jan 2013	Feb 2013	Apr 2013
Real GDP	0.9	1.3	0.7	0.7	0.7
Real GNP	1.4	3.1	1.5	NA	0.7
Consumption	-2.0	-1.0	-1.3	-1.8	-1.8
Investment	-3.8	-3.9	-0.8	-2.0	-2.0
Government	-4.0	-3.0	-3.0	-3.6	-4.0
Exports	3.0	2.7	3.0	2.6	2.6
Imports	0.0	0.0	1.3	0.4	0.4
Current Account (% GDP)	3.4	4.8	3.7	2.1	2.9
Employment	-0.7	-0.9	-0.7	-1.0	-0.6
Unemployment Rate (%)	14.9	14.9	14.8	14.8	14.7
HICP	2.1	2.0	2.0	1.9	1.9
GDP Deflator	1.7	1.3	1.8	1.8	1.8
Nominal GDP (€ billions)	163.2	163.2	162.9	163.0	162.9
Nominal GDP	2.6	2.7	2.5	2.5	2.5
Nominal GNP (€ billions)	130.9	132.1	130.9	NA	NA
Nominal GNP	3.0	4.0	3.1	NA	NA

Note: The EC's nominal GDP figures are derived.

TABLE A3: DETAILED MACROECONOMIC FORECASTS FOR 2013

% change unless otherwise stated	*Budget 2013*	ESRI	CBI	EC	IMF
	Dec 2012	Jan 2013	Jan 2013	Feb 2013	Apr 2013
Real GDP	1.5	1.3	1.3	1.1	1.1
Real GNP	0.9	-2.0	0.5	NA	0.1
Consumption	-0.5	-0.5	-0.4	-0.5	-0.5
Investment	3.2	3.1	0.6	-1.5	-1.5
Government	-2.7	-1.5	-1.6	-2.5	-2.5
Exports	3.3	3.9	3.0	3.0	3.0
Imports	2.3	4.3	1.9	1.6	1.7
Current Account (% GDP)	4.3	2.6	4.3	3.4	3.4
Employment	0.2	0.0	0.3	0.1	0.1
Unemployment Rate (%)	14.6	14.6	14.5	14.6	14.6
HICP	1.7	1.7	1.3	1.3	1.3
GDP Deflator	1.3	1.6	1.8	1.3	1.3
Nominal GDP (€ billions)	167.7	168.1	166.9	166.9	166.7
Nominal GDP	2.8	3.0	2.4	2.4	2.3
Nominal GNP (€ billions)	133.9	131.1	133.0	NA	NA
Nominal GNP	2.3	-0.7	1.6	NA	NA

Note: The EC's nominal GDP figures are derived.

TABLE A4: DETAILED MACROECONOMIC FORECASTS FOR 2014

% change unless otherwise stated	*Budget 2013*	ESRI	CBI	EC	IMF
	Dec 2012	Jan 2013	Jan 2013	Feb 2013	Apr 2013
Real GDP	2.5	2.3	2.5	2.2	2.2
Real GNP	1.7	1.4	1.4	NA	1.5
Consumption	1.0	-0.5	0.2	1.2	1.2
Investment	8.3	3.6	4.3	3.0	3.0
Government	-2.3	-1.5	-3.3	-2.8	-1.3
Exports	4.3	4.9	5.4	4.2	4.0
Imports	3.9	4.4	4.1	3.3	3.5
Current Account (% GDP)	4.2	3.9	5.3	4.3	4.0
Employment	0.9	0.4	1.2	0.9	0.9
Unemployment Rate (%)	14.1	14.3	13.9	14.1	14.1
HICP	1.8	2.0	1.2	1.3	1.3
GDP Deflator	1.3	2.8	1.0	1.4	1.4
Nominal GDP (€ billions)	174.1	176.7	172.7	173.0	172.8
Nominal GDP	3.8	5.2	3.5	3.6	3.7
Nominal GNP (€ billions)	137.8	136.4	136.1	NA	NA
Nominal GNP	2.9	4.0	2.3	NA	NA

Note: The EC's nominal GDP figures are derived.

TABLE A5: DETAILED MACROECONOMIC FORECASTS FOR 2015

% change unless otherwise stated	*Budget 2013*	EC	IMF
	Dec 2012	Jan 2013	Apr 2013
Real GDP	2.9	2.8	2.7
Real GNP	2.1	NA	2.2
Consumption	1.2	1.9	1.6
Investment	4.4	5.2	6.0
Government	-1.5	-3.4	-0.5
Exports	4.8	4.5	4.2
Imports	3.8	3.6	3.9
Current Account (% GDP)	4.3	4.7	4.1
Employment	1.3	2.0	1.9
Unemployment Rate (%)	13.1	13.1	13.3
HICP	2.0	1.6	1.6
GDP Deflator	1.3	1.6	1.6
Nominal GDP (€ billions)	181.4	180.5	180.3
Nominal GDP	4.2	4.5	4.3
Nominal GNP (€ billions)	142.3	NA	NA
Nominal GNP	3.3	NA	NA

Note: The EC's European Economic Forecast for Ireland, published in February 2013, did not contain forecasts for 2015.