

2. Assessment of Macroeconomic Forecasts

2.1 Introduction

As part of its mandate under the Fiscal Responsibility Bill (FRB), the Council is required to provide “...an assessment of the official forecasts” (Department of Finance, 2012b).¹ This chapter assesses the macroeconomic forecasts which were set out by the Government in the most recent Stability Programme Update (*SPU*) 2012 and in previous publications.

Internationally, one reason that this assessment function has sometimes been assigned to fiscal councils is to try to guard against potential over-optimism on the part of official forecasters. Such over-optimism can be seen as a contributing factor to deficit-bias on the part of governments (Calmfors and Wren-Lewis, 2011).² The ideal approach would be for the agency undertaking the assessment to prepare its own forecasts and for a comparison to be made between them and the official forecasts. However, as the remit (and the resources) of the Council do not extend to undertaking such independent forecasts, an alternative approach is adopted.

The Council’s approach involves four strands. First, a comparison of official forecasts with actual outcomes is presented, something that is not always done on a regular basis. Over time, large forecasts errors and/or errors which are repeatedly in the same direction would point to deficiencies in the methods used. Second, the official forecasts are compared with those published contemporaneously by the European Commission (EC), the International Monetary Fund (IMF), the Organisation for Economic Co-operation and Development (OCED), the Economic and Social Research Institute (ESRI) and the Central Bank of Ireland (CBI). The comparison of Department of Finance forecasts with those of other agencies allows one to assess if the official methodology is giving rise to sets of forecasts that are significantly different from those of other agencies.³ Third, the pattern of forecast revisions is examined in order to assess the presence of any systematic tendencies. Fourth, the pattern of identified forecast errors is used to provide an explicit treatment of the uncertainty surrounding growth forecasts using a technique known as a fan chart.

¹ The FRB is available at: <http://www.finance.gov.ie/viewdoc.asp?DocID=7320>

² Calmfors and Wren-Lewis (2011) use the term “optimism bias” to describe the tendency of governments to err on the side of higher forecasts for rates of economic growth, relative to likely outturns and relative to the forecasts of other agencies, in an effort to generate more favourable forecasts for the public finances.

³ In March 2011, a review of the Department of Finance was published by an independent review panel which stated that the Department’s work was “...as good as any other institution making forecasts of the Irish economy. However, the recent past also demonstrates that it is extremely difficult to project ‘turning points’ particularly in a rapidly growing economy.” The review is available at <http://www.finance.gov.ie/viewdoc.asp?DocID=6707&CatID=45&StartDate=01+January+2011>

The chapter is organised as follows. In Section 2.2, the outturn for economic activity in 2011, as estimated by the Central Statistics Office (CSO), is compared to forecasts for 2011 provided by the Department of Finance in April 2011 (*SPU 2011*) and December 2011 (*Budget 2012*). Section 2.3 considers forecast errors for short- and medium-term forecasts over the period 1995 to 2011. Section 2.4 contains a contemporaneous comparison of forecasts from the Department of Finance and other agencies. Section 2.5 highlights the on-going pattern of downward revisions reflected in recent years' forecasts. The uncertainty that this entails is explored in Section 2.6 through the use of a fan chart. Section 2.7 summarises the chapter's main findings.

2.2 How Close was the 2011 Economic Outturn to the Department of Finance Forecasts?

The National Income and Expenditure Accounts (NIE), released in July 2012, provide an opportunity to assess how close the official forecasts for 2011 published in the *SPU 2011* and *Budget 2012* were to the actual outturn (Table 2.1).⁴ The NIE estimate that annual real GDP growth in 2011, at 1.4 per cent, was stronger than official forecasts, while real GNP growth in 2011 was almost three percentage points lower than forecast.

Table 2.1: Department of Finance Forecasts for 2011 versus the Outturn

% change between 2010 and 2011 unless otherwise stated	2011 Forecast	2011 Forecast	2011 Outturn
	<i>SPU 2011</i> April 2011	<i>Budget 2012</i> December 2011	NIE July 2012
Real GDP	0.8	1.0	1.4
Real GNP	0.3	0.4	-2.5
Nominal GDP (€ billions)	156.1	155.3	159.0
Nominal GDP	1.4	-0.5	1.6
Nominal GNP (€ billions)	n.a.	126.5	127.0
Nominal GNP	n.a.	-1.4	-2.4

The higher outturn for the *level* of nominal GDP in 2011 reflects a number of factors, including both the stronger real growth rate and an upward revision to the estimated level of GDP in 2010. The level of nominal GNP is roughly in line with the *Budget 2012* estimate as weaker growth was offset by upward revisions to the 2010 level. The large under prediction of real GNP highlights the difficulties in anticipating accurately the component “net factor income from abroad” which is the difference between GNP and GDP (see Box A). GDP measures the total output of the economy, while GNP measures output (domestic and foreign) accruing as income to Irish residents, i.e. net factor payments (in Ireland's case, mainly net profit transfers by multinationals) are subtracted. In

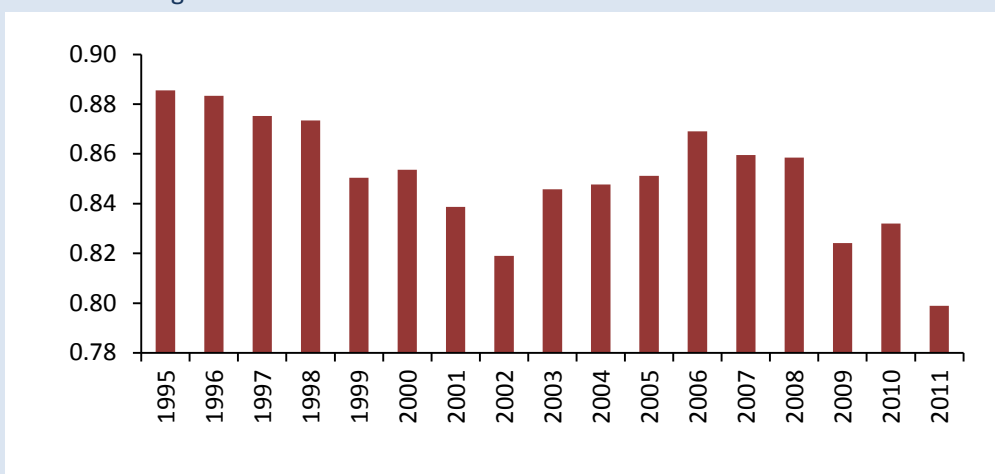
⁴ By December 2011, there were already considerable economic data for 2011 available. Hence, the “forecast” for 2011 at that time was a combination of estimation and forecasting.

Ireland, unlike most other countries, the difference between GNP and GDP is very sizeable and also somewhat volatile. Chapter 4 discusses the implications of using GDP or GNP as the scale variable in assessing fiscal policy and indebtedness.

Box A: Measures of Output: GDP and GNP

Gross Domestic Product (GDP) measures the total output produced in an economy. Gross National Product (GNP) measures the output (domestic and foreign) accruing to residents. The difference between GNP and GDP equals net factor income from abroad (NFI). For most countries the difference between GNP and GDP is very small but in Ireland it is highly significant and volatile, with the growth rates of the two variables varying considerably in some years (Figures A1 and A2). In 2011, the level of nominal GNP was about 20 per cent (€32 billion) lower than nominal GDP. This has important implications both in terms of forecasting and in considering the appropriate scale variable to use in assessing fiscal policy and indebtedness (the latter issue is discussed in Chapter 4).

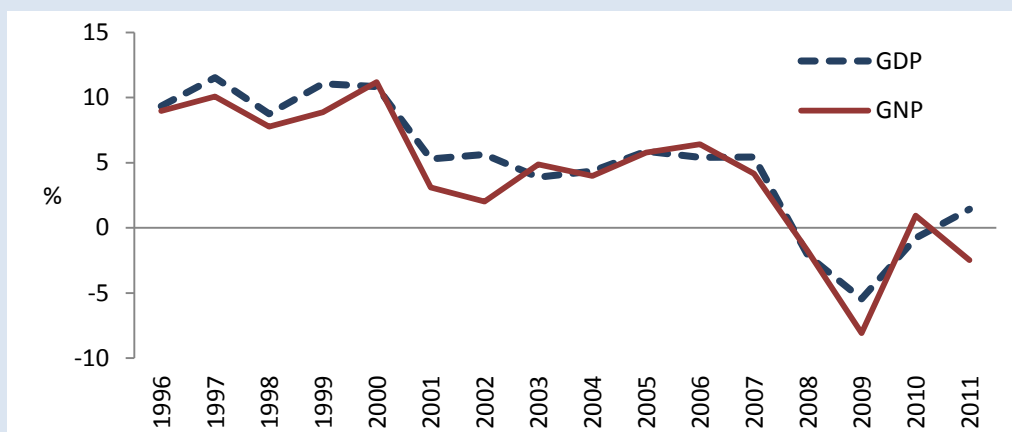
Figure A1: Ratio of Nominal GNP to Nominal GDP



Source: CSO, National Accounts Data. Note: Data at current market prices.

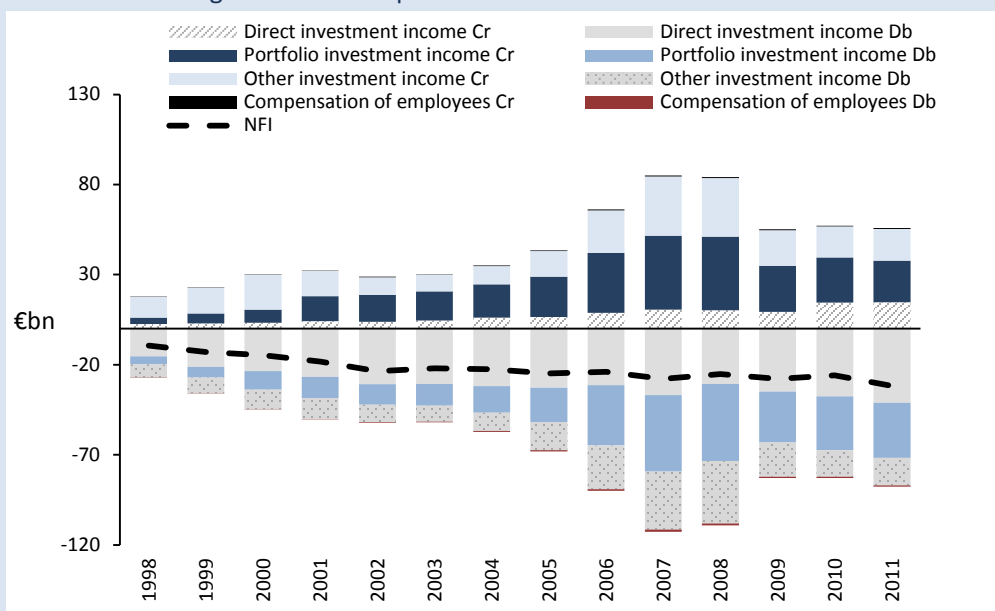
The breakdown of NFI by major category is shown in Figure A.3. A large part of NFI is the profits and dividends of foreign multinationals located in Ireland. Net interest payments, although minor to date, are beginning to grow in importance due to rising public debt service payments, which are reflected in Portfolio and Other investment income in Figure A3.

Figure A2: Real GDP and Real GNP Growth Rates



Source: CSO, National Accounts Data.

Figure A3: Components of Net Factor Income



Source: CSO, Balance of Payments Data.

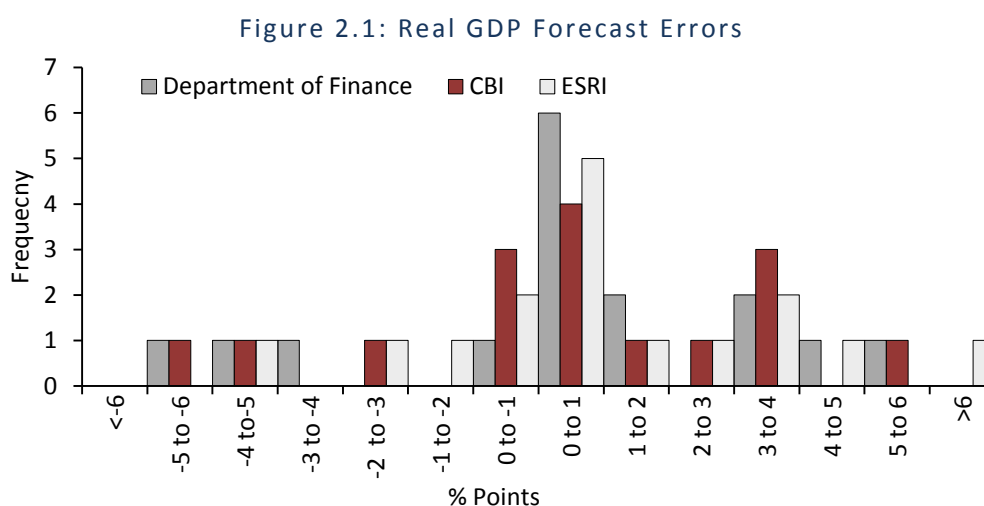
Notes: Db = Debit, Cr = Credit.

The volatility of NFI in recent years partly reflects the application of particular tax management strategies at a given time. Estimation of the output and related transactions of the multinational sector often requires firm specific data, especially for large enterprises. Forecasts for NFI and GNP by the ESRI, the CBI and the Department of Finance are linked closely to projections for exports of the multinational sector, taking into account any special factors. Projections for the (increasingly important) net interest component reflect the estimated debt service payments contained in the *Budget* adjusted as applicable to take into account up to date interest rate developments.

2.3 A Look Back at Forecast Errors

2.3.1 Short-Term Forecasts

This section examines the one-year forecast errors for real GDP over the period 1996 to 2011 in order to detect any evidence of systematic errors or bias. Figure 2.1 summarises the distribution of the one-year forecast errors associated with the forecasts undertaken by the Department of Finance, the CBI and the ESRI.⁵ The percentage forecast errors, i.e. the values on the horizontal axis, are calculated as the actual growth rate minus the forecast growth rate and thus positive values represent an underestimation. The modal value for the Department of Finance forecasts is between 0 and 1 per cent, although there were very large errors from time to time.⁶ The short-term forecasts of the ESRI and the CBI follow a similar pattern. Hence, the official forecasts do not exhibit evidence of optimism bias viewed relative to those of other agencies or in isolation.



Note: The histogram reflects one-year forecasting errors between 1996 and 2011.

The forecast errors shown in Figure 2.2 represent the percentage point difference between the outcome for a given year, labelled t , and the forecast published by the Department of Finance in the previous year ($t-1$).⁷ Both positive and negative errors were observed over the period. One-year ahead forecasts showed large positive errors (under prediction) in 1999/2000. There were consistently positive errors in the one-year ahead forecasts during the upswing from 2002, typically of less than one percentage point in magnitude. Relatively large errors were observed during the

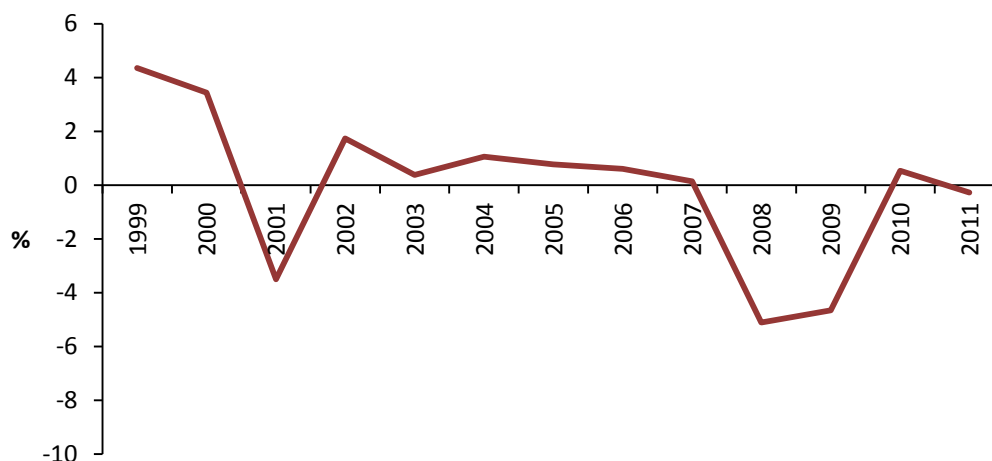
⁵ The Department of Finance forecasts are taken from annual Budgets. The CBI forecasts are taken from the final *Quarterly Bulletin* to be published in a calendar year. The ESRI forecasts are taken from the final *Quarterly Economic Commentary* to be published in a calendar year.

⁶ The pattern of forecast errors is similar across agencies, with the largest errors occurring in the late 1990s, 2007 and 2008.

⁷ For example, if year t is 2010, the $t-1$ forecast is that published in December 2009 (i.e. *Budget 2010*).

downturn in 2001, as well as in 2008 and 2009, but one-year forecasts for 2010 and 2011 showed much smaller errors.

Figure 2.2: Department of Finance Real GDP Forecast Errors: Short-Term Forecasts



Source: IFAC calculations.

2.3.2 Medium-Term Forecasts

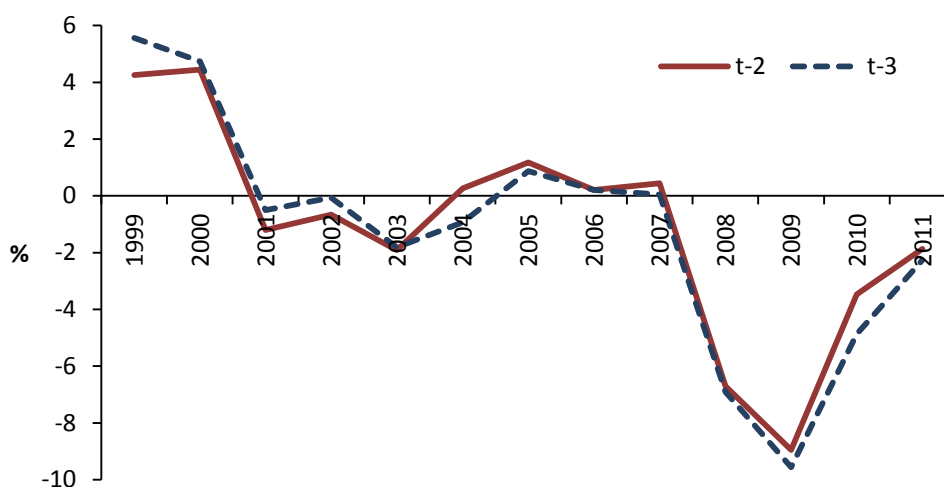
The Department of Finance provides real GDP growth forecasts not only for the current year but also for up to 3 years ahead. Figure 2.3 shows the forecast errors from *Budget* publications' medium-term forecasts between 1999 and 2011, where $t-2$ and $t-3$ represent forecasts for year t published two years and three years previously.^{8,9} As was the case with the short-term forecasts, medium-term forecasts were relatively more accurate in the early period of the decade leading up to the recession, when compared to the latter years of the nineties. Following the large errors in 2008 and 2009, the negative errors for 2010 and 2011 indicate some underestimation of the length and depth of the current recession.¹⁰

⁸ Taking 2010 as t again, the $t-2$ forecast is from December 2008 (i.e. *Budget 2009*) and the $t-3$ forecast is from December 2007 (i.e. *Budget 2008*).

⁹ The *SPU* started in 1999 and up until 2010 was published with the *Budget* in December. As part of the European Semester, the *SPU* was published in April in 2011 and 2012. For consistency, this analysis takes forecasts from *Budget* publications from 1999 onwards.

¹⁰ The forecasts of other agencies such as the EC and the IMF follow a similar pattern.

Figure 2.3: Department of Finance Real GDP Forecast Errors:
Medium-Term Forecasts



Source: IFAC calculations.

2.4 Comparison with Contemporaneous Forecasts

The forecasts published by the Department of Finance in *SPU 2012* are similar to the contemporaneous forecasts of other agencies. In the *SPU*, the Department of Finance’s forecast for real GDP growth of 0.7 per cent in 2012 (Table 2.2) was revised downwards significantly from the estimate published in *Budget 2012* (1.3 per cent) while the forecast for nominal GDP in 2012 was also reduced due to a slightly lower inflation outlook. The most recent forecast of the CBI, which was published after the release of the NIE for 2011, has a much higher outlook for nominal GDP than the Department of Finance. The Department of Finance’s forecast for real GNP has also been revised downwards significantly since *Budget 2012* but remains similar to the forecasts of other agencies. It is worth noting that the Department of Finance does not provide a forecast for nominal GNP in the *SPU*. It would be preferable for the Department to include this in future *SPU* publications given the importance of this variable.

As was the case in earlier forecasts, the Department of Finance expects all components of domestic demand to continue to decline in 2012. Investment expenditure is envisaged to fall, although there is some variation across agencies as to the magnitude. Available information does not permit an assessment of whether the investment stimulus package announced by the Government in July 2012 will affect this estimate. There is a consensus that the export growth rate will be lower in 2012 than in 2010-11, reflecting the ongoing Euro Zone debt crisis and the associated uncertainty. All agencies, except the OECD, anticipate that imports (a sizeable portion of which are associated with the multinational export sector) will increase slightly in 2012.

Table 2.2: Macroeconomic Forecasts for 2012

% change unless otherwise stated	SPU 2012	OECD	ESRI	EC	IMF	CBI
	Apr-12	May-12	Jun-12	Jun-12	Jun-12	Jul-12
Real GDP	0.7	0.6	0.6	0.5	0.5	0.7
Real GNP	-0.2	-0.7	0.0	n.a.	-0.1	-0.3
Consumption	-1.7	-1.5	-2.0	-1.7	-1.7	-1.6
Investment	-2.5	-2.1	-2.7	-4.0	-4.5	-1.7
Government	-2.2	-2.9	-2.3	-3.8	-2.0	-2.0
Exports	3.3	2.1	3.3	3.2	3.0	3.2
Imports	1.4	-0.6	0.9	1.2	1.0	1.7
Current Account (% GDP)	1.1	1.3	2.9	1.6	0.9	2.6
Employment	-0.4	-0.1	-0.7	-0.6	-0.8	-0.8
Unemployment Rate (%)	14.3	14.5	14.9	14.3	14.3	14.7
HICP*	1.8	2.0	1.7	1.7	1.7	1.4
GDP Deflator	0.9	0.6	1.9	1.2	1.2	2.1
Nominal GDP (€ billions)	158.9	158.4	160.4	159.2	159.2	163.4
Nominal GDP	1.6	1.2	2.5	1.8	1.8	2.8

Note: *Harmonised Index of Consumer Prices. The ESRI forecast refers to the Consumer Price Index.

Continuing the pattern observed in forecasting since the crisis began, all agencies are expecting a recovery in activity next year, followed by a further pickup in the outer years (Table 2.3). In line with most forecasting agencies, the Department of Finance anticipates real GDP growth to gain momentum in 2013 and a resumption of positive real GNP growth is expected. Investment is forecast to grow for the first time since 2007 and while the Department of Finance's investment forecast is similar to that of the OECD and the, EC and IMF, it is significantly below that of the ESRI (Table A1 of the Appendix to this chapter). Consumption is anticipated to remain weak in 2013.

The Department of Finance has maintained its 2014 and 2015 real GDP and real GNP growth forecasts since *Budget 2012* despite downward revisions to the short-term growth outlook. The EC and the IMF have lowered their medium-term growth forecasts slightly. Nonetheless, the Department of Finance's medium-term forecasts for consumption and investment are lower than those of the IMF and EC (Table A2 of the Appendix to this chapter).

Table 2.3: Macroeconomic Forecasts 2013, 2014 and 2015

% change unless otherwise stated	SPU	OECD	ESRI	EC	IMF	CBI
	Apr-12	May-12	Jun-12	Jun-12	Jun-12	Jul-12
2013						
Real GDP	2.2	2.1	2.2	1.9	1.9	1.9
Real GNP	1.4	1.6	0.5	n.a.	1.4	0.9
Unemployment Rate (%)	13.6	14.4	14.7	13.6	13.7	14.4
Nominal GDP	3.3	3.0	3.7	3.1	3.1	3.2
2014						
Real GDP	3.0	n.a.	n.a.	2.6	2.6	n.a.
Real GNP	2.3	n.a.	n.a.	n.a.	2.2	n.a.
Unemployment Rate (%)	12.8	n.a.	n.a.	13.0	13.0	n.a.
Nominal GDP	4.3	n.a.	n.a.	4.1	4.1	n.a.
2015						
Real GDP	3.0	n.a.	n.a.	2.9	2.8	n.a.
Real GNP	2.3	n.a.	n.a.	n.a.	2.4	n.a.
Unemployment Rate (%)	11.7	n.a.	n.a.	12.4	12.3	n.a.
Nominal GDP	4.5	n.a.	n.a.	4.5	4.5	n.a.

2.5 The Recent Pattern of Downward Revisions and Delayed Upturns in Forecasts

In this section the evolution of forecasts for the Irish economy in recent years is examined. This provides an insight into the difficulties posed by the particularly high degree of uncertainty prevailing currently.

Figures 2.4a and b show how forecasts for real GDP growth in 2012 and 2013 across agencies have been successively modified over time. These forecasts have generally been revised downwards, continuing the pattern observed in 2010 and 2011.¹¹

The turnaround in the economy has been consistently forecast to start around the time the forecast was made and then to recover at a healthy pace. However, this has not occurred. For example, the recovery that had been expected to occur in 2010/2011 did not materialise and, instead, is now envisaged to occur, albeit at a slower pace, in 2014/2015.

¹¹ The evolution of forecasts for 2011 was illustrated in previous *Fiscal Assessment Reports* (IFAC, 2011 p.8; IFAC, 2012a p.10).

Figure 2.4a: Evolution of 2012 Real GDP Growth Forecasts¹²

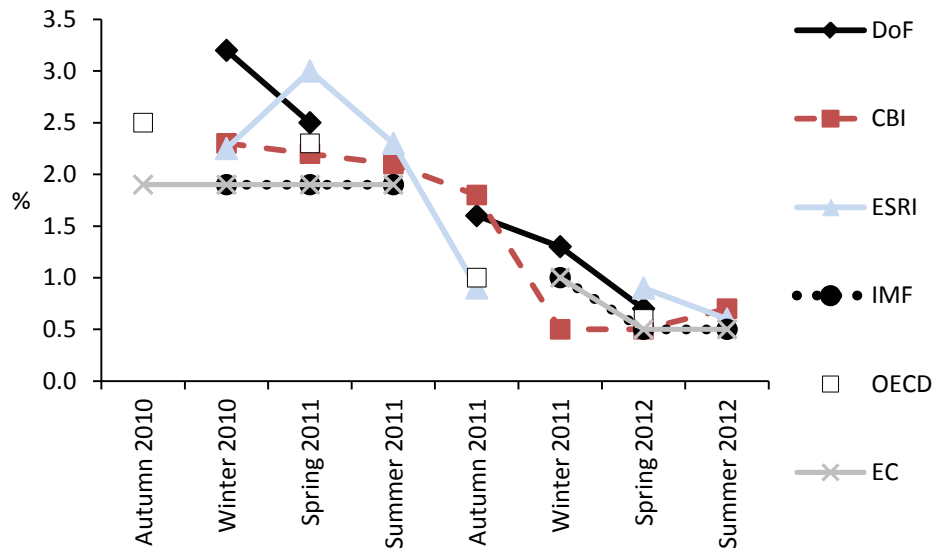
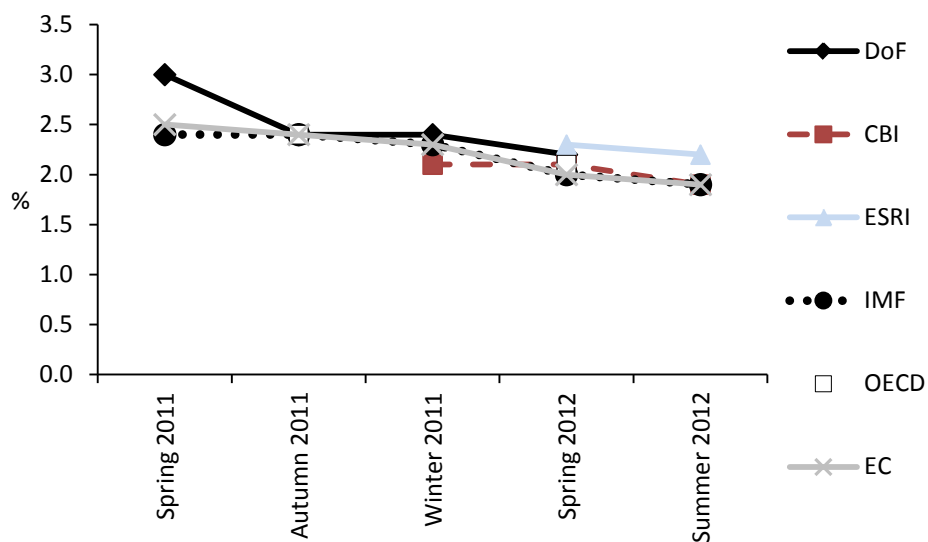


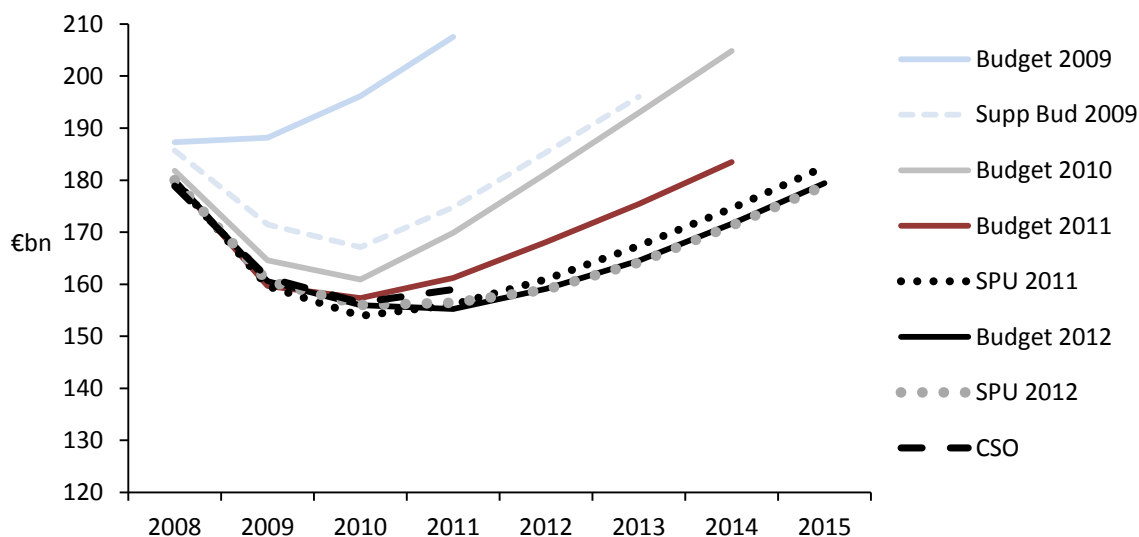
Figure 2.4b: Evolution of 2013 Real GDP Growth Forecasts



¹² Labels on the horizontal axis refer to the season in which the forecast is published. There is some overlap between Winter 2011 and early 2012.

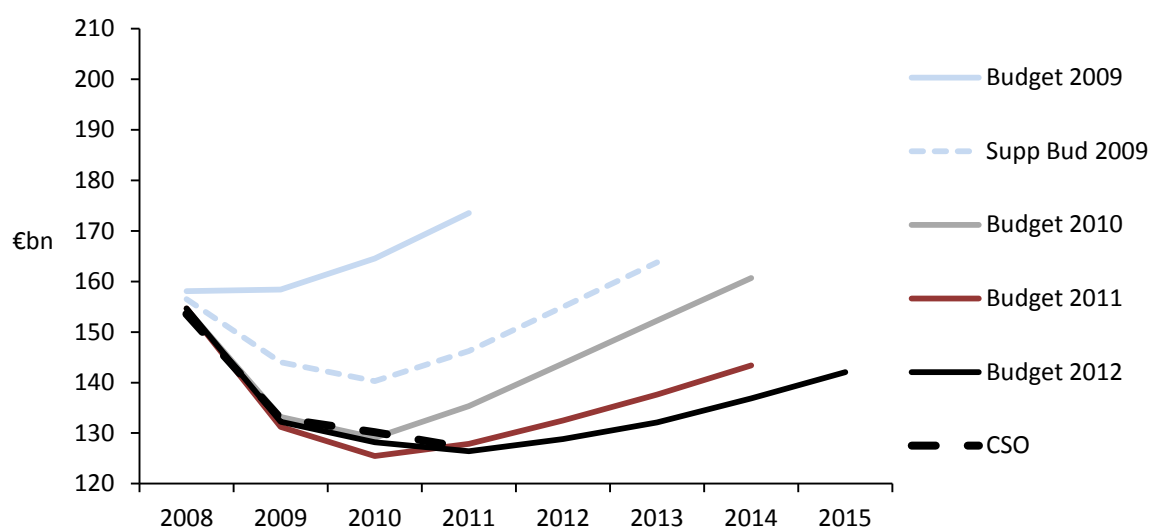
The downward revisions have resulted in a lowering of the expected *levels* of GDP and GNP by the Department of Finance in successive forecasts (see Figures 2.4c and d).¹³ This pattern is stronger for nominal GNP than for nominal GDP.

Figure 2.4c: Department of Finance Nominal GDP Forecasts



Note: The outturns for each year are shown as "CSO".

Figure 2.4d: Department of Finance Nominal GNP Forecasts



Note: The outturns for each year are shown as "CSO".

¹³ The IMF and EC forecasts for nominal GDP have followed a similar pattern.

2.6 Uncertainty Remains High

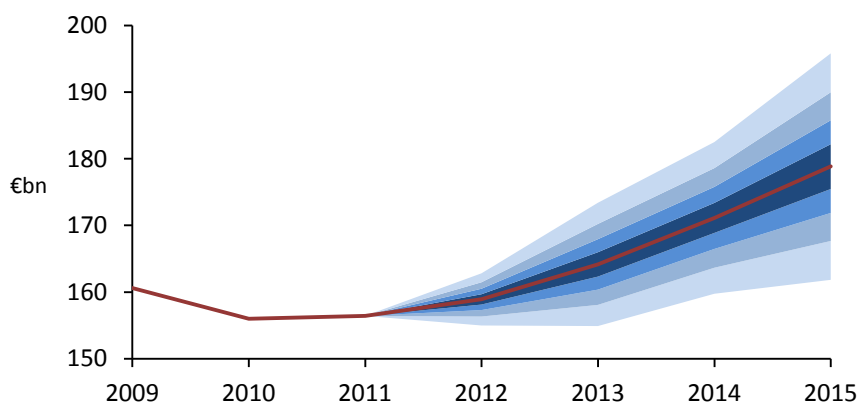
The April 2012 *Fiscal Assessment Report* discussed the factors underlying the unusually high degree of uncertainty surrounding the short- to medium-term growth prospects for the Irish economy. It identified three broad types of uncertainty relating to (a) the size of the current output gap; (b) the rate at which the output gap will be closed; and (c) the trend growth rate of potential output itself.

Despite the inherent uncertainty in forecasting, “point forecasts” (i.e. a single number) have long been used in economic publications. However, even with the best forecasting techniques, for a variety of reasons, it is highly improbable that actual outcomes will coincide with the forecasts.

One way of representing this inherent uncertainty is through the use of fan charts. Fan charts have been widely used by central banks over the past fifteen years (Britton, Fisher and Whitley, 1998, Cronin and Dowd, 2011). The fan chart in Figure 2.5 is based on the Department of Finance’s one-, two- and three-year nominal GDP forecast errors over the period 1999 to 2005. The methodology used to develop the fan charts is explained in more detail in Annex A. The width of the fan represents the range of possible outcomes for nominal GDP in the coming years.¹⁴

Figure 2.5 shows the *SPU 2012* forecast, i.e. the central forecast, as a red line. The surrounding dark blue areas represent the range of outcomes with a probability of 10 per cent either side of the central forecast. Each successively lighter band represents a further increase of 10 percentage points on each side of the total probability of the range covered. The range of possible GDP outcomes widens as the forecast horizon lengthens.

Figure 2.5: Fan Chart for Nominal GDP



Source: *SPU 2012* and IFAC calculations.

¹⁴ The fan chart shows 80 per cent of the distribution around nominal GDP. It is extremely difficult to represent events beyond this range.

While the fan charts in this report are assumed to be symmetric by construction, the Council judges that the risks are likely to be greater on the downside. The repeated experience since 2008 of forecasts of imminent recovery leading to moderate growth being incorrect points to specific downside risk relating to a prolonged “balance sheet recession” (Koo, 2011).¹⁵ This forecast pattern has been widely shared by other official and private sector forecasters, but this could be explained by common modelling assumptions. Moreover, the close involvement of the EC and the IMF in the design of Ireland’s programme has likely led to a convergence of assumptions. As noted above, GNP, in particular, has yet to show signs of turning around, although turning points are hard to forecast in advance. The “balance sheet” nature of the recession raises the possibility of a so-called “L-shaped” pattern, whereby output and GNP (which is most strongly affected by domestic factors) would remain largely flat for some years. This scenario is specifically examined in the scenario analysis conducted in Chapter 3.

In the previous assessment report (IFAC 2012a), the Council urged that the official forecasts give greater prominence to uncertainty by attaching error bands to the forecasts and by including a more complete assessment of the overall balance of risks. *SPU 2012* provides a more detailed discussion of risks than had previously been the case, including a statement that “the risks appear broadly balanced at this time”. Nevertheless, the Council suggests that the use of error bands and the provision of a more detailed sensitivity analysis around the central projections would further enhance the usefulness of the forecasts.

2.7 Summary

This chapter provides an assessment of the Department of Finance’s macroeconomic forecasts.

- Relative to the outturn for 2011, the Department of Finance underestimated real and nominal GDP growth rates but overestimated real GNP.
- Forecasts for nominal GNP were not provided in either *SPU 2011* or *SPU 2012*. It would be preferable for the Department to include these forecasts in future *SPU* publications given the importance of this variable.
- An analysis of forecast errors over the period 1995 to 2011 indicates that the pattern of past forecast errors is similar across agencies, including the Department of Finance. Further, the official forecasts do not exhibit evidence of optimism bias.

¹⁵ In this context, Koo (2011) refers to the negative impact that arises from a debt-financed bubble associated with a collapse in asset prices. As a result, households and businesses are forced to repair their balance sheets by increasing savings or paying down debt.

- Current Department of Finance forecasts for 2012-2015 are similar to the contemporaneous forecasts of other agencies. In general, forecasters remain of the view that growth rates of about 3 per cent will return over a two-three year horizon.
- In recent years, the forecast levels of GDP and GNP have generally been lowered by the Department of Finance (and other agencies) in each successive forecast. This pattern is more apparent for nominal GNP than it is for nominal GDP. Thus, forecasters have consistently over-anticipated the timing and extent of a possible turnaround in the economy.
- The uncertainties surrounding the growth outlook for the Irish economy that were highlighted in the Council's previous report (IFAC, 2012a) remain. The use of fan charts attaches a probability to each of a wide range of possible outcomes for GDP over the coming years. Although the fan chart is symmetric by construction, in reality the risks to GDP are likely to be weighted to the downside. While the discussion of risks included in *SPU 2012* is welcome, a more detailed and quantitative sensitivity analysis of the uncertainty surrounding official forecasts would be desirable.

Appendix

Table A1: Detailed Macroeconomic Forecasts for 2013

% change unless otherwise stated	SPU	OECD	ESRI	EC	IMF	CBI
	Apr-12	May-12	Jun-12	Jun-12	Jun-12	Jul-12
Real GDP	2.2	2.1	2.2	1.9	1.9	1.9
Real GNP	1.4	1.6	0.5	n.a.	1.4	0.9
Consumption	0.0	0.0	-0.5	0.3	0.3	-0.1
Investment	1.5	1.3	4.3	1.0	1.0	0.7
Government	-2.2	-2.2	-2.2	-2.7	-1.5	-1.2
Exports	4.3	5.3	3.5	4.2	4.0	4.2
Imports	2.6	4.0	2.6	3.0	2.8	3.1
Current Account (% GDP)	2.2	2.0	3.0	3.1	1.8	3.7
Employment	0.8	0.3	-0.3	0.7	0.7	0.3
Unemployment Rate (%)	13.6	14.4	14.7	13.6	13.7	14.4
HICP	1.3	1.2	1.5	1.2	1.2	0.7
GDP Deflator	1.0	0.9	1.5	1.2	1.2	1.3
Nominal GDP (€ billions)	164.2	163.2	166.3	164.2	164.2	168.6
Nominal GDP	3.3	3.0	3.7	3.1	3.1	3.2

Note: The ESRI forecast refers to the Consumer Price Index rather than the HICP.

Table A2: Detailed Macroeconomic Forecasts for 2014 and 2015

% change unless otherwise stated	SPU		EC		IMF	
	Apr-12		Jun-12		Jun-12	
	2014	2015	2014	2015	2014	2015
Real GDP	3.0	3.0	2.6	2.9	2.6	2.8
Real GNP	2.3	2.3	n.a.	n.a.	2.2	2.4
Consumption	1.0	1.2	1.5	1.9	1.1	1.5
Investment	3.8	4.5	4.0	4.9	4.3	7.5
Government	-2.3	-2.1	-4.0	-3.5	-1.3	-1.2
Exports	4.8	4.8	4.8	4.8	4.3	4.6
Imports	3.4	3.5	3.6	3.8	3.5	4.3
Current Account (% GDP)	3.2	3.7	4.5	4.6	2.8	3.6
Employment	1.3	1.6	1.3	2.0	1.3	2.0
Unemployment Rate (%)	12.8	11.7	13.0	12.4	13.0	12.3
HICP	1.5	1.8	1.4	1.7	1.4	1.6
GDP Deflator	1.3	1.4	1.5	1.6	1.5	1.6
Nominal GDP (€ billions)	171.2	178.9	171.0	178.7	171.0	178.7
Nominal GDP	4.3	4.5	4.1	4.5	4.1	4.5