The Domestic Economy

Overview

- *Irish GDP is forecast to grow by 4.5 per cent this year reflecting a reduced contribution from exports together with some moderation in the growth of domestic demand. This represents a modest slowdown from an estimated underlying rate of about 6 per cent in 2015, when the effect of the level shift in 2015 GDP is excluded (see Box A).*

- *A downward revision to projected GDP growth this year is mainly accounted for by a weaker external performance. The outlook for external demand has also been reduced for 2017. However, since this was already reflected in a negative Brexit adjustment in the last Bulletin, forecast GDP growth of 3.6 per cent for next year remains unchanged. GNP growth is forecast to average 4.5 per cent in 2016, slowing to 3.1 per cent in 2017.*

- *While total domestic demand was boosted by a sharp increase in R&D investment in the second quarter, underlying domestic demand, excluding intangibles and aircraft, moderated significantly in the first half of the year. While housing output continued to recover in line with expectations, core machinery was particularly weak.*

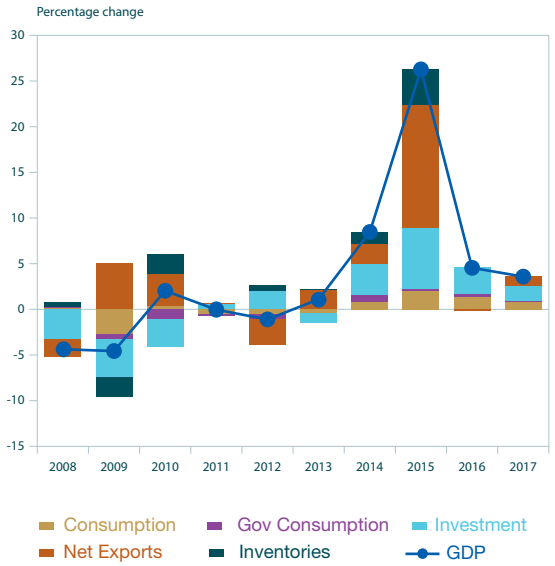
- *Consumer spending grew strongly in the first quarter yet declined in seasonally adjusted terms in the second quarter. For the year as a whole, underlying domestic demand is projected to increase by close to 4 per cent, with about 2.7 per cent growth projected in 2017. This is broadly in line with previous projections but reflects a stronger outlook for investment offset by a slight downgrade in the outlook for consumer spending.*

- *The growth in consumer spending in the first half of this year was lower than might be expected given the strength of higher-frequency indicators such as retail sales, car sales and consumer sentiment together with a stronger than expected labour market outturn. Reflecting these mixed signals, the forecast for growth in consumer spending has been revised down marginally to 3.8 per cent in 2016. A more pronounced slowdown to growth of about 2.2 per cent is forecast for next year. This reflects a projected slowing in employment growth and the unwinding of some positive factors that have boosted disposable incomes this year. These include lower energy prices and an appreciating exchange rate which has contained consumer price inflation at close to zero this year. In addition, as noted in the previous Bulletin, the impact of Brexit on consumer sentiment will become more evident in 2017.*

- *A weak first half outturn together with a downgrade to external demand assumptions has prompted a downward revision to the outlook for export growth to about 5.6 per cent this year. Lower export growth in 2017 mainly reflects the assumed impact of Brexit. Import growth is also set to moderate, with projected growth of 7.8 per cent in 2016 and 4.7 per cent in 2017.*

- *The performance of the labour market has been stronger than expected this year. Employment growth of 2.7 per cent in the first half of the year exceeded expectations. However, there was also a sharp pick up in labour force growth, which prompted an upward revision to the unemployment rate from 7.8 per cent to 8.3 per cent (July). Furthermore, data on migration flows for the year to April 2016 point to a return to net inward migration for the first time since 2009. Taking all of these factors into account, the forecast for both*

Chart 1: Contributions to GDP



Source: CSO and Central Bank of Ireland.

Table 1: Expenditure on Gross National Product 2015, 2016[f] and 2017[f]

	2015	% change in		2016[f]	% change in		2017[f]
	EUR millions	volume	price	EUR millions	volume	price	EUR millions
Personal Consumption Expenditure	92,377	3.8	1.0	96,846	2.2	1.1	100,066
Public Net Current Expenditure	26,985	2.5	1.0	27,932	1.1	2.0	28,817
Gross Domestic Fixed Capital Formation	54,103	14.0	2.0	62,933	7.0	2.2	68,830
Building and Construction	14,243	8.3	2.8	15,848	6.6	3.4	17,471
Machinery and Equipment	16,365	13.2	1.5	18,807	2.8	1.5	19,630
Intangibles	23,495	18.0	2.0	28,279	10.0	2.0	31,729
Value of Physical Changes in Stocks	1,293			1,293			1,293
TOTAL DOMESTIC DEMAND	174,758	6.9	1.2	189,004	3.6	1.6	199,005
of which: Underlying Domestic Demand	143,774	3.9	1.2	151,285	2.7	1.5	157,713
Exports of Goods & Services	317,197	5.6	0.2	335,704	4.4	1.1	354,332
FINAL DEMAND	491,955	6.1	0.5	524,708	4.1	1.3	553,337
Imports of Goods & Services	-235,987	7.8	0.2	-254,950	4.7	0.7	-268,932
Statistical Discrepancy	-155			-155			-155
GROSS DOMESTIC PRODUCT	255,813	4.5	0.8	269,603	3.6	1.8	284,250
Net Factor Income from Rest of the World	-53,173	4.6	0.2	-55,728	5.4	1.1	-59,363
GROSS NATIONAL PRODUCT	202,640	4.5	1.0	213,875	3.1	2.0	224,887

employment and unemployment has been revised upwards when compared to the last Bulletin. Employment is now forecast to increase by 2.6 per cent this year, slowing to about 1.5 per cent growth next year. The unemployment rate is forecast to average 8.3 per cent this year and 7.7 per cent in 2017.

- *Headline inflation remains subdued. Weak global commodity prices and a strengthening exchange rate are reflected in negative goods price inflation. This has been offset by positive services inflation. CPI and HICP inflation are expected to average 0.2 and zero per cent respectively in 2016. A pick-up in inflation is expected in 2017 as the impact of commodity price declines and the appreciation of the exchange rate begin to fade. Inflation as measured by both the CPI and the HICP is forecast to average 1 per cent in 2017.*
- *Risks to the outlook for the economy remain firmly weighted to the downside and mainly relate to external factors. Model simulations, which are reported in Box B below, illustrate the vulnerability of the Irish economy to global economic shocks such as Brexit. While the results are very much in line with estimates of a Brexit effect published in the last Bulletin, they also point to the risk of a more negative outcome.*

Demand

Domestic Demand Overview

Following growth of 4.9 per cent in 2015, underlying domestic demand is projected to grow by 3.9 per cent in 2016 and by 2.7 per cent in 2017. The projected moderation in growth in 2017 follows an unwinding of some of the effects that are boosting real purchasing power at present and potential implications on sentiment arising from Brexit related uncertainty.

Box A: An indicator of domestic economic activity in 2015

By Graeme Walsh[1]

Preliminary estimates of real GDP growth suggested that the Irish economy grew by 7.8 per cent in 2015. This figure was later revised upwards to an extraordinary 26.3 per cent. Similarly, the preliminary estimate of real GNP growth was revised up from 5.7 per cent to 18.7 per cent. These revisions reflect a large level shift in output caused, in the main, by the relocation of a sizeable amount of intangible assets to Ireland, which had the effect of 'on-shoring' a significant amount of economic activity carried out elsewhere. This effect of increasing globalization has complicated the assessment of Ireland's recent underlying economic performance.

While compiled in accordance with international standards, the results of the 2015 National Income and Expenditure Accounts have generated a considerable focus on measures of domestic incomes, production and the level of economic activity carried out in Ireland in 2015. Estimates can be produced in a number of ways, for example, through attempting to adjust the published figures in various ways (e.g. to abstract from the effects of contract manufacturing, focussing on net measures of activity etc.). This box adopts a different approach using a statistical model that draws on the historical relationship between measures of output growth and economic activity (notably labour market activity) in the absence of any large level shifts. An extended discussion, covering annual, quarterly, and monthly data, can be found in Walsh (2016, forthcoming).

The model is called an unobserved components (UC) model and its purpose is to estimate an indicator of domestic economic activity in 2015 using a number of variables. There are two main types of variable in the model: (i) direct measures of output growth; and (ii) other indicators of the business cycle. The measures of output growth include Gross Domestic Product (GDP), Gross National Product (GNP), Gross National Income (GNI), and Gross Value Added (GVA). Additional indicators of the business cycle include employment growth (EMP), the unemployment rate (URATE) and underlying domestic demand (UDD). The latter is derived from a relatively straight-forward accounting approach which strips out investment in intangibles and aircraft from total domestic demand. A third variable is included in the model to signify that a variable experienced a level shift in 2015.

The role of the direct measures is to ground the indicator and provide an appropriate starting point for estimating a number for 2015. The other indicators, which are related to domestic activity, particularly the labour market, are used to drive the results in 2015.The model is shown below, where the level shift is denoted by L_t.

UC Model

Measurement Equations

$$\begin{bmatrix} GDP_t \\ GNP_t \\ GNI_t \\ GVA_t \\ UDD_t \\ EMP_t \\ URATE_t \end{bmatrix} = \begin{bmatrix} 0 \\ 0 \\ 0 \\ 0 \\ 0 \\ \alpha_1 \\ \alpha_2 \end{bmatrix} + \begin{bmatrix} 1 \\ 1 \\ 1 \\ 1 \\ 1 \\ \lambda_1 \\ \lambda_2 \end{bmatrix} Indicator_t^* + \begin{bmatrix} \beta_1 \\ \beta_2 \\ \beta_3 \\ \beta_4 \\ 0 \\ 0 \\ 0 \end{bmatrix} L_t + \begin{bmatrix} \epsilon_{1,t} \\ \epsilon_{2,t} \\ \epsilon_{3,t} \\ \epsilon_{4,t} \\ \epsilon_{5,t} \\ \epsilon_{6,t} \\ \epsilon_{7,t} \end{bmatrix}$$

State Equation

$$Indicator_t^* = \mu + \rho Indicator_{t-1}^* + \epsilon_t^*$$

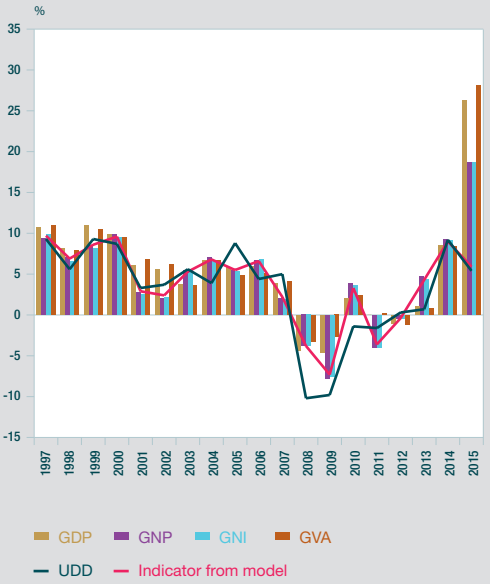
1 Irish Economic Analysis Division.

Box A: An indicator of domestic economic activity in 2015
By Graeme Walsh

The indicator derived from the model using annual data is shown in Figure 1. Over the sample period to 2014, it closely tracks the official measures of output growth (e.g. GDP, GNP, GNI, and GVA). This is a desirable result, as the aim of the model for present purposes is not to generate an alternative output measure for all years but rather to adjust the level shift in 2015. We can be confident about the size of this adjustment precisely because the indicator closely tracks the data up to end-2014, and because the UDD, EMP and URATE measurements are, by assumption, not impacted by the level shift.

Focusing on 2015, Table 1 provides a comparison of annual growth rates for 2015. The indicator provides a significantly smaller, yet still strong, estimate of 5.9 per cent when compared to official measures. One caveat associated with this approach is that the indicator in 2015 relies on a fairly narrow set of variables (in our case EMP and URATE). Walsh (2016 forthcoming) examines the sensitivity of the results to including a wider set of variables, such as those in the Bank's economic heatmap (see Bulletin 2, 2016), which includes variables on expenditure, output, trade, the labour market and prices.

Box A Chart 1: Comparisons of the estimated indicator with GDP, GNP, GNI, GVA, and UDD (annual growth rates).



Source: CSO and author's calculations.

Table 1: Annual growth rates for 2015

	GDP	GNI	GNP	GVA	UDD	Indicator from model
2015	26.3%	18.7%	18.7%	28.1%	5.4%	5.9%

Consumption

The volume of personal consumption expenditure is projected to grow by 3.8 per cent in 2016 and by 2.2 per cent in 2017. This outlook was revised downwards following the release of the Quarterly National Accounts (QNA) data, which revealed a surprisingly weak profile for spending on goods in the second quarter of the year. In seasonally adjusted terms, the volume of consumption is estimated to have contracted by 0.5 per cent in the second quarter following strong gains in the first 3 months of the year.

The forecast is also influenced by recent and prospective labour market developments as well as higher frequency data (retail sales and taxation trends). The savings ratio is expected to remain broadly unchanged over the forecast horizon. So far, any Brexit related effects appear limited although it will take a number of months for any trends to emerge. Following a sharp drop in the ESRI/KBC Bank Consumer Sentiment Index in July, sentiment improved in August.[2]

2 The index fell from 103.4 in June to 99.6 in July before increasing to in August to 102.7. The 3-month moving average index also increased in the period to end-August..

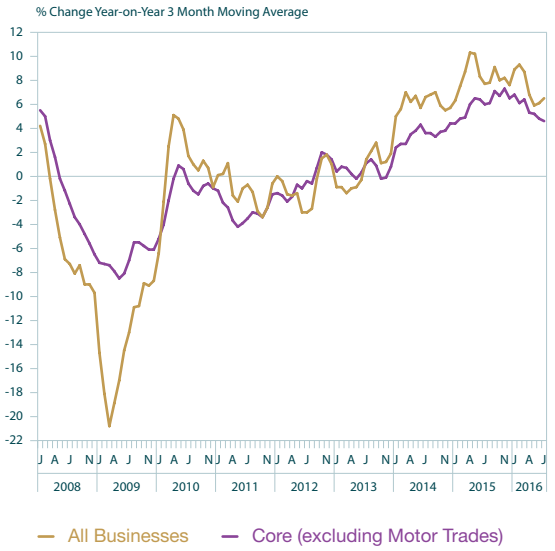
Investment

Investment expenditure is expected to increase by 14 and 7 per cent in 2016 and 2017, respectively – an upward revision compared to the previous Bulletin. The dampening effect of uncertainty stemming from the Brexit decision on overall investment over the forecast horizon may be mitigated somewhat given the shortages in the residential and commercial property markets. The QNA data for the second quarter of 2016 suggest that activity in the construction sector picked up as the year progressed. Building and construction expenditure increased by 13.9 per cent year-on-year in the second quarter of 2016; machinery and equipment investment, excluding other transport equipment (mainly aircraft) declined by 24.8 per cent over the same period.

In the residential sector, new house completions are expected to number approximately 14,000 and 16,000 units in 2016 and 2017, respectively, following 12,666 completions in 2015. Although this represents a substantial increase, it is well below available estimates of medium term requirements. On the non-housing side, other building and construction registered an increase of 2.4 per cent in the second quarter of 2016 year-on-year. With current available supply of commercial space dwindling, and a strong pipeline of incoming investments, investment in commercial real estate construction is also projected to be strong. Taking all of these factors into account, overall building and construction investment is projected to increase by approximately 8.3 per cent in 2016 and 6.6 per cent in 2017.

On the machinery and equipment side, following a period of restocking, the trend – net of aircraft – turned negative in the first two quarters of the year, which has led to a downward revision to our forecasts - to 3 and 5 per cent for 2016 and 2017, respectively. In conjunction with the forecasts for building and construction, underlying investment – i.e.

Chart 2: Index of Volume of Retail Sales



Source: CSO.

investment excluding intangibles and aircraft, is forecast to increase by approximately 6.1 and 6 per cent in 2016 and 2017. The level of investment as a percentage of GDP (net of aircraft and intangibles, however, is still well below what is indicated by historical and international norms (generally about 20 per cent of GDP).

As indicated in previous Bulletins, the inclusion of intellectual property (IP) assets and the change in aircraft leasing arrangements in gross fixed capital formation adds considerably to the unpredictability in published investment figures. Investment in 'intangible' assets (generally in the form of a purchase of a licence or patent) amounted to €12.8 billion in the first half of 2016 – an increase of 18.9 per cent in the year. While this was most likely related to the activities of multinationals, it represents a large proportion of overall investment (approximately 46 per cent) and adds considerable noise to the investment figures. For this reason, it is instructive to focus on the underlying components of investment.

Table 2: Goods and Services Trade 2015, 2016[f], 2017[f]

	2015	% change in		2016[f]	% change in		2017[f]
	EUR millions	volume	price	EUR millions	volume	price	EUR millions
Exports	317,197	5.6	0.2	335,704	4.4	1.1	354,332
Goods	195,592	5.2	-0.3	205,145	4.3	0.5	215,037
Services	121,605	6.3	1.0	130,559	4.6	2.0	139,296
Imports	235,987	7.8	0.2	254,950	4.7	0.7	268,932
Goods	85,024	8.3	-0.2	91,892	4.9	0.6	96,930
Services	150,963	7.5	0.5	163,058	4.6	0.8	172,002

Government Consumption

The volume of government consumption is expected to grow by 2.5 per cent this year and by a further 1.1 per cent in 2017. This outlook is based on the end-year National Income and Expenditure Accounts (NIE) and announced government expenditure plans.

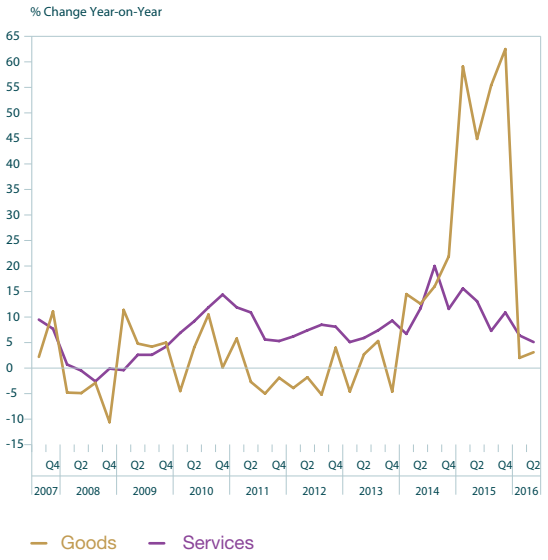
External Demand and the Balance of Payments

Exports and Imports

The latest QNA data indicate that overall export growth improved marginally in the second quarter of 2016, to yield an increase of 3.8 per cent in the first half of this year. The muted performance of goods exports weighed somewhat on overall exports over this period, with a 2.6 per cent annual rate of change largely owing to recent developments in contract manufacturing. In contrast, services exports proved quite buoyant, with an average annual increase of 5.8 per cent during the first six months of 2016; much of the growth in services export activity over this period emanated from the computer services sector.

On the basis of the most up-to-date external demand assumptions for Ireland, the outlook for demand in our main trading partners in both 2016 and 2017 is somewhat weaker than in the previous Bulletin; the revision is almost entirely due to the envisaged implications of

Chart 3: Volume of Exports



Source: CSO Quarterly National Accounts.

Brexit. Evidence from the new export orders index of the Manufacturing Purchasing Managers Index (PMI) further suggests some softening of goods export demand is in prospect during the second half of 2016. In view of this and the somewhat muted goods export outturn for the first half of this year, the projected profile for the year as a whole is weaker than previously envisaged, with overall export growth of around 5.6 per cent currently projected. The prospects for 2017 are broadly unchanged, with growth in exports of around 4.4 per cent. It is important to note

Table 3: Balance of Payments 2015, 2016[f], 2017[f]

€ million	2015	2016[f]	2017[f]
Trade Balance	81,209	80,754	85,400
Goods	110,568	113,253	118,106
Services	-29,359	-32,499	-32,706
Net Factor Income from the Rest of the World	-51,914	-55,728	-59,363
Current International Transfers	-3,139	-3,139	-3,139
Balance on Current Account	26,156	21,887	22,898
(% of GDP)	10.2	8.1	8.1

that the short-term outlook for Irish exports is characterised by higher than usual levels of uncertainty in view of the considerable volatility surrounding recent data and external demand developments.

A noticeable feature of Ireland's trade performance during the second quarter of 2016 was the pronounced upward momentum in imports of both goods and services. The strength of services imports over this period may be largely attributed to the research and development sector, with a dramatic increase in the import of intellectual property assets. As regards the outlook for 2016 as a whole and 2017, growth in imports is projected to ease to 7.8 per cent and 4.7 per cent, respectively, reflecting both the envisaged weakening of exports and an expected slowing in the pace of domestic demand growth.

Net Trade, Factor Incomes and International Transfers

The trade balance narrowed sharply during the second quarter of 2016 as a falloff in net goods exports was compounded by a pronounced widening of the services deficit. Net factor income outflows declined sharply year-on-year in the first half of 2016 reflecting a particularly weak first quarter.

Combining the prospective trends across the current account, a surplus of around 8.1 per cent of GDP is expected for 2016 as a whole; some further albeit modest improvement in the current account balance is projected in 2017. It is however noteworthy that given the magnitude of factor income flows and the uncertainty of their timing, small changes can have a sizable impact on current account projections.

Box B: Modelling the Impact of Global Shocks on the Irish Economy
By Michael O'Grady, Jonathan Rice, Reamonn Lydon and Graeme Walsh[3]

As a Small Open Economy (SOE), Ireland is susceptible to global economic shocks. Understanding how the economy might evolve over a given horizon requires us to take account of these interdependencies between the domestic and global economy. This means considering many different transmission channels stemming from global and peripheral sources. In the current environment, for instance, one may wish to consider the economic impact of Brexit, changes in the US monetary policy stance, the effect of fluctuations in oil prices or other commodities, or the international effect of a global economic slowdown. One of the approaches the Bank uses to analyse these relationships is a Global Vector Autoregression, or 'GVAR' model. As with all VARs, the GVAR uses information on the historical co-movement of a range of variables to understand how shocks ripple through the global economy. Originally proposed in Pesaran et al. (2006) the GVAR method complements other approaches for modelling large datasets with multiple variables, including large scale Bayesian VARs (BVARs) and factor augmented VARs (FAVARs).[4]

3 Irish Economic Analysis Division.

4 For a technical discussion of the GVAR modelling technique see Dees, Di Mauro, Pesaran and Smith (2006). For a recent summary of the literature, in particular how the GVAR model relates to other approaches used to model datasets with large numbers of variables (FAVARs and BVARs) see Chudik and Pesaran (2014). The original GVAR for this context was developed by Pesaran, Schuermann and Weiner (2004). .

Box B: Modelling the Impact of Global Shocks on the Irish Economy

By Michael O'Grady, Jonathan Rice, Reamonn Lydon and Graeme Walsh

Using a GVAR model, this Box estimates the impact of four different shocks on the Irish economy: (i) a fall in UK GDP; (ii) a tightening of US monetary policy; (iii) an oil price increase, and; (iv) a global GDP shock. The GVAR is estimated using the toolbox of Smith and Galesi (2014) for 25 countries. We extend the original global database to include data from 2013(q1) to 2016(q1) and add Ireland to the set of countries. We also update the trade-weight matrix in Smith and Galesi to 2015, using the IMF Direction of Trade Statistics (DoTS) database. We provide a brief intuition for the GVAR approach at the end of the box.

The GVAR covers 25 countries, comprising approximately 88% of global GDP and is estimated using quarterly data from 1980(q1) to 2016(q1). Of these 25 countries, 17 are modelled individually, with the remaining 8 countries clustered together as a single 'euro area' group. The domestic variables used in the GVAR are real output, the inflation rate, the short-term interest rate, the long-term interest rate, the real effective exchange rate and real equity prices. The inclusion of both short and long-term interest rates captures the effect of bond markets on output and inflation. The global variables included in the GVAR are oil prices, the price of raw materials and the price of metal. The euro area data is collated using the average of each domestic variable for the set of euro area countries, weighted by each country's average Purchasing Power Parity GDP weight, calculated over the 2012-2014 period.

The impacts of each of the four shocks are presented below in Table 1 for Ireland, the euro area, the UK and the US. Impulse responses are calculated over a 40 quarter horizon; however, we focus on response estimates at the four and eight-quarter horizons in the table, which we consider to be a reasonable period to gauge impact of the shocks using this approach.

With respect to the UK output shock, Irish GDP responds considerably more negatively than either the US (-0.11% at 8 quarters) or the euro area (-0.10% at 8 quarters), with cumulative losses of 0.33% and 0.32% per cent of GDP after four and eight quarters. These estimates for Ireland are very much in-line with estimates presented for Ireland in the Q3 2016 bulletin, which were based on a BVAR model. Figure 1 shows the response of GDP for Ireland and the euro area. Time paths for the euro area response are similar to Ireland, with the majority of the response observed after 12 quarters.

Turning to the other shocks, the Irish eight-quarter GDP response to a US interest rate shock is the smallest estimate of the four countries presented in the table. This is due to the more staggered time-path of the response; over the full 40-quarter horizon period, the cumulative response of Irish GDP is estimated to be a reduction of 1.1%.

The Irish economy is relatively strongly affected by the shock to oil prices (a one standard error increase in the price of oil, equivalent to a permanent price increase of 12.6%). Figure 2 shows the time path for the cumulative impact of oil prices on Irish GDP and inflation. Despite a minor increase in the value of output in the periods directly after the shock, the effect on GDP turns negative after four quarters, with the peak effect at the 14-quarter horizon point estimated to be -0.46% of GDP and statistically significant. The cumulative impact after 40 quarters is -0.30%. For annual inflation, the initial impact is a 0.16% increase, declining gradually thereafter.

The global GDP shock represents a decline in aggregate output across all countries in the model, with domestic shock responses defined in terms of the country's PPP-GDP weighting. Again, Ireland is strongly impacted, with cumulative output losses equal to 1.21 and 0.85 per cent of GDP after the four and eight quarter horizons, respectively.

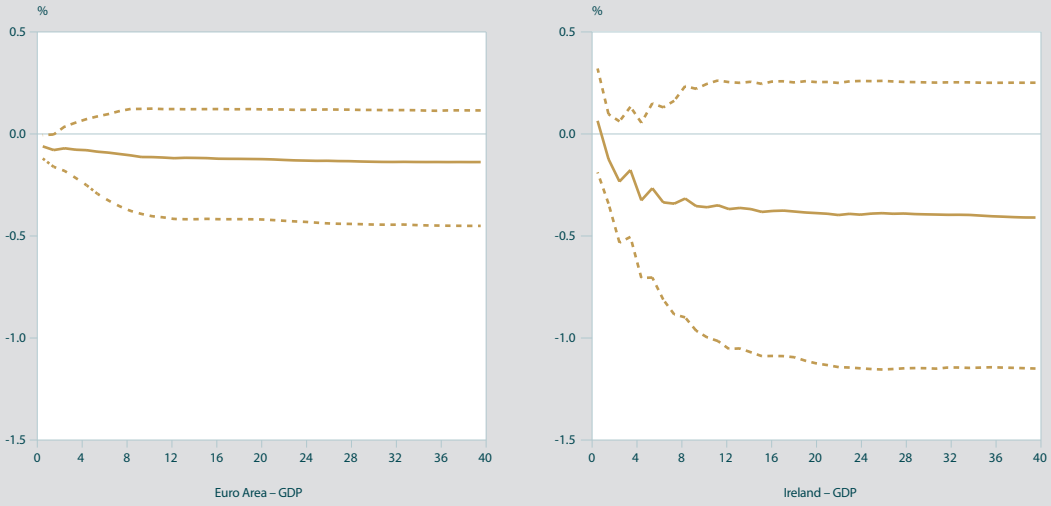
Box B: Modelling the Impact of Global Shocks on the Irish Economy

By Michael O'Grady, Jonathan Rice, Reamonn Lydon and Graeme Walsh

Box B Table 1: Change in GDP following shock at four and eight-quarter horizons

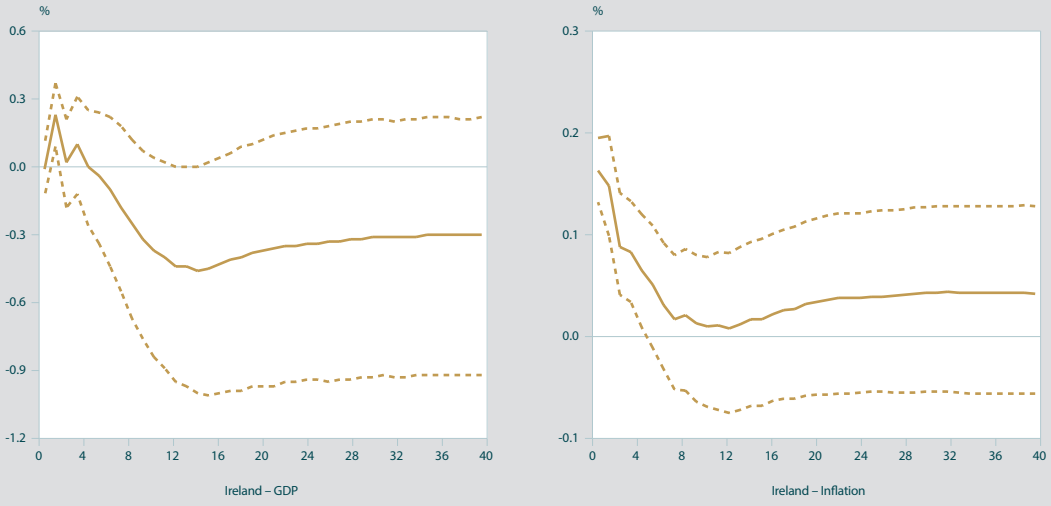
	UK GDP (-1%) Horizon		US Int. Rate (+100 bps) Horizon		Oil prices (+1se) Horizon		Global GDP (-1%) Horizon	
	4 qtr	8 qtr	4 qtr	8 qtr	4 qtr	8 qtr	4 qtr	8 qtr
Ireland	-0.33%	-0.32%	0.16%	-0.40%	0.00%	-0.26%	-1.21%	-0.85%
Euro area	-0.08%	-0.10%	-0.18%	-0.48%	0.01%	-0.13%	-0.91%	-0.96%
U.K.	-1.19%	-1.21%	-0.15%	-0.95%	-0.18%	-0.34%	-0.71%	-0.57%
US	-0.05%	-0.11%	-0.38%	-0.96%	0.07%	-0.08%	-1.05%	-0.88%

Box B Figure 1: Output Response to negative UK GDP Shock of 1%



Source: Central Bank of Ireland calculations using IMF and CSO data.

Box B Figure 2: Irish Output and Inflation Response to positive (12.6%) Oil Price Shock



Source: Central Bank of Ireland calculations using IMF and CSO data.

Box B: Modelling the Impact of Global Shocks on the Irish Economy
By Michael O'Grady, Jonathan Rice, Reamonn Lydon and Graeme Walsh

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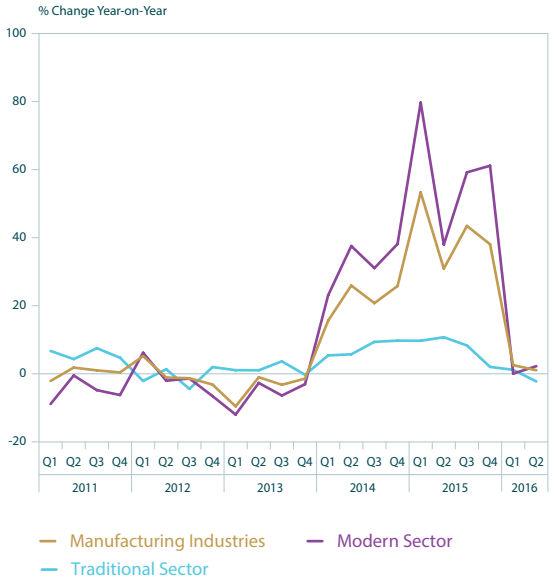
GVAR models - The GVAR model is best described using a two-stage approach. To begin, small-scale country-specific models (called error correction models) are separately estimated, conditional on the global economy. These models predict country-specific domestic variables and include weighted cross-section averages of foreign variables. The weighting of foreign variables is based on a matrix of trade weights between all countries in the model. Intuitive justification for this approach is simple; a GDP shock in the UK is likely to have a larger effect on Ireland than it will have on Mexico, as Ireland engages in more trade with the UK than does Mexico. The Bank is also currently developing a weighting matrix based on capital flows between countries. The foreign variables entering these error correction models are assumed to be weakly exogenous for the purposes of estimation, that is, individual countries are small relative to the rest of the world. The models allow for co-integration among domestic variables as well as between domestic and foreign variables.

At the second stage, these country-specific models are stacked into one large global model and solved simultaneously for all endogenous variables. In this setting, various shock-scenarios may be considered using impulse response functions. The shocks occur in the model through shocks to the errors of the individual country-specific models. All shocks are modelled dynamically, calculated using Generalized Impulse Response Functions (GIRFs). GIRFs calculate shocks using the observed distribution of error terms, making them independent of conventional orthogonalization techniques, and can be considered a special case of Structural Impulse Response Functions (SIRFs). Standard errors are estimated using a sieve bootstrap procedure using 1,500 simulations and calculated as per Sims and Zha (1998). Finally, it should be noted that the GVAR is a linear regression model, estimating responses from shocks within an observed distribution. Rescaling shocks, so as to represent extreme events within the tails of these distributions, changes the nature of the shocks, so that a linear rescaling of the impulse responses may not reflect the true responses to such extreme tail events.

Supply

On the output side, the latest QNA data confirm a strong performance in the first 6 months of the year. On the services side, the broad other services sector grew by 7.4 per cent year-on-year in the second quarter of 2016, with the distribution, transport, software and communications sector and public administration up 7.4 and 6.3 per cent, respectively, over the same period. The agricultural sector continued a recent trend of strong growth in Q2 2016 with a 10.2 per cent increase year-on-year. A notable increase was seen in the building and construction sector for Q2 2016, with robust growth of 12.2 per cent. Industrial output growth appears to have stabilised after the extraordinary gains made in 2015 when growth for the year was 87.3 per cent, with 2 per cent growth in the first half of 2016 on an annual basis.

Chart 4: Volume of Industrial Production



Source: CSO.

The most recent data from the monthly industrial production and turnover series showed strong growth for the manufacturing sectors, with year-on-year growth of 7.4 per cent in July 2016. This headline number obscures an underlying divergence between some of the manufacturing sub-sectors. The modern sector, which is heavily influenced by multinational corporations, saw 14.1 per cent growth on an annual basis. However, the mainly indigenous traditional sector saw a year-on-year contraction of 8.9 per cent. While the volume of industrial production data is quite volatile from month to month, analysing the first 7 months of 2016 in comparison to the same period for 2015 also shows a weakened performance for the traditional sector. For this period in 2015, the traditional sector saw growth of 11.1 per cent while in 2016 this sector saw a 1.9 per cent decrease.

A notable development with regard to the supply side of the economy is the recent adjustment of the Industrial Production and Turnover (IPT) results for 2015. These results have been modified to reflect the large revisions seen in the NIE for 2015.[5] The revisions to the IPT have had a similar effect to the NIE revisions. The IPT has seen a large level shift from January 2015, with growth for manufacturing industries of 38.5 per cent now observed for 2015 in comparison to a previous estimate of 17.4 per cent. It is important to note that these revisions only affect 2015; the growth figure for 2014 remains unchanged.

The modern sector plays a key role in this surge in production. Growth in the modern sector for 2015 was previously estimated to be 23.5 per cent. This has now been revised upwards to 57.1 per cent. The modern sector is heavily influenced by the activities of multinational corporations and this is consistent with the explanation provided by the CSO that the revisions are attributable to the globalisation activities of a small number of companies. The traditional sector is largely unaffected by the revisions to 2015 with growth being reduced slightly from 5.1 per cent to 4.4 per cent.

On the services side, the latest monthly services index showed growth of 5 per cent in the year to end-July (relative to growth of 6.6 per cent over the same period in 2015).

5 See Box A: "Recent Revisions to the National Income and Expenditure Accounts," in the Domestic Economy Chapter of the Central Bank of Ireland *Quarterly Bulletin No. 3, 2016*.

Table 4: Employment, Labour Force and Unemployment 2014, 2015, 2016[f] and 2017[f]

	2014	2015	2016[f]	2017[f]
Agriculture	109	110	115	116
Industry (including construction)	348	374	393	404
Services	1,458	1,481	1,509	1,526
Total Employment	**1,916**	**1,964**	**2,016**	**2,046**
Unemployment	241	203	183	171
Labour Force	2,157	2,167	2,200	2,217
Unemployment Rate (%)	11.2	9.4	8.3	7.7

Note: Figures may not sum due to rounding.

The Investec manufacturing PMI for August showed moderate expansion overall at 51.7 (values above 50 signify an increase). The manufacturing employment PMI also showed expansion at 52.8. However, the new export orders index contracted for the third time in the last four months with a value of 49.8. According to Investec, who compile the series, this contraction is partially driven by a drop in new work orders from the UK. All components of the Investec services PMI showed expansion for August. However, the new exports index fell to a five-month low at 55.1.

The Labour Market

Total employment is forecast to increase by 2.6 per cent in 2016 and by 1.5 per cent in 2017. The most recent set of labour market data from the Quarterly National Household Survey (QNHS) pointed to further robust gains in numbers at work. Employment expanded by 2.9 per cent, year-on-year, in the second quarter of the year, rising above 2 million for the first time since 2009. These employment gains continue to be broad based, with 12 of the 14 sectors (notably construction, accommodation and food services, manufacturing and administrative and support services) posting strong gains.

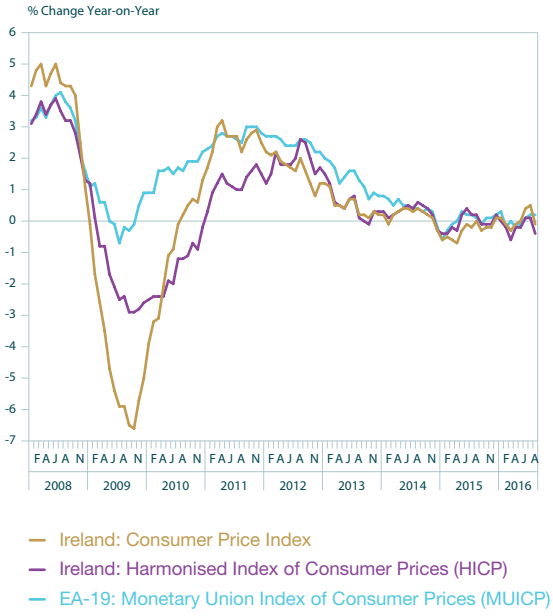
A marked increase in the pace of labour force growth was also notable, with an annual increase of 1.5 per cent in the year to end-June – the strongest rate of increase since 2008.[6] Following a number of quarters of relatively stagnant growth, the strength in this number came as a surprise. For now, it is difficult to conclude whether these developments are part of a more pronounced permanent upward trend or more of a once-off spike. It is noteworthy that there were large labour force and employment gains amongst younger age cohorts, specifically those aged 15-19 years. In the second quarter, this cohort accounted for 40 per cent of the annual increase in the labour force and close to a fifth of employment gains. These employment gains appear to have been concentrated in the broad services sector for this age group.

A further important development was the return to net inward migration in the year to April 2016, for the first time since 2009.[7] The CSO also made significant revisions to the monthly unemployment rate data in 2016 - the unemployment rate in July was revised up from 7.8 per cent to 8.3 per cent. Hence, an extra degree of uncertainty surrounds the labour force outlook, with growth of 1.5 per cent projected for 2016 and 0.8 per cent in 2017. The unemployment rate is set to average 8.3 per cent this year before declining to 7.7 per cent in 2017.

6 The seasonally adjusted quarter-on-quarter growth rate in the labour force (at 1.0 per cent) was also the fastest rate of increase since 2007.

7 The CSO's Population and Migration Estimates pointed to net migration of 3,100 persons in April 2016.

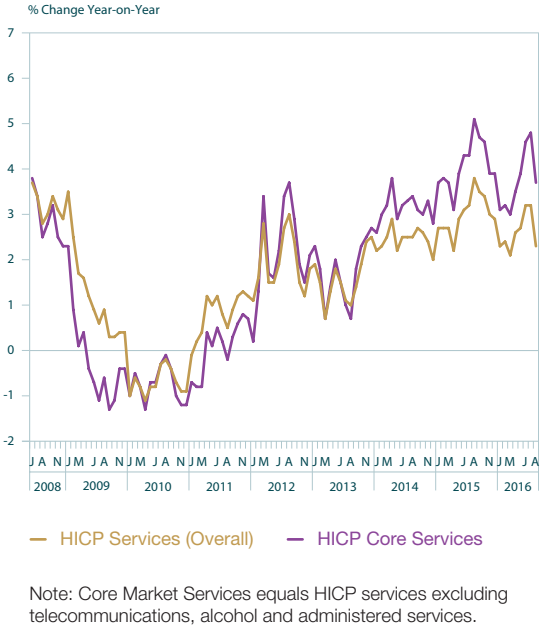
Chart 5: Consumer Prices



— Ireland: Consumer Price Index
— Ireland: Harmonised Index of Consumer Prices (HICP)
— EA-19: Monetary Union Index of Consumer Prices (MUICP)

Source: CSO.

Chart 6: Services Sector Inflation



— HICP Services (Overall) — HICP Core Services

Note: Core Market Services equals HICP services excluding telecommunications, alcohol and administered services.

Source: CSO.

Pay

For 2016 and 2017, wages, are projected to increase by 2.5 per cent per annum. In the context of strong employment gains and weak price pressures, this outlook points to robust increases in economy wide real compensation levels in both 2016 and 2017. This outlook should lend support to the outlook for consumer spending set out above.

Inflation

Consumer Prices

Aggregate inflation measures for Ireland suggest that price pressures have remained subdued throughout much of 2016, with the Consumer Price Index (CPI) and the Harmonised Index of Consumer Prices (HICP) hovering near zero for much of the year. The CPI and the HICP posted year-on year declines of 0.1 and 0.4 per cent, respectively, in August 2016. The aggregate figure for both measures, however, hides two very different underlying trends: goods prices, continued their downward trend (which turned negative in year-on-year terms in mid-2013), declining by 3.1 per cent in the year to August 2016. Services prices, on the other hand, recorded a year-on-year increase of 2.6 per cent over the same period, continuing a run of strong price increases, reflecting the pick-up in domestic demand and, in particular, demand pressures in the residential rental market. Thus, there are two opposing forces at work here: weak global goods prices and strong domestically driven services prices.

Compounding low global commodity prices is the weakness in sterling following the Brexit referendum. At the time of writing, the euro was approximately 10 per cent stronger vis-à-vis sterling since June. All else being equal, a rise in the value of the euro serves to decrease the euro price that foreign producers selling in Ireland need to charge to maintain profits in their own currency. The potential for a Brexit-related exchange rate impact was flagged in the previous Bulletin and this factor has contributed to a downward revision to the inflation forecast. The outlook for HICP inflation has been revised downwards and is expected to register increases of 0.0 and 1.0 per cent in 2016 and 2017, respectively.

Table 5: Inflation Measures - Annual Averages, Per Cent

Measure	HICP	HICP excluding Energy	Services[a]	Goods[a]	CPI
2012	1.9	1.0	2.0	1.9	1.7
2013	0.4	0.5	1.6	-0.6	0.5
2014	0.2	0.6	2.5	-1.9	0.2
2015	0.0	1.0	3.0	-3.0	-0.3
2016[f]	0.0	0.9	3.1	-3.3	0.2
2017[f]	1.0	1.1	3.1	-1.4	1.0

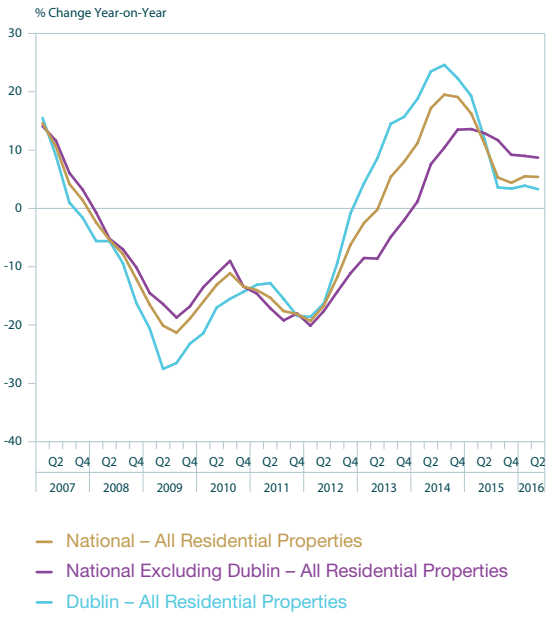
a Goods and services inflation refers to the HICP goods and services components

Residential Property

Residential property prices increased by 6.7 per cent in July 2016 on an annual basis. This increase is consistent with the moderation of property price increases seen through late 2015 into 2016. However, the national measure of property prices obscures divergent regional dynamics. Property prices in Dublin have risen at an average rate of 3.6 per cent through the first seven months of 2016, while property prices outside Dublin have increased by 9.2 per cent on average.

An important development with regard to residential property prices in Ireland is the release of a new residential property price index (RPPI) by the CSO. The new RPPI has been adjusted to include housing transactions involving cash buyers. Previously, the RPPI used data solely based on mortgage transactions. The new RPPI offers a significant methodological improvement as cash buyers have played a large role in the housing market in recent years, accounting for over 50 per cent of all transactions by some estimates.[8] The new RPPI provides revisions back to 2005 and shows that house prices fell by more than previously estimated from their peak in 2007 to their trough in 2013. The new RPPI seems to indicate that cash buyers paid less than mortgage buyers from 2010 to 2016 although it should be noted this difference is observed for property prices outside Dublin; the new RPPI shows minimal change for prices in Dublin.

Chart 7: Residential Property Price Indices

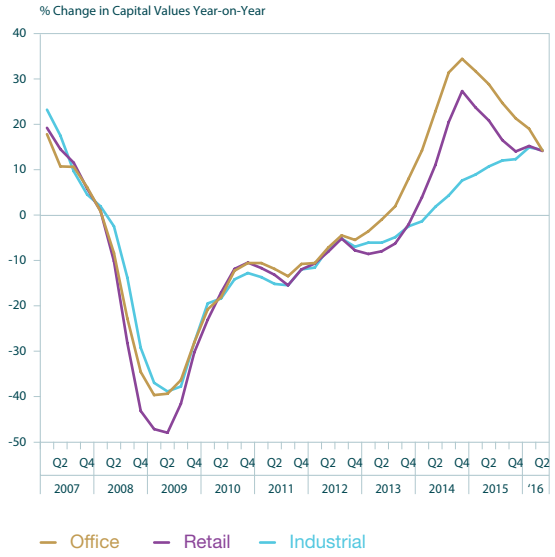


Source: CSO.

The latest Residential Tenancies Board data for Q2 2016 shows that rents increased nationally by 9.9 per cent on an annual basis. The strength in the recovery of the Dublin rental market in recent years means that rents in the second quarter were 3.9 per cent higher than their previous 2007 peak. Further rent increases seem likely in the short term given existing supply constraints combined with strong demand for housing.

8 See Article: "Estimating Cash Buyers and Transaction Volumes in the Residential Property Sector in Ireland. 2000-2014," by Dermot Coates, Joe McNeill and Brendan Williams, in the Central Bank of Ireland *Quarterly Bulletin No. 3, 2016*.

Chart 8: MSCI/IPD Irish Commercial Property Index



Source: MSCI/IPD.

On the supply side, 6,642 houses were completed in the first half of 2016. This represents an 18.1 per cent increase on the same period in 2015. Planning permissions were granted for 3,141 houses/apartments in the second quarter of 2016; a 1 per cent increase year-on-year. For the first half of the year, planning permissions were granted for 6,232 houses/apartments, which represents a 1.4 per cent decrease in comparison to the same period for 2015.

Commercial Property

The latest data from the MSCI/IPD show that commercial property prices continued to grow at a robust pace in the first quarter of 2016. On an annual basis growth was strong across all sectors with the office, retail and industrial sectors recording increases of similar magnitude. Overall commercial property prices expanded by 14 per cent. The Bank's latest Macro Financial Review (June 2016) conducts a more detailed analysis of recent developments in the commercial property sector.

Competitiveness

The euro/sterling exchange rate has been strongly affected in recent months by the Brexit referendum. In the weeks following the referendum, the euro appreciated by over 10 per cent against the pound. The euro has appreciated to a much smaller degree relative to the US dollar in 2016 - by early September, the euro had appreciated by 1.5 per cent in the year.

The latest Harmonised Competitiveness Index (HCI) data for August 2016 show that the nominal HCI increased by 2.7 per cent on an annual basis. In real terms, the HCI increased by 2 per cent when deflated with consumer prices and 0.7 per cent when deflated with producer prices. These increases point to some loss of competitiveness and the nominal HCI is now trading above its long term average. However, the real HCIs are still trading at relatively low levels in comparison to recent years.

The Public Finances

Overview

The latest fiscal developments have continued to be broadly positive. The latest set of Government Finance Statistics reveal that the general government deficit declined in nominal terms once again in the first quarter of the year, while Exchequer returns data point to robust tax growth and only modest increases in spending more recently. Reflecting these developments, it is very likely that the 2016 general government balance will improve further from the 1.8 per cent of GDP deficit recorded last year, with the debt ratio also continuing on it's downward trend.

Government Finance Statistics

First quarter Government Finance Statistics show a decline in the general government deficit ratio at the start of the year. The deficit ratio declined to 2.3 per cent of GDP from

Table 6: Analytical Exchequer Statement for June 2016 (€ millions)

	Jan-Aug 2016 €m	Jan-Aug 2015 €m	Annual Change (%)	Outturn vs Profile (%)
Revenue	**38,026**	**36,698**	**3.6**	**1.9**
– Tax revenue	29,046	27,344	6.2	1.6
– Appropriations-in-aid	7,234	7,066	2.4	0.4
– Other Revenue	1,746	2,288	-23.7	16.3
Expenditure	**40,765**	**40,419**	**0.9**	**-1.0**
– Current Primary Expenditure	34,484	34,287	0.6	-0.7
– Capital Expenditure	1,787	1,609	11.1	-2.4
– Interest on National Debt	4,494	4,524	-0.7	-2.3
Exchequer Balance	**-2,739**	**-3,721**	**26.4**	**29.0**

Source: Department of Finance

Note: The figures in the Table exclude transactions with no general government impact, giving a closer approximation to the General Government balance.

3.8 per cent one year earlier, supported by a solid increase in tax revenues and lower net capital investment. The general government gross debt ratio also declined, from 97.1 per cent of GDP in the first quarter of 2015 to stand at 80.4 per cent of GDP in the first three months of this year. This decrease was largely driven by developments in the denominator. Similar factors resulted in a fall in the general government net debt ratio to 67.1 per cent.

Exchequer Returns[9]

Exchequer data is currently available for the first eight months of the year. Tax revenues continued to grow at a strong pace up to end-August, while expenditure was marginally higher, with the overall outturn notably better than that recorded in the same period last year (see Table 7). The Exchequer Balance, excluding transactions with no general government impact, is also significantly ahead of profile so far this year, largely due to stronger than expected revenue growth.

Exchequer tax revenue grew by 6.2 per cent on an annual basis in the year to August, with strong gains across virtually all tax categories. Income taxes were up 4.2 per cent year-on-year, as the ongoing recovery in the labour market continues. Meanwhile, the remaining 'big four' tax heads – VAT, excise duties and corporation tax – were up by 3.9 per cent, 19.4 per cent and 5.8 per cent, respectively, relative to the same period in 2015. Corporation tax continues to perform well ahead of expectations, with the outturn more than €500 million above profile in the first eight months of the year. This over-performance has more than offset the below profile returns for VAT and income tax up to end-August. Total tax revenues remain above profile in cumulative terms in the first eight months of the year, despite coming in below target on a monthly basis. Non-tax revenues were lower in year-on-year terms, although this was mostly anticipated and primarily reflects lower dividends and Central Bank surplus income.

On the expenditure side, developments in capital spending and current primary spending drove the overall modest increase in total spending. There were broad based savings across almost all departments which came in below profile in the year to August, although these were partly offset by developments in Health, where current spending was 2.9 per cent higher than budgeted and 4.5 per cent higher than the same period last year. Smaller EU Budget contributions in the first eight months of the year continued to help to contain spending. Capital expenditure

9 The figures in this section exclude transactions with no general government impact, giving a closer approximation to the General Government balance. These figures are provided by the Department of Finance in its Analytical Exchequer Statement.

increased significantly in annual terms, primarily reflecting developments in Transport and Education. Meanwhile, interest spending was down 0.7 per cent year-on-year. Overall, total spending was 1.0 per cent below profile in the year to end-August.

Funding and Other Developments

The National Treasury Management Agency (NTMA) raised a further €1.0 billion through bond sales in the third quarter of this year, with auctions continuing to be oversubscribed. This brought the total raised to date in 2016 to €6.6 billion, and as a result the NTMA is comfortably on target to achieve its range of €6-10 billion for the year as a whole. The funding requirement for Ireland is comparatively light this year compared to the €13 billion raised in 2015, due to the smaller general government deficit expected and the next bond redemption not occurring until October 2017. The NTMA cancelled a further €500 million in outstanding bonds linked to the liquidation of IBRC during the third quarter of this year. Ireland remains in the A ratings category with all major credit rating agencies, with a stable or positive outlook.