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**Research Report**

## Quarterly Economic Commentary, Autumn 2016

ESRI Forecasting Series

**Provided in Cooperation with:**

The Economic and Social Research Institute (ESRI), Dublin

*Suggested Citation:* Duffy, David; McQuinn, Kieran; Foley, Daniel (2016) : Quarterly Economic Commentary, Autumn 2016, ESRI Forecasting Series, ISBN 978-0-7070-0411-2, The Economic and Social Research Institute (ESRI), Dublin

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# Quarterly Economic Commentary

David Duffy  
Kieran McQuinn  
Daniel Foley

Autumn 2016



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The Quarterly Economic Commentary analyses current economic trends and provides macro-economic forecasts for the current and following year. It assesses international economic prospects and provides short-term forecasts in the framework of a consistent set of national accounts for Ireland. Its wide range of users includes government departments, policymakers, social partners, international organisations, academics and the national and international financial sectors.

# Quarterly Economic Commentary

David Duffy

Kieran McQuinn

Daniel Foley

## Autumn 2016

The forecasts in this *Commentary* are based on data available by 12 September 2016. Draft completed on 13 September 2016.

A subscription to the *Quarterly Economic Commentary* costs €327 per year, including VAT and postage.

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The *Quarterly Economic Commentary* has been accepted for publication by the Institute, which does not itself take institutional policy positions. It has been peer reviewed by ESRI research colleagues prior to publication. The authors are solely responsible for the content and the views expressed.

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## Summary Table

	2013	2014	2015	2016	2017
<b>Output (Real Annual Growth %)</b>					
Private Consumer Expenditure	-0.8	1.7	4.5	4.2	4.0
Public Net Current Expenditure	0.1	5.4	1.2	1.0	1.0
Investment	-5.4	18.2	32.7	16.2	18.6
Exports	3.1	14.4	34.4	8.3	7.6
Imports	1.1	15.3	21.7	12.1	11.9
Gross Domestic Product (GDP)	1.1	8.5	26.3	4.3	3.8
Gross National Product (GNP)	4.7	9.2	18.7	4.1	3.5
<b>Prices (Annual Growth %)</b>					
Consumer Price Index (CPI)	0.5	0.2	-0.3	0.5	1.0
Growth in Average Hourly Earnings	-0.8	1.6	2.0	2.3	2.3
<b>Labour Market</b>					
Employment Levels (ILO basis (000s))	1,880	1,914	1,964	2,010	2,043
Unemployment Levels (ILO basis (000s))	282	243	204	181	161
Unemployment Rate (as % of Labour Force)	13.1	11.3	9.4	8.3	7.3
<b>Public Finance</b>					
General Government Balance (€bn)	-10.2	-7.6	-4.0	0.2	1.4
General Government Balance (% of GDP)	-5.8	-4.1	-1.6	0.1	0.5
General Government Debt, % of GDP	123.2	109.7	78.9	73.6	68.7
<b>External Trade</b>					
Balance of Payments Current Account (€bn)	3.9	3.2	26.2	22.3	14.1
Current Account (% of GNP)	2.5	2.0	12.9	10.3	6.1

Note: Detailed forecast tables are contained in an Appendix to this *Commentary*

## National Accounts 2015

### A: Expenditure on Gross National Product

	2014	2015	Change in 2015		
	€ bn	€ bn	Value	Price	Volume
Private Consumer Expenditure	87.8	92.4	5.3	0.7	4.5
Public Net Current Expenditure	26.5	27.0	1.9	0.8	1.2
Gross Fixed Capital Formation	39.6	54.1	36.7	3.1	32.7
Exports of Goods and Services	219.8	317.2	44.3	7.4	34.4
Physical Changes in Stocks	2.8	1.3			
<b>Final Demand</b>	<b>376.4</b>	<b>492.0</b>	<b>30.7</b>	<b>5.2</b>	<b>24.2</b>
less:					
Imports of Goods and Services	185.2	236.0	27.4	4.7	21.7
Statistical Discrepancy	1.9	-0.2			
<b>GDP at Market Prices</b>	<b>191.2</b>	<b>256.0</b>	<b>33.8</b>	<b>5.7</b>	<b>26.7</b>
Net Factor Payments	-29.7	-53.2			
<b>GNP at Market Prices</b>	<b>163.4</b>	<b>202.6</b>	<b>24.0</b>	<b>4.5</b>	<b>18.7</b>

### B: Gross National Product by Origin

	2014	2015	Change in 2015	
	€ bn	€ bn	€ bn	%
Agriculture	3.3	3.3	0.0	-0.9
Non-Agriculture: Wages, etc.	73.4	77.6	4.2	5.7
Other	69.3	94.1	24.8	35.8
Adjustments: Stock Appreciation	0.2	0.2		
Statistical Discrepancy	-1.9	0.2	2.1	-108.1
<b>Net Domestic Product</b>	<b>144.4</b>	<b>175.5</b>	<b>31.1</b>	<b>21.5</b>
Net Factor Payments	-29.7	-53.2	-23.5	78.9
<b>National Income</b>	<b>114.7</b>	<b>122.3</b>	<b>7.6</b>	<b>6.6</b>
Depreciation	30.9	61.6	30.7	99.3
<b>GNP at Factor Cost</b>	<b>145.6</b>	<b>183.9</b>	<b>38.3</b>	<b>26.3</b>
Taxes less Subsidies	17.9	18.8	0.9	5.2
<b>GNP at Market Prices</b>	<b>163.4</b>	<b>202.6</b>	<b>39.2</b>	<b>24.0</b>

### C: Balance of Payments on Current Account

	2014	2015	Change in 2015
	€ bn	€ bn	€ bn
X – M	34.6	81.3	46.7
F	-29.7	-53.2	-23.5
Net Transfers	-2.7	-2.9	-0.1
<b>Balance on Current Account</b>	<b>2.2</b>	<b>25.3</b>	<b>23.1</b>
as % of GNP	1.3	12.5	11.4



## National Accounts 2016

### A: Expenditure on Gross National Product

	2015	2016	Change in 2016		
	€ bn	€ bn	Value	Price	Volume
Private Consumer Expenditure	92.4	97.2	5.2	1.0	4.2
Public Net Current Expenditure	27.0	28.0	3.7	2.7	1.0
Gross Fixed Capital Formation	54.1	63.9	18.1	1.6	16.2
Exports of Goods and Services	317.2	355.7	12.1	3.6	8.3
Physical Changes in Stocks	1.3	1.0			
<b>Final Demand</b>	<b>492.0</b>	<b>545.8</b>	<b>11.0</b>	<b>2.7</b>	<b>8.0</b>
less:					
Imports of Goods and Services	236.0	271.4	15.0	2.6	12.1
Statistical Discrepancy	-0.2	0.0			
<b>GDP at Market Prices</b>	<b>255.8</b>	<b>274.4</b>	<b>7.3</b>	<b>2.8</b>	<b>4.3</b>
Net Factor Payments	-53.2	-57.9			
<b>GNP at Market Prices</b>	<b>202.6</b>	<b>216.6</b>	<b>6.9</b>	<b>2.7</b>	<b>4.1</b>

### B: Gross National Product by Origin

	2015	2016	Change in 2016	
	€ bn	€ bn	€ bn	%
Agriculture	3.3	3.4	0.1	2.5
Non-Agriculture: Wages, etc.	77.6	81.2	3.6	4.6
Other	94.1	103.3	9.2	9.7
Adjustments: Stock Appreciation	0.2	0.2		
Statistical Discrepancy	0.2	0.0	-0.1	-93.5
<b>Net Domestic Product</b>	<b>175.5</b>	<b>188.1</b>	<b>12.7</b>	<b>7.2</b>
Net Factor Payments	-53.2	-57.9	-4.7	8.8
<b>National Income</b>	<b>122.3</b>	<b>130.3</b>	<b>8.0</b>	<b>6.5</b>
Depreciation	61.6	66.3	4.7	7.7
<b>GNP at Factor Cost</b>	<b>183.9</b>	<b>196.6</b>	<b>12.7</b>	<b>6.9</b>
Taxes less Subsidies	18.8	20.0	1.2	6.4
<b>GNP at Market Prices</b>	<b>202.6</b>	<b>216.6</b>	<b>13.9</b>	<b>6.9</b>

### C: Balance of Payments on Current Account

	2015	2016	Change in 2016
	€ bn	€ bn	€ bn
X – M	81.3	84.3	3.0
F	-53.2	-57.9	-4.7
Net Transfers	-2.9	-2.9	0.0
<b>Balance on Current Account</b>	<b>25.3</b>	<b>23.6</b>	<b>-1.7</b>
as % of GNP	12.5	10.9	-0.8

## National Accounts 2017

### A: Expenditure on Gross National Product

	2016	2017	Change in 2017		
	€ bn	€ bn	Value	Price	Volume
Private Consumer Expenditure	97.2	102.1	5.0	1.0	4.0
Public Net Current Expenditure	28.0	27.5	-1.8	-2.8	1.0
Gross Fixed Capital Formation	63.9	79.4	24.2	4.8	18.6
Exports of Goods and Services	355.7	392.9	10.4	2.7	7.6
Physical Changes in Stocks	1.0	2.0			
<b>Final Demand</b>	<b>545.8</b>	<b>603.9</b>	<b>10.6</b>	<b>2.6</b>	<b>7.9</b>
less:					
Imports of Goods and Services	271.4	309.5	14.0	1.9	11.9
Statistical Discrepancy	0.0	0.0			
<b>GDP at Market Prices</b>	<b>274.4</b>	<b>294.4</b>	<b>7.3</b>	<b>3.4</b>	<b>3.8</b>
Net Factor Payments	-57.9	-63.6			
<b>GNP at Market Prices</b>	<b>216.6</b>	<b>230.8</b>	<b>6.5</b>	<b>3.0</b>	<b>3.5</b>

### B: Gross National Product by Origin

	2016	2017	Change in 2017	
	€ bn	€ bn	€ bn	%
Agriculture	3.4	3.5	0.1	3.5
Non-Agriculture: Wages, etc.	81.2	84.4	3.2	4.0
Other	103.3	113.9	10.6	10.3
Adjustments: Stock Appreciation	0.2	0.2		
Statistical Discrepancy	0.0	0.0	0.0	0.0
<b>Net Domestic Product</b>	<b>188.1</b>	<b>202.1</b>	<b>13.9</b>	<b>7.4</b>
Net Factor Payments	-57.9	-63.6	-5.8	10.0
<b>National Income</b>	<b>130.3</b>	<b>138.4</b>	<b>8.2</b>	<b>6.3</b>
Depreciation	66.3	71.3	4.9	7.5
<b>GNP at Factor Cost</b>	<b>196.6</b>	<b>209.7</b>	<b>13.1</b>	<b>6.7</b>
Taxes less Subsidies	20.0	21.1	1.1	5.3
<b>GNP at Market Prices</b>	<b>216.6</b>	<b>230.8</b>	<b>14.2</b>	<b>6.5</b>

### C: Balance of Payments on Current Account

	2016	2017	Change in 2017
	€ bn	€ bn	€ bn
X – M	84.3	83.4	-0.9
F	-58.2	-63.5	-5.3
Net Transfers	-2.9	-2.9	0.0
<b>Balance on Current Account</b>	<b>23.6</b>	<b>16.9</b>	<b>-6.7</b>
as % of GNP	10.9	7.3	-2.9



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## The Irish Economy – Forecast Overview

The Irish economy is set to register significant growth in 2016 following exceptionally strong performances in 2015 and 2014. As noted in previous *Commentaries*, however, there is now a considerable contrast between the domestic and external components of growth. With the former, investment and particularly consumption are in the main fuelling present growth rates, while on the external trade side a certain softening of the growth performance is evident. We now believe that GDP will increase by 4.3 per cent in 2016 with growth moderating somewhat in 2017 at 3.8 per cent.

This weakening of the external trade performance is mainly due to two related considerations, the deterioration in global demand, which, in turn, is due to the continuing weakness of the Chinese economy and, secondly, Brexit-related issues. Concerns about the UK referendum had already impacted, marginally, on the Irish economy in advance of the June referendum; however since the UK's decision has become evident, high frequency data particularly for the domestic manufacturing sector suggests that the negative impact has persisted.

Of course, the ultimate long-term implications of Brexit will only be evident once the differing trade relationships between the UK, Europe and the rest of the world have been established. This is likely to take a number of years.

The release of the recent National Accounts raises a number of important issues for analysts and policymakers alike. Difficulties with interpreting the National Accounts of a highly open, small economy have long been apparent, however these challenges have been exacerbated by recent developments. No one believes that economic activity in the Irish economy expanded by 26 per cent in 2015 and while the Central Statistics Office (CSO) is clearly bound by the accounting criteria mandated by Eurostat (i.e. the ESA2010 standard), it is imperative that a set of National Accounts be published which presents a credible narrative as to developments in the domestic economy.

To deal with this issue, in the present *Commentary* we have adopted an output-based estimate of domestic growth. While we focus on the expected future performance of the domestic agricultural, industrial and services sector, we also produce an *adjusted* growth rate for 2015 based on this approach. In seeking to deal with some of the multinational-related issues which have caused the significant output fluctuations, we also present adjusted estimates for depreciation and net factor flows in 2015.

As noted in the *Commentary*, one area where the national accounting issues cause particular difficulties is in generating reliable metrics for evaluating the suitable fiscal and budgetary stance. In using our alternative growth estimates, we believe that the output gap has closed in the Irish economy. This is an important development on a number of fronts and confirms that the domestic economy has mostly recovered from the international financial crisis of 2007/2008. It also indicates that, subject to full indexation of taxation and social welfare bands, the 2017 budgetary policy should be neutral with fiscal policy neither explicitly stimulating nor contracting economic activity.

The case for a neutral policy is compounded by the particularly strong increases in personal consumption in 2015. This, along with the continuing increases in retail sales observed in 2016, suggests that economic activity does not need to be further stimulated by reducing personal taxation levels. Additionally, recent research by ESRI researchers,<sup>1</sup> illustrates the relatively stable nature of income tax vis-à-vis other taxation items as a source of Government revenues. It is important, from a fiscal stability perspective, that income tax remains a sizeable component of the overall taxation take of the State.

It is important that any significant increases in Government expenditure at this point would increase the productive capacity of the economy. In that regard, given the difficulties currently being experienced in the housing market, the Government commitment of additional revenues towards the construction of social housing is a prudent policy. It is important to note that the overall housing requirement in the economy requires both a private and a public sector response. The increased provision of social housing could have a positive spill-over impact on construction activity in the private sector.

In a *Research Note* to the present *Commentary*, Duffy et al. analyse the impact of the macroprudential measures introduced by the Central Bank of Ireland in 2015. The Note, which comes at a time when the Central Bank is reviewing the implementation of the policy, suggests that the measures have had a contractionary impact on the Irish housing market in terms of reducing prices, housing supply and mortgage lending below levels that would have otherwise pertained. The research argues, as previous ESRI research has, that a counter-cyclical dimension be incorporated into the revised policy framework.

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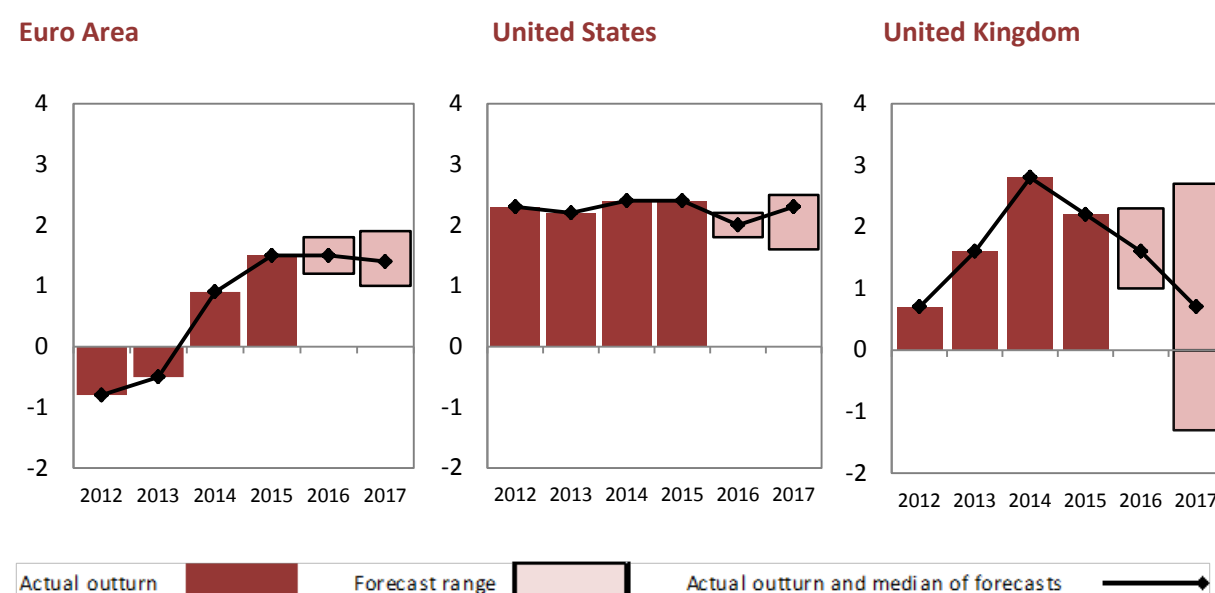
<sup>1</sup> McQuinn K. and M. Roche (2016). 'Efficient frontiers and fiscal stability: An ex-ante and ex-post application to the Irish public finances', ESRI Working Paper No. 538, August.

The recent Quarterly National Household Survey (QNHS) results indicate that employment in Q2 2016 exceeded two million for the first time since 2009. In a Special Article to the *Commentary*, Bercholz and FitzGerald analyse female labour force participation rates in Ireland over the last few decades, with a particular focus on trends before, during and after the most recent economic crisis. Importantly, from a future labour supply perspective and owing to a continuing rise in average educational attainment, the analysis forecasts a sizeable rise in female participation rates by 2020. Given strong underlying growth in the economy, this should help to alleviate labour supply shortages which may arise over that time.

## The International Economy

There have been a number of revisions to international growth forecasts since the previous *Commentary*. Pre-Brexit, consensus forecasts suggested Euro Area GDP would grow by 1.5 per cent in 2016 and 1.6 per cent in 2017. The 2017 figure has since been revised downwards following the UK's vote to leave the EU. In particular, the growth forecast for 2017 has fallen by 0.2 percentage points down to 1.4 per cent. Unsurprisingly, the UK's growth forecasts have experienced more significant revisions following the vote. Growth in real GDP is now expected to grow at 1.6 per cent in 2016 while the figure for 2017 has been revised down to 0.7 per cent, a drop of 1.4 percentage points compared to the forecast for 2017 in June. Of Ireland's main trading partners, the US is expected to register the strongest growth with a growth rate of 2 per cent anticipated in 2016 and 2.3 in 2017.

**FIGURE 1** Real GDP Growth (% Change, Year-on-Year)



Sources: FocusEconomics, IMF, OECD, HM Treasury and Federal Reserve.

### The Euro Area Economy

Flash estimates of GDP released by Eurostat indicate that GDP rose by 0.3 per cent in the Euro Area and by 0.4 per cent in the EU28 in the second quarter of 2016. In the first quarter of 2016, GDP grew by 0.6 per cent in the Euro Area and 0.5 per cent in the EU28. Compared with the same quarter in 2015, seasonally-adjusted GDP grew by 1.6 per cent in the Euro Area and by 1.8 per cent in the EU28. As noted in the Output section of the *Commentary* Ireland's unusually large

growth in 2015 has had a significant impact on the overall aggregate growth rate in the Euro Area. It appears to have raised aggregate GDP by around 0.5 per cent. This effect makes it harder to judge not only Ireland's growth rate but also the overall growth rate in Europe and, arguably, has implications for the ECB's monetary policy measures.

Increased uncertainty due to the Brexit vote has resulted in a deterioration of the GDP growth outlook in the Euro Area. In recent months, private consumption grew at a steady rate prompted by labour market improvements, low oil prices and accommodative monetary policy. Investment has accelerated at a moderate pace while net trade has acted as a drag on growth. The result of the vote is expected to slow private consumption, investment and trade. A scenario analysis carried out by the European Commission<sup>2</sup> found that Euro Area GDP is expected to moderate to between 1.5 and 1.6 per cent in 2016 and between 1.3 and 1.5 per cent in 2017. This implies that the fall in GDP due to Brexit could be between one quarter and one half of a percentage point by 2017.

Euro Area annual inflation has shown a modest increase in July to 0.2 per cent, up from 0.1 per cent the previous month. The main components indicate that there is strong growth occurring on the services side and in relation to food, alcohol and tobacco. There is however, a significant negative impact coming from energy prices which is muting the overall rate of growth.

HICP inflation in June stood at 0.1 per cent on a year-on-year basis up from -0.1 per cent in May. The majority of countries in the Euro Area are experiencing positive growth in the HICP; however, there are still countries like Cyprus who are experiencing annual deflation. Energy is still impacting negatively on price growth via housing, electricity and gas and transport while the remaining components are contributing positively.

The results of the ECB's survey of professional forecasters shows that average inflation expectations in the Euro Area are 1.2 and 1.5 per cent in 2016 and 2017 respectively. These have been modified down slightly from the previous forecasts. Average longer term (2021) expectation remains at 1.8 per cent. This is, however, still below the ECB's target of 2 per cent.

At the most recent meeting of the ECB's governing council it was decided to leave the interest rate on the main refinancing operations, the interest rates on the marginal lending facility and the deposit facility unchanged at 0 per cent, 0.25 per

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<sup>2</sup>

'The Economic Outlook after the UK Referendum: A First Assessment for the Euro Area and the EU'. Institutional Paper 032 July 2016.



cent and -0.40 per cent respectively. With regard to non-standard monetary policy, the council confirmed that they would keep monthly asset purchases at €80 billion until the end of March 2017, or beyond if necessary. This stance may need to be changed, however, if Brexit exhibits a significant drag on Euro Area growth. Quantitative Easing may not be sustainable in the long run if the ECB continues to purchase assets at this rate. Prolonged purchases may raise the issue of bond shortages as the ECB cannot buy bonds below a certain yield. This problem has already emerged in relation to German government bonds, with a significant proportion of them with a yield below this minimum.<sup>3</sup>

Euro Area seasonally-adjusted unemployment was 10.1 per cent in June down from 11 per cent a year earlier. This is the lowest rate recorded in the Euro Area since July 2011. The comparable rate for the EU28 was 8.6 per cent down from 9.5 per cent since June last year. There remains a significant disparity across countries with the lowest rate recorded in Malta of 4 per cent while the unemployment rate in countries such as Greece and Spain remain stubbornly high at 23.3 and 19.9 per cent respectively. In the longer term, continuing demographic decline such as population ageing remains a significant problem in Europe and remains a risk for stable growth. The more immediate risk concerns Britain's exit from the EU and the negative impact it could have on growth in the Euro Area. In particular, higher uncertainty and weaker domestic demand are expected to threaten improvements in the labour market moving into the second half of the year and in 2017.

### The US Economy

In the second quarter of 2016, US GDP grew at 1.2 per cent. The growth primarily reflects positive contributions from personal consumption expenditures and exports. This was, however, partially offset by negative contributions from investment and government spending. As well as Quarter 2 data, there were revisions to Quarter 1 data. In particular, real GDP is now estimated to have increased by 0.8 per cent rather than the initial estimate of 1.1 per cent. The fall reflects downward revisions to the investment and exports components of GDP. Despite slowdowns on the trade front due to recent strengthening of the Dollar, domestic demand seems to be growing at a steady rate. An improving labour market is leading to increases in income which is supporting gains in personal consumption.

Despite the sluggish growth in Q2, the 'GNPNow' model from the Federal Reserve Bank of Atlanta forecasts that Q3 2016 annual GDP growth will be 3.6 per cent which is marginally up from previous estimates. Overall the outlook for the US in

<sup>3</sup> German bond yields are actually negative in the case of two- and five-year-bonds. Ten-year and 30-year-bond yields are, however, marginally positive.

2016 is reasonably positive with GDP growth expected to be in the region of 2 per cent in both 2016 and 2017.

Employment and unemployment in the US have been improving since the start of the year. By many estimates, the unemployment rate seems to be near the natural rate of around 4.5 to 5 per cent. Latest estimates suggest the rate is 4.9 per cent, unchanged from the previous month. Total non-farm payrolls rose by 255,000 in July with job gains occurring in professional and business services, healthcare and financial activities. Employment in mining continued to trend down, largely as a result of oil price falls in 2015. Despite the apparent improvement in the labour market, the participation rate has fallen steadily since the onset of the financial crisis to levels last seen in the late 1970s. An ageing work force coupled with increasing numbers of young people pursuing higher education are often cited as reasons for the decline.

Recent research<sup>4</sup> looks at participation rate trends for eight developed countries since the 1970s including Canada, Sweden, France, Germany, Japan, Spain, United Kingdom and the United States. The research finds that there has been a common diverging trend in most countries in that female participation rate has been increasing while male participation has tended to decline. One interesting result from the research is that, despite similar trends in youth and pre-retirement participation rates, the US is the only country in the sample experiencing a recent decline in the aggregate labor force participation rate. If we take data from 1997 to 2013, the US is the only country where the growth in participation is negative. In particular, the rate fell by 4.6 percentage points in this period. It suggests that demographics has played a part in the decline but is unlikely to be the entire cause. Overall the results indicate that the likely reason for the decline is due to people in their prime age dropping out of the labour force. The overall decline is likely a combination of this as well as increasing numbers of people pursuing higher education. This low level of participation coupled with sluggish productivity growth could hinder the long-term growth prospects for the US.

The Federal Reserve's (FED) monetary policy remains accommodative although they have begun the process of ending unconventional monetary policy by ceasing bond purchases and are starting to normalise interest rates. In its most recent meeting the Federal Open Market Commission (FOMC) has maintained the target range for the federal funds rate at 0.25 to 0.5 per cent due to increasing global uncertainty following the Brexit referendum. Although the FED has

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<sup>4</sup> Dvorkin, M. and H. Shell (2015). 'Labour Force Participation: The US and its peers'. Federal Reserve Bank of St. Louis.

signaled very gradual rate increases to ensure economic stability, they expect rates to be normalised at 2 per cent by 2018.

### The UK Economy

The biggest change in the international environment since the previous *Commentary* is, following the Brexit vote, the outlook for the UK economy. GDP growth in the UK was estimated to be 0.6 per cent in Q2 2016 following a growth rate of 0.4 per cent in Q1 2016. This is the fourteenth consecutive quarter of positive growth in GDP. The rate of growth, however, is largely expected to decrease as a result of Brexit. The latest PMIs are shown in Table 1. All series for the month of July fell below the 50 mark which indicates that there was a sizeable slowdown in the UK economy in the immediate aftermath of Brexit. The composite PMI Output Index in particular shows that the economy contracted at its fastest rate since 2009. The latest release in August, however, shows that this fall may have been only temporary with the all indices recovering to higher levels than June. This suggests that after the initial adverse reaction to Brexit, the impact appears to have stabilised in the short term.

**TABLE 1** Monthly UK PMIs

Date	UK Composite	UK Construction	UK Jobs	UK Manufacturing	UK Services
Jun-16	52.5	46	49.3	52.4	52.3
Jul-16	47.5	45.9	45.4	48.2	47.4
Aug-16	53.6	49.2	-	53.3	52.9

Source: Markit.

In the immediate aftermath of the Brexit vote, there was a significant amount of financial market volatility. In particular, the FTSE fell following the vote but has since recovered. There was also significant volatility in the Pound, falling sharply against the Euro and the Dollar as capital left the country. Since the vote, Sterling has fallen by around 10 per cent. The Economic Policy Uncertainty Index in the UK showed a sharp increase in uncertainty around the time of Brexit. This has since returned to more normal levels which again may indicate that uncertainty for the time being has stabilised somewhat.

Recent data suggests that this has provided a boost to UK exporters helping offset some of the immediate impact of the vote; however, this positive stimulus is only likely to have a short-run impact.

The Bank of England responded to the vote with a 25 basis-point cut in the bank interest rate as well as announcing £60 billion of government bond purchases in

an attempt to offset some of the negative effects of the vote. An analysis carried out by the National Institute of Economic and Social Research (NISER)<sup>5</sup> suggests that the impact of the Bank of England policy measures could have a peak impact of half of one per cent of GDP compared to a no policy change scenario. While this suggests that some of the negative impact of Brexit could be mitigated by an expansionary monetary policy, forecasts suggest that GDP will still be significantly negatively affected.

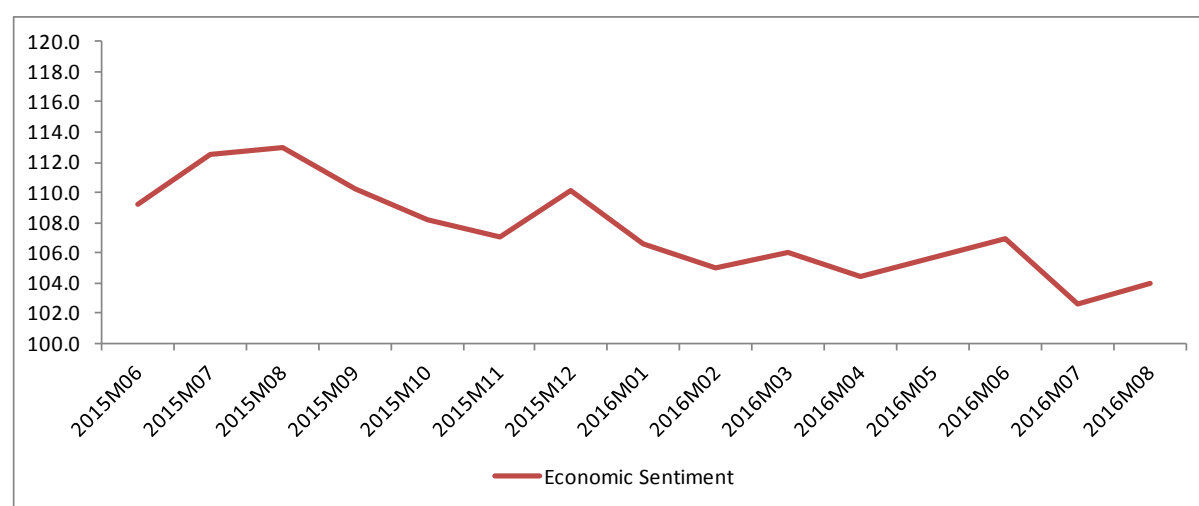
Aggregated GDP forecasts for the UK economy released by the Treasury have been revised downwards since the Brexit vote. In August the forecasted growth rate for GDP in 2016 remained the same as July at 1.6 per cent. The 2017 figure, however, has been significantly revised down to 0.7 per cent from 2.1 per cent since the 'leave' vote. It will become clearer what the broader impact on the UK economy has been when Q3 2016 data become available.

The latest retail sales release following Brexit seems to be more positive than many would have expected. Annual retail sales have grown by 5.9 per cent indicating that consumer spending was quite strong in July. One possible explanation for the increase may be a surge of spending by tourists as the Pound Sterling declined in the months leading up to the vote. The full effects are expected to materialise with a lag and so we will not likely see the scope of the impacts until the latter part of the year. Latest survey data hint that there may be a slowdown in consumer spending for Q3 2016. Figures 2 and 3 show that consumer and economic sentiment in the UK economy has been declining since the beginning of the year indicating consumers and businesses are increasingly concerned about the economic climate which may cause investment and consumption to slow for the rest of the year.

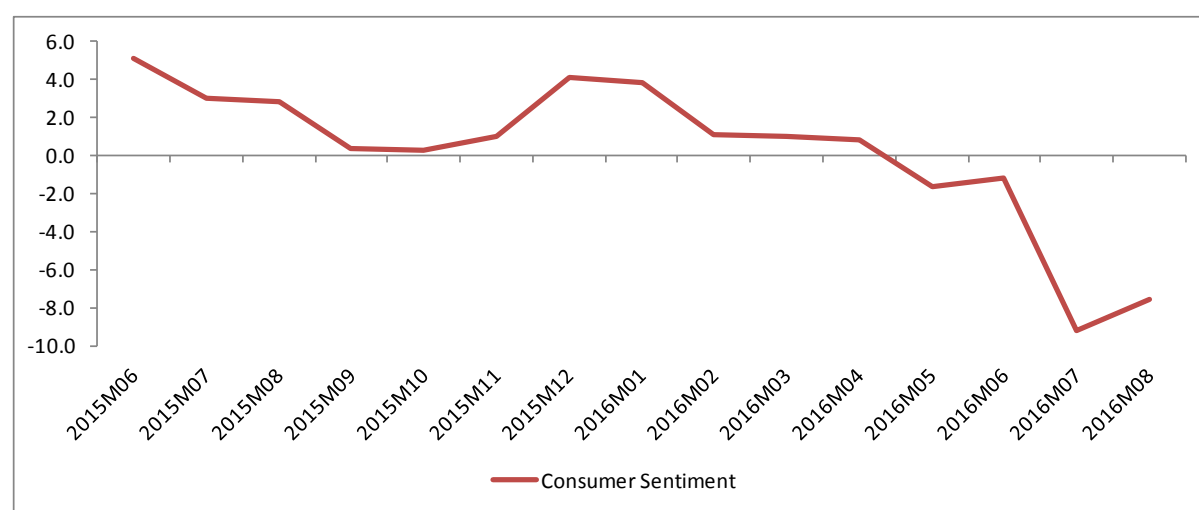
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<sup>5</sup>

'QE and Bank Rate: Comparing Tools', NiGEM Observation No.6. (2016). National Institute of Economic and Social Research.

**FIGURE 2** Economic Sentiment Index

Source: European Commission Economic Sentiment Indicator.

**FIGURE 3** Consumer Sentiment Index

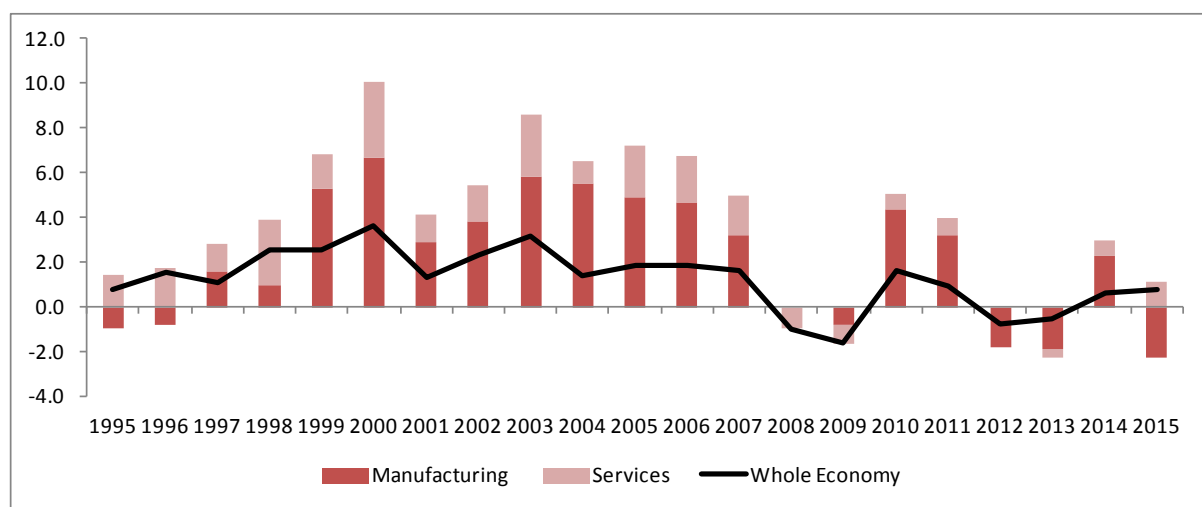
Source: European Commission.

The most recent quarterly release of the unemployment rate in Q2 2016 was 4.9 per cent, a modest improvement from the previous quarter where the unemployment rate stood at 5 per cent. There has been a steady improvement in the unemployment rate over the past few years. The employment rate has also improved up to 74.4 per cent with the latest release of Office of National Statistics (ONS) data. This is the highest rate of employment reached since comparable records began in 1971. Despite the steady improvement in unemployment and employment in recent years, labour productivity growth has been sluggish in the UK. Data for Q1 2016 show that UK labour productivity, as measured by output per hour, grew by 0.5 per cent from Q4 2015. Productivity is particularly low in the manufacturing sector where output per hour was 1.5 per cent lower than the previous year. Output per hour in the services sector,

however, experienced a more positive performance, growing by 1.1 per cent over the same period.

As can be seen from Figure 4, productivity growth in the UK has been very low post-crisis. Pre-crisis the average growth was just over 2 per cent. Post-crisis growth has averaged only 0.15 per cent. Given the importance of productivity growth in determining long-term growth in an economy, this is becoming more of an important issue, especially given the recent result of the Brexit referendum.

**FIGURE 4** UK Growth in Output Per Hour (%)



Source: Office of National Statistics (ONS)

The Consumer Price Index rose by 0.6 per cent in the year to July 2016. This is a slight increase on the June figure, however it is still relatively low historically and below the 2 per cent growth target. Given the relative weakness in post-crisis wage growth,<sup>6</sup> the continuing low rate of inflation should ease pressure somewhat on household disposable income. The low wage growth observed in the UK partly reflects weak labour productivity growth (Figure 4) and it is possible that wages and productivity could further worsen if there is a fall in Foreign Direct Investment following Brexit.

### The World Economy

Growth forecasts globally have been revised downwards in recent months in light of global trade uncertainty and emerging downside risks to the world economy. The most recent downgrade has largely been a result of the referendum in the UK. In particular, the IMF has downgraded their growth forecasts for World

<sup>6</sup> An OECD report calculates that hourly real wage growth in the UK fell by 10.4 per cent in the period Q4 2007 to Q4 2015. See [www.oecd.org/unitedkingdom/Employment-Outlook-UnitedKingdom-EN.pdf](http://www.oecd.org/unitedkingdom/Employment-Outlook-UnitedKingdom-EN.pdf).

output for both 2016 and 2017 by -0.1 percentage points. World output is now expected to be 3.1 per cent in 2016 and 3.4 per cent in 2017. The result of the 'leave' vote is largely expected to create additional political and economic uncertainty which will most likely limit World output over the forecast horizon.

The Chinese economy continues to show signs of weaker growth as the country attempts to move away from investment towards consumption-led growth. China's Purchasing Manufacturers Index (PMI) for the manufacturing sector has declined over the year, dipping below the threshold of expansion and contraction of 50 at numerous points. Data for July show that the Index fell to 49.9 or by -0.1 percentage points over last month. The PMI for the non-manufacturing sector appears to be healthier with levels steadily above 50 over the past year with most recent data showing a level of 53.9.

There also seems to be a slowdown in other domestic economic activity in China. The most recent data released show that investment, lending and retail spending were all lower than expected. For example, fixed asset investment grew at its lowest level since 1999 in the first half of the year. There has also been a slowdown in imports and exports. In July, exports fell 4.4 per cent compared to last year while imports fell 12.5 per cent annually. As a result of observed slowdowns in both domestic and trade activity, the IMF expects the rate of growth to moderate somewhat in 2016 and 2017 to 6.6 and 6.2 per cent respectively. Although the slowdown is expected to be marginal, it is still expected to dampen world output growth over the next two years.

The Bank of Japan recently cut interest rates resulting in negative rates and there was a continuation of asset buying, particularly exchange traded funds (ETF). Despite the unprecedented monetary easing, Q2 2016 data for Japan show that growth remains sluggish. Annualised GDP growth was 0.2 per cent which was lower than expected while the quarter-on-quarter growth was 0 per cent. Capital expenditure fell 0.4 per cent over the quarter, likely prompted by global uncertainty delaying business investment. There was also evidence of increased consumer uncertainty with a slowdown in consumption growth, only growing by 0.2 per cent over the quarter. As well as this, the long-term growth prospects for Japan are complicated by a significant demographic problem which is expected to exert a large fiscal burden on the government in the coming years.

The recent Brexit decision initially had a negative impact on financial markets and equity prices declined worldwide. Most of these have recovered, however, apart from European and UK bank stocks which remain substantially lower than pre-referendum. Global oil prices recovered somewhat recently spurred by a series of production outages in Nigeria and Canada over the last six months. In August, oil

prices rallied stemmed by speculation that OPEC will begin reducing the global supply glut of oil.

### Implications for Irish Exports, Imports and the Balance of Payments

After a slowdown in both goods exports and imports at the start of the year, there has since been a moderate improvement in the values of both of these series (Figure 5). The most recent release of seasonally-adjusted goods imports and exports shows that the value of goods exports was €9,553 million, an increase of 2.3 per cent or €227 million compared to June 2015. For the period January to June 2016, the value of goods exports was €55,401 million, an increase of 1 per cent over the same period last year.

In terms of exports growth by commodity, the largest move over the year was in electrical machinery, apparatus and appliances which grew by 109 per cent, or from €266 million to €509 million. Other notable changes included exports of medical and pharmaceutical products, increasing by 12 per cent or €298 million as well as a decrease in exports of petroleum, petroleum products and related materials of €15 million.

On an annual basis goods imports fell by 12.2 per cent, indicating that global uncertainty since the beginning of the year is impacting the demand for imports. Notable changes in imports in June included a 36 per cent or €99 million increase in imports of road vehicles and a reduction in imports of medical and pharmaceutical products of €154 million or by 25 per cent.

**FIGURE 5** Seasonally-adjusted Goods Exports and Imports (€ Billions)

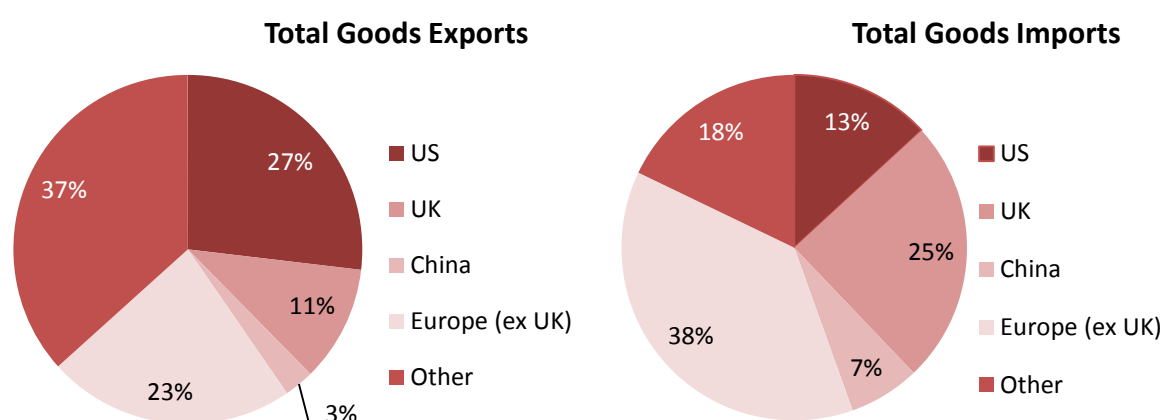


Source: Central Statistics Office.



The geographical breakdown of goods exports and imports by region (Figure 6) highlights the continued importance of the UK as a major trading partner. In June, the UK accounted for approximately 25 per cent of our imports and 11 per cent of our exports remains the second largest single trading partner for the Irish economy after the US. In the aftermath of Brexit, the Irish trade relationship with the UK is impacted through a combination of expected lower growth in the UK as well as competitiveness losses for Irish exporters due to a weakening Pound Sterling. The proportion of total goods exports to the UK has fallen by 2 per cent when compared to this time last year. Europe as a whole accounts for the majority of Ireland's goods imports and exports at around 38 and 23 per cent of the total. As mentioned in the International Economy section, Brexit is expected to have spill-over effects in Europe and has the potential to lower GDP by between one quarter and one half of a per cent over the forecast horizon, which will likely impact the demand for Irish goods and services. Although, we have moderated down our export forecasts, it is our view that export growth remains positive as the US and the EU economies are still expected to grow at a moderate pace over the next two years.

**FIGURE 6** Goods Exports and Imports by Geographical Region (%)

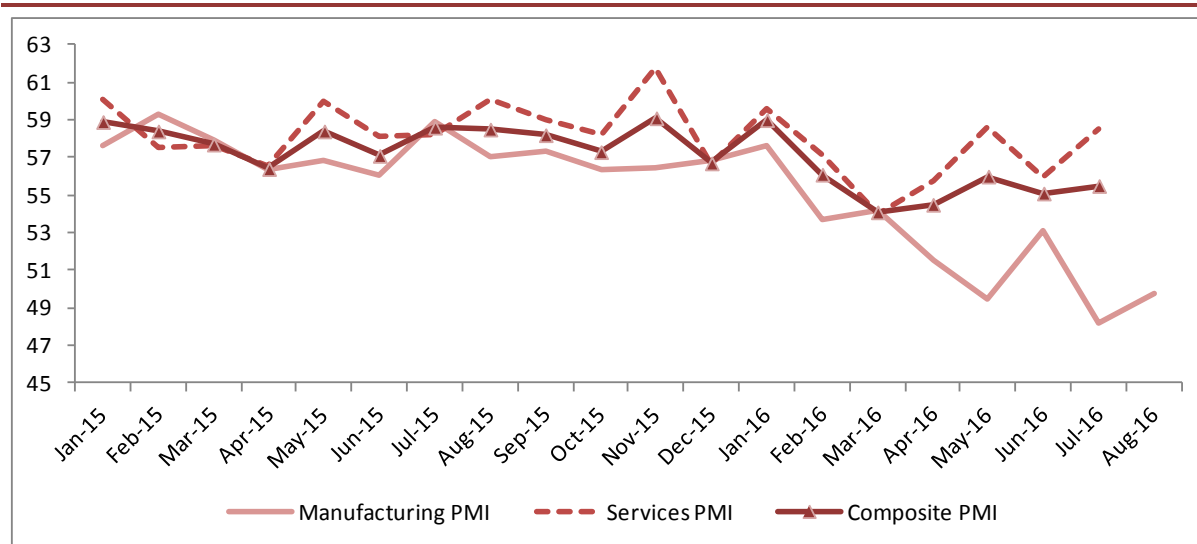


Source: Central Statistics Office.

Figure 7 shows the composite, manufacturing and services PMI for new export orders in Ireland. As can be seen, although the composite index is above 50 and therefore indicates expansion, the rate of growth of new export orders has clearly slowed since the beginning of the year. The downward trend appears to be more pronounced on the manufacturing side with the index down 7.8 points since the start of the year. There was a moderate recovery on the manufacturing side in August moving up to 49.8. This level is still however, below the 50 point mark and signifies a contraction for that sector. The services side appears not to have been impacted, growing 2.5 index points in July. The slowdown in new

export orders appears to be consistent with PMI data in the UK which are showing a marked slowdown across the indices in July.

**FIGURE 7** PMI New Export Orders Ireland



Source: Markit.

Significant revisions were made to the Balance of Payments in 2015 that became apparent in Q1 2016. More specifically, the balance on the current account was revised by nearly €17 billion from €9 billion up to €26 billion (Figure 8). There was a large increase in the merchandise export component, largely as a result of contract manufacturing.<sup>7</sup> This caused the current account balance to significantly increase as well as contributing to an increase in overall GDP. It is clear from the graph that there was a steep increase in the series in Q1 2015 largely as a result of a number of multinational corporations (MNCs) transferring over intangible assets to Ireland. This caused a level shift in the value of the current account while also significantly impacting Ireland's net investment position. The most recent Balance of Payments data show a relatively large decrease in the current account balance and this is largely as a result of increased business services imports and in particular, research and development.

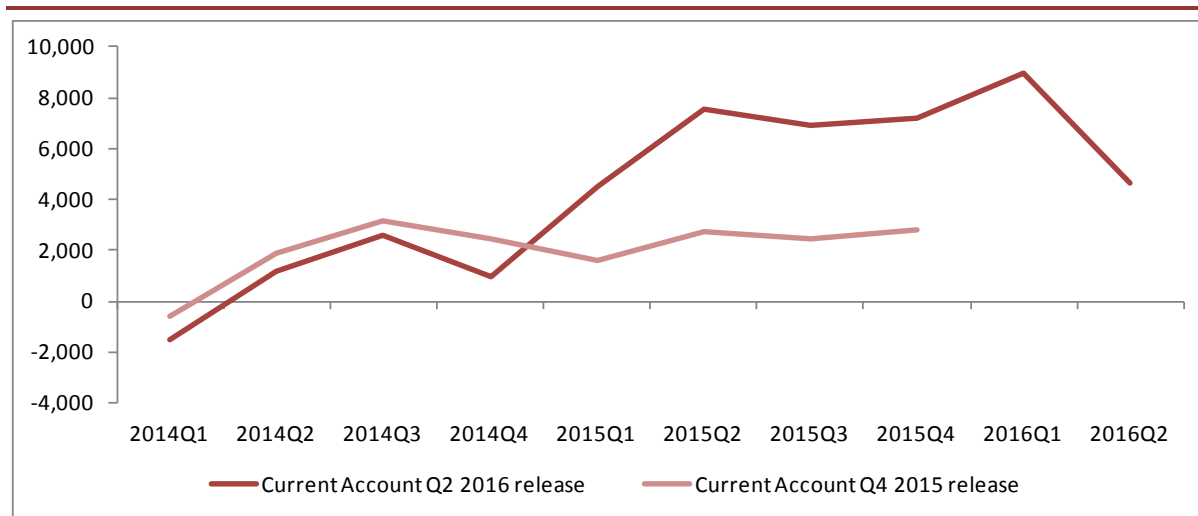
On the services side, data for Q2 2016 show that imports and exports were both up compared to last year. Total service exports grew at an annual rate of 6 per cent in Q2 2016. The computer services sector which accounts for the single largest proportion of service exports grew by 8 per cent. Other notable increases

<sup>7</sup>

'Contract manufacturing' refers to a special form of outsourcing, where an Irish company engages a company abroad to manufacture products on its behalf but retains the economic ownership of the inputs used in this production process. When the product is sold to a customer abroad, a change in economic ownership takes place and the export of this good is then recorded in the Irish National Accounts and Balance of Payments, even though it was never produced in Ireland.  
[www.cso.ie/en/media/csoie/surveysandmethodologies/documents/ContractManufacturinginformationNotice.pdf](http://www.cso.ie/en/media/csoie/surveysandmethodologies/documents/ContractManufacturinginformationNotice.pdf).

included tourism and travel, increasing by 6 per cent and business services growing 16 per cent. There were, however, decreases in sectors such as the communications sector of 4 per cent and the insurance sector of 14 per cent. The level of service imports continues to outweigh service exports in Ireland. Total service imports grew by 9 per cent from Q2 2015 to Q2 2016. Royalties and licenses, usually accounting for the majority of growth, were flat over the year largely as a result of on-shoring of intangible assets by multinationals over the year.

**FIGURE 8** Current Account Balance Revisions (€ Millions)



Source: Central Statistics Office.

Given the recent revisions in the National Accounts and the Balance of Payments, it has become increasingly difficult to forecast these components of GDP. For 2016 and 2017 we have moderated our trade forecasts down as a result of the Brexit referendum as uncertainty and lower expected growth in the UK and the Euro Area will likely impact demand for Irish exports. In light of this, it is our expectation that growth in exports in 2016 will be 8.3 per cent, growing by a further 7.6 per cent in 2017. Although in recent months imports have fallen somewhat, we still envisage import growth to be underpinned by an improving labour market, growth in real wages and continued growth in domestic activity. The relative fall in the Pound Sterling over the last number of months should also provide a boost to imports from the UK and many commentators suggest that parity with the Euro could be reached in 2017. As a result, we forecast imports to grow at a rate of 12.1 per cent in 2016 and 11.9 per cent in 2017. This should result in a broadly neutral or marginal net negative impact on GDP from net exports.

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## The Domestic Economy

### Output

The Domestic section of the *Commentary* is organised as follows; we initially review the outlook for output growth before discussing developments in the Irish monetary and financial sectors. Prices and earnings in the economy are then discussed, followed by a review of demand-side factors such as consumption and housing market issues. On the supply side, we then examine developments in investment and the labour market before concluding with an analysis of the public finances.

The release in July of the National Accounts indicated that GDP had grown in 2015 by 26 per cent in real terms and by 8.5 per cent in 2014. While little official comment on the significant increase in output is available, some preliminary analysis would suggest that contract manufacturing by a relatively small number of multinational firms is one of the main reasons for the substantial increases observed. In this case intangible assets have been used for contract manufacturing; the owner of the intangible asset contracts with an external party in another country to manufacture some product based on using the intellectual property (IP) associated with the assets. The manufacturer is paid a fee for undertaking the production but the profit arising from the difference between the costs of production and sales revenue accrues to the owner of the IP, who has now become Irish resident.

Because of the rules on ownership under the new European System of National and Regional Accounts (ESA 2010),<sup>8</sup> the exports and imports associated with the product are counted as Irish with the country of the external manufacturer showing an inbound service fee for undertaking the production. The current rules mean that it is in the Irish 'industry' sector that the impact is seen. Gross value added (GVA) in the Irish industry sector more than doubled in 2015 with nominal GVA for industry going from €41 billion in 2014 to €92 billion in 2015. Even though most of the production took place elsewhere, the IP behind the production is now located here. Consequently, this results in a level-shift in GDP and not a once-off increase.

There are a number of reasons why this accounting treatment poses a significant challenge for analysts in an Irish context; we outline some of these in the Public

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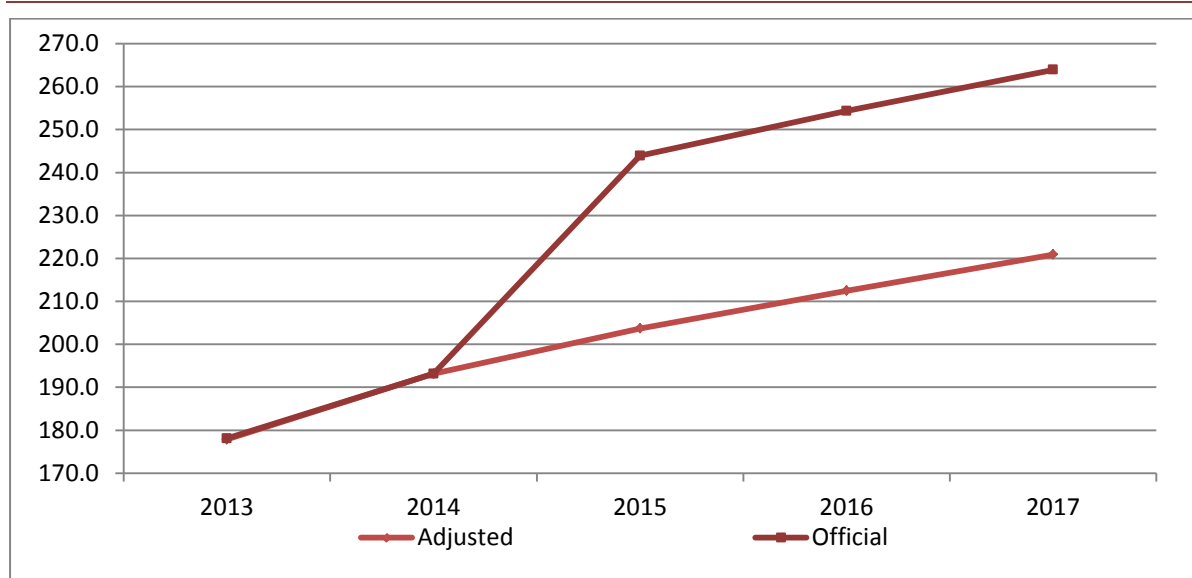
<sup>8</sup>

ESA 2010 was implemented by all European statistical agencies reporting to Eurostat from September 2014 onwards.

Finances section of the *Commentary*, where the difficulty of obtaining accurate debt-to-GDP ratios as well as plausible estimates of potential output and the output gap are discussed. However, in general, it is imperative that an estimate of national output be produced which accurately reflects underlying economic activity in the domestic economy. Over the medium term one possible alternative is to accompany the ESA2010 National Accounts with the ESA95 set of accounts. Under the latter criteria, more attention is paid to the actual physical movement of goods across borders, whereas under the former set of accounts, changes of ownership between residents and non-residents are now the foremost consideration. Therefore, by comparing the two sets of accounts one could quantify more accurately the contribution of contract manufacturing to estimates of domestic economic activity.

The approach we have taken in the present *Commentary* is to derive an estimate of economic output on the basis of an output-based approach. In effect, this means taking Tables 2 and 3 of the National Accounts and forecasting the main output components for the agricultural, industry and services component of the domestic economy. To allow for the contract manufacturing, we replace the official industrial output figure for 2015 with an estimate.<sup>9</sup> We make similar adjustments for that year's depreciation and net factor flows figure. Therefore, we generate an adjusted GDP figure for 2015. This is then forecast for 2016 and 2017. If we apply the same forecast growth rates to the official 2015 figure, Figure 9 shows the contrasting paths for the adjusted and official GDP series.

**FIGURE 9** Alternative Real Irish GDP Paths (€ billions)



Sources: Central Statistics Office and QEC calculations.

<sup>9</sup> The estimate is from a model of Irish industrial output based on Bradley J. and J. FitzGerald 1988. 'Industrial output and factor input determination in an econometric model of a small open economy', *European Economic Review*, Elsevier, Vol. 32(6), pages 1227-1241, July.

Combining the forecasts of the individual output components of the National Accounts results in an overall GDP forecast of 4.3 per cent in 2016 and 3.8 per cent in 2017. While this is still a very strong growth performance, particularly when compared with most other European economies, it does reflect something of a slowdown compared to our estimates for the same period at the start of the year. This is mainly down to vulnerabilities discussed in the International Economy section of the *Commentary*.

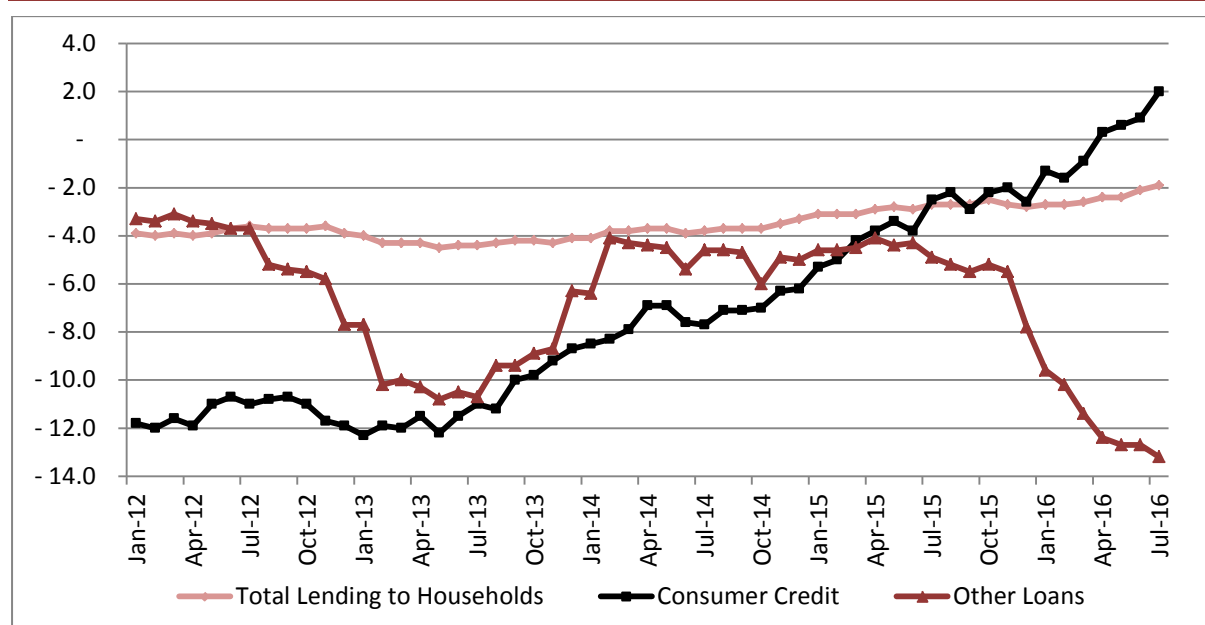
Finally, the significant fluctuations in the official Irish growth rate have implications at a European level. For example, Eurostat reports an increase of 2.1 per cent for the Euro Area in 2015. By aggregating up the individual growth rates across the Euro Area, it can be calculated that the Irish growth rate of 26 per cent contributed 0.5 per cent of this 2.1 per cent figure. Had the Irish economy grown at 5.6 per cent in 2015 (as per our adjusted estimate), then the Euro Area growth rate would be 1.6 per cent. This is significant as a growth rate in excess of 2 per cent may indicate that the European economy is growing at its potential rate, which, in turn, could have certain monetary policy implications.<sup>10</sup>

### Monetary and Financial Conditions

Financial accounts data available up to June of this year reveal that, on an annual basis, the rate of lending to Irish households continues to exhibit negative growth as can be seen in Figure 10. This has been the case since late 2009, however the degree of the decline has been slowing in recent times with lending for consumption purposes actually increasing since Q2 2016; this is particularly the case for consumer credit on loans between one and five years.

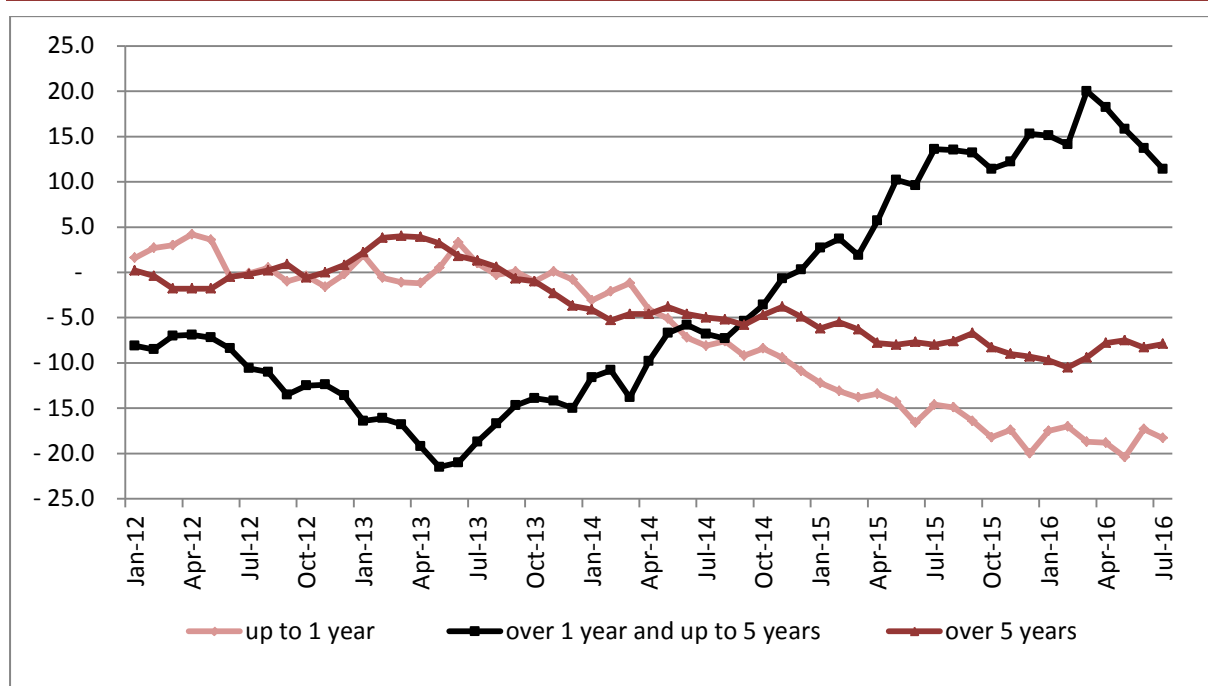
<sup>10</sup>

John Taylor of the ‘Taylor rule’ has suggested, for example, that if GDP increases by 0.5 per cent relative to its growth path, then the proper response is to increase the official interest rate by 0.25 per cent.

**FIGURE 10** % Year-on-Year Change in Lending to Irish Resident Households

Source: Central Bank of Ireland.

This marginal improvement in credit conditions in the Irish market is also reflected in Figure 11 which illustrates lending to Irish resident non-financial corporations (NFCs). The significant contraction in lending to Irish NFCs post-2008 is evident across all loan types, however, since 2013 the pace of decline in medium-term loans slowed with growth in this category of lending turning positive in early 2015. Since then, the annual rate of growth in credit extension for loans between one and five years has increased consistently reflecting the pick-up in activity for these sectors of the domestic economy.

**FIGURE 11** % Year-on-Year Change in Lending to Irish Resident Non-financial Corporations

Source: Central Bank of Ireland.

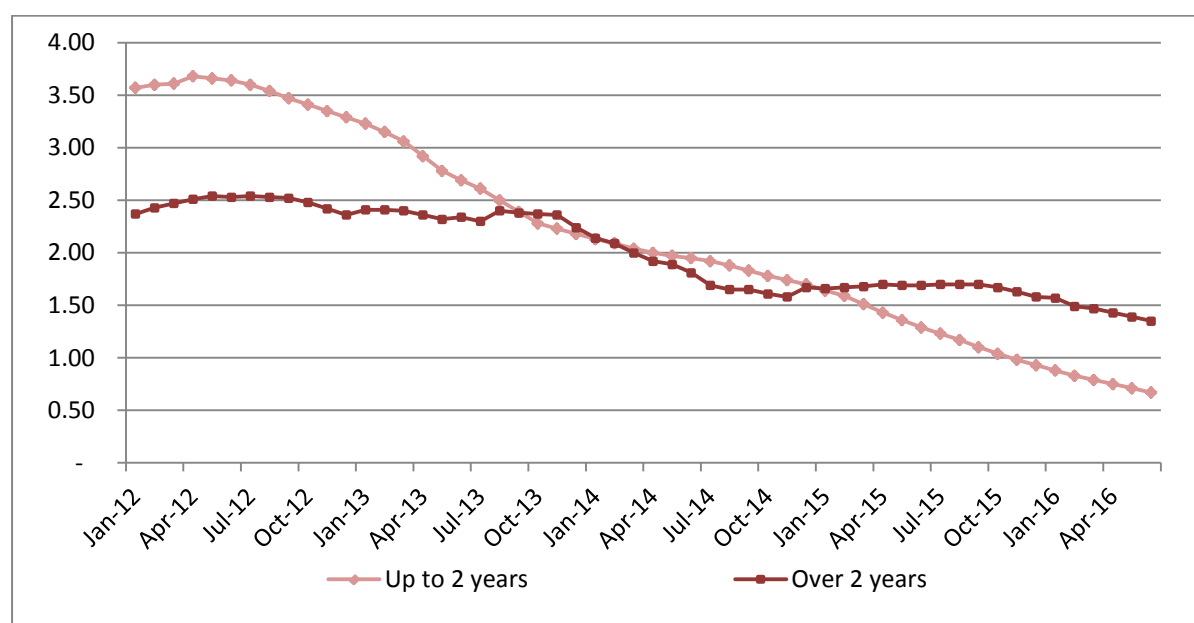
As noted in previous *Commentaries*, the continued increases observed in Irish house prices over the past number of years has helped households to improve their balance sheets, with household net worth improving steadily since Q2 2012.

One aspect of the Irish financial household sector which has seen a weaker recovery is changes in private sector deposits. As can be seen from Figure 12, while the degree of deposits has started to increase over the past year, this is only after registering negative growth for a number of years prior to this. The substantial increases in deposits prior to 2007 can also be observed from the figure. The relatively small rate of increase is inevitably related to the particularly low interest rates on offer for deposits at present. Figure 13 charts the deposit rates for Irish households; the downward trend in deposit rates since mid-2013 is almost certainly a function of the low policy rates being experienced in the Euro Area at present.



**FIGURE 12** % Year-on-Year Change in Irish Household Deposits

Source: Central Bank of Ireland.

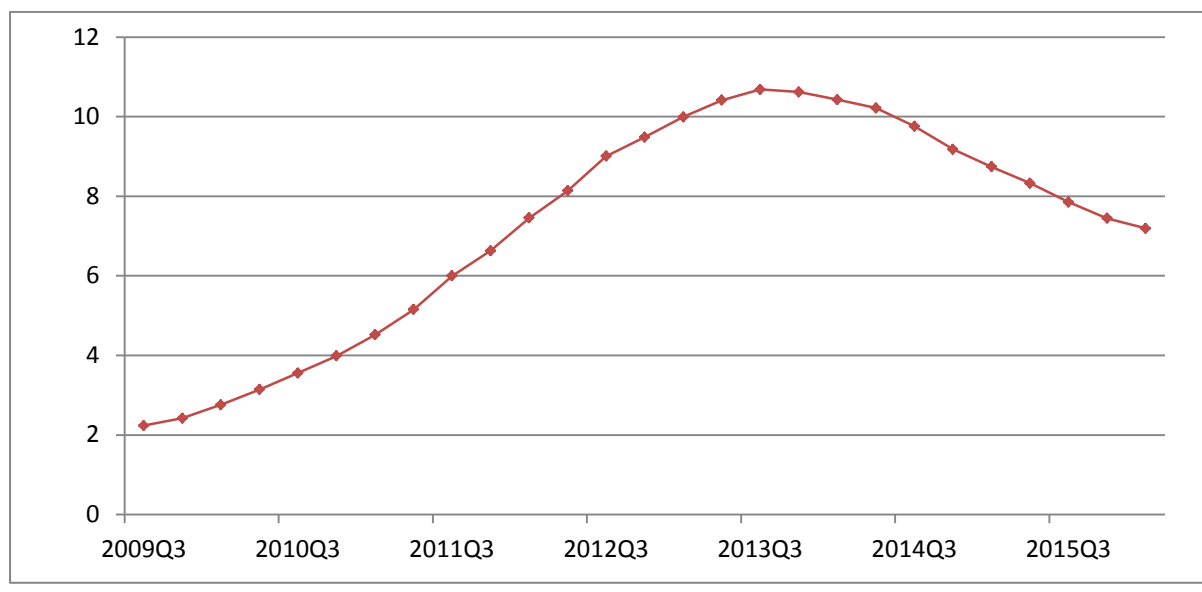
**FIGURE 13** Interest Rates on Household Deposits

Source: Central Bank of Ireland.

While the three main domestic financial institutions have returned to profitability in 2016, the low interest rate regime, while seeking to stimulate economic activity across Europe, does make it difficult for financial institutions to increase their profit levels and hence generate greater levels of capital. A further complication for Irish credit institutions is the relatively higher levels of non-performing loans on domestic institutions' balance sheets owing to the residential and commercial property bubbles of the mid-2000s. Figure 14, for

example, plots the rates of residential mortgage arrears in 180 days + arrears; this provides an example of the ongoing nature of the longer-term arrears issue.

**FIGURE 14** % of Residential PDH Mortgages in 180 Days + Arrears



Source: Central Bank of Ireland.

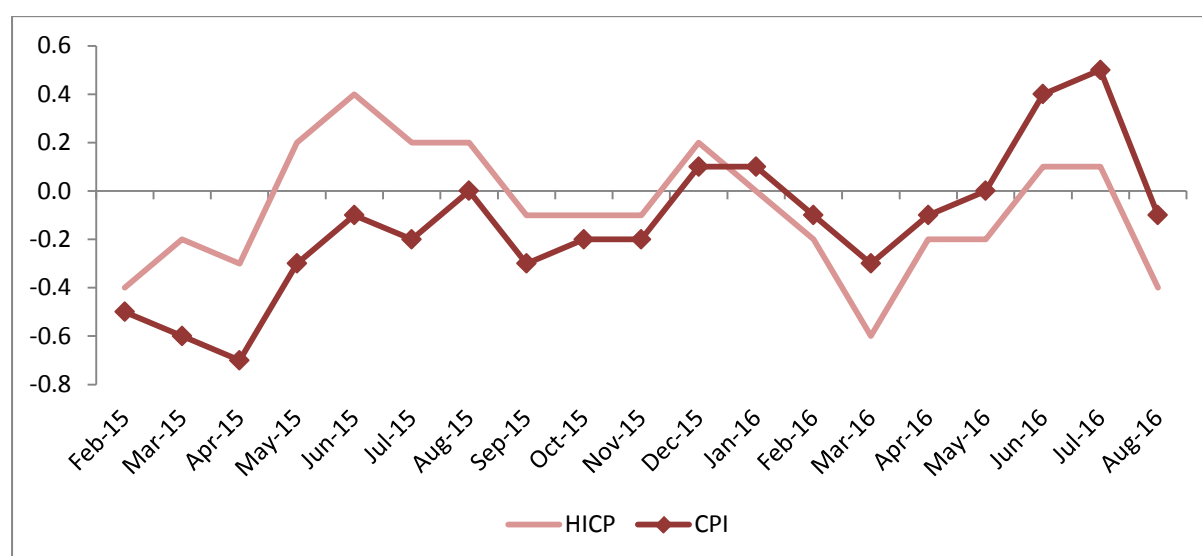
These factors were the main reasons why two Irish banks showed up quite poorly in the recent stress test of 51 European banks (33 in the Euro Area) conducted by the European Banking Authority (EBA) in July. The stress scenario examined in the exercise for the Irish economy consisted of a GDP downturn from 2016 through 2018 resulting in a depletion of capital adequacy as against the end-2015 balance sheet number. The size of the capital fall reflects the extent of the assumed downturn. While one reason for the sharper loss of capital adequacy for the Irish banks is that the economic downturn assumed for Ireland is greater than other European countries, it also reflects the persistent underlying fragilities in the Irish banking sector.

With only two major redemptions in 2016/2017, Government debt issuance is lower in 2016 than in recent years. This is due to the declining general government deficit and the fact the next bond redemption will be October 2017. Overall in 2016 the National Treasury Management Agency (NTMA) was expected to issue €6-10 billion worth of long term bonds with €5.6 billion already issued. Historically, the Ireland Government Bond 10Y, which reached an all time high of 14.76 per cent in January of 1985, reached a record low of 0.33 per cent in September.

### Prices and Earnings

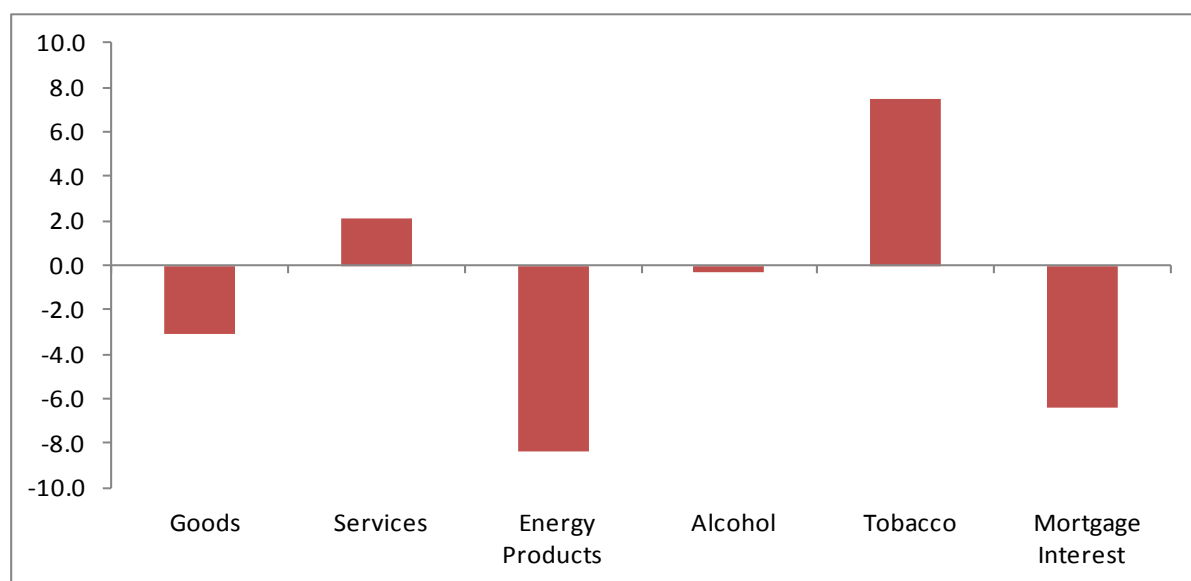
The annual rate of growth in Consumer Price Index (CPI) over the last few months has improved steadily as seen in Figure 15. Data for August, however, indicate that the annual growth rate is -0.1 per cent, compared to 0.5 per cent the previous month. The annual change consisted of strong growth in certain areas such as miscellaneous goods and services of 5.1 per cent, education of 3.8 per cent and restaurants and hotels at 2.5 per cent. There were also declines experienced in certain sectors such as transport of 4.6 per cent and housing, water, electricity, gas and other fuels of 1.5 per cent. Subdued fuel prices as well as lower mortgage interest repayments were factors contributing to the decline in these areas.

**FIGURE 15** Annual Growth in CPI (%)



Source: Central Statistics Office.

There is still a diverging trend present in the growth rate of the goods and services component of the CPI. Weak global commodity prices as well as moderate increases in the exchange rate have contributed to a negative rate of inflation in the goods component with most recent data showing annual growth of -3.1 per cent. The services side, however, has continued to grow with most recent data showing 2.1 per cent annual growth. Figure 16 shows a further breakdown in the growth rates of some of the components of the CPI.

**FIGURE 16** Annual Growth in CPI Components (%)

Source: Central Statistics Office.

We can see that energy products are still exerting a significant negative drag on the overall growth rate. There is also evidence of a reduction in mortgage debt burdens for consumers with decreases in average mortgage interest costs of 6.4 per cent. This, coupled with lower energy prices is increasing consumers' disposable income which should support our forecast for consumption this year.

There was also an decrease in annual average prices for the Harmonised Index of Consumer Prices (HICP). The annual percentage change in August was -0.4 per cent. Similar, to the CPI, increases were observed in education and restaurants and hotels of 3.8 and 2.6 percent. There were also decreases in the in certain components such as transport of 5 per cent and communications of 3 per cent.

The latest earnings and labour costs data from CSO show that annual Average Hourly Earnings increased marginally by 0.2 per cent or from €21.89 to €21.93 in the year to Q2 2016. There was an increase in Average Hourly Earnings observed in eight of the 13 sectors. The largest increases were shared by the transportation and storage and accommodation and food services sectors with an increase of 2.5 per cent from €20.40 to €20.91 and €12.17 to €12.47 per hour respectively. The largest decrease occurred in the arts, entertainment, recreation and other service activities sector, falling by 3.8 per cent compared to Q2 2015.

If we take the five years to Q2 2016, the overall increase in Average Hourly Earnings across sectors only increased by €0.01 from €21.92 to €21.93. This, however, consisted of increases and decreases across the different sectors. The

increases in the five years to Q2 2016 were relatively broad with eight of the 13 sectors showing gains in Average Hourly Earnings. The information and communication sector, which includes many multinational corporations, experienced the largest gain over the five years at 12.7 per cent, rising from €26.37 to €29.71. The largest decrease was observed in the human health and social work sector, falling 6 per cent or from €23.57 to €22.15.

In terms of private and public sector wages, Average Hourly Earnings in the private sector in the year to Q2 2016 rose by 0.8 per cent while earnings fell by 0.4 per cent in the public sector over the same period.

Growth in Average Hourly Earnings has been moderate but steady in the last few years. We expect this trend to continue for the forecast horizon with wages growing by 2.3 in 2016 and 2017. Due to the recent pick-up in annual inflation growth and evidence of continuing strong domestic demand, it is our expectation that in 2016 we will see growth of around 0.5 per cent in the CPI, before growing a further 1 per cent in 2017. We may also see an upside risk to this forecast if the Euro appreciates further against the Dollar or the Pound. We expect that growth in HICP inflation will be somewhat similar and grow by 0.8 per cent and 1 per cent this year and next year respectively.

**TABLE 2** Inflation Measures

	2014	2015	2016	2017
	Annual Change			
	%	%	%	%
CPI	0.2	-0.3	0.5	1.0
Personal Consumption Deflator	1.7	0.4	1.0	1.0
HICP	0.3	0.0	0.8	1.0

Sources: Central Statistics Office and ESRI forecasts.

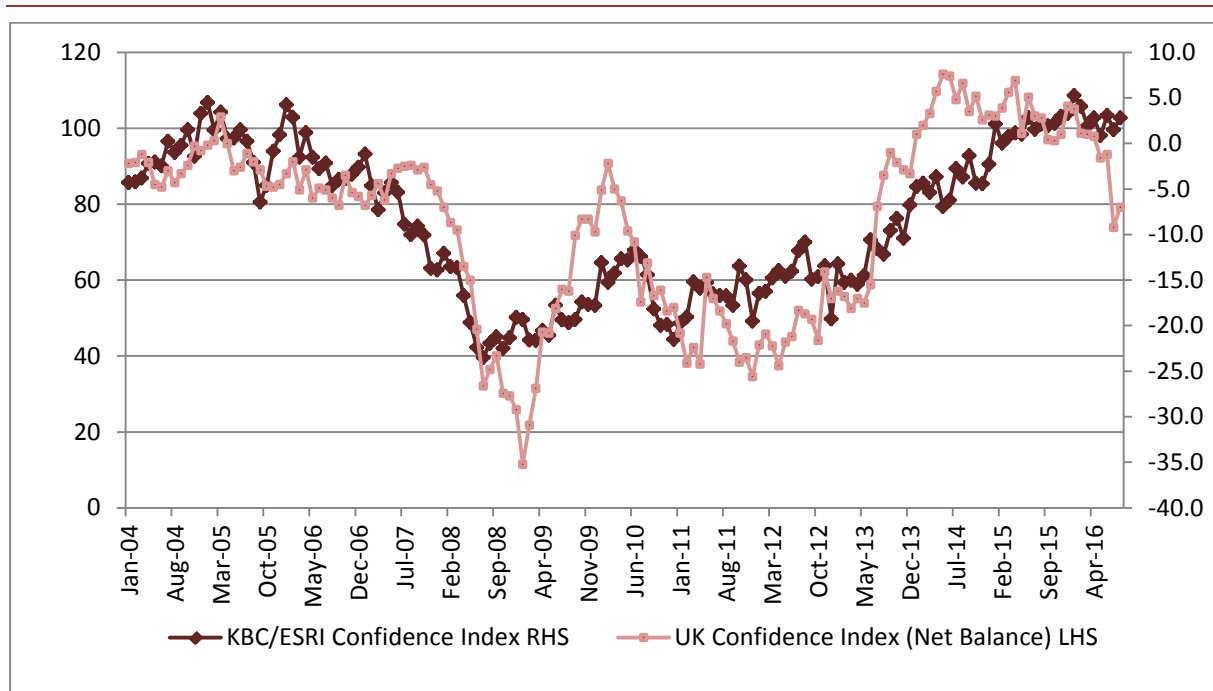
## Demand

### *Household Sector Consumption*

The most recent National Accounts indicate that consumption grew by 4.5 per cent in 2015; this was greater than previously expected. Between 2014 and 2015 the largest increase in expenditure was on motor vehicles (16 per cent) and retail sales of furniture and lighting (9 per cent) with all retail businesses witnessing an increase in sales of 5 per cent. For the first six months of 2016, retail sales also experienced strong increases over the comparable period in 2015 with motor vehicle related expenditure again experiencing the strongest growth at 13 per cent. In the year to June, all retail businesses witnessed increases with sales increasing by 5.5 per cent over the previous year.

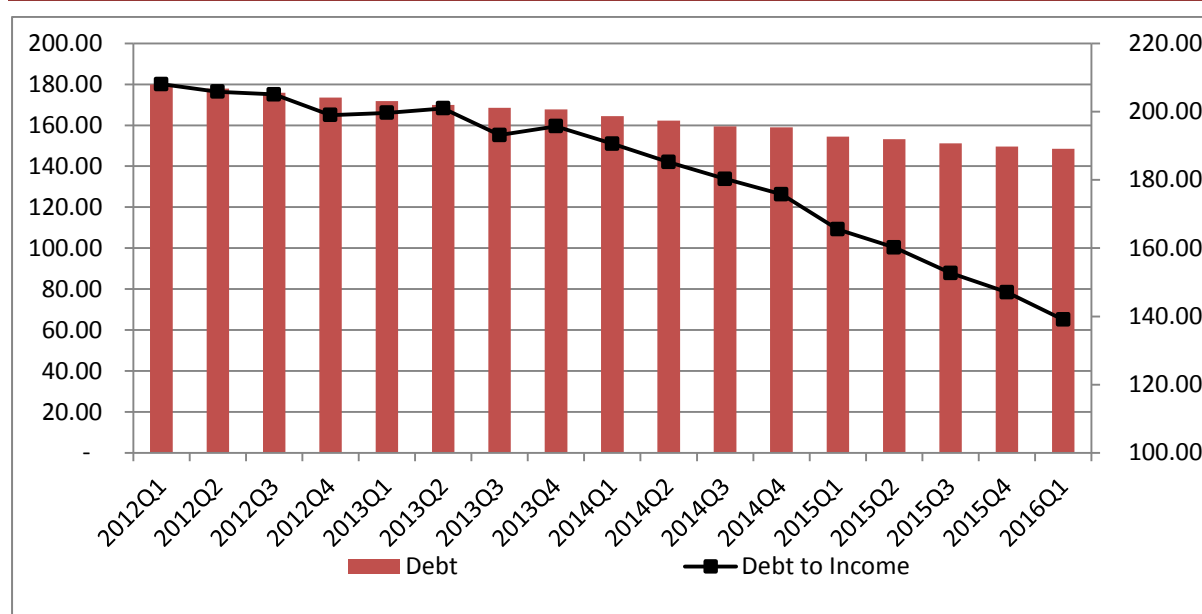
Following the Brexit referendum result, Irish consumer sentiment declined although the scale of the drop was relatively modest, particularly in comparison to the deterioration in a comparable UK measure. The August figures have since recovered somewhat in both Ireland and the UK, however the perception of the general economic climate and employment prospects in the UK are notably worse compared to last year. Figure 17 compares the KBC/ESRI Consumer Sentiment Survey with comparable results for the UK GFK survey. Brexit has less adverse concerns for the average Irish consumer than it does for firms exporting to the UK, but further information of the details of the survey point to a clear understanding that ‘Brexit’ is an adverse outcome for the Irish economy and, by extension, for Irish households. The results of the sentiment survey tend to suggest that a number of domestic, countervailing factors are providing some offsetting support to consumer sentiment and spending.

**FIGURE 17** Irish and UK Consumer Price Indices



Source: Central Statistics Office.

The latest financial balance sheet data from the Central Bank illustrates that, while Irish household debt levels are still quite high by European standards, the affordability of such debt is steadily improving, particularly as a ratio of disposable income. Figure 18 plots both the total level of household debt and the ratio of this debt to gross disposable income. This continuous improvement in the overall financial position of households has been one of the main reasons for the increases in consumption over the past two years in the domestic economy and is, arguably, the key reason behind Irish growth at present.

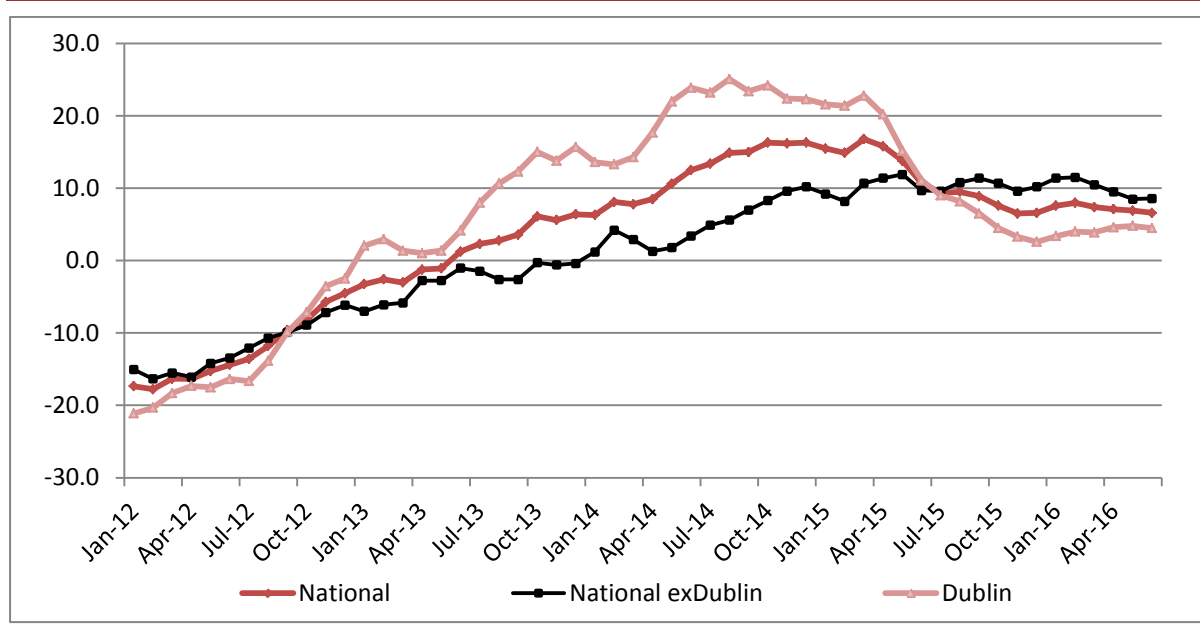
**FIGURE 18** Irish Household Debt

Source: Central Bank of Ireland.

Overall, therefore, given the continued improvement expected in the labour market and the ongoing strength of the Exchequer tax receipts observed so far this year, we expect growth in personal consumption to be 4.2 per cent in volume in 2016. Many of the factors outlined above will continue to influence personal consumption in 2017 and so we forecast growth of 4 per cent in the volume of personal consumption for next year.

### *Property Market Developments*

As demonstrated in Figure 19, house price growth in 2016 appears to have stabilised throughout the country. The fall-off in growth rates observed in the Dublin area since mid-2015 now appears to have arrested with house prices in the capital growing by an average of just over 4 per cent per annum in 2016. Meanwhile, prices outside of Dublin are growing an average of 10 per cent per annum for the same period. The significant decline in growth rates in Dublin house prices correlates with the introduction of the macroprudential rules by the Central Bank of Ireland. Given that a 20 per cent requirement for a deposit is one of the two rules applied, it is inevitable that these measures would have a greater impact where house prices are, on average, higher. This may cause a greater demand for housing amongst those looking to owner-occupy in the commuter region around the Dublin area.

**FIGURE 19** Annual Growth Rates (%) of Irish House Prices

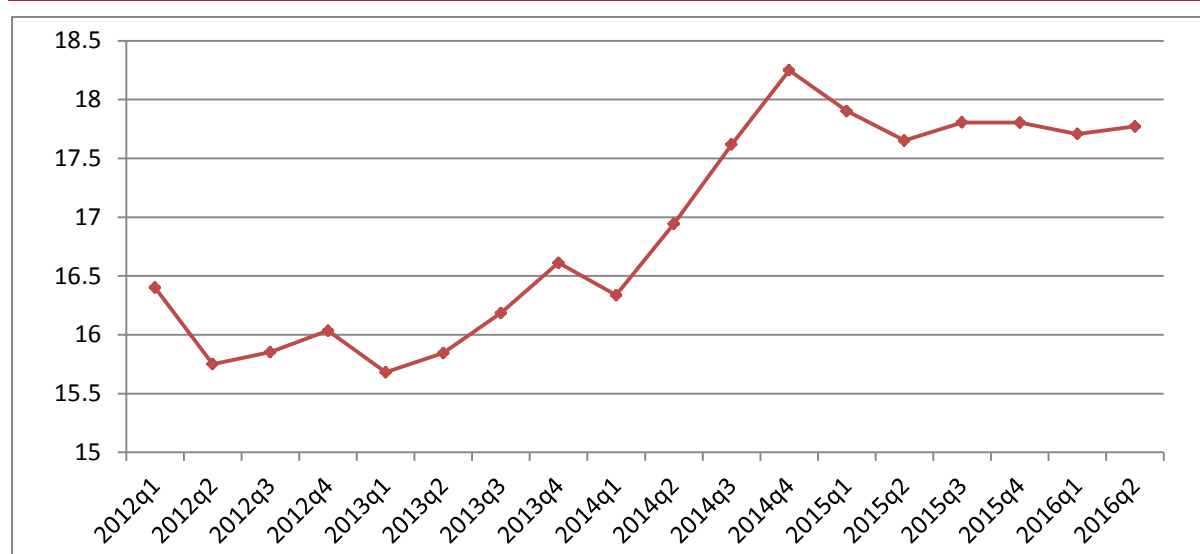
Source: Central Statistics Office.

Another unintended or unforeseen consequence of the macroprudential measures is the change in tenure choice which is likely to occur. For example, for those wishing to live in Dublin but who are unable to raise the down payment required in order to buy a property, renting is the only real viable option. Consequently, there is likely to be an increase in the demand for rental properties vis-à-vis those for owner-occupying. Evidence for this can be gleaned from Figure 20, which plots the house price-to-rent ratio for the Irish residential market. It is clear that the ratio increased significantly from 2012 onwards as residential property prices started to recover. However since 2015 this ratio has been declining, even in the continuing presence of strong house price growth, demonstrating the degree to which rental levels are increasing. According to the RTB/ESRI Rental Index, rents are up 8 per cent between Q2 2015 and Q2 2016. This tendency for the house price-to-rent ratio to decline in the presence of credit constraints (i.e. macroprudential measures) has been observed in the international literature by Duca et al. (2011)<sup>11</sup> and in the Irish case by Duffy et al. (2016).<sup>12</sup>

<sup>11</sup> Duca J., J. Muellbauer and A. Murphy (2011). 'House prices and credit constraints: Making sense of the US experience', *Economic Journal*, Royal Economic Society, Vol. 121(552), pp. 533-551,05.

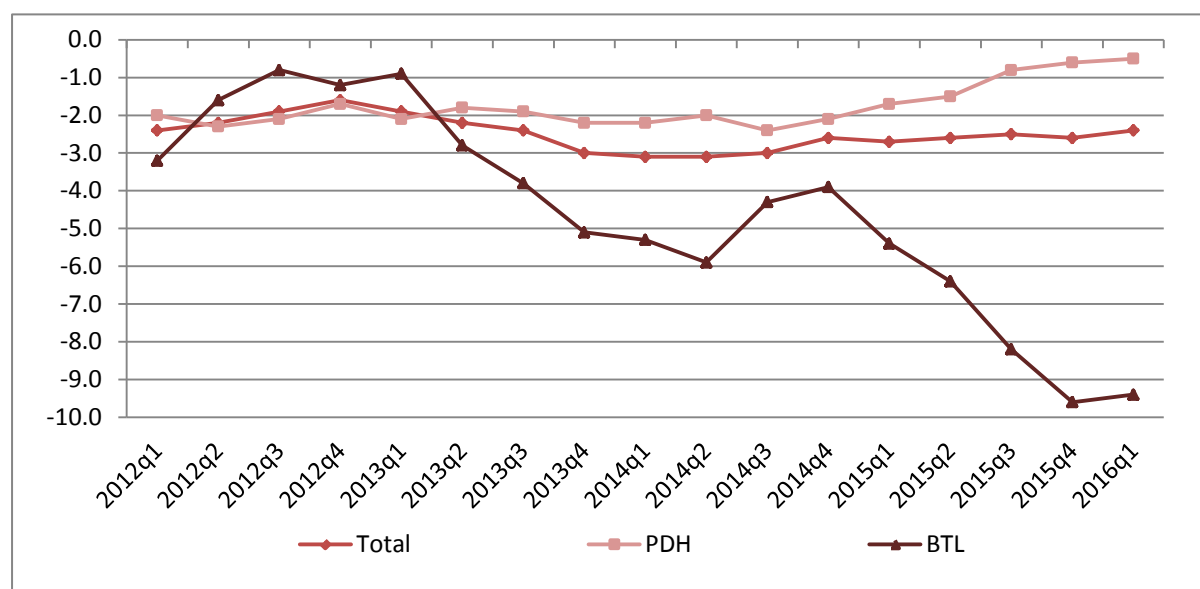
<sup>12</sup> Duffy D., D. Foley, K. McQuinn and N. Mc Inerney (2016). 'An empirical assessment of macroprudential measures in the Irish housing and credit markets'. Paper submitted by the Irish Bankers and Payments Federation to the Central Bank of Ireland concerning the macroprudential regulations.



**FIGURE 20** Irish House Price-to-Rent Ratio

Sources: RTB plus QEC calculations.

Mortgage lending continues to exhibit negative rates of growth; Figure 21 plots the annual growth rate in total mortgage lending as well as breaking out the figures for primary dwellings (PDHs) and buy-to-lets (BTL).

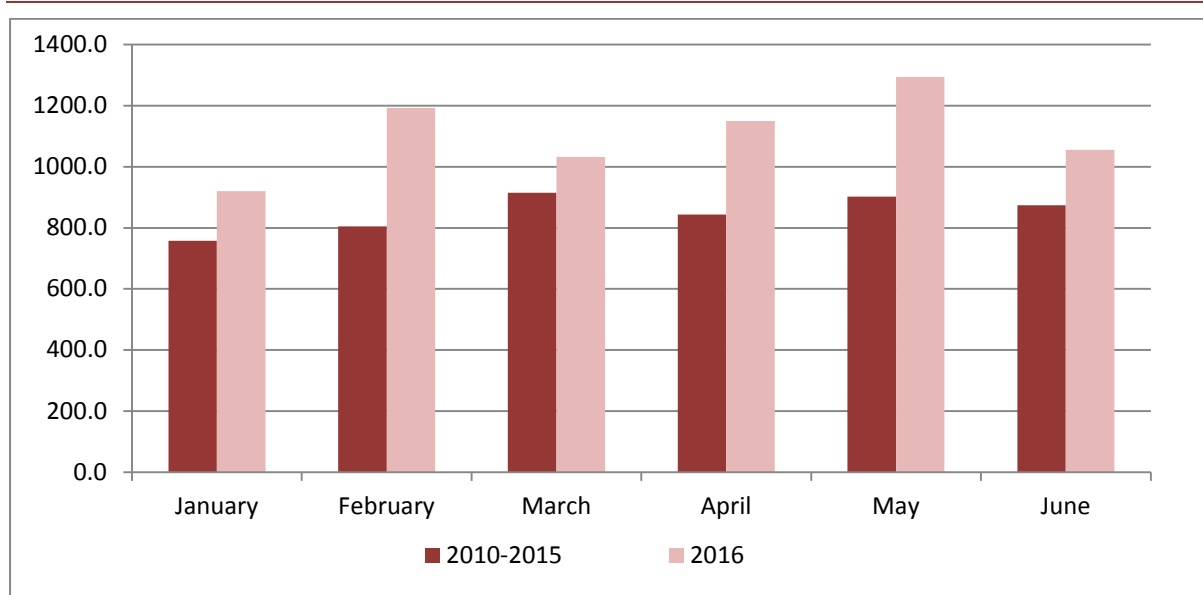
**FIGURE 21** Annual Growth Rates (%) of Irish Residential Mortgage Lending

Source: Central Bank of Ireland.

While all categories exhibit declining rates of lending, the relative fall in lending for the buy-to-let category is particularly stark given the clear increase in demand for rental accommodation in the economy at present.

There are some tentative signs that housing supply may be beginning to pick up in 2016 albeit from a very low base. Figure 22 plots the monthly supply of housing for the present year and compares this with the average over the 2010-2015 time period. From the graph it is evident that for each month, the degree of supply in the present year exceeds the average over the earlier period. Accordingly, we have increased upwards our forecast for housing completions for the present year; we now believe that 14,200 units will be built in 2016 with 17,500 being constructed in 2017.

**FIGURE 22** Monthly Housing Supply Levels



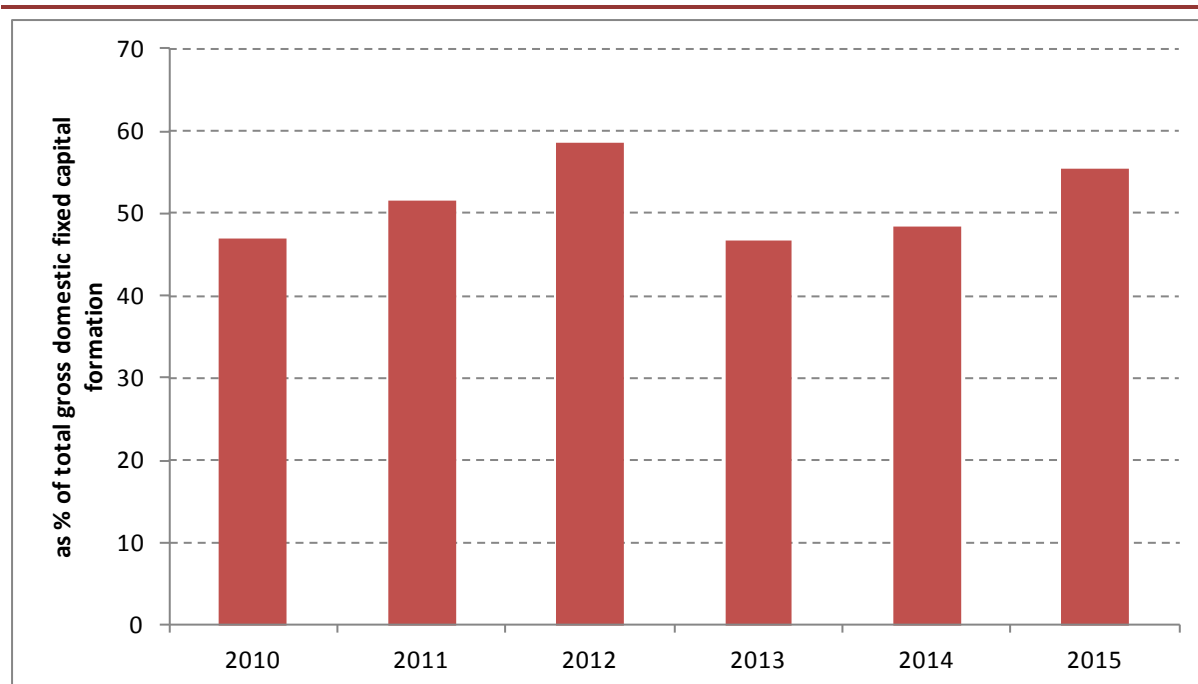
Sources: Department of Housing Planning and Local Government and QEC calculations.

## Supply

### Investment

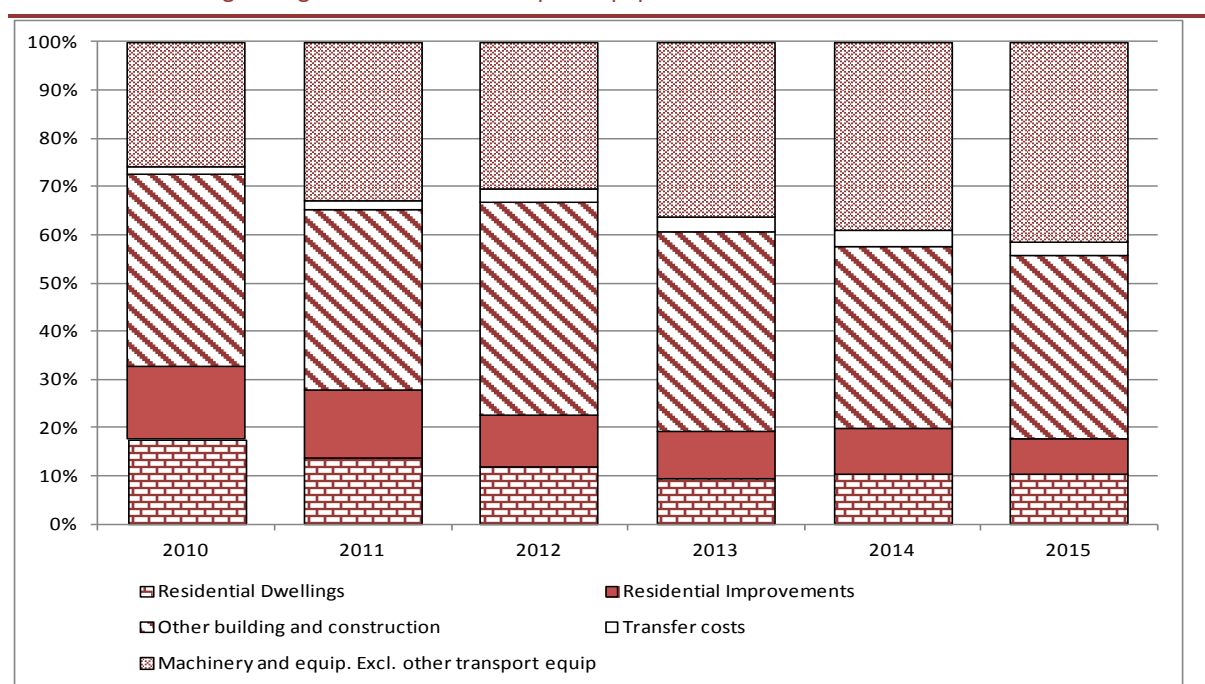
National Accounts data for 2015 show the extent to which changes in investment flows can impact on measures of economic performance. The purchase of intellectual property rights resulted in investment in research and development increasing by 122.8 per cent to €21.3 billion.

However, more disaggregated information on investment has now become available from the CSO; in particular, investment is split out amongst construction of new dwelling and improvements, repair and maintenance, to the existing stock, as well as a series on 'other transport equipment'. This latter item helps us account for the impact of aircraft purchases on investment levels. As can be seen from Figure 23, the data show that investment in intangibles and 'other transport equipment' accounts for a substantial proportion of gross fixed capital formation in recent years, averaging over 51 per cent between 2010 and 2015.

**FIGURE 23** Investment in Intangibles and Other Transport Equipment, as % of Total

Source: Central Statistics Office

Figure 24 shows that having excluded investment in intangibles and aircraft, investment in building and construction accounted for close to 56 per cent on investment in 2015. Within this, investment in building or improving residential dwellings accounted for 17.6 per cent of investment.

**FIGURE 24** Investment in Building and Construction, and Machinery and Equipment, as % of Investment Excluding Intangibles and other Transport Equipment

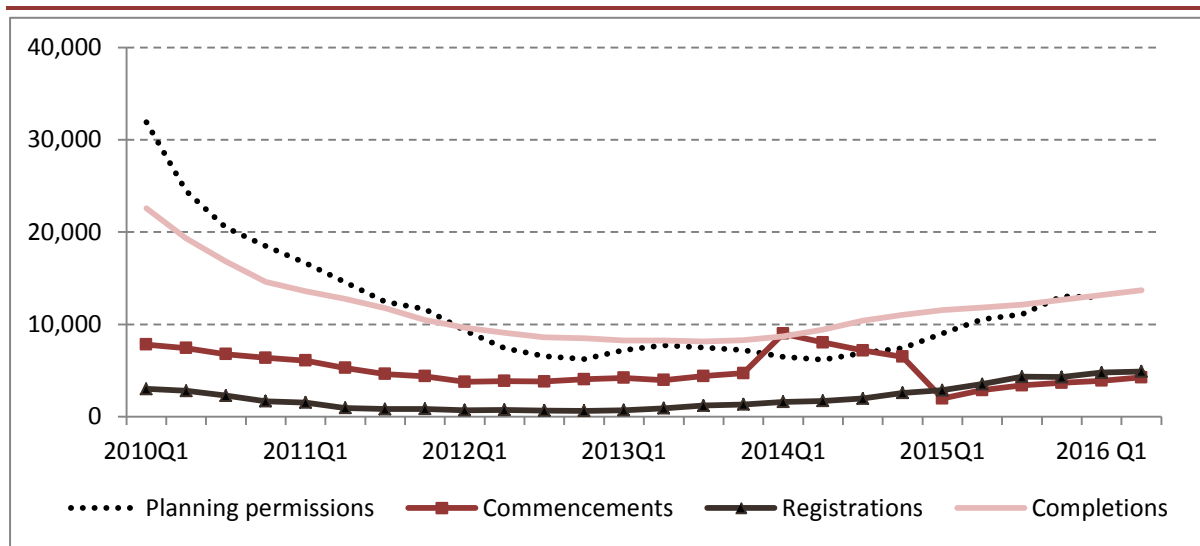
Source: Central Statistics Office.

As noted in the Property Market Developments section of the *Commentary*, we have revised upwards marginally our forecast for housing completions in 2016, consistent with recent trends in important housing market indicators (Figure 25). In line with our forecasts for overall economic activity our view is that the strength of domestic activity will also mean growth in investment in other building and construction will continue to grow, but the rate of growth will moderate. Thus, we estimate the volume of growth will be 8.2 per cent in volume this year and 7.8 per cent in 2017.

Investment in machinery and equipment tends to be driven by similar factors to the other components of investment. As outlined above and elsewhere in this *Commentary* the purchase of intellectual property rights resulted in exceptionally high growth rates for this component of investment. On the assumption that such purchases are not repeated to the same scale as in 2015, we are forecasting that investment in machinery and equipment will grow by 14.7 per cent in 2016, and by 23.9 per cent in 2017 in volume.

On the basis of the above forecasts we expect that overall investment volumes will grow by 16.2 per cent in 2016 and by 18.6 per cent in 2017.

**FIGURE 25** Housing Market Indicators



Source: Central Statistics Office.

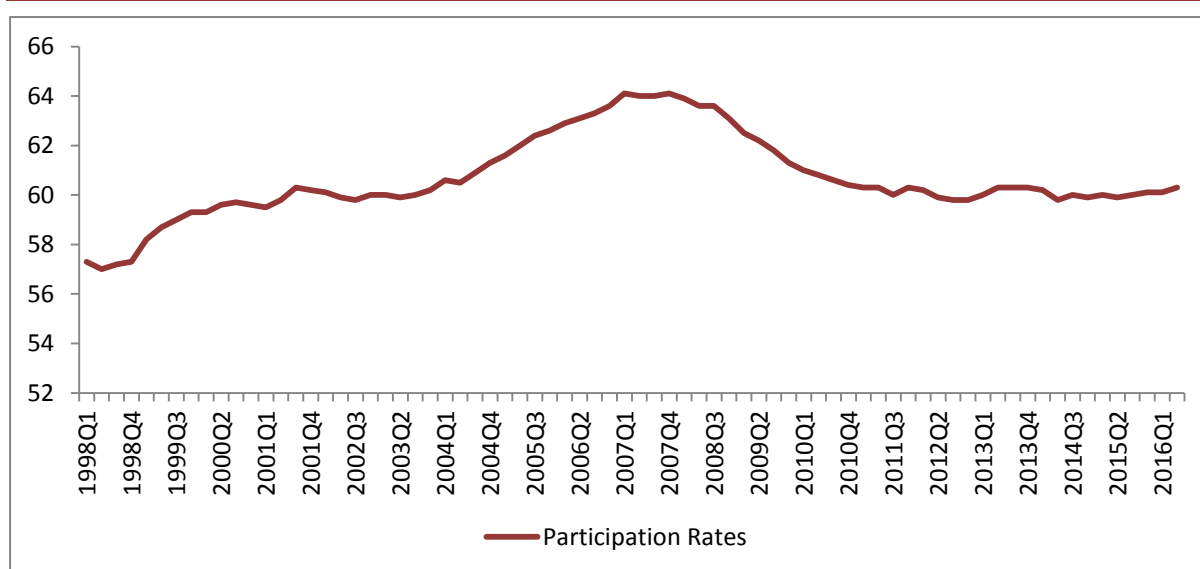
### Labour Market

The most recent QNHS shows that the Irish labour market continued to show positive trends in the second quarter of 2016. Employment increased by 2.9 per cent, up 56,200 in the year, bringing total employment to 2,014,900. This

represents the highest employment level since Q4 2008. Unemployment fell by 23,400 over the year to 187,800, with the seasonally-adjusted unemployment rate unchanged from Q1 at 8.4 per cent. Previous published estimates for seasonally-adjusted unemployment have been revised to take account of the latest QNHS. The estimate for June which is based off the Live Register has been revised from 7.8 per cent to 8.4 per cent, with the provisional estimate for July revised to 8.3 per cent. Long-term unemployment was down, with the long-term unemployment rate declining to 4.4 per cent, compared to 5.5 per cent in 2015 Q2. However despite the decline, those who are long-term unemployed represent the majority of all unemployed, at 51.1 per cent.

The latest QNHS release also shows a marginal increase in the labour market participation rate (Figure 26), from 60.1 per cent to 60.3 per cent. If this trend continues, it further reinforces the improving situation in the Irish labour market. Bercholz and FitzGerald (Special Article in this *Commentary*) analyse female labour force participation. They find an increase in the number of women continuing in education reducing their labour force participation. However, this higher educational attainment will result in rising female participation rates over the next decade. This, combined with an increasing adult population, should result in a rapid expansion in female labour supply over the next five years.

**FIGURE 26** Participation Rate, Seasonally Adjusted



Source: Central Statistics Office.

The CSO has also released the latest estimates of migration flows for the year to April 2016.<sup>13</sup> The data show an increase in immigration to 79,300, up from 69,300 in the year to April 2015. Emigration declined from 80,900 to 76,200. The effect

<sup>13</sup> Preliminary results from the initial estimates of the recent Census indicate that this figure maybe revised.

of the changes to these flows means that it is estimated there was a net inflow of 3,100 in the year ending April 2016. This is the first time since 2009 a net inflow has been recorded.

Table 3 outlines our estimates for the labour market in 2016 and our forecast for 2017. Based on the results of the most recent QNHS and our expectations for the performance of the Irish economy as set out in this *Commentary*, we are projecting further increases in the labour force resulting from a further slight increase in participation rates and an assumption that the net inflow reported for the year to April 2016 continues. We expect that the total number at work will continue to grow, although the pace of this growth will moderate in line with our prediction of slowing economic growth. However, with net job creation remaining positive, the unemployment rate will continue to decline and we are forecasting an annual average rate of 7.3 per cent in 2017. If this proves to be correct it will mean that the unemployment rate will end 2017 below 7 per cent.

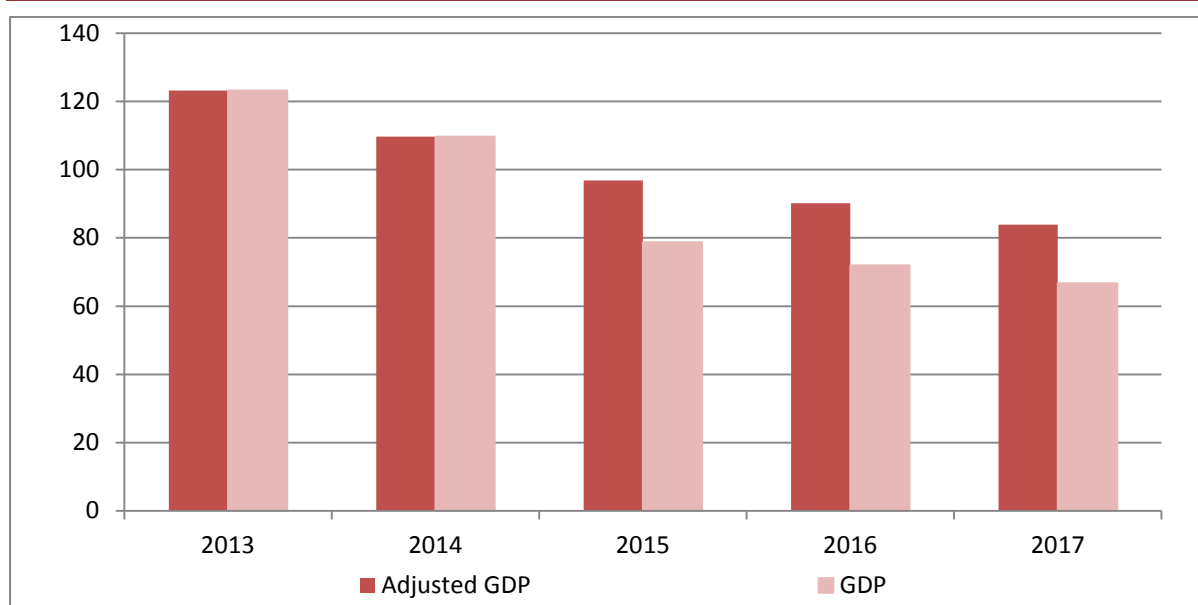
**TABLE 3** Labour Market Forecasts

	Annual Averages ('000)					
	2012	2013	2014	2015	2016	2017
Agriculture	86	107	109	110	114	115
Industry	336	343	348	374	389	392
of which: Construction	102	102	109	125	136	141
Services	1,414	1,430	1,453	1,474	1,503	1,536
<b>Total at work</b>	<b>1,835</b>	<b>1,880</b>	<b>1,914</b>	<b>1,964</b>	<b>2,010</b>	<b>2,043</b>
Employment Growth Rate, %	-0.5	2.4	1.8	2.6	2.4	1.6
Unemployed	316	282	243	204	181	161
Labour Force	2,154	2,163	2,157	2,167	2,191	2,204
Unemployment Rate, %	14.7	13.1	11.3	9.4	8.3	7.3

Source: Central Statistics Office.

### Public Finances

One area where the issue of the appropriate National Accounts being used to evaluate real underlying economic activity is in the case of the public finances. According to the National Accounts, the debt-to-GDP ratio fell substantially in both 2014 and 2015 due to the significant increases in GDP reported. However if, as we argue, a better characterisation of real underlying economic activity in the Irish economy is revealed by an adjusted GDP estimate, particularly in 2015, then the movement in this key fiscal metric is quite different. Figure 27 illustrates the difference, with the debt-to-GDP ratio calculated using the two different estimates of GDP. For 2016 and 2017 we apply the QEC forecasts to both ratios.

**Figure 27** Alternative Debt-to-GDP Ratios (%)

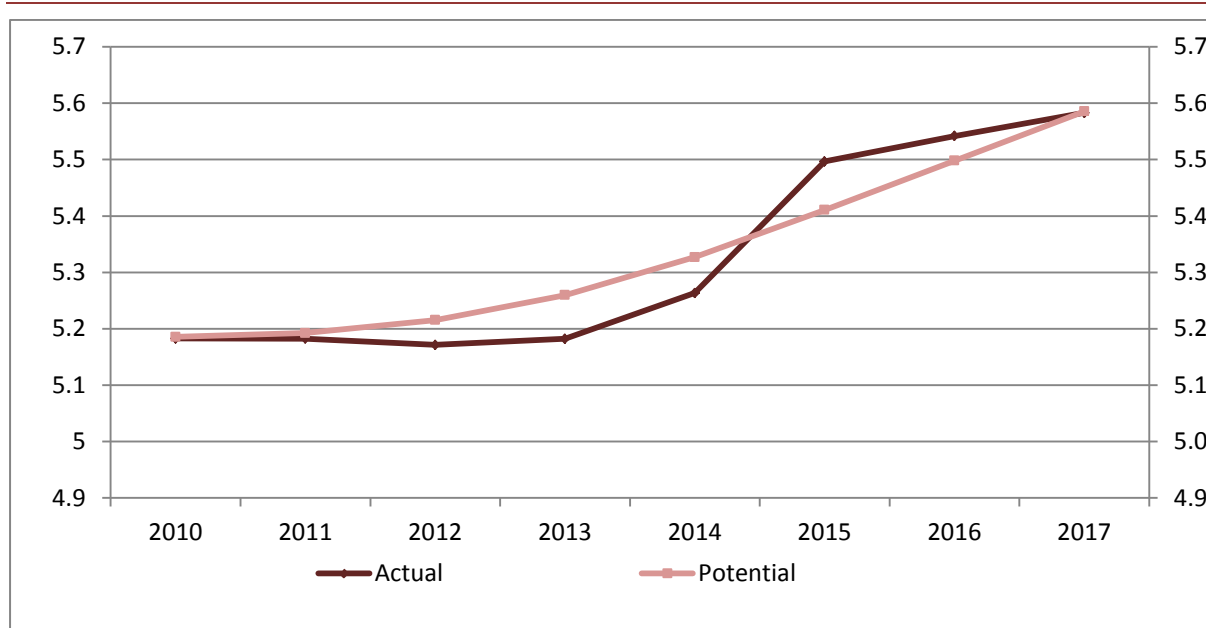
Source: QEC calculations.

As can be seen, this results in a noticeable difference in evaluating the capacity of the domestic economic to service its debt obligations. Under the official estimate, the debt ratio is 67 per cent in 2017; it falls from over 100 per cent in 2014 to less than 80 per cent in 2015. According to the adjusted estimate of GDP, however, the ratio is 84 per cent in 2017. As this latter result better reflects underlying activity in the Irish economy, we believe this is the appropriate rate to consider for budgetary purposes.

A similar issue arises in the context of estimating the 'output gap' or the deviation between the actual and potential level of GDP in the economy. One popular approach in estimating potential GDP is to apply a Hodrick-Prescott<sup>14</sup> filter to the actual series. The output gap is then the difference between actual GDP and the filtered series. In Figure 28 below we apply this standard methodology to the official GDP series.

<sup>14</sup>

Hodrick, R. and E.C. Prescott (1997). 'Postwar US Business Cycles: An Empirical Investigation'. *Journal of Money, Credit, and Banking*. 29 (1): pp. 1-16. In the application we use a  $\lambda$  value of 10.

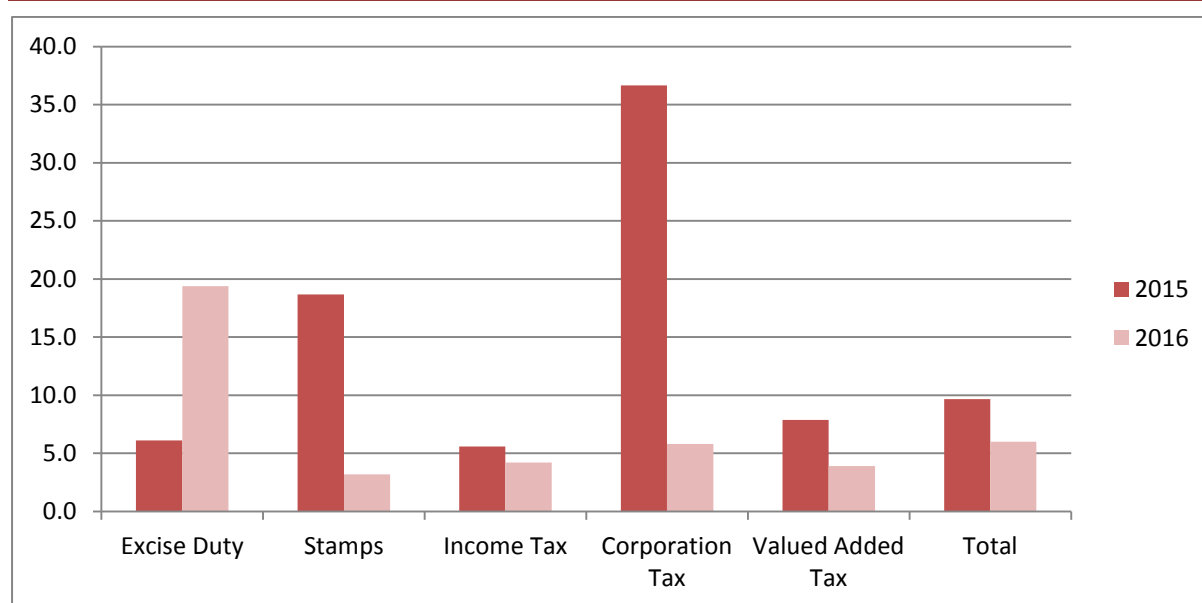
**FIGURE 28** Actual and Potential Irish GDP (logs)

Source: Central Statistics Office.

As can be seen, potential GDP trends upwards significantly from 2012 in light of the substantial movements in actual GDP from this period onwards. Between 2013 and 2016 potential output growth averages over 7 per cent per annum according to this approach. Despite the large increase in potential output, an actual growth rate in 2015 of 26 per cent suggests that the Irish economy is significantly above trend. *Ceteris paribus*, this indicates that the Government would need to introduce an intensely contractionary budget to prevent the economy from further overheating. If we take the adjusted GDP series and apply the same methodology we get an average potential output growth rate of just over 3 per cent. This highlights the need for more accurate assessments of real activity in the Irish economy to underpin key fiscal metrics.

While Exchequer receipts for August were down somewhat compared to the same month last year and with respect to profile, overall for the year to August growth in taxation receipts still remains quite significant. Figure 29 plots the year-on-year increases for select Exchequer receipt items for the January-July period for both 2016 and 2015. Overall taxation receipts are up by just over 6 per cent for the year compared with an increase of almost 10 per cent for the same time last year. While corporation receipts have not grown to the same extent this year as they did last year, it is evident that, year-on-year, taxation revenues from this source for the present year are up by nearly 6 per cent. Based on this, we believe that total taxation revenues for the State will be up by 4 per cent for the year.



**FIGURE 29** Year-on-Year Growth Rate in Select Exchequer Receipts for January-July Period (%)

Source: QEC calculations.

Supplementary estimates in the lead-up to Budget 2016 increased the level of government expenditure allocated to the year 2015. Against this backdrop and given the new fiscal framework our expectation is that the growth rate of current expenditure in 2016 will be lower than in 2015.<sup>15</sup>

On the basis of the revenue and expenditure forecasts, the general government balance should increase to €167 million this year and move into surplus in 2017. As above we look at this balance using GDP and our measure of adjusted GDP. On the basis of our forecasts for GDP the general government finances would be in balance in 2016 and in surplus equivalent to 0.4 per cent of GDP in 2017. Using adjusted GDP the general government balance as a percentage of adjusted GDP would improve to 0.1 per cent in 2016 and a surplus of 0.5 per cent of adjusted GDP in 2017.

As outlined above use of an adjusted GDP series also results in a higher debt-to-GDP ratio in 2016 and 2017. We argue in the General Assessment section that the deficit and debt ratios calculated using adjusted GDP suggest the need for a cautious approach when framing budgetary policy.

<sup>15</sup>

Expenditure in 2015 was 'inflated' by a Eurostat ruling in 2016 which indicated that a preference share conversion in the nationalised AIB should be classified as a government expenditure. The transaction, in December 2015, yielded a €1.6 billion dividend for the State.

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## General Assessment

While the Irish economy is still set to register a strong performance in 2016, it is clear that the rate of growth envisaged for both this year and next has moderated somewhat compared with what was expected for the same periods earlier in the year. As outlined in *Commentaries* since late 2015, the deterioration in general global trading conditions mainly attributable to ongoing weakness in the Chinese economic conditions are undoubtably a factor in the reduced outlook for the Irish economy. However, this situation has been compounded by the outcome of the Brexit referendum in June of this year; most independent forecasters now believe economic activity in the United Kingdom will decline for the remainder of 2016, while the outlook for the UK in 2017 has also been dramatically revised downwards in light of the referendum outcome. In broad terms the impact of Brexit can be separated into initial effects; the impact on consumer and producer confidence with resulting implications for investment and more substantial longer term implications which depend on the outcome of the subsequent trade negotiations, which will now occur.

In the Summer *Commentary*, the growth forecast for the Irish economy was reduced slightly as uncertainty concerning the Brexit outcome prior to the referendum appeared to have already impacted on the outlook for both the manufacturing and services sectors of the domestic economy. As noted in the previous *Commentary* however, domestic components such as consumption and investment are now very much the primary sources of growth in the Irish economy. Overall, when taking these somewhat countervailing forces into consideration, we expect the Irish economy to grow by 4.3 and 3.8 per cent in 2016 and 2017 respectively.

The moderation in the domestic growth outlook for both 2016 and 2017 comes at a time when uncertainty about Irish economic performance is further exacerbated by the results of the recent National Accounts. Clearly no one believes that the Irish economy grew by 26 per cent in real terms in 2015 or indeed by almost 9 per cent in 2014, however, the need for the CSO to comply with the European System of National and Regional Accounts (ESA 2010) means that it is imperative that these set of results be accompanied by National Accounts, which in so far as is possible, give an accurate assessment of real activity in the Irish economy. For a number of reasons the National Accounts as per the ESA 2010 accounting standards report changes in key variables such as profits, investment and depreciation for the Irish economy which have little or no impact on the real economy here. As documented in the Output section, we

suggest that the official set of National Accounts be now accompanied by the publication of accounts as per the previous accounting standards (ESA95).

To deal with the difficulties presented by the recent National Accounts, we have decided to replace the official 2015 value of certain variables with model-based estimates. We also generate our forecasts based on an output based approach, which enables us to better identify and isolate the impact of contract manufacturing. While there are a number of reasons why it is important to have National Accounts which accurately reflect the degree of economic activity at a point in time, one important issue is the reputational problem which would have arisen had there been an equal but negative variation in output. The potential damage which might be suffered had the domestic economy been reported as experiencing a contraction of 26 per cent is quite stark.

Regarding the Irish National Accounts there are more general issues which have been documented extensively in FitzGerald (2015),<sup>16</sup> for example. Fitzgerald argues for a body of research to produce and maintain indicators which more accurately capture developments in the real Irish economy. One avenue of approach would be to derive a set of productivity indicators amongst firms in the Irish economy decomposing the overall growth in labour productivity between existing and new entrants to the market. Combining future trends in productivity along with the expected changes in employment would provide an estimate of output growth. A key challenge in this respect would be to produce these indicators on a sufficiently timely basis such that they can provide relevant information from a forecasting perspective.

One key reason for National Accounts to provide an accurate assessment of current real activity in the domestic economy is the budgetary process. From a fiscal perspective, the ESA2010 results for 2014 and 2015 will indicate a deceptively strong improvement in headline indicators such as the debt-to-GDP ratio. This ratio, based on the ESA2010 growth rates for 2014 and 2015 will have fallen to less than 80 per cent by the end of 2015, whereas using an adjusted GDP estimate would suggest the ratio is nearer to 90 per cent in 2015. These alternative results can lead to significantly different implications for budgetary policy.

Additionally, efficient fiscal policy relies on understanding whether current economic activity is at, above or below trend or potential levels of activity. At present, it is almost impossible to assess the underlying potential rate of growth

16

FitzGerald, J. (2015). 'Problems interpreting the National Accounts in a globalised economy – Ireland', *Quarterly Economic Commentary (QEC)* Special Article, June.

in the Irish economy with the ESA2010 National Accounts. Using our adjusted GDP series it is our view that the Irish economy is now at its potential level of activity. This is a significant development and indicates that the economy has finally overcome the financial crisis of 2007/2008.

It also has important conclusions for budgetary policy; it indicates that the optimal budgetary policy at this point is to follow a neutral strategy. By this we mean a policy which neither stimulates nor contracts the Irish economy and which, accordingly, fully indexes taxation and social welfare bands. Further rationale for this policy is underscored by the fact that the recent National Accounts show personal consumption increasing up by 4.5 per cent in 2015 – a significant increase. This suggests that households are, on average, experiencing a sustained improvement in living standards and argues against the need for any significant reduction in personal taxation rates. Furthermore, recent research by McQuinn and Roche (2016)<sup>17</sup> indicates the relatively stable nature of income taxation revenue in an Irish context, particularly when compared with revenues from other sources such as indirect (VAT) or corporate taxation.

Any significant increases in Government expenditure can only be justified on the basis that they increase the productive capacity of the Irish economy. The recent Government initiative on increasing the supply of housing can be seen in this regard with expenditure of €5.5 billion on social housing between 2017 and 2021. The greater provision of social housing, while addressing the obvious need for this type of accommodation, should also have a positive spill-over effect on facilitating greater levels of private housing supply. This in turn will alleviate some of the pressures vis-à-vis the rising cost of accommodation in the economy which, at present, threatens to impact on overall economic activity through increased competitiveness pressures. The targets outlined in the Government's action plan<sup>18</sup> are quite ambitious; however, apart from the increase in funding made available, it is not entirely clear how the measures in the report will facilitate the greater supply. It is worth noting that in the 2000s when an average of 4,000 units of social housing were being constructed on an annual basis, the overall cost was somewhere in the region of €1.5 billion per annum. Furthermore, it is disappointing that the introduction of the site tax – one specific measure which has been identified in Morley et al. (2015)<sup>19</sup> as being particularly effective in stimulating housing supply – has not been fast-tracked in advance of the 2019 originally proposed date.

<sup>17</sup> McQuinn K. and M. Roche (2016). 'Efficient frontiers and fiscal stability: An ex-ante and ex-post application to the Irish public finances', ESRI Working Paper No. 538.

<sup>18</sup> 'Action plan for homelessness and housing, rebuilding Ireland' (2016). Initiative by the Government of Ireland.

<sup>19</sup> Morley C., D. Duffy and K. McQuinn (2015). 'A review of housing supply policies', *Quarterly Economic Commentary (QEC)* Special Article, December.

In light of the Central Bank's upcoming review of the mortgage rules, a *Research Note* to this *Commentary* by Duffy et al. empirically assesses the impact of the macroprudential measures on the Irish credit and housing market. The analysis is conducted through simulating an existing model of the banking and residential mortgage market. In particular, the effects are assessed by examining the effects of changes in the loan-to-value (LTV) and loan-to-income (LTI) restrictions vis-à-vis a no policy change scenario. The results indicate that the measures, as noted in Duffy et al. (2016),<sup>20</sup> have, in the period to date, had a contractionary impact on lending in the Irish market; there has been very little impact of the measures on housing supply. However, the analysis also suggests that, over a longer period of time, housing supply levels will be less than what they otherwise would have been in the absence of the macroprudential measures. More generally, it is to be hoped, as advocated in Duffy and McQuinn (2014),<sup>21</sup> that any review of the macroprudential measures will result in a counter-cyclical dimension being incorporated in the implementation of this crucial policy.

The recent QNHS results indicate that Irish employment in Q2 2016 exceeded two million for the first time since 2009. In a paper to the *Commentary*, Bercholz and FitzGerald analyse female labour force participation rates in Ireland over the last few decades, with a particular focus on trends before, during and after the most recent economic crisis. Importantly, from a future labour supply perspective, the analysis suggests that, owing to a continuing rise in average educational attainment, there is likely to be a significant rise in female participation rates by 2020. Given the strong underlying growth expected for the Irish economy over the short- to medium-term, this should help to alleviate labour supply shortages which may arise over that time.

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<sup>20</sup> Duffy D., K. McQuinn and N. Mc Inerney (2016). 'Macroprudential policy in a recovering property market: Too much too soon?' *International Journal of Housing Policy*.

<sup>21</sup> Duffy D. and K. McQuinn (2014). 'Assessment of proposed macro-prudential policy measures', Appendix, *Quarterly Economic Commentary*, Summer, Dublin: The Economic and Social Research Institute, October.

# Detailed Forecast Tables

**FORECAST TABLE A1**

## Exports of Goods and Services

	2014	% change in 2015		2015	% change in 2016		2016	% change in 2017		2017
	€ bn	Value	Volume	€ bn	Value	Volume	€ bn	Value	Volume	€ bn
Merchandise	114.3	70.9	55.5	195.5	12.3	8.0	219.5	10.1	7.4	241.7
Tourism	3.7	18.2	17.3	4.3	6.1	5.0	4.6	5.0	4.0	4.8
Other Services	101.7	15.4	11.4	117.3	12.3	9.0	131.7	11.2	8.0	146.5
Exports Of Goods and Services	219.8	44.3	34.4	317.2	12.2	8.3	355.9	10.4	7.6	393.1
FISM Adjustment	0.0			0.0			-0.2			-0.3
Adjusted Exports	219.8	44.3	34.4	317.2	12.1	8.3	355.7	10.4	7.6	392.9

**FORECAST TABLE A2**

## Investment

	2014	% change in 2015		2015	% change in 2016		2016	% change in 2017		2017
	€ bn	Value	Volume	€ bn	Value	Volume	€ bn	Value	Volume	€ bn
Housing	4.1	12.3	5.2	4.6	35.8	47.3	6.2	23.4	-3.2	7.7
Other Building	7.7	15.8	9.9	8.9	13.1	8.2	10.0	12.7	7.8	11.3
Transfer Costs	0.7	6.7	-2.1	0.8	15.5	10.0	0.9	20.8	15.0	1.1
Building and Construction	12.5	14.1	7.7	14.2	20.5	20.7	17.2	17.0	3.9	20.1
Machinery and Equipment	27.1	47.1	44.2	39.9	17.2	14.7	46.7	26.9	23.9	59.3
Total Investment	39.6	36.7	32.7	54.1	18.1	16.2	63.9	24.2	18.6	79.4

**FORECAST TABLE A3****Personal Income**

	2014	% change in 2015		2015	% change in 2016		2016	% change in 2017		2017
	€ bn	%	€ bn	€ bn	%	€ bn	€ bn	%	€ bn	€ bn
Agriculture, etc	3.3	-0.9	0.0	3.3	2.5	0.1	3.4	3.5	0.1	3.5
Non-Agricultural Wages	73.4	5.7	4.2	77.6	4.6	3.6	81.2	4.0	3.2	84.4
Other Non-Agricultural Income	15.3	15.2	2.3	17.6	8.7	1.5	19.2	11.5	2.2	21.4
Total Income Received	92.1	7.1	6.5	98.6	5.3	5.2	103.7	5.3	5.5	109.3
Current Transfers	23.7	-2.6	-0.6	23.1	-1.3	-0.3	22.8	0.5	0.1	22.9
Gross Personal Income	115.8	5.1	5.9	121.6	4.0	4.9	126.5	4.5	5.7	132.2
Direct Personal Taxes	27.3	3.3	0.9	28.2	4.1	1.1	29.4	3.3	1.0	30.3
Personal Disposable Income	88.5	5.6	5.0	93.4	4.0	3.7	97.2	4.8	4.7	101.8
Consumption	87.8	5.3	4.6	92.4	5.2	4.8	97.2	5.0	4.9	102.1
Personal Savings	0.7	49.0	0.3	1.1	-103.9	-1.1	0.0	560.0	-0.2	-0.3
Savings Ratio	0.8			1.1			0.0			-0.3
Average Personal Tax Rate	23.5			23.1			23.1			22.8

**FORECAST TABLE A4****Imports of Goods and Services**

	2014	% change in 2015		2015	% change in 2016		2016	% change in 2017		2017
	€ bn	Value	Volume	€ bn	Value	Volume	€ bn	Value	Volume	€ bn
Merchandise	73.6	15.3	13.6	84.8	10.7	8.0	93.9	9.5	7.2	102.7
Tourism	4.8	6.1	-0.5	5.1	5.6	2.5	5.4	4.3	2.8	5.6
Other Services	106.6	36.8	28.3	145.8	18.1	15.2	172.2	16.9	14.9	201.2
Imports of Goods and Services	185.2	27.4	0.0	236.0	15.1	0.0	271.7	14.0	0.0	309.9
FISM Adjustment	0.0			0.0			-0.4			-0.4
Adjusted Imports	185.2	27.4	21.7	236.0	15.0	12.1	271.4	14.0	11.9	309.5



**FORECAST TABLE A5** Balance of Payments

	2014	2015	2016	2017
	€ bn	€ bn	€ bn	€ bn
Exports of Goods and Services	219.8	317.2	355.9	393.1
Imports of Goods and Services	185.2	236.0	271.7	309.9
Net Factor Payments	-29.7	-53.2	-57.9	-63.9
Net Transfers	-2.7	-2.9	-2.9	-2.9
Balance on Current Account	2.2	25.3	23.6	16.9
As a % of GNP	1.3	12.5	10.9	7.3

**FORECAST TABLE A6** Employment and Unemployment, Annual Average

	2014	2015	2016	2017
	000s	000s	000s	000s
Agriculture	109.0	109.9	113.8	114.8
Industry	348.4	373.7	389.4	391.9
Of which: Construction	109.4	125.5	136.2	140.9
Services	1,453.2	1,474.1	1,503.2	1,536.3
Total at Work	1,913.8	1,963.5	2,010.2	2,043.0
Unemployed	242.6	203.6	181.0	160.7
Labour Force	2,156.8	2,167.2	2,191.2	2,203.6
Unemployment Rate, %	11.3	9.4	8.3	7.3

# Special Article

*Special Articles* are substantive articles that are typically of immediate policy relevance and often directly relevant to the associated QEC.

*This Article has been accepted for publication by the Institute, which does not itself take institutional policy positions. Special Articles are subject to refereeing prior to publication. The authors are solely responsible for the content and the views expressed.*



# Recent Trends in Female Labour Force Participation in Ireland<sup>\*</sup>

Maxime Berholz<sup>1</sup> and John FitzGerald<sup>2</sup>

## 1. Introduction

By the standards of Northern Europe, Ireland in 1980 had a very low level of labour force participation by women. This was in spite of the fact that women were, on average, better educated than men. However, from the early 1980s onwards there was a steady rise in female labour force participation rates. This rise, and the related increase in female labour supply, was an important factor contributing to the exceptional rate of economic growth in the Celtic Tiger years. However, the female participation rate, which had risen steadily since the early 1980s, stabilised over the years of the Great Recession.

The paper explores the factors underpinning the rise in participation rates since the early 1990s and the factors that have contributed to the stabilisation in rates since 2007. This analysis, combined with information on the current demographic structure, gives some indication of how participation rates and female labour supply may develop over the next five years.

Section 2 considers the range of factors that may potentially affect female labour force participation. Section 3 discusses the evidence from previous relevant studies for Ireland and elsewhere. Section 4 looks at the changing level of educational attainment in the population, especially the female population. Section 5 analyses changes in employment and migration in recent years which may affect female labour force participation. Section 6 examines how different factors have contributed to the growth in female labour participation rates and to their more recent stabilisation. The implications of this research for female labour supply over the next few years are discussed in Section 7 and conclusions are drawn in Section 8.

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<sup>\*</sup> The authors would like to thank an anonymous referee for very helpful comments on an earlier draft. The authors remain responsible for the views expressed in this article.

## 2. Factors Affecting Female Labour Force Participation

Prior to Ireland joining the EU in 1973 women's participation in the labour force was affected by a range of legal restrictions reflecting wider cultural attitudes. From the foundation of the State in 1922, a frequently held view was that the male partner was the 'provider' and that most women were expected to marry and to devote themselves to the care of their children to the exclusion of any role in the paid labour market. This attitude was reflected in legislation introduced in the early years of the State which required women to resign from the public service the day they married (Maguire, 2008). In addition, in the public service married men were entitled to higher rates of pay than single men or women, reflecting their expected role as 'provider' for their wife and children. While this legislation only applied to the public sector, the attitudes that it reflected also impacted on the private sector.

While the Irish approach to the role of women in the labour market was relatively extreme, expectations about women's labour market role were not that different in many European countries in the years before the Second World War. However, in the post-war years expectations and behaviour changed rapidly across much of Europe. Ireland was an exception in maintaining its patriarchal approach to women's role in the labour market until the 1970s.

It was only after Ireland's entry into the then European Economic Community (EEC) in 1973 that changes in legislation were required to provide equal treatment for women. Reflecting EU law, the marriage bar was removed in 1973 and equal pay for equal work became a legislative requirement, not just in the public sector, but also in the private sector. These legal changes, combined with a rapidly changing view of women's role in society and the economy, saw a major change in female labour market behaviour in the following decades.

As well as the legal and administrative changes which impacted on female labour force participation, there have been major cultural changes. Whereas 50 years ago the expectation had been that most women would marry and drop out of the labour market to look after children, today the expectation is that, whether or not women have children, they will participate in the labour market throughout most of their adult life.

In addition to the cultural changes, women's education plays an important role in determining whether or not they participate in the labour market. Traditionally women in Ireland have been better educated than men and this remains the case today. Women with a higher level of education have the ability to earn

substantially more over their lifetime than those with a more limited education. The higher earnings make continued participation in the labour market more attractive. It also means that women with higher levels of education, and hence higher earnings, can better afford childcare so that they can remain in the labour market while also having children.

On the side of the demand for labour, in recent decades there has been a continuing growth in employment of well-educated workers in Ireland and elsewhere in the EU. As the demand for skilled labour steadily grew over the 1980s, Ireland had a large number of well-educated women who were not in the labour market. Over the 1990s this rising demand, and the wages paid to well-educated workers, saw a rapid rise in female labour supply to meet the growing requirement for skilled labour.

Changes in the tax system have also affected the earnings of women in the labour market. In 1980 the Supreme Court held that the tax system unfairly discriminated against married women. The result was a change in the tax system so that married couples received double the allowances of single people and they were taxed on their joint incomes.

In the 2000 Budget there was a move towards individualisation, which enhanced the after-tax earnings of married women. Callan et al. (2009) estimate that it has had a small direct impact on female labour supply in comparison to the long-term rising trend in married women's participation, which began in the 1970s.

Since the early 1970s there has also been a change in behaviour affecting when couples choose to have children and how many children they have. Whereas in the 1980s the average age of mothers at first birth was under 25, today it is nearly 31. This means that for most women in their 20s today, issues of childcare are not relevant to their decisions on labour market participation. However, for many women in their 30s and 40s the issue of childcare is an important factor affecting their labour market behaviour. This reflects the fact that in Ireland the primary impact of childcare is on mothers' labour market behaviour rather than on that of fathers.

A final factor that has had an important impact on female (as well as male) labour force participation is the decision whether to remain in education or to enter the labour market. In the 1970s the minimum legal age for school leaving was important in determining when many children left school. However, since then it has become the norm for women (and more recently for men) to complete

second level (Leaving Certificate). Today a majority of women continue to third level. Since the economic crisis began in 2008 this has also been true for men.

The decision to continue in education is affected by cultural factors, by job opportunities if individuals don't continue in education, and by the expected increase in their lifetime earnings as a result of enhancing their education. Acquiring a third-level qualification is costly in the short run because of fees and maintenance costs, and also because of foregone earnings. However, higher levels of educational attainment substantially increase expected lifetime earnings. During the recent economic crisis there was a large increase in participation in education by women (and men) in their 20s. This may have reflected a reduction in the opportunity cost of continuing in education at a time when unemployment was high and real after-tax wage rates had fallen. However, to date the factors underlying this important development have not been analysed through appropriate research.

### 3. Evidence from Previous Research

As discussed above, the labour force participation of women has increased dramatically in the last thirty to forty years. Examining the literature for Ireland and other countries, Russell et al. (2009) identify four main factors potentially affecting female labour supply at the individual level:

- expected earnings, which depend on the educational level of the individual;
- the number and age of children;
- the presence, and earnings, of a partner; and
- the tax-benefit system, in particular the tax treatment of couples.

By European standards, female labour force participation in Ireland was very low until the mid-1980s, when it began to rise rapidly (Fahey et al., 1998). In less than thirty years, the participation of women aged 25 to 64 rose from slightly above 20 per cent in 1971 to nearly 50 per cent in 1996, with most of the increase occurring in the late 1980s and 1990s, particularly among married women (Callan et al., 2009). Yet, while the participation rate of women aged 25 to 34 was approaching the EU average by 1995, that of women aged 35 to 44 was still among the lowest, probably due to the time spent out of the labour market in the presence of children, which was a barrier to the labour force participation of mothers.

Underpinning this rise in participation was the growing educational attainment of the labour force over that period, which translated into higher expected earnings.

At least as important, cultural change altered women's aspirations. Looking at the evolution of female labour force participation across different age groups between the late 1980s and the mid-1990s, the biggest increase was in the 25-50 age groups whereas little changed in the older age groups. In line with Russell et al.'s (2009) more recent findings, Fahey et al. (1998) also observe lower participation rates and significantly greater variation in behaviour across educational levels for mothers.

Examining more recent developments, Russell et al. (2009) found that rising educational levels and favourable economic conditions played an important role in raising female labour supply in the decade preceding the crisis. Yet, the presence of children continued to be a major barrier to the participation of mothers, partly due to cost of childcare compared to other countries. Estimated using data for 2005, the marginal effects of having young children on labour force participation do not seem to have changed significantly since the 1990s.<sup>3</sup> The study shows that the probability of women participating in the labour market varies strongly with the level of their income in the labour market. For women aged 35 with two children their probability of participating in the labour market was 25 per cent if they were able to earn only half the average wage whereas for those able to earn twice the average wage the probability of participation was 96 per cent.

By 2005, Russell et al. (2009) find that the earnings of a partner no longer had a significant effect on the probability of participating in the labour force of either qualified or unqualified women, in contrast to previous results for 1994 and 1998, which suggested a small but significant effect (Doris, 2001). This may have been partly due to the individualisation of income taxation for married couples in 2000, mentioned above. Lastly, unqualified women have a much higher wage elasticity than qualified women, implying a large pro-cyclical effect for women with low qualifications.<sup>4</sup>

McGuinness et al. (2009) model the returns to education for men and women in Ireland over the 1994-2001 period.<sup>5</sup> Their approach takes into account a range of other important factors that may explain the higher earnings of those with a third-level education. The period they examine saw a sustained rise in female

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<sup>3</sup> Using a very similar model, McGuinness et al. (2009) depict a different evolution of these marginal effects over the 1990s. Their estimates show that the effects of the presence of a child under the age of six had, in fact, fallen significantly by 2001. Russell et al.'s (2009) results, which are not directly comparable as they are for 2005, have the advantage of separating qualified and unqualified women.

<sup>4</sup> Russell et al. (2009) and Doris (2001) employ different definitions of qualifications. Nevertheless, their findings are consistent.

<sup>5</sup> Appendix 1 gives comparative data from OECD on returns to education for a range of countries. However, these data do not take account of the range of factors covered by McGuinness et al. (2009).



labour force participation. Controlling for a range of other factors, in 1994 women with a university degree earned twice as much as women with an upper secondary educational level, and nearly three times as much as a woman with no qualification. However, as the labour supply of women with a third-level qualification rose rapidly over the following decade (with women who had previously been out of the labour force entering it), the return to tertiary education fell.<sup>6</sup>

**TABLE 1** Summary of Participation Elasticities by Sex and Level of Qualification

		2004	2005	2006	2007	2008	2009	2010
<b>Men</b>	All	0.09	0.12	0.11	0.10	0.09	0.09	
	Unqualified	0.31						
	Qualified	0.07	0.13	0.12	0.11	0.10	0.10	
<b>Women</b>	All	0.45	0.48	0.50	0.45	0.46	0.56	0.54
	Unqualified	1.25	1.06	1.31	1.17	1.05	1.81	1.03
	Qualified	0.42	0.46	0.47	0.42	0.41	0.52	0.52

Source: Bergin et al. (2013)

Bergin et al. (2013) estimate labour supply elasticities for men and women over the last decade (Table 1). They find that the labour supply elasticity of qualified women, though higher than for men, was much lower than that of women with lower qualifications. This probably reflects the fact that the returns to working for women with good qualifications were generally sufficient to offset the costs of childcare whereas this was much less likely to be the case for women with lower qualifications. Doris (2001) estimated similar elasticities for qualified women for 1994 and 1998, but much higher elasticities for unqualified women.

A recent study by Byrne and O'Brien (2016) has looked at factors affecting labour force participation for both men and women. They find that since 2007 the decline in the female participation rate was entirely due to cyclical factors whereas the decline in the male rate also reflected some more permanent trends.

Using time series data to analyse the educational participation rates of 16-year-olds in England and Wales over a thirty-year period, Whitfield and Wilson (1991) find evidence that high adult unemployment induces lower educational

<sup>6</sup> As Flannery and O'Donoghue (2016) argue, a full analysis of the returns to education should include a wider range of outcomes, in particular changes in taxes and benefits stemming from the increased earnings associated with a higher educational level. Because of data limitations McGuinness et al. (2009), use gross instead of net earnings, which means that they cannot control for these changes. However, Flannery and O'Donoghue (2016) limit their analysis to the year 2000.

participation rates. More recently, examining English regional panel data, Clark (2011) finds that youth labour unemployment positively affects post-compulsory enrolment rates, more than is generally found in time series models. Effects are bigger for boys and generally larger than the impact of exam achievement. However, his estimates vary greatly across periods, so it is not clear how stable the relation between participation in post-compulsory education and youth unemployment is.

In another study, Tumino and Taylor (2015) exploit panel data from the British Household Panel Survey to show that local youth unemployment rates positively affect post-compulsory enrolment, while high adult unemployment discourages it, in line with the previous literature. Importantly, they find that labour market conditions are unimportant to students from higher socio-economic backgrounds, portraying education as a consumption good.

Their estimates, which must be interpreted in relation to the sample period, predict that a 7.5 percentage-point rise in the youth unemployment rate reduces the probability of dropping out by 8.2 percentage points for young people living in social housing, while a 1.8 percentage-point increase in the adult unemployment rate raises this probability by 5.6 percentage points. Thus, for those who do consider labour market conditions when deciding whether or not to work, dropout rates are more responsive to changes in adult unemployment than in youth unemployment. However, in the UK as the latter tends to vary more than the former in a recession, the net effect on participation could still be favourable.

Fredriksson (1997) examines the extent to which economic incentives affect the demand for higher education in Sweden, focusing on men. His findings suggest that the net university wage premium is the most important factor. Unemployment seems to play a role too: enrolment rates increase as aggregate unemployment and unemployment in the 20-24 age group rise, or as white-collar unemployment falls. Thus, participation in further education appears to be strongly influenced by a range of factors pertaining to the state of the economy.

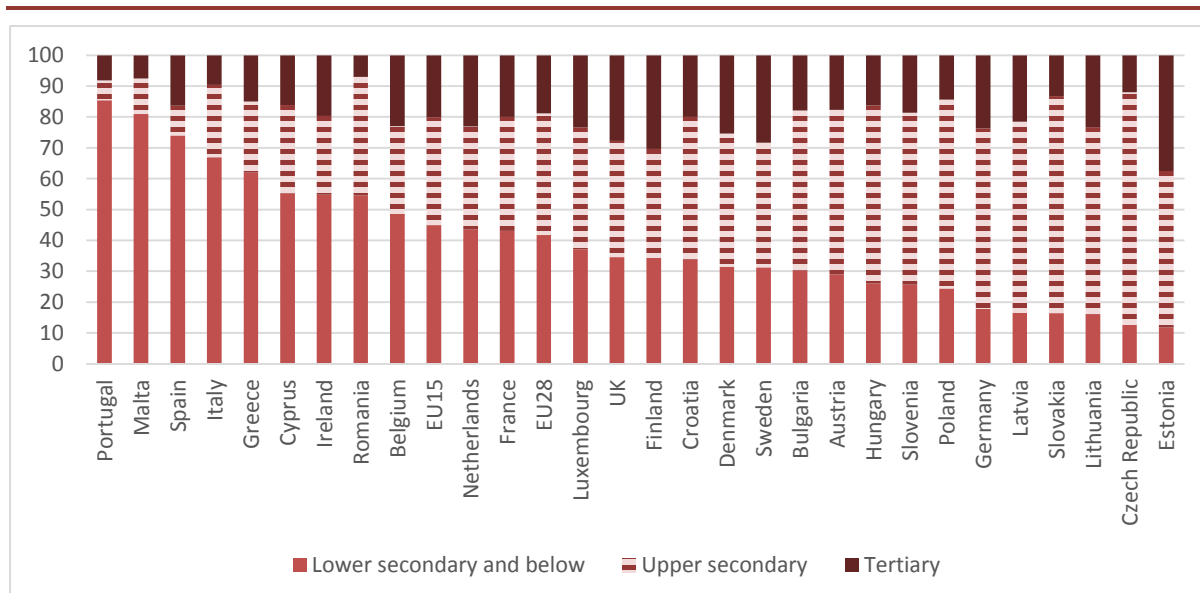
If the experience of the UK and Sweden is replicated in Ireland, this research would suggest that the high youth unemployment rates of the crisis years played an important role in raising participation in education. This research would also imply that a major improvement in labour market conditions might see some reduction in participation in the educational system.

#### 4. Educational Attainment

Ireland, along with Southern Europe, lagged behind much of Northern and Central Europe in developing its educational system in the post-war years. As much as 55 per cent of the 1946-1950 birth cohort in Ireland did not complete secondary school, compared to 35 per cent in the UK and only 12 per cent in Estonia (Figure 1).<sup>7</sup> In line with the spectacular rise in educational attainment across the EU over the second half of the last century, the Irish rate of non-completion had fallen to 9 per cent for the 1986-1990 birth cohort (Figure 2), much lower than the EU15 and EU28 averages (17 per cent and 16 per cent, respectively). In addition, no less than 52 per cent of the same cohort have a third-level qualification (compared to only 20 per cent of the 1946-1950 birth cohort), the third highest rate after Cyprus and Lithuania.

Traditionally, women have been better educated than men, with a higher proportion completing secondary school. This has been true also for tertiary education since the 1980s, with a large 10 percentage-point gap for the 1986-1990 birth cohort (Figure 3). Examining time series, the share of the female population with less than a Leaving Certificate more than halved from 1995 to 2015, while that of women holding a third-level qualification increased from 18 per cent to 41 per cent (Figure 4). As older women with lower educational levels retire and younger women with higher qualifications enter the labour force, these changes will continue to affect the labour market for some time to come.

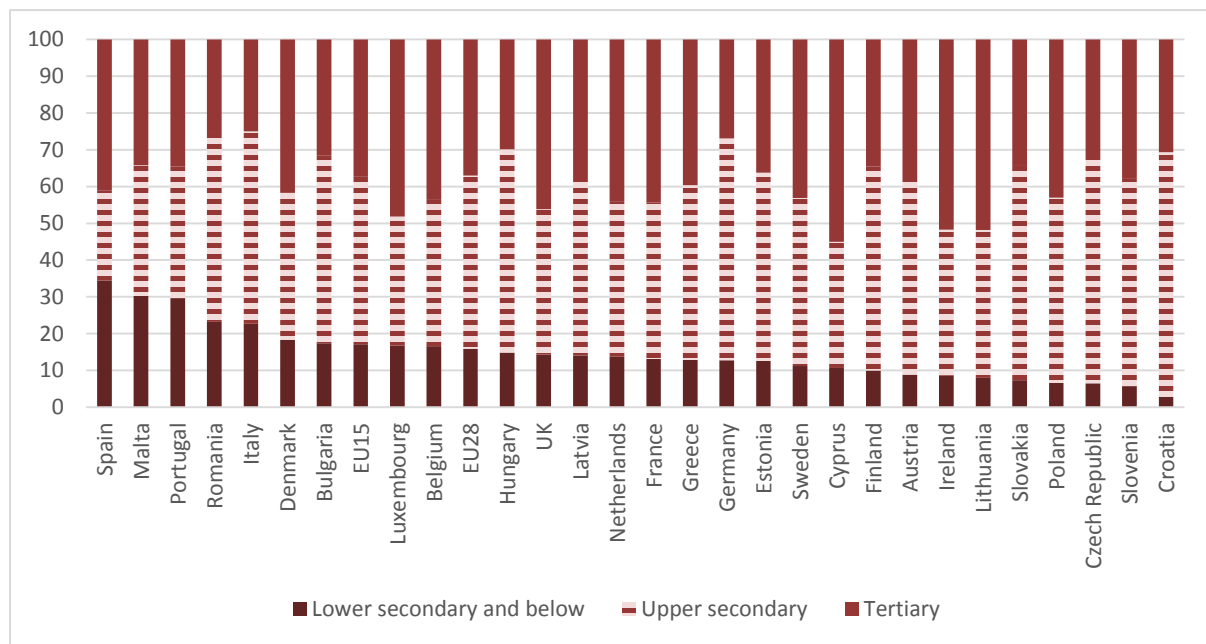
**FIGURE 1** Educational Level of the EU Population by Country, 1946-1950 Birth Cohort (%)



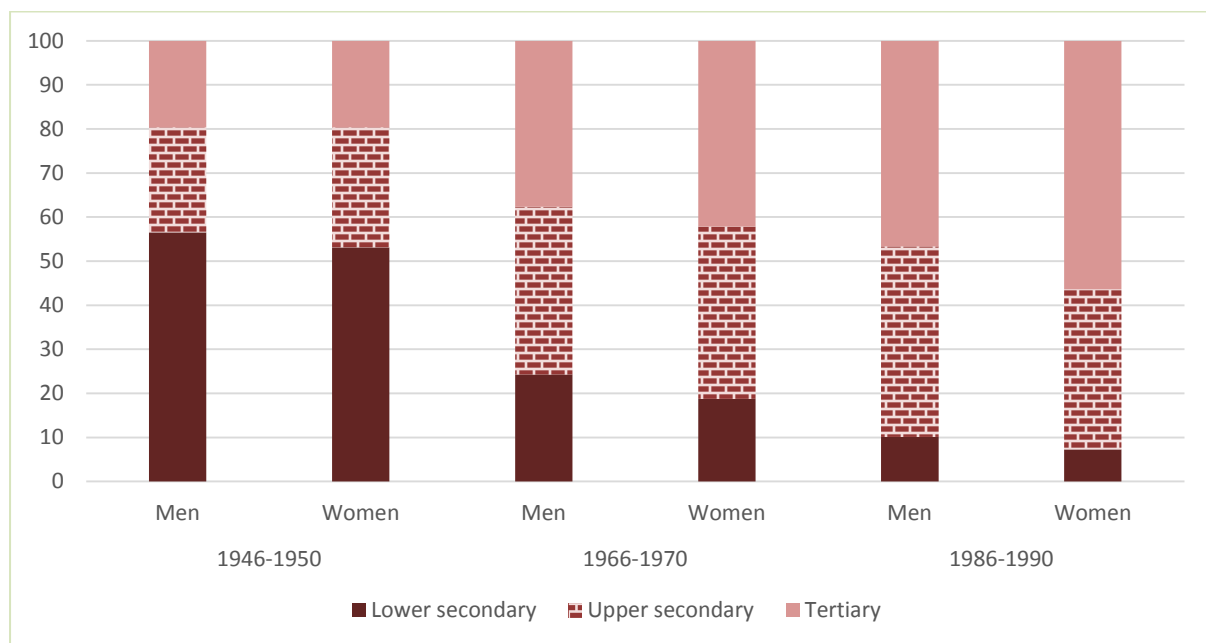
Source: Eurostat.

Note: Hereafter we use the ISCED 11 framework for educational levels. In the Irish system, 'lower secondary and below' refers to the Junior Certificate and below and 'upper secondary' to the Leaving Certificate ('tertiary' is self-explanatory).

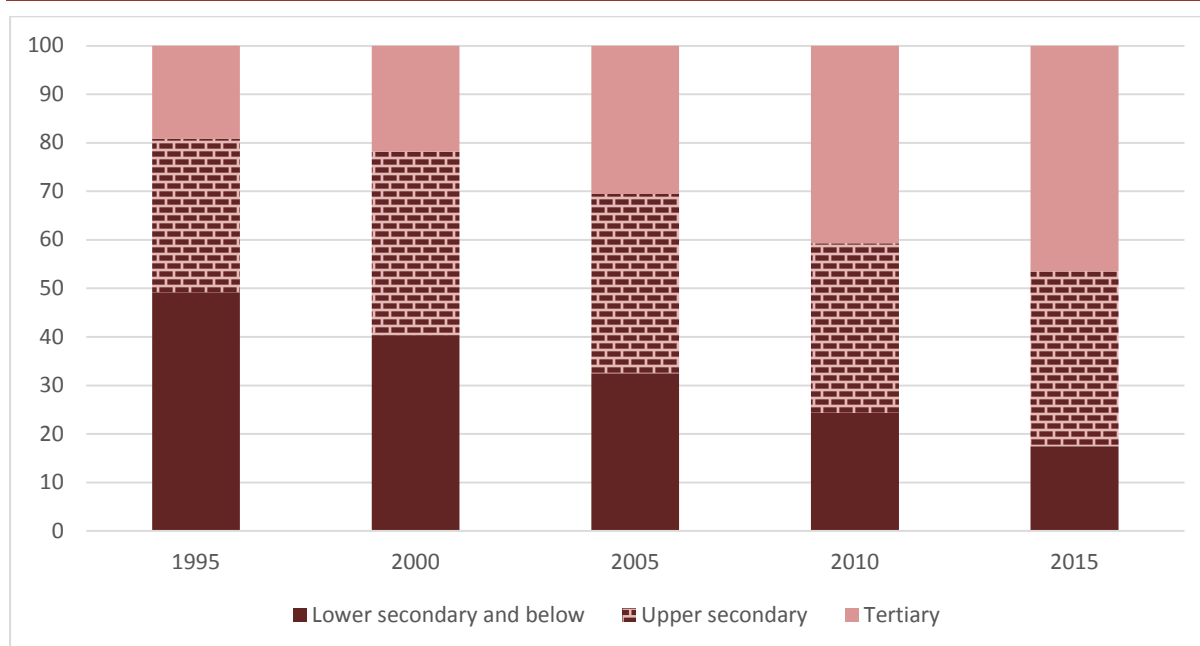
<sup>7</sup> This ignores excess deaths in the immediate post-war years and migration flows.

**FIGURE 2** Educational Level of the EU Population by Country, 1986-1990 Birth Cohort (%)


Source: Eurostat.

**FIGURE 3** Educational Level of the Population by Sex and Birth Cohort, 2015 (%)


Source: Eurostat.

**FIGURE 4** Educational Level of the Female Population, 25-64 (%)

Source: Eurostat.

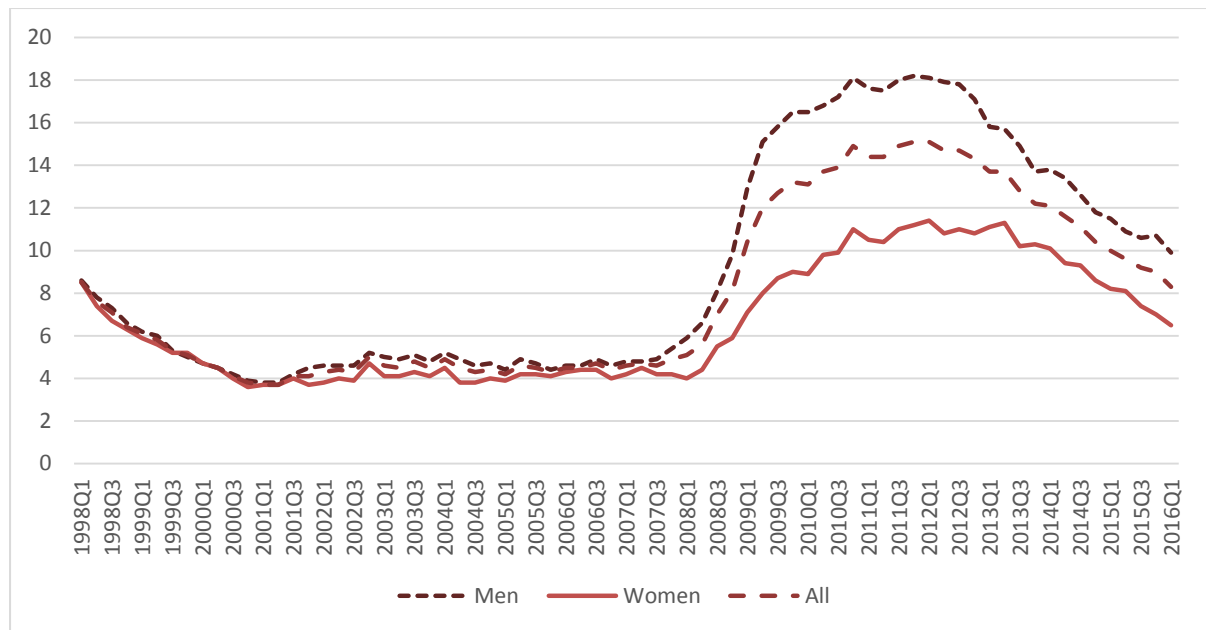
As discussed above, the rising educational attainment of the population has been important in raising participation rates, given the financial returns to education in the labour market. Since the economic crisis began in 2008, the tendency for younger people to spend longer in the educational system has impacted significantly on labour force participation. It has also resulted in a significant fall in the proportion of women (and men) aged 20 to 29 in 2015 who had not completed secondary education (Appendix 1, Tables A1.3 and A1.4). However, while there has been some increase in the proportion of women aged 20 to 29 who have completed third-level education; the increase is rather small relative to the substantial increase in time that people in their 20s are spending in the educational system. This suggests that part of this increased participation in education of women (and men) in their 20s reflects people developing additional qualifications over and above their basic third-level qualification.

## 5. Employment and Migration

Women were less badly hit by the unemployment crisis than men. Peaking at 11.4 per cent in early 2012, the female unemployment rate rose much less than the male unemployment rate, which had reached 18.2 per cent by the end of 2011 (Figure 5). This differential stands in sharp contrast to the decade preceding the recession, during which the difference between the male and female unemployment rates did not exceed 1.1 percentage point. The bulk of the rise in female unemployment also came later than the rise in the male rate, as the

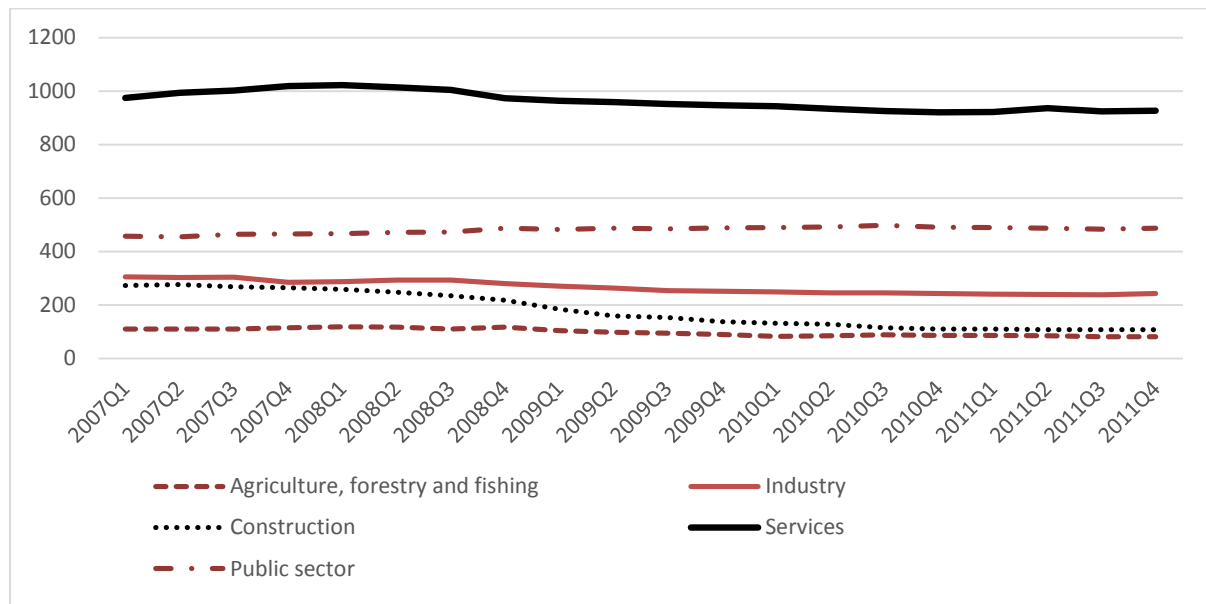
ripples from the collapse in the property bubble gradually came to affect the wider economy.

**FIGURE 5** Seasonally-Adjusted Unemployment Rate by Sex, 15-74 (%)



Source: Central Statistics Office.

**FIGURE 6** Employment by Sector, Population 15 Years and Over, Seasonally Adjusted ('000)

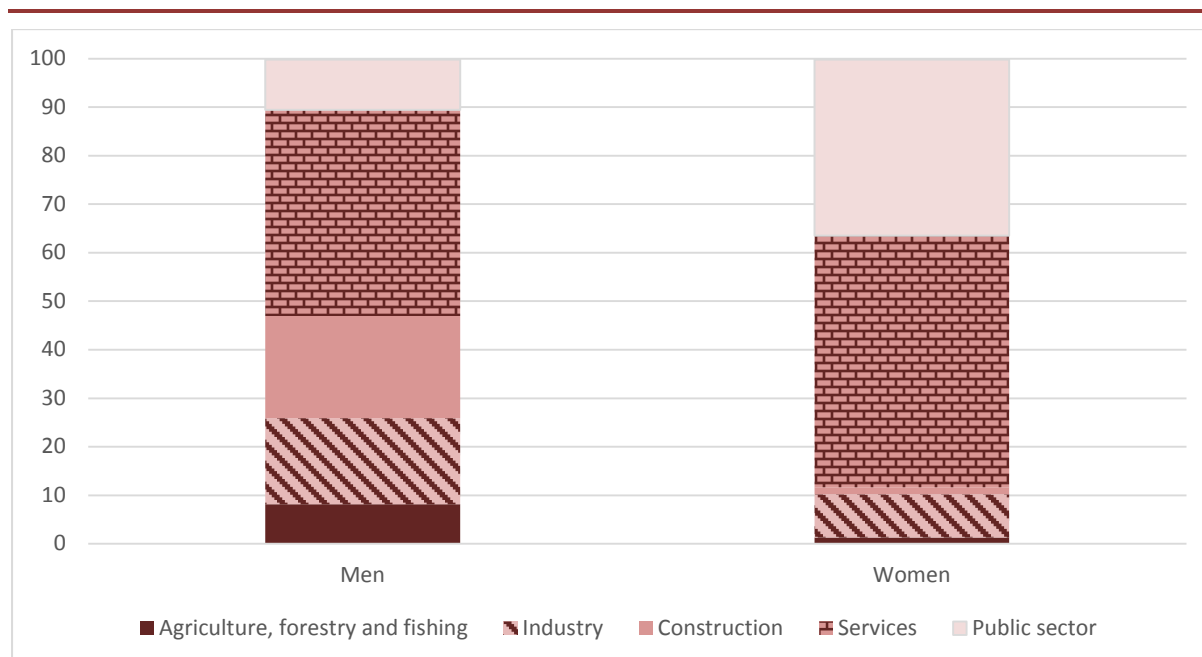


Source: CSO Quarterly National Household Survey. We do not use data for the more recent period because of a serious discontinuity in the CSO data for sectoral employment.

The Great Recession impacted first and most severely on employment in building and construction and related sectors (Figure 6). Between the beginning of 2007

and the beginning of 2012, while employment generally fell by 14 per cent, the numbers employed in building and construction fell by 170,000 or 62 per cent. As one-in-five male workers were employed in this sector immediately before the crisis, compared to only 1 per cent of female workers (Figure 7), this had a much bigger impact on men. This big fall had knock-on effects in other sectors, which also tended to have a higher proportion of male employees (for example, manufacture of non-metallic mineral products). The Great Recession was slower to impact on female employment because of the sectors in which the bulk of women worked. The reduction in employment in those sectors was also more moderate than in the male dominated sectors.

**FIGURE 7** Male and Female Employment Shares by Sector, 15 Years and Over, 2007 (%)



Source: Central Statistics Office.

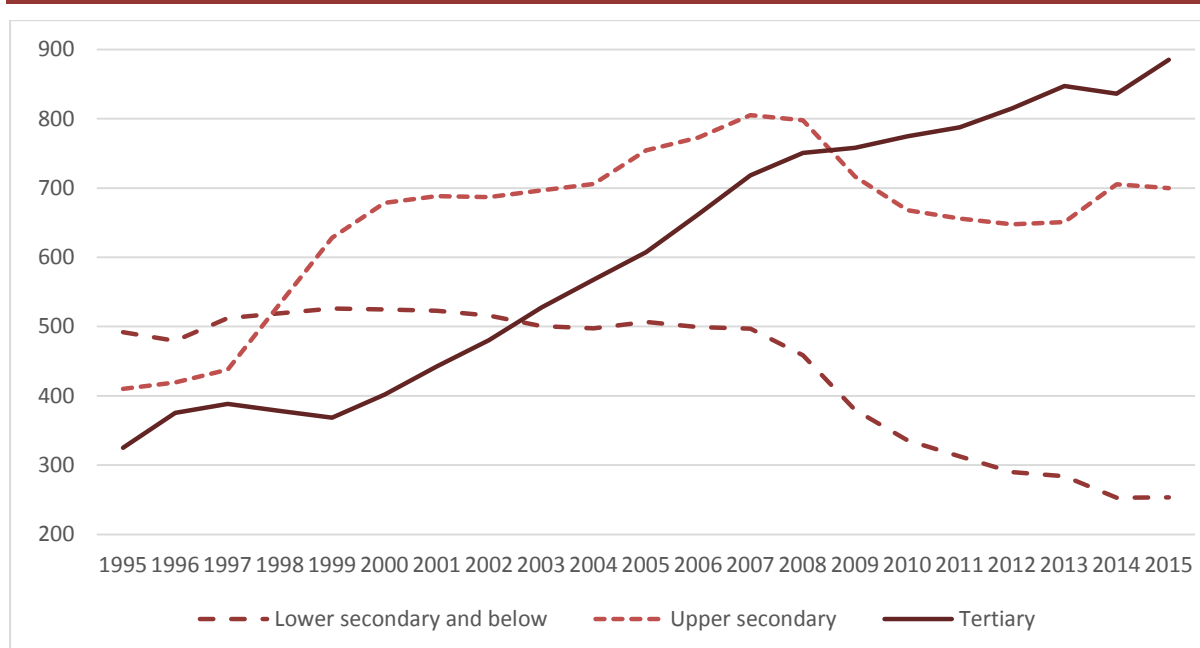
Note: We use the NACE Rev. 2 categories, singling out the public sector from total services (services refers to non-public services).

In recent decades there has been buoyant growth in employment of people with third-level qualifications and this has been another reason why women were less exposed to the crisis than men, given their higher educational attainment. Over the last 20 years, the educational composition of the labour force reversed, with the share of workers with tertiary education growing from 27 per cent to 48 per cent between 1995 and 2015 and that of workers with at most a lower secondary level dropping from 40 per cent to only 14 per cent.<sup>8</sup>

<sup>8</sup> Eurostat Data.

The recession has had different effects on employment across educational levels. While the number of workers with at most upper secondary education has fallen quite significantly, and seems to be stabilising below its pre-crisis level, the crisis had little effect on the trend rise in the number of workers with a third-level qualification, with numbers employed showing a virtually uninterrupted upward trend since the early 2000s (Figure 8). Because women were, on average, better educated than men this continuing rise in employment opportunities for those with a third-level qualification favoured women, contributing to the lower increase in unemployment.

**FIGURE 8** Employment by Educational Level, 15-64 years ('000)



Source: Eurostat.

Note: Due to missing data, the figures for 1998 are the averages of the 1997 and 1999 figures.

An important factor affecting labour market participation is the opportunity for employment in those labour markets, best reflected in the unemployment rate. While most people who lose their jobs will classify themselves initially as unemployed, over time some of these jobless individuals may lose confidence and classify themselves as being out of the labour market. These individuals are often referred to as 'discouraged workers'. In addition, there may be other individuals who, for example, are looking after children and do not consider themselves as unemployed but who would be interested in a job if the working conditions and financial returns to working were sufficiently attractive.

For many years the CSO has published a series of labour market indicators which attempt to capture this discouraged worker effect. These indicators cover people



who are not currently in the labour force but who might be interested in a job. These indicators tend to follow the cycle of unemployment, which supports the claim that the unemployment rate is an important factor determining whether people who are not working are in the labour force.

For the last two centuries a very important indicator of the state of the Irish labour market has been net migration. When economic circumstances have been particularly difficult emigration was very high and during particularly successful periods, such as the Celtic Tiger years, there was net immigration. A range of different papers have modelled past migration patterns as a function of the differential between unemployment rates in Ireland and the UK (e.g., Honohan, 1992). Likewise, Bergin et al. (2013) consider the role of the expected real after-tax return to working in Ireland relative to the UK and other available labour markets.

**TABLE 2** Net Emigration of 15-34-year-olds as a Percentage of the Population of Relative Age

	2009	2010	2011	2012	2013	2014	2015	2009-2015
<b>Men</b>	0.6	2.1	1.7	2.9	2.0	1.9	1.5	12.6
<b>Women</b>	1.6	1.2	0.2	1.1	-0.5	0.9	0.3	4.9

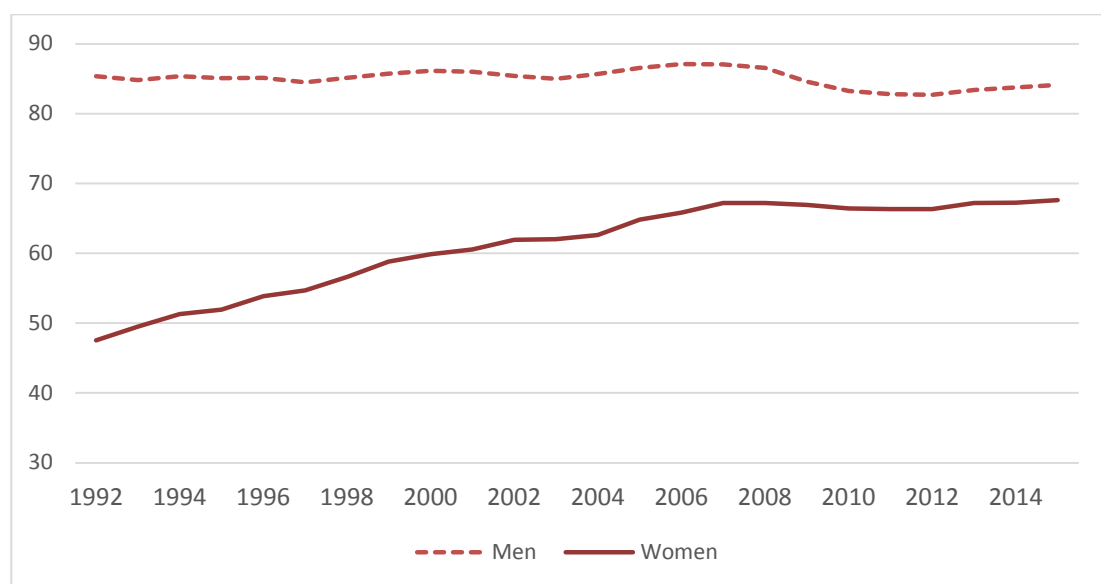
Source: Central Statistics Office.

Note: These figures are based on the CSO migration estimates before the publication of the data from the 2016 Census.

Prior to the crisis, a feature of the net emigration was that roughly equal numbers of men and women left Ireland. Yet in recent years, for the age groups which cover the bulk of emigrants (15-34), more men left than women (Table 2) reflecting the more difficult conditions in the sectors in which many men were working. Over the 2009-2015 period, net emigration accounted for almost 12 per cent of the male population aged 15-34, whereas the figure for women was 5 per cent. As discussed above, this difference reflects the fact that the Great Recession had a much more attenuated impact on the labour market experience of women than of men.

## 6. Labour Force Participation

Over the last 20 years there has been relatively limited change in the male labour force participation rate (Figure 9). It peaked at 87 per cent of the population aged 20-64 in 2007 and it fell in the early years of the Great Recession. While there has been some limited recovery since 2012, it stood at 84 per cent in 2015. Nonetheless the variation over time is relatively limited.

**FIGURE 9** Labour Force Participation Rates by Sex, 20-64 (%)

Source: Eurostat.

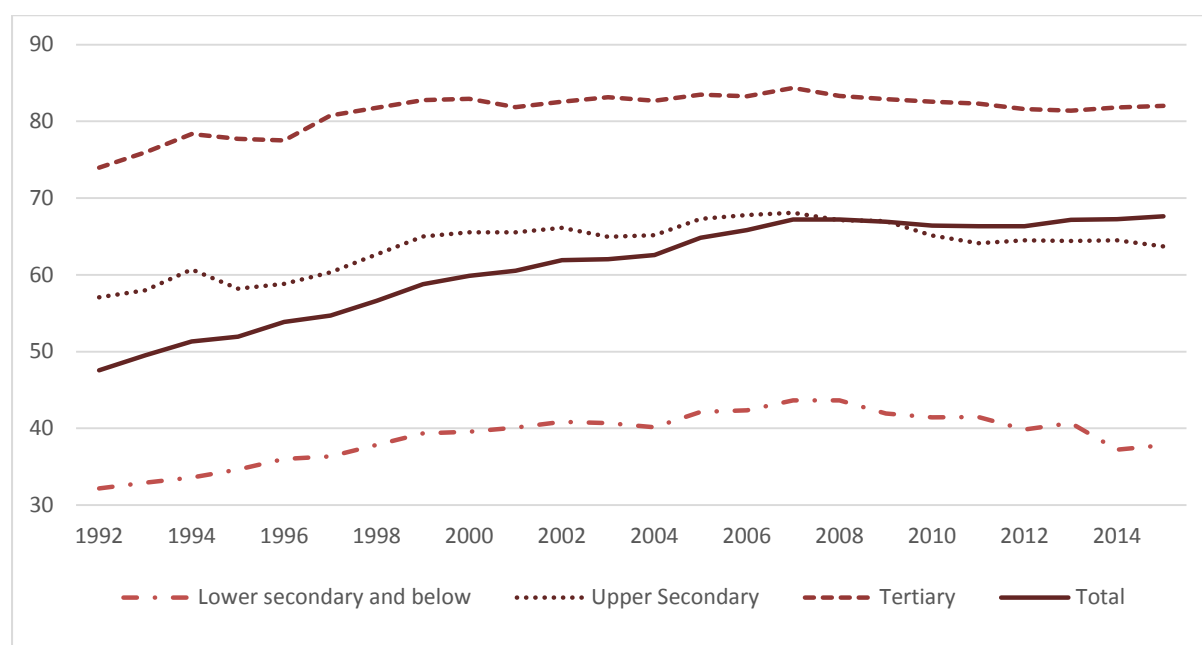
On the other hand, female labour force participation rates have changed very substantially since the early 1990s. In 1992 only 48 per cent of women aged 20 to 64 were in the labour force. There was a steady rise over the subsequent fifteen years to 2007 when, just before the economic crisis began, female labour force participation had reached 67 per cent of the population aged 20 to 64. Since 2007 the participation rate has stabilised and in 2015, 68 per cent of women aged between 20 and 64 were in the labour force.

As discussed above there are a range of different factors impacting on the decision by women to join and remain in the labour force. The factors determining this decision are rather different for women in their 20s than for their older sisters and, in the discussion below; we consider the participation behaviour of 20 to 29-year-olds separately from that of 30 to 64-year-olds.

Over time, the rise in educational attainment has worked its way through the female population of working age having a major impact on labour force participation. Figure 10 shows labour force participation rates for women aged 20 to 64 classified by the highest level of education that they have completed. For women with third-level education, the participation rate rose quite rapidly in the 1990s. However, since 2000 it has been over 80 per cent, peaking at 84 per cent in 2007, 9 percentage points less than the rate for males with a similar level of education. While the participation rate for this group of women fell slightly in the crisis years it was still 82 per cent in 2015.

For women with upper secondary education, the participation rate rose over the 1990s from 57 per cent in 1992 to 67 per cent in 2007 (the comparable figure for men was 90 per cent). Thereafter it fell quite significantly over the crisis years and today it stands at 64 per cent.

**FIGURE 10** Female Labour Force Participation Rates by Level of Education, 20-64 (%)



Source: Eurostat.

For women with only lower secondary education the participation rate was as low as 32 per cent in 1992. It rose over the subsequent 15 years to 44 per cent in 2007. However, there was a substantial fall over the crisis years so that today it has fallen back to 38 per cent.

Figure 11 shows participation rates for men and women aged 20 to 29. There was a limited increase between 1992 and 2007. However, since the economic crisis began there has been a substantial fall, taking participation rates today for men and women below their level in 1992.

One of the important factors affecting female participation is whether women have children (Russell, et al., 2009). The average age of mothers at first birth rose from 24.9 in 1980 to 30.7 today. Therefore, while in the 1980s and the early 1990s many women in their twenties were mothers – and this will have impacted on their participation in the labour market – a much smaller proportion of women in their twenties are now mothers. In the absence of other factors, this decline in the number of young mothers would help explain a rise in labour force

participation in this age group. However, a more important factor affecting participation rates of both men and women in this age group has been participation in the educational system.

**FIGURE 11** Labour Force Participation Rates by Sex, 20-29 (%)



Source: Eurostat.

**TABLE 3** Full-time Education Participation Rates by Age Group, Sex and Census Year (%)

		1991	1996	2002	2006	2011	Change
15-19 years	Men	67.8	74.4	76.2	77.5	87.9	20.1
	Women	75.1	81.8	85.2	86.5	91.3	16.3
	All	71.3	78.0	80.6	81.9	89.6	18.2
20-24 years	Men	15.5	20.7	31.5	34.4	43.6	28.1
	Women	13.7	21.9	36.0	39.9	46.9	33.2
	All	14.6	21.3	33.7	37.1	45.3	30.7
25-29 years	Men	1.6	2.9	9.5	13.8	17.9	16.4
	Women	1.1	2.3	10.2	14.7	17.5	16.5
	All	1.3	2.6	9.8	14.3	17.7	16.4
20-29 years	Men	9.0	12.4	20.8	23.6	29.7	20.7
	Women	7.5	12.6	23.4	26.8	30.6	23.1
	All	8.2	12.5	22.1	25.2	30.2	22.0

Source: Central Statistics Office (1991, 1996, 2002, 2006 and 2011 Censuses).

As discussed earlier, labour market conditions may affect youth labour supply in various ways. On the one hand, high youth unemployment should discourage young people from leaving the educational system and looking for a job as employment prospects are low. On the other hand, by reducing future employment prospects, high adult unemployment may reduce the perceived returns to education, which could lead to a fall in full-time education participation. Likewise, the unemployment rates of skilled and unskilled labour

are also likely to have contrasting effects on the labour supply of young people who must decide whether or not to invest in human capital. These factors are particularly relevant in the Irish context as the massive fall in employment in the construction sector from 2008 may have contributed to the large rise in the proportion of boys aged 15 to 19 staying in full-time education (from 78 per cent in 2006 to 88 per cent in 2011), leading to a rise in human capital in the long run (Table 3).

As a result, labour supply of those aged under 30 is an important segment of the labour force which needs to be examined separately. For virtually all young people, the decision whether or not to work implies a trade-off between remaining in full-time education and working. They may face this decision several times as they move through different stages in the educational system before entering the labour force. These decisions will be determined by factors such as the cost of education, labour market prospects for skilled and unskilled workers (employment and earnings) and the socio-economic background of the individual.

In 2011, Census data show that 90 per cent of those aged 15 to 19 were still in full-time education (Table 3), suggesting that most youths chose to complete secondary school. However, this has not always been the case: only 71 per cent were in full-time education in 1991. Likewise, while 45 per cent and 18 per cent of those aged 20 to 24 and 25 to 29, respectively, participated in full-time education in 2011, only 15 per cent and 1 per cent of them did in 1991.

As shown in Table 3 above, 9 per cent of men and 8 per cent of women in their 20s were in education in 1991. When combined with the employment rate, this meant that there were very few men in that age group who were not in the labour force or education, while about 20 per cent of women in that age group were neither in labour force nor in education.

However, since the early 1990s there has been a dramatic increase in the proportion of that age cohort who are in the educational system. By 2006 around 27 per cent of women in their 20s were in the educational system. When this is combined with a labour force participation rate of over 75 per cent it suggests that very few women in that age cohort were neither the labour force nor pursuing further education.

**TABLE 4** Female Participation Rates, as % of Population

	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Aged: 15-19</b>									
In Education	86.8	86.3	88.0	89.3	88.7	90.7	90.6	91.4	91.8
Labour Force	27.3	25.4	19.8	16.9	16.5	16.8	16.3	15.0	14.2
Sub-Total	114.1	111.7	107.8	106.2	105.2	107.5	107.0	106.4	105.9
<b>Aged: 20-24</b>									
In Education	26.5	27.2	27.6	31.1	33.9	38.1	40.1	39.7	41.0
Labour Force	72.2	70.5	69.2	64.7	62.4	62.0	62.2	59.6	58.5
Sub-Total	98.8	97.7	96.9	95.7	96.3	100.1	102.3	99.3	99.5
<b>Aged: 25-29</b>									
In Education	5.3	5.8	4.5	4.7	5.3	6.9	8.3	8.1	7.2
Labour Force	81.4	80.3	79.4	78.2	78.1	77.1	77.2	76.4	76.7
Sub-Total	86.7	86.2	83.9	82.9	83.3	84.0	85.4	84.5	83.9

Source: Eurostat for Labour Force and CSO special tabulation for data on Students.

Under normal labour market conditions there is a significant opportunity cost, in terms of foregone earnings, to continuing in education (over and above the direct cost of third-level education). However, the higher levels of unemployment and lower after-tax earnings since 2007 reduced this opportunity cost. It is, as yet, unclear whether the rise in participation in education by those aged 20 to 29 is due to this factor<sup>9</sup> and hence whether it may be reversed with a recovery in the labour market, or whether it is a permanent change in behaviour.

In considering the impact of the Great Recession on the labour force participation of those under 30, especially on women aged under 30, it is useful to use the CSO QNHS Principal Economic Status (PES) data on student numbers. These data are not fully consistent with the International Labour Organization (ILO) data used elsewhere in this article and with the Census data shown in Table 3. In particular, as will be seen below, students may work part-time so that they appear as both students on a PES basis as well as being in the labour force on an ILO basis. However, these data are available on an annual basis since 2007 up to the present allowing us to analyse recent developments.

Using the CSO QNHS data, Table 4 shows that in 2007 the combined total of female students and females in the labour force aged 15-19 amounted to 114 per cent of the population of that age. This indicated that many students were also working part-time. However, in the early years of the crisis the total fell to 106 per cent of the population indicating a major fall in part-time working among this

<sup>9</sup> As Tumino and Taylor (2015) suggest for the UK.

cohort of women. At the same time there was a further significant increase in the proportion of this cohort of young women in education.

As shown in Appendix 2, the pattern was rather different for young men. Having had a significantly lower participation rate in education before the crisis, today the participation rate for men is closer to that for young women of the same age. However, the rise in educational participation by males was largely counterbalanced by a fall in labour force participation by young men as jobs in the construction sector dried up.

For those women aged 20 to 24 the total of those who were students and those who were in the labour force amounted to just under the total population in that age cohort. This suggested both a very low level of non-participation in either the labour force or education and also a much lower level of part-time working than for the younger cohort of women. It is clear that as the crisis developed there was a major increase in the proportion of this cohort remaining on in education. This rise in participation in education explains all of the fall in the labour force for this cohort.

For the 25-29 cohort of women the crisis years saw a small increase in educational participation. This did not fully compensate for the fall in labour force participation. This reflects lower labour force participation rates for women with more limited education as a result of the crisis.

These data show that for those aged 20 to 29 the decline in female (and male) participation in the labour force was largely offset by a rise in participation in education. However, it is unlikely that this delay in entering the labour market because of participation in full-time education will expand further. Certainly the data for the most recent years suggest a plateauing of participation rates in education among this age group. The behaviour over the crisis years is consistent with findings for the UK (Tumino and Taylor, 2015).

It is unclear what the long-term impact of this investment is on the human capital of the population; most likely the lifetime productivity and earnings of those who improved their education will be enhanced. In any event, over the 2008-2015 period, increased participation in education served to reduce the unemployment rate and also reduce (or at least delay) emigration.

Table 5 shows a decomposition of the factors affecting female participation rates for those aged 20 to 29 over the period 1992-2015. The decomposition shows the contribution of the rising educational attainment of the cohort to the rise in participation rates, assuming unchanging education and age-specific participation rates. The residual change in behaviour also includes the effect of rising participation in full-time education.<sup>10</sup> This shows that 3 percentage points of the 5-percentage point rise in the participation rate between 1992 and 2000 for women aged 20 to 29 was due to the rising average educational attainment of the cohort. The rest was due to a general trend for more women to participate in the labour market, partly driven by the declining number of women in the cohort with children.

**TABLE 5** Decomposition of the Change in Female Participation Rates, 20-29 (Percentage Points)

	Actual	Due to Higher Educational Attainment	Due to Behaviour, Including Participation in Education
<b>1992 to 2000</b>	5.0	3.0	2.1
<b>2000 to 2007</b>	2.1	3.1	-1.1
<b>2007 to 2015</b>	-8.1	1.6	-9.8

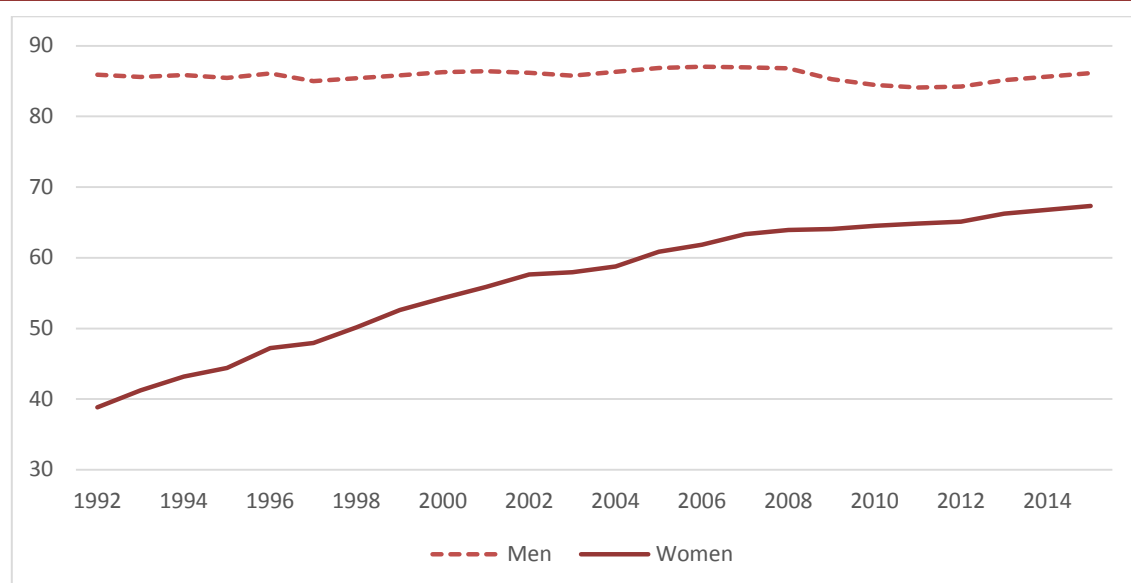
Source: Authors' calculations based on Eurostat data.<sup>11</sup>

Between 2000 and 2007 the changing educational attainment had a similar effect to that in the 1990s. However, when that effect is excluded, there was a decline in participation rates due to changes in behaviour. This change in behaviour was primarily due to a rise in the number in the cohort who were still in education.

<sup>10</sup> The changing age composition within the cohort had no real impact on participation rates.

<sup>11</sup> The effect of higher educational attainment is calculated by applying the education specific participation rates to the data on population by level of education, where the proportion of the population with a given level of education in each year is held constant at the proportion in the base year. The third column is then derived as a residual.



**FIGURE 12** Labour Force Participation Rates by Sex, 30-64 (%)

Source: Eurostat.

For the 2007-2015 period the effect of rising educational attainment was smaller, reflecting the fact that a high proportion of the cohort in 2007 already had completed third-level education. However, the decline due to changing behaviour was very large at almost 10 per cent. As discussed above, all of this change was due to an increase in numbers remaining in the educational system to a later age.

Figure 12 shows male and female participation rates for those aged 30 to 64. In the case of male participation rates there was relatively little change over time, moving from 85 per cent in 1992 to 87 per cent in 2007 and back down to 84 per cent in 2015. However, for women there was a rapid rise from 39 per cent in 1992 to 64 per cent in 2007. Even over the crisis years the participation rate continued to rise, albeit more slowly, reaching 67 per cent in 2015.

In Table 6 we again decompose the change in participation rates into a change due to the rising educational attainment of the population and a change due to other factors affecting education- and age-specific participation rates. As shown in Table 6, between 1992 and 2000 the bulk of the 15.5 per cent rise in participation rates was due to changes in behaviour. Women, who in a previous generation would have remained at home, instead chose to work. The effect of rising educational attainment was also important, resulting in a rise in participation rates of 3.4 percentage points. This pattern continued between 2000 and 2007 with a further substantial rise due to rising educational attainment. There was a slower but nonetheless substantial increase due to changing behaviour.

**TABLE 6** Decomposition of the Change in Female Participation Rate, 30-64 (Percentage Points)

	Actual	Due to Higher Educational Attainment	Due to Behaviour
<b>1992 to 2000</b>	15.5	3.4	12.0
<b>2000 to 2007</b>	9.0	3.9	5.1
<b>2007 to 2015</b>	4.0	4.7	-0.7

Source: Authors' calculations based on Eurostat data.

This pattern changed during the crisis years. The education effect was even larger than in earlier periods but there was actually a small decline due to other factors. Looking at the age- and education-specific participation rates shown in the Appendix Tables A2.2 to A2.4, there was a decline in participation rates for women aged 30 to 39 with less than tertiary education. Most of them will have had young children and they will have been affected by a fall in real after-tax earnings, a fall that was not mirrored in a fall in childcare costs. This made participation in the labour market unattractive or even, in some cases, expensive.

**TABLE 7** Participation Rate for Cohorts of Women with Upper Secondary Education (%)

Age in 2015	1995	2000	2005	2010	2015
<b>30-34</b>			68.1	75.0	69.4
<b>35-39</b>		65.2	79.5	70.5	66.4
<b>40-44</b>	64.7	85.2	72.7	65.0	67.9
<b>45-49</b>	79.8	73.5	65.0	64.8	68.3
<b>50-54</b>	67.9	66.7	67.0	70.5	67.4
<b>55-59</b>	58.2	64.9	69.5	67.2	61.8
<b>60-64</b>	50.7	64.1	64.5	60.3	47.3

Source: Eurostat.

In the last column of Table 7 the actual participation rates observed for women with an upper secondary education in 2015 are shown. Along the rows the Table shows the participation rate for the same cohort of women 5, 10, 15 and 20 years earlier. Thus, while the participation rate for women aged 40-44 in 2015 was 67.9 per cent, the same cohort of women, when they were ten years younger in 2005, had a participation rate of 72.7 per cent.

This table shows that for women aged 35 to 39 in 2015; their participation rate (66.4 per cent) was substantially lower than when they were 25-29 in 2005. This fall reflects the fact that over the ten years many of them had children. However, those in their 40s in 2015 had a higher participation rate than in 2010 when their children were younger. This reflects a pattern of returning to work by some of the

women who had dropped out to mind young children. For those women who were aged between 50 and 64 in 2015, their participation rate was lower than it had been in 2010. This reflects the fact that from 50 onwards some women begin to retire. This is particularly noticeable for the cohort who were 60-64 in 2015; their participation rate was 47 per cent, down from 60 per cent five years earlier when they were aged 55 to 59.

Table 8 shows similar data for women with a third-level education. For those aged 50 to 54 their participation rate in 2015 was 84 per cent; the same as it had been 20 years earlier when they were 30 to 34. A rather similar pattern is shown for younger women with a third-level education: their participation rate was 80 per cent or more throughout their working lives. It is only among the oldest cohort, aged 60 to 64 in 2015, that there is a substantial drop-off in participation as they begin to retire. Even for that cohort their participation rate had been close to 80 per cent 20 years earlier (when they were 40 to 44).

**TABLE 8** Participation Rate for Cohorts of Women with Third-Level Education (%)

Age in 2015	1995	2000	2005	2010	2015
30-34			83.0	89.4	87.0
35-39		81.8	89.6	87.6	83.5
40-44	80.5	92.7	86.2	80.5	81.4
45-49	89.4	87.0	81.1	79.5	83.6
50-54	84.2	82.9	83.7	84.8	84.2
55-59	79.0	83.5	86.1	85.9	74.6
60-64	78.0	81.4	83.3	78.1	49.6

Source: Authors' calculations based on Eurostat.

To sum up, for women who were under 30 the major impact of the crisis appears to have been that many more of them continued in the educational system than would have been the case before the crisis, possibly because the opportunity cost was lower in an adverse labour market. For women aged 30 and over, the rising average educational attainment caused labour force participation to increase. However, controlling for education there was some fall in participation rates, especially for women with more limited education in the age groups where they have young children.

## 7. Implications for Future Labour Supply

As discussed in the previous section there have been major changes in female labour force participation rates as a result of rising educational attainment, because of cultural changes and, finally, because of the effects of the financial

crisis on the labour market. In this section we consider the implications of these results for female labour supply over the next five years.

Already the highest level of completed education for those aged 25 is largely determined. Assuming no net migration and no deaths, this allows us to estimate the population by level of education and by age in 2020.

For those aged 30 to 54 we assume that by 2020 education and age-specific labour force participation rates will have reverted to what they were in 2007. This assumes that there is some combination of an upward trend in real after-tax earnings, to offset the cost of childcare for those with more limited education, and also a continuing change in behaviour along the lines of that seen in the 2000s. For those aged 55 and over, participation rates rose through the crisis years so we make the conservative assumption that these rates remain unchanged at their 2015 level.<sup>12</sup>

For the 20-29 age group there was a major increase in numbers remaining in the educational system, though there does not appear to have been a significant increase in numbers completing tertiary education.<sup>13</sup> In the base case we assume that this change in behaviour is permanent. However, if rising opportunities in the labour market saw those aged 20 to 29 leave the educational system at the same age that they did before the financial crisis, this would add to labour supply. In a second scenario we look at the effect of assuming a return to the education-specific participation rates of 2007 for this cohort.<sup>14</sup> For this second scenario we also assume that the composition of this cohort in terms of educational attainment is the same as in 2007.

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<sup>12</sup> As shown in the tables in the Appendix, the rise was particularly marked for those women with an upper secondary education.

<sup>13</sup> This implies a longer stay in third-level education, possibly because they acquire additional qualifications.

<sup>14</sup> To date there is little sign of such a reversion to the 2007 educational participation rates.

**TABLE 9** Female Labour Supply Scenarios for 2020

	2015	2020 (1)		2020 (2)	
		Base Case		2007 educational part. rates	
	Thousands	Thousands	% change	Thousands	% change
<b>Lower Secondary and below</b>	96.9	91.4	-5.6	99.9	3.1
<b>Upper Secondary</b>	339.1	360.3	6.3	372.5	9.8
<b>Tertiary</b>	499.3	553.2	10.8	556.3	11.4
<b>Total</b>	935.3	1005.0	7.5	1028.7	10.0

Source: Authors' calculations<sup>15</sup> based on Eurostat.

In the base case, with no net migration, the female population aged 20 to 64 is likely to be around 1.5 per cent higher in 2020 than it is today. However, the combination of rising educational attainment, especially in the older age groups, and some recovery from the effects of the economic crisis, could see total female labour supply rise by 7.5 per cent between 2015 and 2020 or 1.5 per cent a year. The increase in supply would be particularly marked for women who have completed tertiary education, rising by 10.8 per cent. However, the labour supply of women with only lower secondary education is likely to fall over the same period. This rise in the labour force by 2020 would reflect an increase in the female participation rate for those aged 20-64 from the 68 per cent observed in 2015 to 69 per cent in 2020.

In Scenario 2, if those in their twenties left the educational system at the same age as they did in 2007 (at the peak of the boom) and if they experienced the same labour force participation rates as in 2007, female labour supply would rise by 10 per cent by 2020 (2 per cent a year). The impact would be especially significant for those with upper secondary education. This reflects the fact that labour force participation rates fell more for them during the crisis years than for those with tertiary education. Under this second scenario, the rise in the labour force by 2020 would reflect an increase in the female participation rate for those aged 20-64 from the 68 per cent observed in 2015 to 71 per cent in 2020.

Given the demographic profile of the population, under the base case, if participation rates in education remained unchanged at the 2015 level, the number of female students in their 20s would rise by around one-eighth by 2020. However, if educational participation rates for women in their 20s were to fall

<sup>15</sup> Scenario 1 refers to the base case, which assumes no migration and no deaths, no change in educational attainment for cohorts aged 30 and over (but they are five years older in 2020) and the same education-specific participation rates as in 2007 for those aged under 55. For those aged 20-29 and 55-64, education-specific participation rates are assumed to be the same as in 2015. Scenario 2 assumes the same education-specific participation rates and rates of educational attainment for the 20-29-year-olds as in 2007.

back to their 2007 level, the number of female students in their 20s could fall by a quarter by 2020.

In this article we analyse the factors driving changes in the participation rate for women aged 20 to 64 whereas Byrne and O'Brien (2016) look at participation rates for both men and women aged 15 and over, including those aged 65 and over. Byrne and O'Brien (2016) suggest that the decline in female participation rates since 2007 has been entirely due to cyclical factors. Our research shows that a major factor in the decline was the rise in participation in education by women aged under 30. The economic crisis was clearly very important in driving this rise in educational participation; as such it could be considered to be a cyclical change, as suggested by Byrne and O'Brien. However, to date, there is no sign of educational participation rates for those aged under 30 reverting to the pre-crisis level. Thus it may prove to be a structural change.

In this article we take account of the fact that the average educational attainment of the population will continue to rise for some time to come and we conclude that a further limited rise in the female participation rate is likely over the next five years. In addition, the rise in participation in education during the crisis years, if permanent, will continue to affect labour force participation rates for many years to come as the better educated cohort of women (and men) who graduated since the crisis replace less well-educated earlier cohorts.

## 8. Conclusions

The economic crisis had a significant effect on female labour force participation rates, especially for those women under 30 and for those older women with more limited education.

For women under 30 the major change was that they remained in the educational system in their 20s for a longer period than before the crisis. To the extent that the higher rates of participation in the educational system among those in their 20s in the 2008-2015 period was due to the crisis, this might be reversed in the next five years if the economy continues to grow rapidly. However, up to the first half of 2016, there is no evidence of such a reversal. The impact of such a change would be to cut student numbers.

There is, as yet, no evidence on the longer-term human capital impact of the increased educational participation of those in their 20s during the crisis years. If the increased time spent in the educational system raises the lifetime earnings of the individuals then it will have been a very valuable investment. However, if the

increased educational participation arose merely because of the reduced opportunity cost, without a commensurate rise in expected lifetime earnings, then a reversion to the lower education participation rates of the pre-crisis years may be a sensible outcome.

Because of the uncertainty about this issue, planning for the number of third-level education places over the next decade must be especially difficult. If the additional investment in human capital over and above getting a basic third-level qualification turned out to be relatively low then it might be sensible to limit the expansion in the number of third-level places, or even cut them. On the other hand, if it turns out that there is a significant return on the additional crisis-years' investment in human capital, then the long-term benefits for the economy could offset some of the permanent damage from the crisis. It would also justify the provision of some additional third-level places to cater for a continuing high participation rate of those in their twenties. Further research is needed to reach a conclusion on this issue.

The average educational attainment of the female population aged 30 and over will continue to rise for at least the next decade. This will result in rising female participation rates, especially among women aged 40 and over. When combined with the rising adult population, this will see quite a rapid expansion in female labour supply over the next five years, ranging between 1.5 per cent and 2 per cent a year. Obviously, a return to net immigration could add to this growth.

In addition, as older women with more limited education retire and are replaced by women who had the benefit of greater educational opportunities, there is likely to be a positive productivity effect on the economy. This effect will continue for some time to come, reflecting the pattern of investment in education in Ireland since the 1980s.

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## Appendix 1 Returns to Education and Educational Attainment of the Population

A crude measure of the returns to tertiary education, which does not take into account years of experience, the sector of employment, personal characteristics and other relevant factors, is the average earnings of people with a third-level qualification relative to those with upper secondary level. In the same way we can examine the negative premium for lower secondary education relative to upper secondary level. As shown in Tables A.1 and A.2, OECD has published comparative data on this basis for a number of EU countries since the 1990s.

Over the last fifteen years, the returns to tertiary education have increased for women in Ireland (Table A.1). For men, the returns to tertiary education have increased even more rapidly.

For women, a similar pattern is observed in Germany. In Portugal, the returns to third-level education were higher in the 1990s than in many other EU countries, probably reflecting a shortage of supply: Portugal has a much smaller proportion of the population with third-level education than is the case for other EU countries (Figure 3).

**TABLE A1.1** Women's Third-Level Education Premium Relative to Upper Secondary (%)

	1998	2000	2002	2004	2005	2007	2009	2010	2011	2012	2013
<b>Finland</b>	143	146	146	146	145	146	146		147	148	
<b>France</b>	145		146	145	142	147	144	155	150		
<b>Germany</b>	128	137	137	148	151	159	154	153	155	172	
<b>Ireland</b>	145	163	153	168	178		171	178	190		184
<b>Poland</b>	145		159	166				168		174	
<b>Portugal</b>	171			173	173		171	171	172		171
<b>Spain</b>	137			141		149	159	157	155	165	
<b>Sweden</b>	125		129	127	126	127	127	127		129	126
<b>UK</b>	176	176	177	180	181	181	176	177	182	178	169

Source: OECD (Education at a Glance, 2010-2015).

Note: The OECD's Education at a Glance reports do not have data for every country and every year, hence the missing data here.

**TABLE A1.2** Men's Third-Level Education Premium Relative to Upper Secondary (%)

	1998	2000	2002	2004	2005	2007	2009	2010	2011	2012	2013
<b>Finland</b>	159	169	163	161	162	161	162		159	159	
<b>France</b>	159		159	154	152	158	154	162	165		
<b>Germany</b>	126	141	140	149	151	158	154	171	161	171	
<b>Ireland</b>	131	138	141	171	147		162	180	169		191
<b>Poland</b>	175		194	204				186		188	
<b>Portugal</b>	178			183	183		172	173	173		172
<b>Spain</b>	152			132		133	133	133	136	149	
<b>Sweden</b>	136		139	135	135	135	134	133		136	133
<b>UK</b>	149	152	147	146	146	145	151	162	151	147	146

Source: OECD (Education at a Glance, 2010-2015).

Note: The OECD's Education at a Glance reports do not have data for every country and every year, hence the missing data here.

**TABLE A1.3** Educational Attainment of Female Population aged 20-29, % of Total

	1992	2000	2007	2015
Lower Secondary	31.5	17.5	11.2	6.5
Upper Secondary	47.4	53.7	45.9	48.0
Third Level	21.1	28.8	42.8	45.5

Source: Eurostat.

**TABLE A1.4** Educational Attainment of Male Population aged 20-29, % of Total

	1992	2000	2007	2015
Lower Secondary	42.1	23.5	16.9	9.6
Upper Secondary	38.8	52.4	53.4	54.9
Third Level	19.1	24.1	29.7	35.5

Source: Eurostat.

## Appendix 2 Detailed Data on Participation Rates

**TABLE A2.1** Male Participation Rates as % of Population

	2007	2008	2009	2010	2011	2012	2013	2014	2015
<b>Aged: 15-19</b>									
In Education	77.1	80.5	83.7	86.2	87.1	87.6	88.9	89.4	88.5
Labour Force	31.4	26.8	21.9	17.9	16.4	17.2	15.8	14.9	15.9
Sub-Total	108.5	107.3	105.6	104.1	103.5	104.8	104.7	104.3	104.5
<b>Aged: 20-24</b>									
In Education	20.9	22.9	26.2	32.3	33.0	37.2	38.4	40.4	37.9
Labour Force	81.9	79.8	74.5	69.3	68.3	66.0	67.3	66.2	65.6
Sub-Total	102.8	102.6	100.7	101.6	101.3	103.2	105.7	106.6	103.5
<b>Aged: 25-29</b>									
In Education	4.8	5.4	5.7	6.9	6.6	7.1	10.4	10.4	11.1
Labour Force	92.2	91.3	89.8	88.4	87.3	86.9	84.8	85.0	84.7
Sub-Total	97.0	96.7	95.6	95.3	93.9	94.0	95.2	95.3	95.8

Source: Eurostat.

**TABLE A2.2** Female Labour Force Participation by Age Cohort, Lower Secondary Education

	1992	2000	2007	2015
<b>20-24</b>	64.2	58.4	46.5	36.7
<b>25-29</b>	49.1	62.1	53.8	34.0
<b>30-34</b>	40.2	49.9	47.6	42.8
<b>35-39</b>	35.1	46.5	50.8	38.2
<b>40-44</b>	30.9	46.2	51.6	42.3
<b>45-49</b>	26.7	41.7	53.0	45.7
<b>50-54</b>	24.4	34.7	47.8	46.3
<b>55-59</b>	18.5	26.7	35.6	35.2
<b>60-64</b>	11.2	14.3	24.1	26.5

Source: Eurostat.

**TABLE A2.3** Female Labour Force Participation by Age Cohort, Upper Secondary Education

	1992	2000	2007	2015
<b>20-24</b>	68.4	65.2	69.3	52.2
<b>25-29</b>	79.4	85.2	77.7	68.2
<b>30-34</b>	65.0	73.5	71.9	69.4
<b>35-39</b>	50.2	66.7	68.2	66.4
<b>40-44</b>	44.2	64.9	66.8	67.9
<b>45-49</b>	41.9	64.1	72.2	68.3
<b>50-54</b>	37.1	54.1	67.9	67.4
<b>55-59</b>	28.6	38.0	56.0	61.8
<b>60-64</b>	0.0	22.9	37.5	47.3

Source: Eurostat.

**TABLE A2.4** Female Labour Force Participation by Age Cohort, Third-Level Education

	1992	2000	2007	2015
<b>20-24</b>	78.7	81.8	85.4	75.7
<b>25-29</b>	89.0	92.7	90.8	88.5
<b>30-34</b>	80.6	87.0	87.0	87.0
<b>35-39</b>	71.6	82.9	81.7	83.5
<b>40-44</b>	72.6	83.5	81.7	81.4
<b>45-49</b>	69.2	81.4	85.9	83.6
<b>50-54</b>	64.8	80.9	85.8	84.2
<b>55-59</b>	54.5	64.0	73.0	74.6
<b>60-64</b>	0.0	41.8	49.6	49.6

Source: Eurostat.



# Research Note

*Research Notes* are short papers which draw on QEC-related research, which may be issued in fuller detail as Working Papers.

*This Note has been accepted for publication by the Institute, which does not itself take institutional policy positions. Research Notes are subject to refereeing prior to publication. The authors are solely responsible for the content and the views expressed.*



# An Empirical Assessment of Macroprudential Measures in the Irish Housing and Credit Market

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## 1. Introduction

This Research Note empirically assesses the impact of the macroprudential measures recently implemented by the Central Bank of Ireland on the credit and housing markets in Ireland. An existing model of the overall Irish housing and banking sectors (Gerlach-Kristen and Mc Inerney, 2014; Duffy et al., 2016) is simulated to examine how the macroprudential measures have impacted on key housing variables such as prices, supply and credit levels over the period the measures have been implemented.

The Note is structured as follows. We first construct a scenario whereby we look at the effects of the loan-to-value (LTV) and loan-to-income (LTI) restrictions relative to a baseline scenario on the housing and credit markets with respect to mortgage credit, house prices and housing supply. Under the baseline scenario, the measures are assumed not to have been implemented. Therefore, by comparing the outcomes for the different housing variables under the two scenarios, the relative impact of the measures can be gauged.

## 2. Results Overview

We begin by examining how two macroprudential policy restrictions, the LTV and LTI ratios, have affected the credit and housing markets since their introduction. To do this, we construct two different scenarios and compare them to the actual outcomes observed over the period. We first look at what would have happened to mortgage credit, house prices and housing supply with no change in loan-to-value and loan-to-income ratios and on the basis of this, how much of the actual change in mortgage credit etc. can be attributed to these mortgage restrictions.

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\* This paper is part of a research project carried out on behalf of the Banking and Payments Federation of Ireland.  
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The results from our scenarios suggest that the impact of the mortgage restrictions only began to take hold in the second half of 2015 and early 2016 as the weighted average of LTVs and LTIs started to fall. The results suggest that the LTV has become the more binding restriction of the two in the most recent period. By 2016 Q1 the combined effect of the LTV and LTI restrictions has been to reduce new mortgage lending by approximately 10 per cent relative to the baseline of no change in the ratios. The effect on the housing market is as yet quite muted with house prices being only approximately 0.05 per cent lower than in the baseline as at 2016 Q1. The results also show that the effect of the macroprudential rules on housing supply has been effectively zero at this point but this is not surprising given the lags involved in construction.

We next conduct an analysis on the potential longer-term impact on housing supply of the macroprudential policies and find that the full effects of the restrictions are not manifested until 3-4 years after the changes. Overall, the analysis suggests that over the longer term new mortgage lending is 15 per cent lower in each quarter relative to a baseline of no changes in the LTV or LTI leading to a mortgage stock that is 8 per cent lower. This decline in mortgage lending leads to a reduction in house prices; they are approximately 3.5 per cent lower relative to the baseline level. As this simulation holds all of the model's exogenous variables apart from the LTV and LTI ratios constant, the decline in house prices lowers the profitability of housing construction. The number of housing units completed in each quarter is approximately 5 per cent lower relative to the baseline by the end of the simulation period. Overall this results in a housing stock that is 0.5 per cent lower than the baseline case.

### 3. Model Description

The housing and credit model (Gerlach-Kristen and Mc Inerney, 2014; Duffy et al., 2016) can be considered in two blocks which consist of housing demand and supply equations, as well as equations for mortgage and housing stock accumulation.

Macroprudential policy enters the model as restrictions on mortgage demand through changes in the LTI and LTV ratios. Cyclical influences on these ratios are first removed so that they purely reflect exogenous (to the model) changes in credit conditions (similar to the case of Duca et al., 2011 and Duffy et al., 2016). These ratios, together with house prices, income levels and interest rates determine the volume of new mortgage lending in the model.

We assume that the Irish mortgage market is monopolistically competitive so that mortgage supply can be modelled as banks setting mortgage rates as a mark-up over deposit and money market funding costs.<sup>1</sup> This mark-up mainly reflects both macroeconomic and household-specific risks, which are approximated by the unemployment rate and housing equity respectively.

In terms of housing demand, we adopt the standard inverted demand for housing framework which relates house prices to income levels, demographics, the user cost of capital and a proxy for the demand for housing services. One of the innovations in Duffy et al. (2016) in terms of modelling Irish house prices was the inclusion, following international research such as Duca et al. (2011), of an additional demand shifter in the inverted demand function related to credit conditions. These studies are typically single equation reduced-form models which simply include an indicator of credit conditions, such as an LTV that is adjusted so that it purely reflects changes in credit supply. However, the key innovation in Duffy et al. (2016), as described above, is to build a structural model where exogenous changes in credit conditions affect mortgage volumes directly so that credit conditions are endogenous in the house price equation through the inclusion of the ratio of the mortgage stock to disposable income.

Housing supply is modelled in terms of the completion of new housing units which are mainly determined by the profitability of housing investment (the ratio of house prices to building costs), similar to a Tobin's Q approach to investment (Poterba, 1984). Housing supply is also influenced by the availability and cost of construction credit as well as other variables such as the corporate insolvency rate and output gap which can capture uncertainty about investing.<sup>2</sup>

Finally, the model contains two equations reflecting stock accumulation, similar to the perpetual inventory method. In particular, the housing stock evolves by accumulating the contemporaneous level of housing completions on to the depreciated stock from the previous period (assuming a quarterly depreciation rate of 0.5 per cent). Similarly, the mortgage stock accumulates new mortgage lending on to the previous period's mortgage stock at a rate that is estimated from the data.

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<sup>1</sup> Our identifying assumption is therefore that loan quantities do not enter the mortgage supply equation. The representative interest rate used in the model is the standard variable rate (SVR).

<sup>2</sup> For example, an increase in uncertainty creates a mean-preserving widening of the perceived distribution of future house prices and therefore raises the real option value of postponing housing investment.

We estimate the model over the period 1988 Q1-2014 Q4 so that our sample ends in the quarter prior to the mortgage restrictions being introduced. Tables 1A and 1B present the model's parameters.

In terms of mortgage demand, changes in income levels and interest rates (the affordability channel) and house prices (the collateral channel) have a significant impact on the quantity of new mortgage lending. In addition, credit conditions, which relax the affordability and leverage constraints facing households, are also important. The results suggest that a given percentage change in the LTV ratio has almost twice the impact on mortgage demand as a similar percentage change in the LTI ratio.

On the mortgage supply side, funding costs clearly have an important role in how Irish banks set their mortgage interest rates. Moreover, the pass-through relationship is quite strong in both the short- and long-run with almost 80 per cent of any change in the money market rate feeding into mortgage interest rates in the long run. The results also indicate that repayment and default risk, as proxied by the unemployment rate and household equity respectively, are important determinants of the mortgage interest rate spread. Importantly, from a macroprudential policy perspective, restrictions on the LTV ratios associated with new mortgage lending will affect the mortgage interest rate through the household equity channel, as the leverage of the marginal mortgage will be lower.

On the housing side, Table 1B shows that the traditional determinants of house prices such as income levels, demographics and the user cost of capital all play an important role in Irish house prices. For example, the long-run elasticity of house prices with respect to income is 0.87, which is consistent with both the Irish and international house price literature. We also find that our indicator of credit conditions in the housing market, given by the mortgage stock-to-income ratio, is also important, with a long run elasticity of 0.45. Short-run house price dynamics are primarily driven by shocks in house prices themselves and changes in the unemployment rate.

Table 1B also presents the estimates for the housing supply component of the model. The completion of new housing units is mainly determined by the profitability of housing construction, given by the ratio of house prices to building costs. In addition, there is evidence of credit channels working via both the price and quantity of construction credit. Finally, the model's indicators of uncertainty, as approximated by the output gap and the corporate insolvency rate, suggest

that the macroeconomic variables play an important role in housing construction via channels other than house prices and building costs.

As mentioned, the model adopts a perpetual inventory method in modelling both housing and mortgage stocks. The rate of depreciation on the existing housing stock is assumed to be 2 per cent per annum which is consistent with the rate assumed by the CSO. The relationship between the mortgage stock in the current and previous period is estimated from the data and takes a value of 0.985 over the sample period.

**TABLE 1A** Demand and Supply in the Irish Mortgage Market

Mortgage Demand		Mortgage Supply	
	$NewMortgages_t$		$\Delta MorRate_t$
$NewMortgages_{t-1}$	0.746	$MorRate_{t-1}$	-0.359
	(13.1)		(-7.1)
$RMorRate_t$	-0.026	$HHEquity_{t-1}$	-0.326
	(-2.9)		(-3.2)
$\Delta Income_t$	0.891	$URate_{t-1}$	0.306
	(2.1)		(5.9)
$\Delta HPrices_{t-1}$	0.678	$DepRate_{t-1}$	0.079
	(3.1)		(3.9)
$LTV_t$	0.728	$MMRate_{t-1}$	0.279
	(2.5)		(15.9)
$LTI_t$	0.392	$LTD_{t-1}$	-0.526
	(2.8)		(-5.9)
$Constant$	5.511	$\Delta MMRate_t$	0.519
	(4.5)		(13.1)
		$\Delta DepRate_{t-1}$	0.111
			(2.8)
		$Constant$	-0.034
			(-1.6)
Adj. $R^2$	0.949	Adj. $R^2$	0.884
Sample	1988q1-2014q4	Sample	1988q1-2014q4

Source: Authors' own calculations.

**TABLE 1B** Demand and Supply in the Irish Housing Market

Housing Demand		Housing Supply	
	$\Delta HPrices$		$HCompl_t$
$HPrices_{t-1}$	-0.102	$Hcompl_{t-1}$	0.851
	(-2.9)		(15.3)
$(HStock_{t-1}/Pop2534_{t-1})$	-0.075	$HPrices_t/BCosts_t$	0.224
	(-7.2)		(2.1)
$User_{t-1}$	-0.002	$\Delta RNFC_t$	-0.014
	(-9.8)		(-2.5)
$Income_{t-1}$	0.087	$Insolr_t$	-0.014
	(5.6)		(-2.9)
$(MorStock_{t-1}/Income_{t-1})$	0.045	$\Delta CLoans_{t-1}$	0.915
	(6.5)		(4.4)
$\Delta HPrices_{t-1}$	0.415	$Gap_{t-1}$	-1.237
	(4.4)		(-2.4)
$\Delta Prices_{-2}$	0.213	<i>Constant</i>	-0.188
	(3.0)		(-0.6)
$\Delta URate_{t-1}$	-0.015		
	(-4.2)		
<i>Constant</i>	0.002		
	(1.6)		
Adj. R <sup>2</sup>	0.713	Adj. R <sup>2</sup>	0.979
Sample	1988q1-2014q4	Sample	1988q1-2014q4

Source: Authors' own calculations.

We first calculate the change in the weighted-average LTV and LTI using data from the Banking and Payments Federation of Ireland (BPFI). Data on the distribution of lending by loan-to-value ratios are not available so we use the loan-to-price (LTP) ratio instead. Table 2 shows the distribution of lending for certain ranges of LTI and LTP ratios and the calculated weighted average for each ratio.

**TABLE 2** Distribution of lending by LTI and LTP

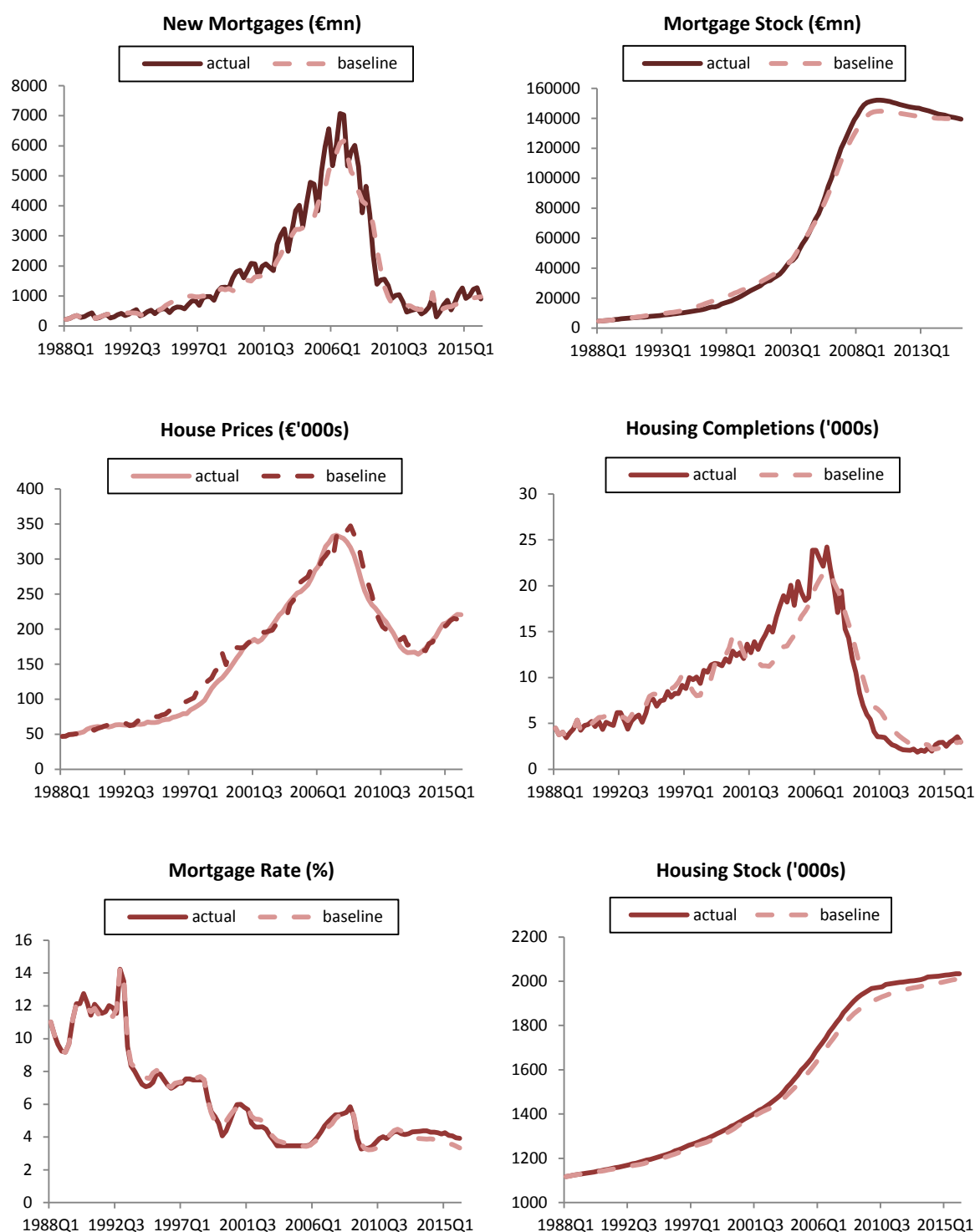
Customer Type	LTP Range	2014 Q4	2015 Q1	2015 Q2	2015 Q3	2015 Q4	2016 Q1
FTB	<=70%	15.04%	15.46%	13.76%	15.94%	17.12%	18.67%
	>70<=80%	15.79%	14.52%	16.79%	20.12%	20.97%	22.08%
	>80<=85%	7.45%	7.64%	7.02%	8.49%	9.74%	9.83%
	>85% <= 90%	34.72%	31.71%	35.49%	37.73%	38.88%	37.84%
	>90%	27.01%	30.67%	26.94%	17.71%	13.28%	11.59%
	W. Avg. LTP	86.39	86.61	86.56	85.26	84.66	84.15
Customer Type	LTI Range	2014 Q4	2015 Q1	2015 Q2	2015 Q3	2015 Q4	2016 Q1
FTB	<=2.5	29.51%	28.11%	28.08%	27.69%	29.82%	28.52%
	>2.5 <= 3.0	22.10%	20.47%	22.81%	22.85%	23.08%	22.60%
	>3.0 <= 3.5	21.26%	21.98%	21.33%	24.96%	28.26%	34.36%
	>3.5 <= 4.0	16.39%	18.39%	17.32%	16.18%	11.49%	9.29%
	>4.0	10.74%	11.06%	10.45%	8.32%	7.35%	5.23%
	W. Avg. LTI	3.28	3.32	3.3	3.27	3.22	3.2

Source: BPF1.

#### 4. Model Solution

We solve the model up to the most recent period for which all data are available which is 2016 Q1, using the coefficients that are estimated up to 2014 Q4. The 2016 Q1 data for the consumer expenditure deflator, real and nominal GDP and personal disposable income are forecasts taken from the ESRI's *Quarterly Economic Commentary*.

Figure 1 graphs the dynamic solution of the model for each variable against the actual values of those variables. The results suggest that the model closely replicates the actual outturn of the variables over the entire sample period, although there are short periods of deviations, particularly for housing supply. Overall, however, the solution suggests that the model's parameters have been stable over the period. The solution of the model gives us a baseline against which we can analyse the contribution of the changes in the LTV and LTI to the changes in the model's endogenous variables: the volume of new mortgage lending, the total stock of mortgage lending, the standard variable mortgage rate, average house prices, housing completions and the housing stock.

**FIGURE 1** Actual and Predicted Values for Mortgage and Housing Market Variables

Source: Authors' own calculations.

We now conduct our scenario analysis. We investigate three possible scenarios. We simulate the model over the 2014 Q4 to 2016 Q1 period holding the LTI constant at its 2014 Q4 value. A comparison of the results of this scenario against our baseline allows us to determine how much of the change in the mortgage and

housing variables can be attributed to changes in the LTI alone. We then conduct a similar scenario analysis for the LTV ratio by holding it constant at its 2014 Q4 value. Our final scenario keeps both the LTI and LTV ratio constant at their 2014 Q4 values and allows us to estimate how much of the change in mortgage volumes and interest rates, house prices and housing supply can be attributed to the total change in credit conditions given by the change in both the LTI and LTV. As the model is essentially linear, we would expect the combined effect of the LTV and LTI to be a simple addition of their individual impacts.

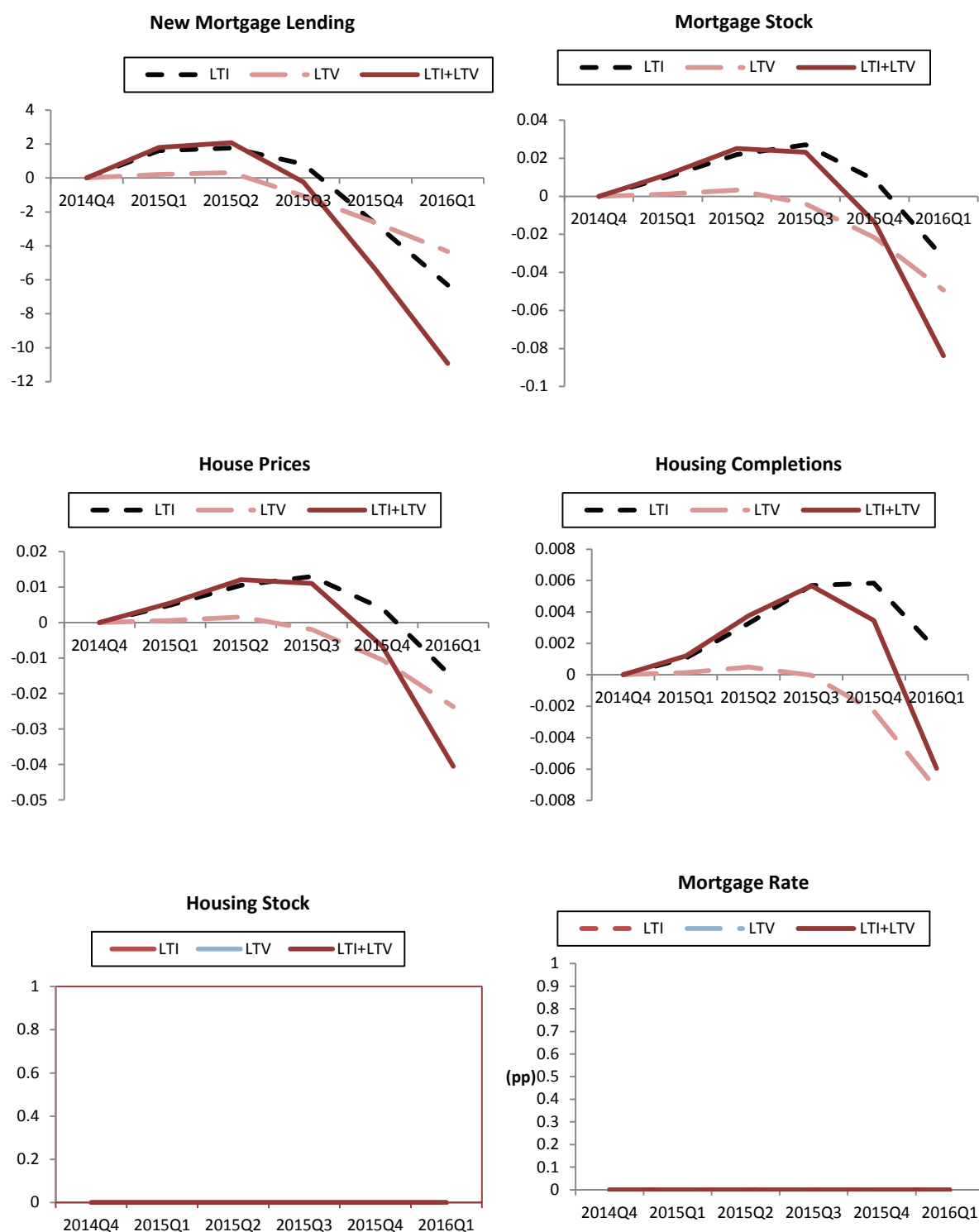
Figure 2 presents the results of these scenarios. The weighted-average LTV and LTI actually increased in the first two quarters of 2015 relative to 2014 Q4, and therefore mortgage volumes and house prices actually rose relative to the baseline of no change in the LTV and LTI ratios. One explanation for this is that mortgages succeeded in getting approval for high LTV and LTI loans during the consultation process prior to the macroprudential restrictions being introduced. These restrictions only affected new lending and not that which had already been approved and therefore we see a ‘bunching’ of lending at the beginning of 2015.

The main driver of the higher mortgage lending (and resultant house prices) relative to the baseline was the changes in the loan-to-income ratio. The overall effect, however, was quite weak with the combined effect of the changes in the LTI and LTV only raising new mortgage lending by 2 per cent and house prices by 0.01 per cent relative to the baseline.

However, the impact of the mortgage restrictions appears to have taken hold in the second half of 2015 and early 2016 as the weighted-average LTIs and LTVs have started to fall. In particular, the results suggest that the LTV has become the slightly more binding restriction in the more recent period. By 2016 Q1 the combined effect of the LTV and LTI restrictions has been to reduce new mortgage lending by approximately 10 per cent relative to the baseline of no change in the ratios. The effect on the housing market is as yet quite muted with house prices being only approximately 0.05 per cent lower than in the baseline as at 2016 Q1.

Figure 2 also shows that the effect of the macroprudential rules on housing supply is approximately zero. This is unsurprising given the lags involved in construction. We explore this issue further in the next section and also discuss the likely longer term impact of the rules if we extrapolate from the current values of the LTI and LTV ratios.



**FIGURE 2** Assessing the Impact of Actual Changes in LTI and LTV on Housing and Mortgage Market

Source: Authors' own calculations.

## 5. Assessing the Future Impact on Housing Supply

The simulation results above clearly illustrate that the short-run response of housing supply to changes in house prices is quite weak. This is partly because

our model measures the response of housing completions to house prices and therefore, given the lags involved in site purchase and construction, the impact on housing supply is likely to be distributed over several years. Indeed, Duffy et al. (2016) find the impact of changes in LTV and LTI ratios on housing completions only peaks after 3-4 years.

To illustrate this point we now consider the longer impact on housing supply by assuming that the values of the LTV and LTI ratios at 2016 Q1 are the steady-state or equilibrium ratios under the new macroprudential rules and, therefore, that the short-run volatility in these ratios caused by banks granting new mortgages before the rules took full effect has now subsided. As a result, we simulate a scenario (using historical data) in which the first five periods reflect the recent actual changes in the LTV and LTI (those that prevailed in the 2015 Q1-2016 Q1 period) and that in subsequent periods these ratios remain constant at their values in the fifth (2016 Q1) period.

Figure 3 illustrates the longer term impact of the mortgage rules if we assume that the LTV and LTI remain at their 2016 Q1 values for periods (quarters)  $t+5$  to  $t+24$ . It is clear that the full effects of the changes in the LTV and LTI ratios are not manifested until 3-4 years after the changes. In this respect, our results suggest that over the longer-term new mortgage lending is 15 per cent lower in each quarter relative to the baseline level. Consequently, the mortgage stock is 8 per cent lower than the baseline case. This decline in mortgage lending generates a decline in house prices that are approximately 3.5 per cent lower in the long term relative to the baseline.

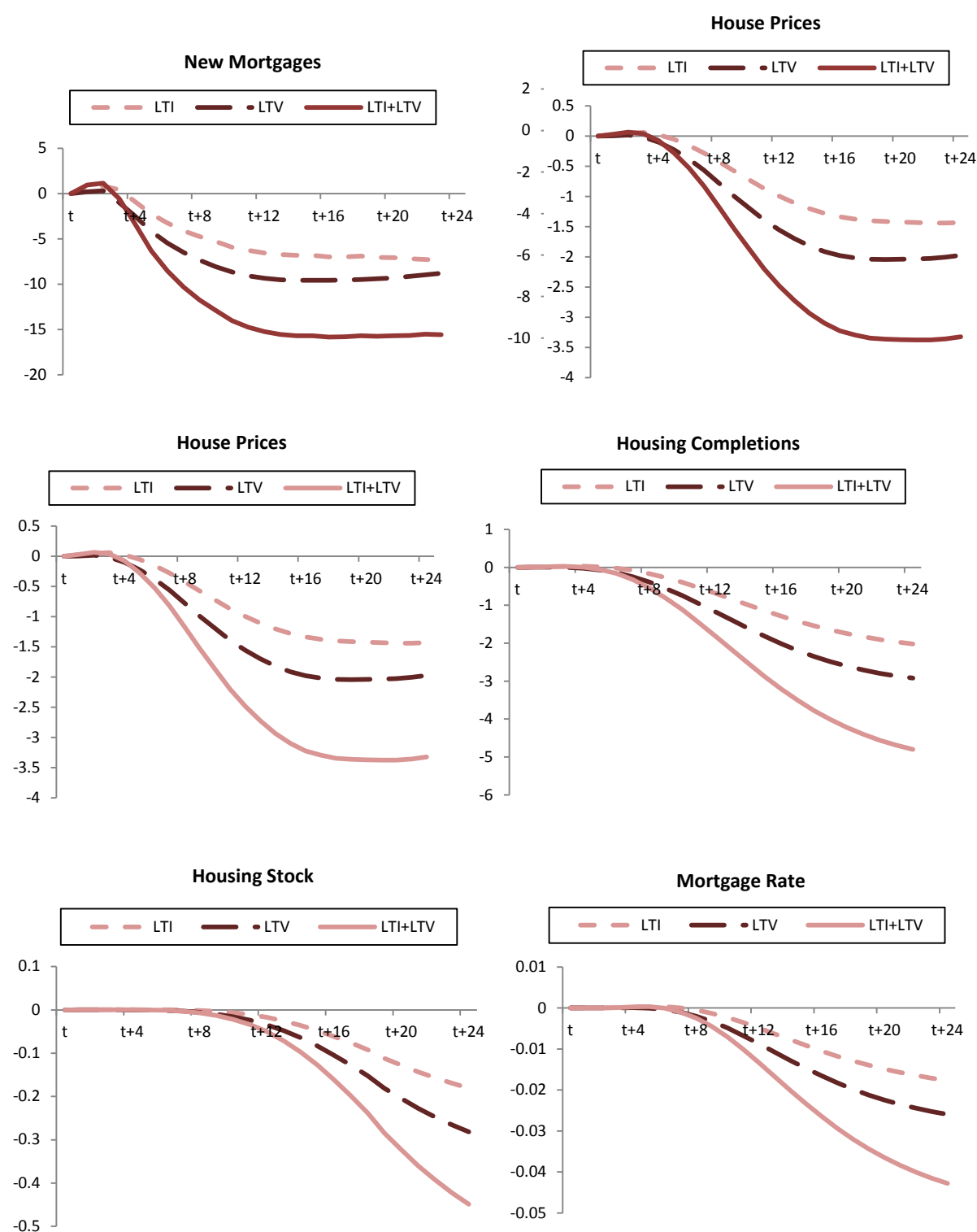
As this simulation holds all of the model's exogenous variables apart from the LTV and LTI ratios constant, the decline in house prices lowers the profitability of housing construction. The number of housing units completed in each quarter is approximately 5 per cent lower relative to the baseline by the end of the simulation period resulting in a housing stock that is 0.5 per cent lower.

Figure 3 also illustrates the impact on the mortgage rate. The decline in house leverage as a consequence of the lower LTV ratio (and corresponding relative increase in housing equity) leads banks to lower the mortgage rate as the riskiness associated with mortgage lending is now less than under the baseline. However, it is clear that this effect is quite weak.

This scenario analysis also allows us to assess the relative importance of the changes in the LTV and LTI on the future evolution of the mortgage and housing

markets. If we assume that the most recent values for the LTI and LTV ratios reflect their steady-state values under the new macroprudential regime, then approximately two-thirds of the long-term decline in mortgage lending, house prices and housing supply would be due to the behaviour of the LTV ratio.

**FIGURE 3** Longer-term Impact of Mortgage Rules



Source: Authors' own calculations.

## 6. Concluding Comments

In this note we have analysed the implications for the Irish housing and credit sector of the recent macroprudential measures introduced by the Central Bank of Ireland. While the macro level assessment of the measures implications is limited somewhat by the relatively short period of time for which they have been in place, it is clear that the measures, as noted in Duffy et al. (2016), have in the period to date had a contractionary impact on lending in the Irish market; there has been very little impact of the measures on housing supply. However, the analysis also suggests that, over a longer period of time, housing supply levels will be less than they otherwise would have been in the absence of the macroprudential measures.

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ISBN 978-0-7070-0411-2