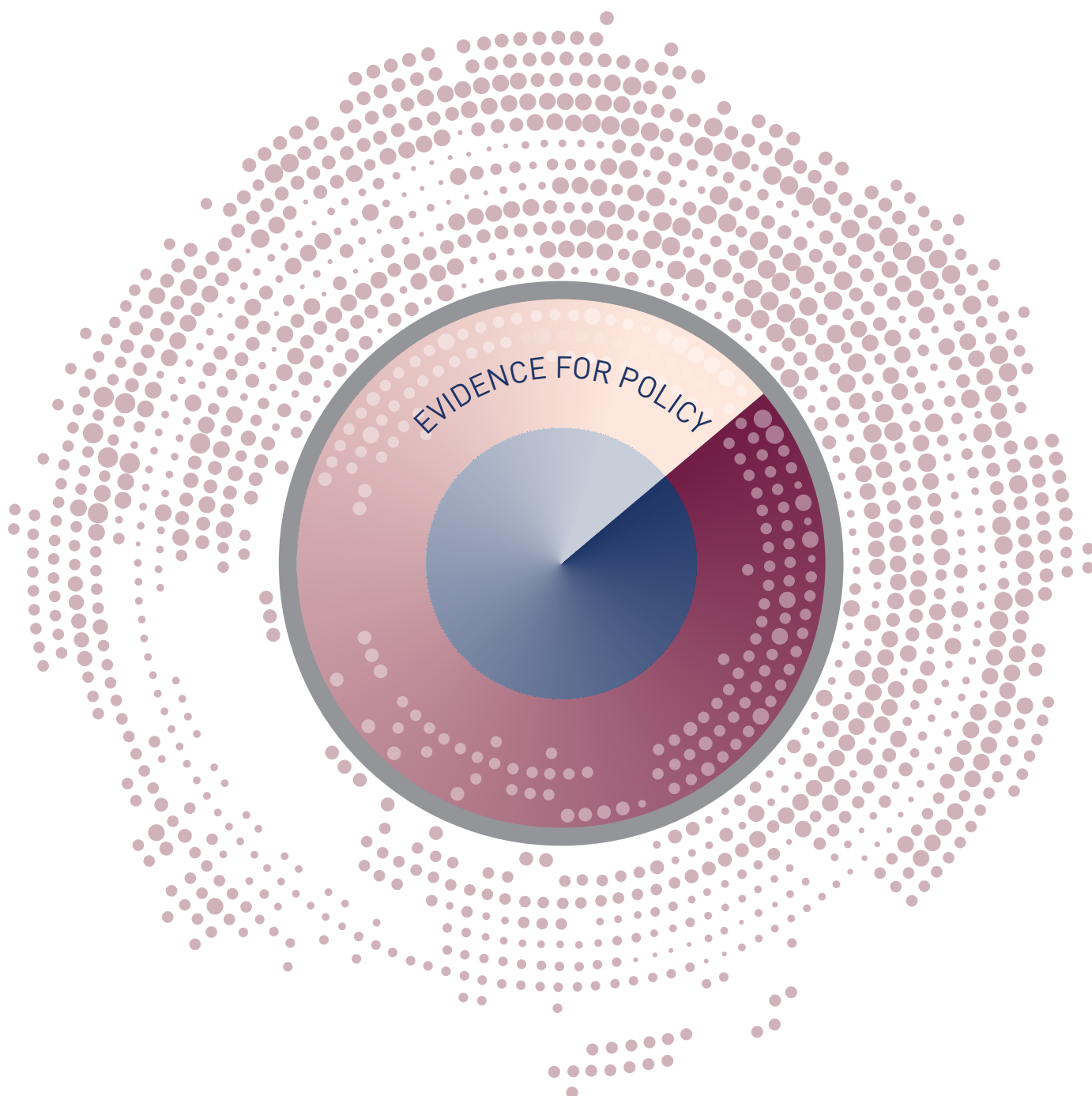


QUARTERLY ECONOMIC COMMENTARY

AUTUMN 2017

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QUARTERLY ECONOMIC COMMENTARY

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Autumn 2017

The forecasts in this *Commentary* are based on data available by 12 September 2017

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Special Articles are published in the *QEC* in order to foster high-quality debate on various aspects of the Irish economy and Irish economic policy. They are subject to refereeing prior to publication.

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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Did Increasing the state pension age in Ireland affect the retirement rate of
65-year-olds?

P. Redmond, S. McGuinness, E. Kelly.

SUMMARY TABLE

	2014	2015	2016	2017	2018
Output (Real Annual Growth %)					
Private Consumer Expenditure	2.0	4.5	3.3	2.6	2.8
Public Net Current Expenditure	4.8	1.8	5.3	3.5	3.6
Investment	18.1	27.9	61.2	15.6	12.0
Exports	14.4	38.4	4.6	4.5	4.9
Imports	14.9	26.0	16.4	6.2	7.7
Gross Domestic Product (GDP)	8.3	25.6	5.1	5.0	4.0
Gross National Product (GNP)	9.0	16.4	9.6	5.4	3.9
Prices (Annual Growth %)					
Consumer Price Index (CPI)	0.2	-0.3	0.0	1.1	1.4
Growth in Average Hourly Earnings	1.6	2.2	2.5	2.8	3.0
Labour Market					
Employment Levels (ILO basis ('000))	1,914	1,964	2,020	2,087	2,134
Unemployment Levels (ILO basis ('000))	243	204	172	136	121
Unemployment Rate (as % of Labour Force)	11.3	9.4	7.9	6.1	5.4
Public Finance					
General Government Balance (€bn)	-7.2	-5.0	-1.8	-1.7	-0.6
General Government Balance (% of GDP)	-3.7	-1.9	-0.7	-0.6	-0.2
General Government Debt, % of GDP	105.2	78.7	75.4	66.2	62.4
External Trade					
Balance of Payments Current Account (€bn)	3.2	26.2	7.6	-5.8	-14.3
Current Account (% of GNP)	1.9	12.7	3.3	-2.3	-5.4

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

NATIONAL ACCOUNTS 2016

A: EXPENDITURE ON GROSS NATIONAL PRODUCT

	2015	2016	Change in 2016		
	€ bn	€ bn	Value	Price	Volume
Private Consumer Expenditure	92.7	96.6	4.2	1.0	3.3
Public Net Current Expenditure	27.0	28.4	5.2	-0.1	5.3
Gross Fixed Capital Formation	53.2	87.7	64.9	2.3	61.2
Exports of Goods and Services	326.6	335.0	2.6	-1.9	4.6
Physical Changes in Stocks	2.4	2.4			
Final Demand	501.8	550.1	9.6	-0.7	10.4
less:					
Imports of Goods and Services	239.9	274.4	14.4	-1.7	16.4
Statistical Discrepancy	0.1	-0.1			
GDP at Market Prices	262.0	275.6	5.2	0.2	5.0
Net Factor Payments	-56.0	-48.8			
GNP at Market Prices	206.0	226.7	10.1	0.4	9.6

B: GROSS NATIONAL PRODUCT BY ORIGIN

	2015	2016	Change in 2016	
	€ bn	€ bn	€ bn	%
Agriculture	3.2	3.2	0.1	1.7
Non-Agriculture: Wages, etc.	76.1	80.3	4.1	5.4
Other	102.3	107.4	5.1	5.0
Adjustments: Stock Appreciation	0.4	0.4		
Statistical Discrepancy	-0.1	0.1		
Net Domestic Product	181.9	191.4	9.5	5.2
Net Factor Payments	-56.0	-48.8	7.2	-12.9
National Income	125.8	142.6	16.7	13.3
Depreciation	61.6	64.5	2.9	4.7
GNP at Factor Cost	187.4	207.0	19.6	10.5
Taxes less Subsidies	18.6	19.7	1.1	6.1
GNP at Market Prices	206.0	226.7	20.8	10.1

C: BALANCE OF PAYMENTS ON CURRENT ACCOUNT

	2015	2016	Change in 2016
	€ bn	€ bn	€ bn
X – M	81.2	56.7	-24.5
F	-51.9	-46.4	5.5
Net Transfers	-3.1	-2.7	0.4
Balance on Current Account	26.2	7.6	-18.6
as % of GNP	12.7	3.3	-8.2

NATIONAL ACCOUNTS 2017

A: EXPENDITURE ON GROSS NATIONAL PRODUCT

	2016	2017	Change in 2017		
	€ bn	€ bn	Value	Price	Volume
Private Consumer Expenditure	96.6	100.1	3.6	1.0	2.6
Public Net Current Expenditure	28.4	28.8	1.6	-1.8	3.5
Gross Fixed Capital Formation	87.7	104.3	18.9	2.9	15.6
Exports of Goods and Services	335.0	368.7	10.0	5.3	4.5
Physical Changes in Stocks	2.4	2.0			
Final Demand	550.1	603.9	9.8	4.0	5.6
less:					
Imports of Goods and Services	274.4	301.8	10.0	3.6	6.2
Statistical Discrepancy	-0.1	-0.1			
GDP at Market Prices	275.7	302.0	9.6	4.4	5.0
Net Factor Payments	-48.8	-52.0			
GNP at Market Prices	226.7	250.0	10.3	4.6	5.4

B: GROSS NATIONAL PRODUCT BY ORIGIN

	2016	2017	Change in 2017	
	€ bn	€ bn	€ bn	%
Agriculture	3.2	3.3	0.1	2.0
Non-Agriculture: Wages, etc.	80.3	85.5	5.2	6.5
Other	107.4	122.9	15.5	14.4
Adjustments: Stock Appreciation	0.4	0.4		
Statistical Discrepancy	0.1	0.1	0.0	0.0
Net Domestic Product	191.4	212.7	20.8	10.9
Net Factor Payments	-48.8	-52.0	-3.1	6.4
National Income	142.6	160.2	17.6	12.7
Depreciation	64.5	69.3	4.8	7.5
GNP at Factor Cost	207.0	229.5	22.5	10.9
Taxes less Subsidies	19.7	20.5	0.8	4.0
GNP at Market Prices	226.7	250.0	23.3	10.3

C: BALANCE OF PAYMENTS ON CURRENT ACCOUNT

	2016	2017	Change in 2017
	€ bn	€ bn	€ bn
X – M	56.6	47.9	8.8
F	-46.4	-51.0	-4.5
Net Transfers	-2.7	-2.7	0.0
Balance on Current Account	7.6	-5.8	-13.4
as % of GNP	3.3	-2.3	-5.3

NATIONAL ACCOUNTS 2018

A: EXPENDITURE ON GROSS NATIONAL PRODUCT

	2017	2018	Change in 2018		
	€ bn	€ bn	Value	Price	Volume
Private Consumer Expenditure	100.1	103.9	3.8	1.0	2.8
Public Net Current Expenditure	28.8	30.1	4.4	0.7	3.6
Gross Fixed Capital Formation	104.3	120.9	15.9	3.5	12.0
Exports of Goods and Services	368.7	398.3	8.0	3.0	4.9
Physical Changes in Stocks	2.0	3.0			
Final Demand	603.9	656.2	8.7	2.7	5.9
less:					
Imports of Goods and Services	301.8	336.0	11.3	3.4	7.7
Statistical Discrepancy	-0.1	-0.1			
GDP at Market Prices	302.0	320.1	6.0	1.9	4.0
Net Factor Payments	-52.0	-54.2			
GNP at Market Prices	250.0	265.9	6.3	2.4	3.9

B: GROSS NATIONAL PRODUCT BY ORIGIN

	2017	2018	Change in 2018	
	€ bn	€ bn	€ bn	%
Agriculture	3.3	3.4	0.1	2.5
Non-Agriculture: Wages, etc.	85.5	90.2	4.7	5.5
Other	122.9	133.4	10.5	8.5
Adjustments: Stock Appreciation	0.4	0.4		
Statistical Discrepancy	0.1	0.0	-0.1	
Net Domestic Product	212.2	227.3	15.1	7.1
Net Factor Payments	-52.0	-54.2	-2.3	4.3
National Income	160.2	173.1	12.9	8.0
Depreciation	69.3	71.7	2.4	3.5
GNP at Factor Cost	229.5	244.8	15.3	6.7
Taxes less Subsidies	20.5	21.1	0.6	2.8
GNP at Market Prices	250.0	265.9	15.9	6.3

C: BALANCE OF PAYMENTS ON CURRENT ACCOUNT

	2017	2018	Change in 2018
	€ bn	€ bn	€ bn
X – M	47.9	41.7	-6.2
F	-51.0	-53.2	-2.3
Net Transfers	-2.7	-2.7	0.0
Balance on Current Account	-5.8	-14.3	-8.5
as % of GNP	-2.3	-5.4	-3.2

The Irish Economy – Forecast Overview

While data for the first quarter of the year suggested a certain slowing in the rate of economic activity, more recent indicators suggests that 2017 looks set to register strong growth for the Irish economy. In particular taxation receipts have increased somewhat in Quarter 2 compared with Quarter 1. Based on this and the continued strong performance of the Irish labour market and related growth in personal consumption we are now increasing our forecast for 2017 to 5.0 per cent for GDP. This is up by over 1 per cent from the last *Commentary*; our GDP forecast for 2018 is marginally increased to 4.0 per cent.

The strengthening of the growth rate comes just as the budgetary process is being finalised. Given the pace of growth over the past number of years, there is certainly no case for the Government to stimulate economic activity with the budgetary package. Indeed some commentators have even suggested that the budgetary policy should be contractionary to prevent the economy from overheating.

At present, given the issues experienced with the National Accounts, it is quite difficult to get a definitive assessment of where the Irish economy stands vis-à-vis its potential level – a key indicator in fiscal policy. Nonetheless, our assessment is that while the economy is certainly converging quite sharply on its sustainable level of activity, a number of indicators, particularly with respect to the labour market, would suggest that there is still some capacity remaining. Therefore, overall, we think the most prudent course of action to take is to adopt a neutral fiscal policy, which neither stimulates nor contracts economic activity.

We examine recent Government expenditure in the *Commentary* noting that any significant movements in total expenditure are mostly explained by variations in capital as opposed to current expenditure. Given the social-infrastructure deficits in housing, healthcare and water provision, one can argue that where public expenditure is increased, the focus should be more on capital investment as opposed to increases in day-to-day expenditure.

In light of the Government's intention to increase capital spending to €7.8 billion by 2021, Garcia-Rodriguez, using COSMO, examines the implications for the domestic economy of such a significant increase in public investment. The overall conclusions are that this increase will expand economic output and also cause a

deterioration in the public finances. In particular, such a capital plan will have to be carefully implemented in order to comply with the fiscal rules.

In another Box in this *Commentary* Morgenroth draws out some important policy conclusions concerning the last period of significant public investment in infrastructure. In particular, Morgenroth notes that it is not how much is spent by the Government which is important but how effectively spending results in net gains for the domestic economy. Also, any public capital plan must support the forthcoming National Planning Framework (NPF).

The issue of whether the change in 2014 which increased the qualifying age for the Irish contributory state pension had a causal effect on the overall retirement rate is explored in a special article to the *Commentary*. Redmond, McGuinness and Kelly compare the retirement rates of two groups of 65-year-olds in 2014; one group was born just after the cut-off date, thereby making them ineligible for the state pension at age 65, while the other group was born just before the cut-off date, making them potentially eligible, subject to meeting the insurance contribution requirements. Overall, no clear evidence of a causal effect on employment or unemployment rates is found. In the context of future possible constraints in the labour market, it is particularly interesting to see how responsive the Irish labour market might be to measures aimed at increasing labour force participation.

The International Economy

The overall outlook for the global economy remains positive through the second quarter of the year; this reflects an improvement in both advanced and emerging market economies. According to consensus forecasts, initial estimates of growth indicated that GDP increased at an annual rate of 3.1 per cent in Quarter 2 reflecting the fastest pace of global growth in two years.

Despite ongoing concerns as to the sustainability of its underlying economic performance, the Chinese economy registered strong year-on-year growth of 6.9 per cent. This should enable authorities to reach the official growth target of 6.5 per cent for the year. It can be argued that additional reform is required, however, to address economic imbalances which persist in the Chinese economy. More generally, other developing countries are benefitting from improving global demand and greater stability in financial markets. One nascent concern is the growing uncertainty concerning key commodity prices; this has the potential to reverse some of the economic gains enjoyed by these countries.

Amongst developed economies, the performance of the Euro Area is relatively impressive with declining unemployment rates and improving domestic demand all contributing to an improved outlook. Even in light of these promising developments, the European Central Bank (ECB) has recently announced no plans to unwind the quantitative easing programme currently in place until December 2017, attributing the decision to a weak underlying inflation rate of 1.5 per cent.

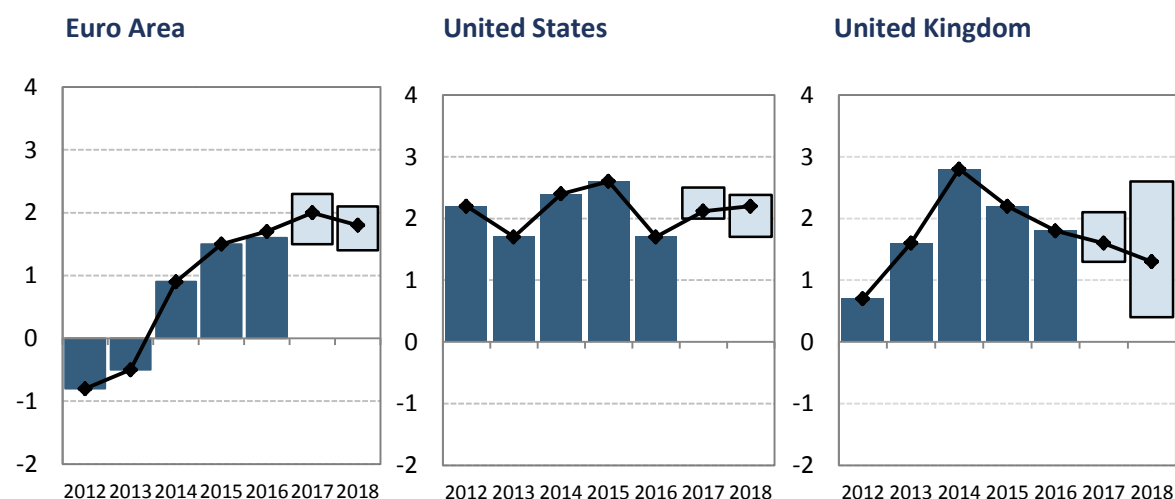
While key US economic indicators such as employment growth, consumer sentiment and housing market activity point to robust economic growth, political uncertainty is especially acute. The Trump administration failed to pass healthcare reform to replace 'Obamacare' while persistent concerns about links between the administration and Russia have all contributed to US political instability. Elsewhere the decision by the Bank of Japan to push back its timeline to reach 2 per cent inflation suggests that Japanese monetary policy will continue to be accommodative for the short to medium term.

THE UK, US AND EURO AREA ECONOMIES

Figure 1 shows the forecasts for GDP growth by some of the major institutions in the respective economies. The outlook overall continues to remain positive over the next two years. The wide bands around the UK forecast for 2017 and 2018 indicate that uncertainty regarding the outcome of Brexit on the UK economy is

still pronounced with GDP forecasts for 2018 ranging from 0.4 per cent to as high as 2.5 per cent.

FIGURE 1 REAL GDP GROWTH (% CHANGE, YEAR-ON-YEAR)



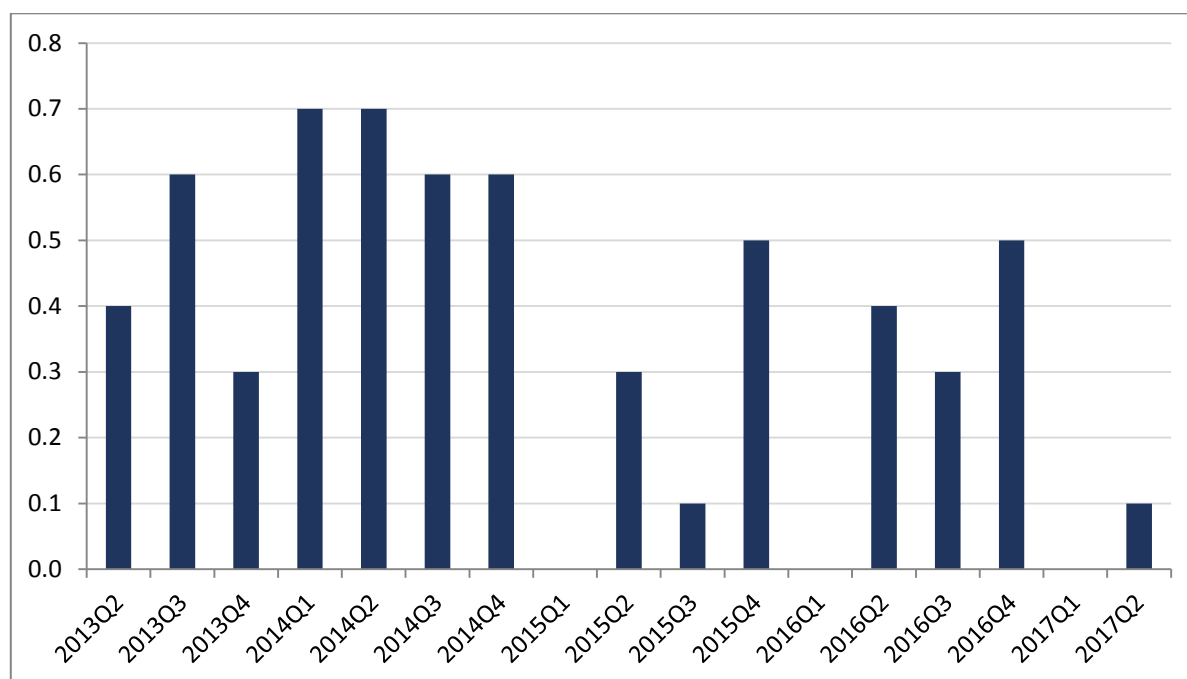
Sources: FocusEconomics, IMF, OECD, HM Treasury and Federal Reserve.

The performance of the UK economy is looking more uncertain as the year progresses; both investor and consumer sentiment has weakened during the summer months and while the unemployment rate continues to fall, the pick-up in inflation, observed since mid-2016, is impacting adversely on real household income. Real wage growth, for example, continues to be negative. Much of the increase in output in the latter part of 2016 was attributable to greater consumer expenditure funded by increased borrowing and a noted reduction in personal savings.

Quarterly growth in UK GDP per head would suggest that increases in the first half of 2017 (2017 H1) have been virtually non-existent.

Some commentators, such as Wren-Lewis (2017),¹ argue that this is evidence of Brexit-related effects negatively impacting the UK economy; the Sterling depreciation immediately after the vote has led to a fall in real incomes, meaning less consumption. There has not been any compensating increase in exports because UK firms are not going to expand in markets that might soon disappear because of leaving the Single Market or Customs Union. Therefore, it can be argued the Brexit depreciation has brought forward some of the negative impacts of Brexit on living standards.

¹ <https://mainlymacro.blogspot.ie/2017/07/the-uk-slowdown-is-result-of-brex-it-and.html>.

FIGURE 2 REAL UK GDP PER CAPITAL GROWTH (% CHANGE, QUARTER-ON-QUARTER)

Source: Office of National Statistics (ONS).

Overall, the performance of the UK economy is expected to weaken in 2017, as higher inflation and uncertainty due to Brexit negotiations are set to adversely impact consumers' expenditure. The accommodative stance taken by the Bank of England (BoE) and otherwise healthy global demand is expected to moderate the slowdown. FocusEconomics are forecasting 1.6 per cent growth for this year with growth in 2018 forecast to fall to 1.3 per cent.

The US labour market displayed strong returns in Quarter 2 with growing evidence of shortages of skilled workers in different sectors of the economy. While wage growth was weak in Quarter 2, the overall effect of strong employment growth, weakening inflation and increased housing market activity are all likely to contribute to growing consumer expenditure. However, against the underlying improvements in the US economy, the Government appears to be deadlocked in its capacity to affect economic performance. The collapse of the healthcare reform bill in early July means that the Republican leadership faces significant difficulties in getting the 2018 budget through the House. This has consequent implications for the ability of the US administration to implement its tax reform agenda.

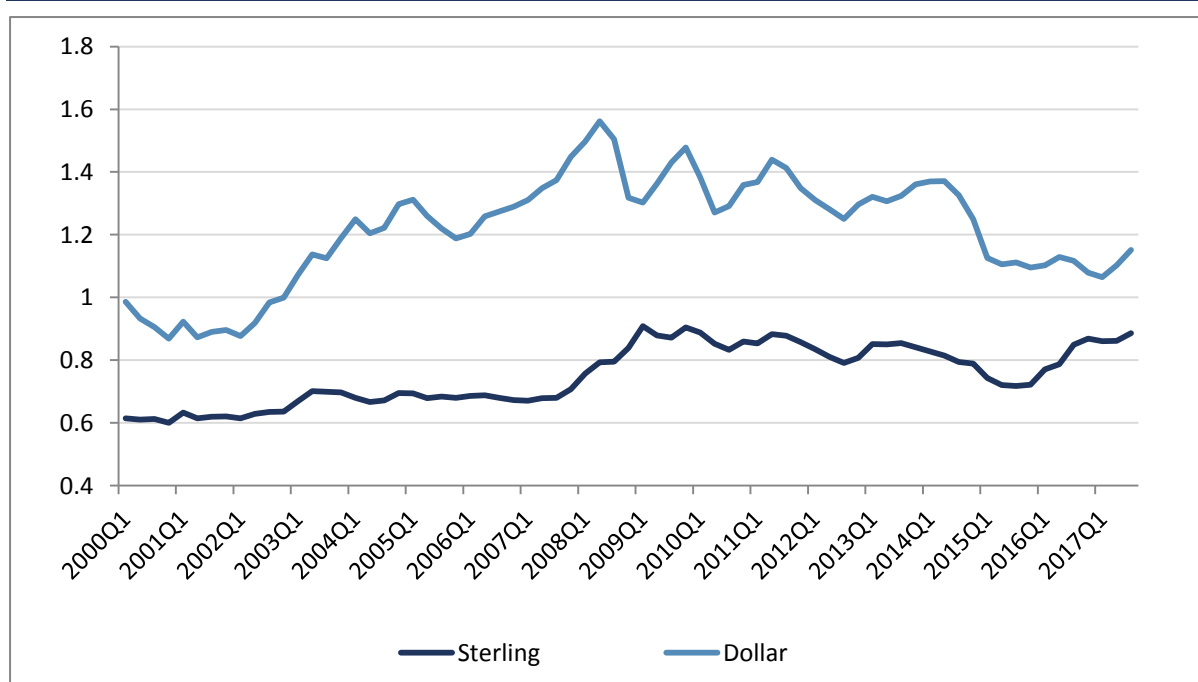
Overall the expectation is that the US economy will grow to a significant degree in 2017 mainly due to improving business and consumer sentiment and a pick-up in

non-residential investment. Consensus Forecast, therefore, is forecasting growth of 2.2 per cent this year with growth expected to pick up in 2018 to 2.3 per cent.

The agenda for the recent gathering of Central Bank Governors and other policymakers at the Jackson Hole conference in August reflected some of the potential policy difficulties impacting the global economy. Rather than the usual commentary on monetary policy, the group focussed more on financial and trade difficulties; with Chairwoman Yellen of the Fed and President Draghi of the European Central Bank, in particular, giving speeches on the dangers of financial deregulation and protectionism respectively.

Evidence of Euro Area recovery continued through 2017 with output growing in a marked manner in Quarter 2. Economic sentiment in the Euro Area increased to a near-decade high in June and the composite PMI points to the best quarterly performance in over six years. Harder economic data also reveal an improved performance with industrial production registering relatively strong increases and unemployment falling to its lowest rate since Quarter 1, 2009. The overall improvement in the fortunes of the Euro Area is reflected in the continued appreciation in the Euro particularly with respect to Sterling. The Euro-Sterling and Euro-Dollar exchange rate since 2000 are plotted in Figure 3. The increase in the Euro-Sterling exchange has significant implications for Irish exporters.

FIGURE 3 EURO-DOLLAR AND EURO-POUND EXCHANGE RATE (€1)



Source: European Commission NewCronos.

Full negotiations concerning the United Kingdom's leaving of the European Union formally commenced in July. A series of position papers have been released by the United Kingdom Government, however the general content appears to be quite aspirational in nature. The chief negotiator on behalf of the EU, Michel Barnier has clearly stated,² that before any future trade relationships between the UK and the EU are discussed, there first must be agreement on three issues:

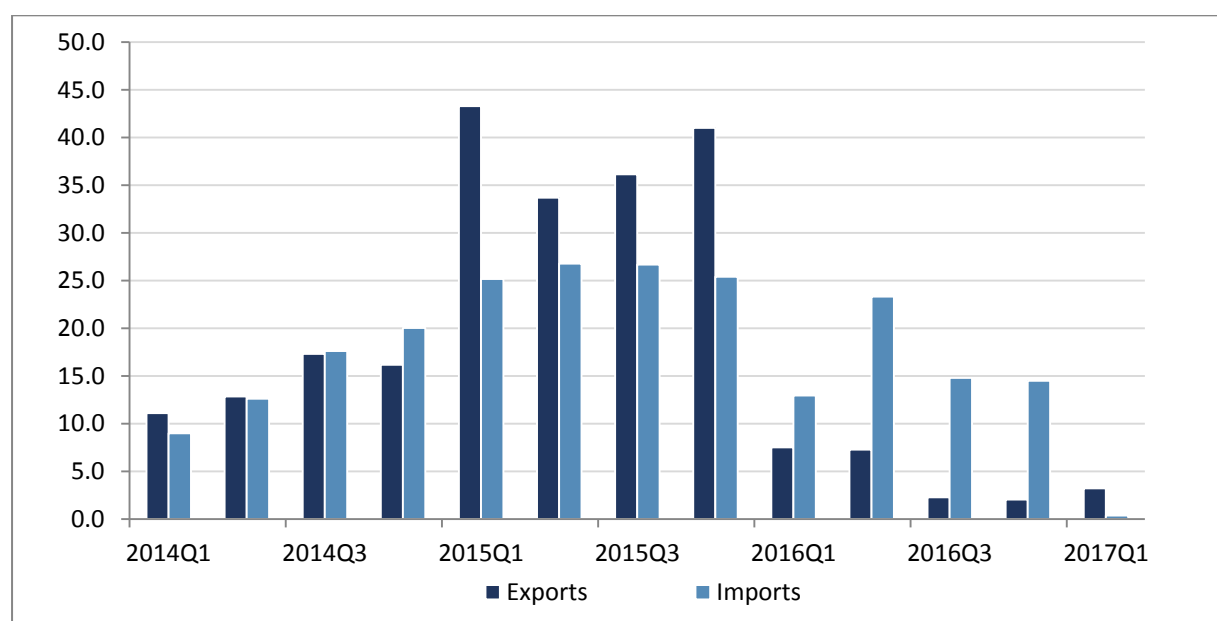
1. The financial cost to the UK of leaving the EU;
2. Clarification of the rights of EU citizens living in the UK; and
3. Agreement on the nature of the border between the Republic of Ireland and the United Kingdom.

Shifting from our Western outlook however, it is also worth noting the recent performance of China. The Chinese economy witnessed significant growth in Quarter 1 of the year with particularly strong property sales and export activity. Data for Quarter 2 suggest that some of this momentum is moderating with weather-related disruptions and lower property sales. The strong performance of the Chinese economy combined with the weaker US Dollar lead to an easing of capital controls by the People's Bank of China (PBOC) thereby reducing the fall in international reserves. The greater success by the Chinese authorities in curtailing capital flight resulted in the Yuan strengthening over the summer period. In response to the strong growth performance the government tightened fiscal expenditure in Quarter 2. Additionally, recent releases from the PBOC illustrate that lending rates in the Chinese economy are gradually increasing in response to the PBOC's attempts to promote financial deleveraging within the economy.

IMPLICATIONS FOR IRISH EXPORTS, IMPORTS AND THE BALANCE OF PAYMENTS

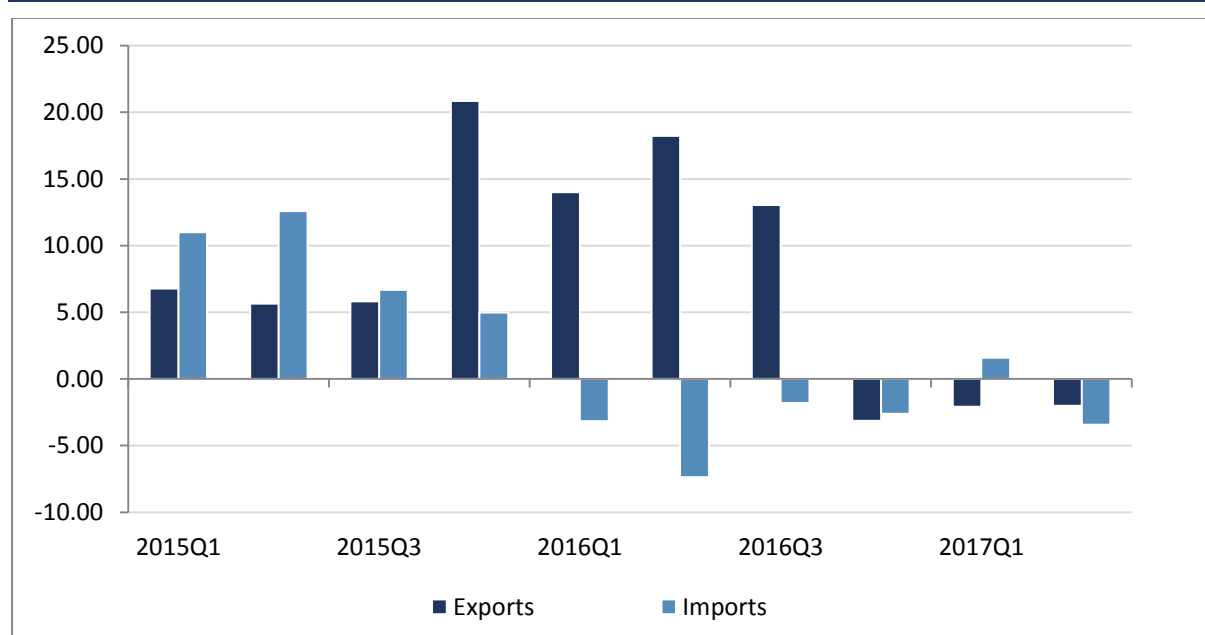
In Figure 4 the annual growth rate of total Irish exports and imports over the period Quarter 1, 2014 to Quarter 1, 2017 is plotted. A key characteristic of Ireland's export performance in 2016 was the difference between services and goods exports. The significant reduction in goods exports in 2016, compared with 2015, was mainly attributable to the reduced levels of contract manufacturing, which had greatly increased the 2015 figures. Services exports on the other hand increased by over 10 per cent in 2016.

² http://europa.eu/rapid/press-release_SPEECH-17-2108_en.htm.

FIGURE 4 ANNUAL GROWTH RATE (%) IN TOTAL IRISH EXPORTS AND IMPORTS

Source: Central Statistics Office.

Contract manufacturing is again likely to have a significant impact on the headline exports figure in 2017. Figure 5 summarises the year-on-year volume growth rates in both goods imports and exports. This suggests negative growth in goods exports for the present year. However, this contrasts with information in the External Trade Statistics (which excludes contract manufacturing) and suggests goods exports are experiencing moderate increases for Quarter 1, 2017.

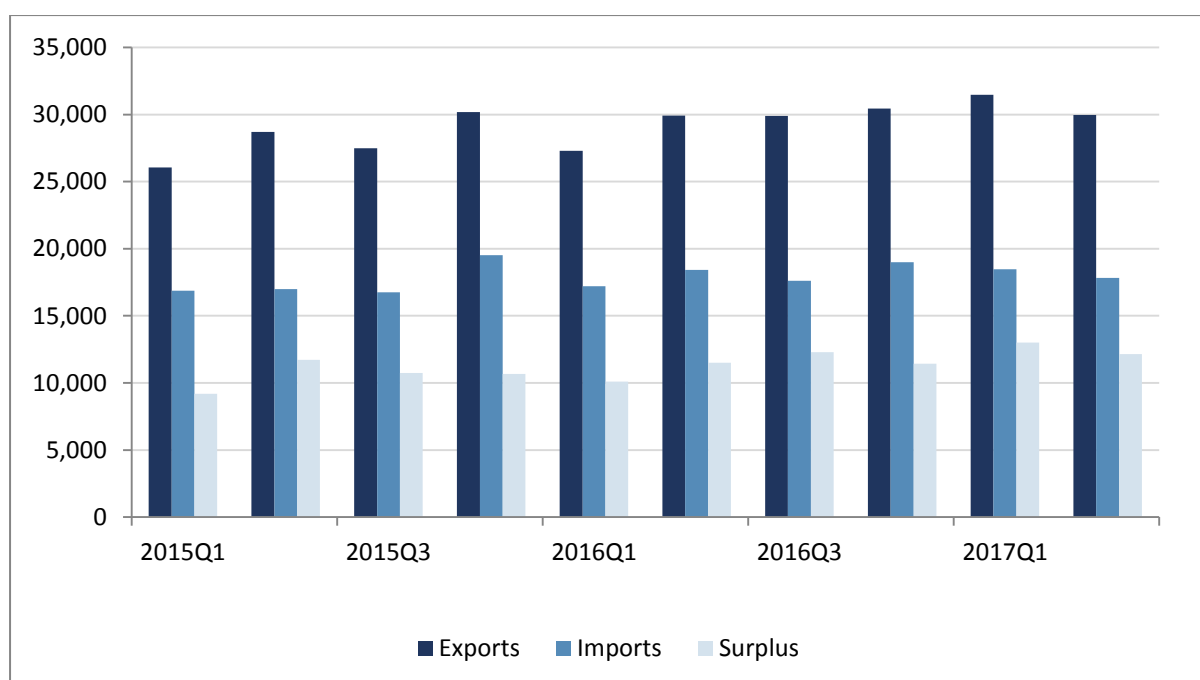
FIGURE 5 GOODS EXPORTS AND IMPORTS YEAR-ON-YEAR GROWTH (%) VOLUME (QUARTERLY)

Source: Central Statistics Office.

Figure 6 plots the quarterly value of Irish exports and imports. There was a 7 per cent increase in the value of goods exports for the first six months of 2017 compared with the same period in 2016. Exports of Other transport equipment actually fell by 90 per cent to €65 million in June 2017 while exports of Food and live animals increased by 26 per cent compared to the previous year; the dairy sector, in particular, observed a substantial increase of €118 million (+77 per cent) compared to the same time last year. Medical and pharmaceutical products also saw a significant increase over the same period.

The value of goods imports from January to July of 2017 increased by 5 per cent compared with the same period for 2016. The largest increase was in Medical and pharmaceutical products, which witnessed a 59 per cent increase from €3,436 million to €5,468 million on a year-to-year basis in 2017. Other transport equipment saw the largest decrease of 9 per cent from €8,446 million to €7,674 million over the same comparative period. Combined, these two goods alone represent 30 per cent of the value of goods imported into the State.

FIGURE 6 QUARTERLY GOODS EXPORTS AND IMPORTS VALUE (€ MILLION)



Source: Central Statistics Office.

The persistent increase in the value of the Euro vis-à-vis Sterling has obvious implications for Irish exporters trading with the United Kingdom. However, in terms of the value of goods exports, the most recent data do not yet indicate any significant slowdown in goods trade between Ireland and the UK. Table 1 summarises annual changes in exports and imports for the year January to June for the UK, the US and the rest of the EU for key commodities.

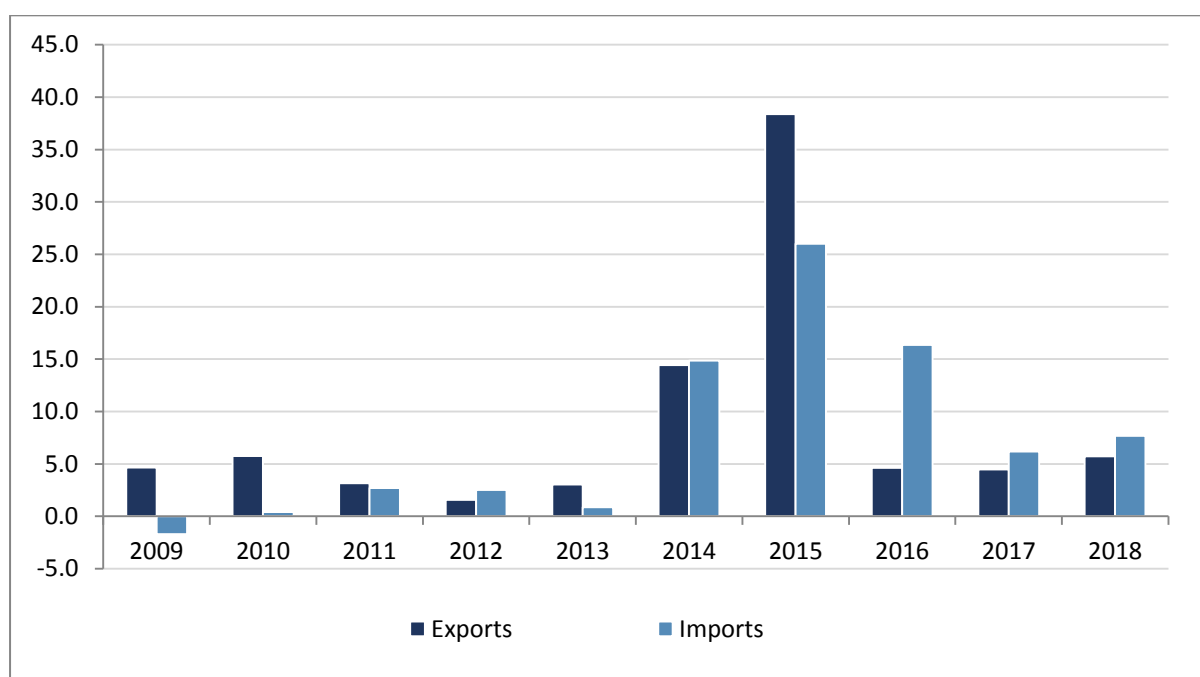
TABLE 1 JANUARY-JUNE ANNUAL CHANGE (%) IN GOODS EXPORTS AND IMPORTS FOR THE UK, THE US AND THE REST OF EU FOR MAJOR COMMODITIES

	Exports	Imports
Total – UK	14	3
Food and live animals	8	39
Chemicals and related products	49	-6
Machinery and transport equipment	-6	-4
Miscellaneous manufactured articles	-2	-3
Total – Rest of EU	1	0
Food and live animals	16	9
Chemicals and related products	3	14
Machinery and transport equipment	-5	-7
Miscellaneous manufactured articles	-16	-4
Total – US	13	8
Food and live animals	47	-17
Chemicals and related products	17	117
Machinery and transport equipment	-8	-31
Miscellaneous manufactured articles	20	-8

Sources: Central Statistics Office.

As can be seen from the Table, total goods exports between Ireland and the UK, in value terms, are up 14 per cent for the period January to June. Exports of Chemicals and related products and Food and live animals constituted the largest increases. There was also a significant increase in trade with the US, while there was relatively little growth overall with the rest of the EU for the same period.

Sentiment indicators such as the Markit Purchasing Manufacturers Index (PMI) indicate that latest trends are consistent with the monthly trade data and point to a continuing expansion of new export orders for both the services and manufacturing sectors in 2017. Based on the latest trends and the expectations of strong growth in our major trading partners, it is likely that exports will grow by 4.5 per cent in 2017 followed by 4.9 per cent in 2018 (Figure 7). As noted in the previous *Commentary*, the robust performance of the Irish labour market and the growing levels of consumer demand result in our expectation of import growth of 6.2 per cent this year and growing a further 7.7 per cent in 2018 (Figure 7). This means that the net contribution to GDP from trade is expected to be moderately negative both in 2017 and 2018 as a result of the reduction in the level of contract manufacturing and a continuing strong level of demand for service imports. However, given the highly influential role that developments in contract manufacturing and aircraft leasing can have on the terms of trade, these forecasts do come with an elevated level of uncertainty.

FIGURE 7 IMPORT AND EXPORT GROWTH (2017-2018 FORECASTS)

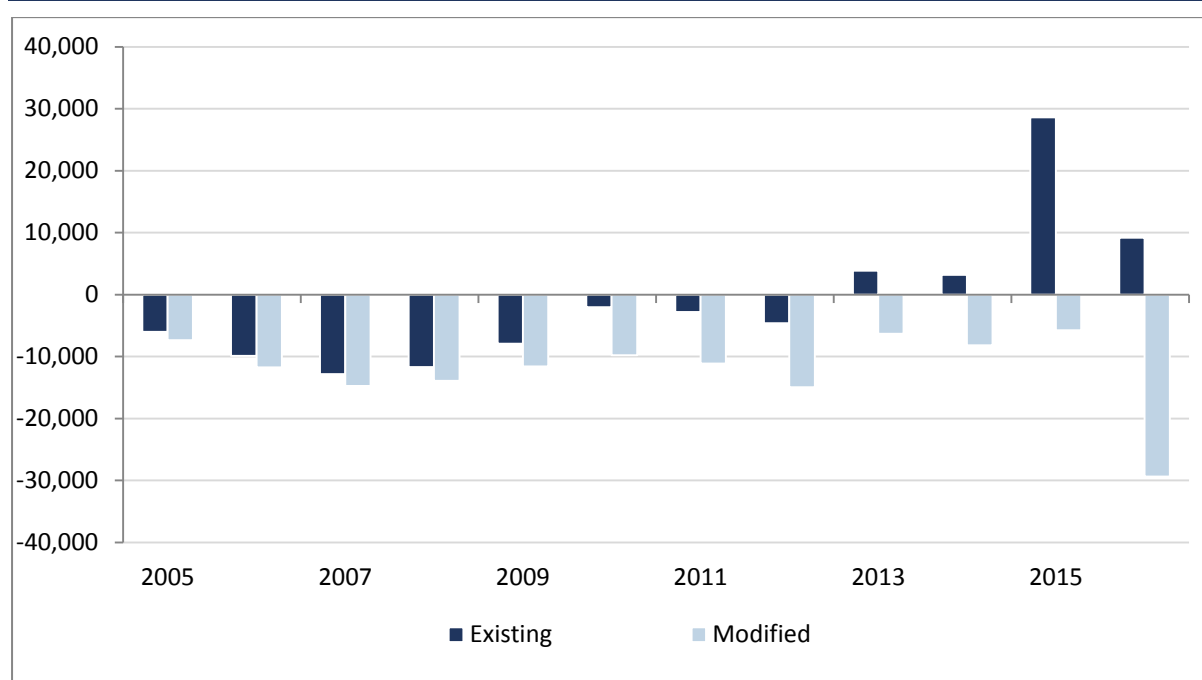
Source: QEC calculations.

Recent developments in the National Accounts have presented particular difficulties in interpreting the Balance of Payments. Therefore, along with the publication of the new output concept (GNI*), the CSO has also published a corresponding modified current account balance measure, known as the Current Account*. Similar to the output concept, the adjustment to the current account balance focusses on the treatment of the factor income of redomiciled companies and the depreciation of foreign-owned domestic capital (such as IP and aircraft leasing). In the unadjusted measure of the current account, the retained income of redomiciled PLCs is recorded as a direct investment inflow. It is only when a dividend is paid to the foreign shareholders that the corresponding outflow is recorded, resulting in a decline in the current account balance at that time. In the modified current account balance, the incomes of these redomiciled plcs are treated as factor income outflows regardless of whether they are distributed as dividends or retained. This adjustment has quite an impact on the current account; the surplus, which was 3.3 per cent of GDP (4.9 per cent of GNI*) fell to 1.2 per cent of GDP (1.8 per cent of GNI*).

Also in the modified current account balance, the depreciation of foreign-owned domestic capital (specifically, intellectual property rights (IP) and aircraft leasing) is excluded on the basis that this is borne by foreign investors. Given that more and more IP and aircraft leasing assets are being relocated to Ireland, the scale of depreciation linked to these (predominantly IP) assets has grown significantly and amounted to almost €33 billion in 2016.

Consequently, when the two adjustments are made to the current account balance, the result is quite striking as can be seen from Figure 8. Instead of a significant surplus as is the case with the existing current account balance in 2015 and 2016, the modified measure reports a sizeable deficit. This does suggest a significant excess of investment over domestic savings financed by foreign borrowing. However, the foreign borrowing is mainly due to the purchase by large multinationals of intellectual property assets from their foreign parents and the cost of aircraft purchases. Profits from the purchase of these IP and aircraft assets will accrue in the future and, consequently, increase future factor income inflows. Furthermore, the increase in large depreciation costs, which also adds to the modified current account deficit, are offset by an equivalent reduction in external liabilities in the Net International Investment Position.

FIGURE 8 **EXISTING AND MODIFIED CURRENT ACCOUNT BALANCE (€ MILLION): 2005 - 2016**



Source: Central Statistics Office.

The Domestic Economy

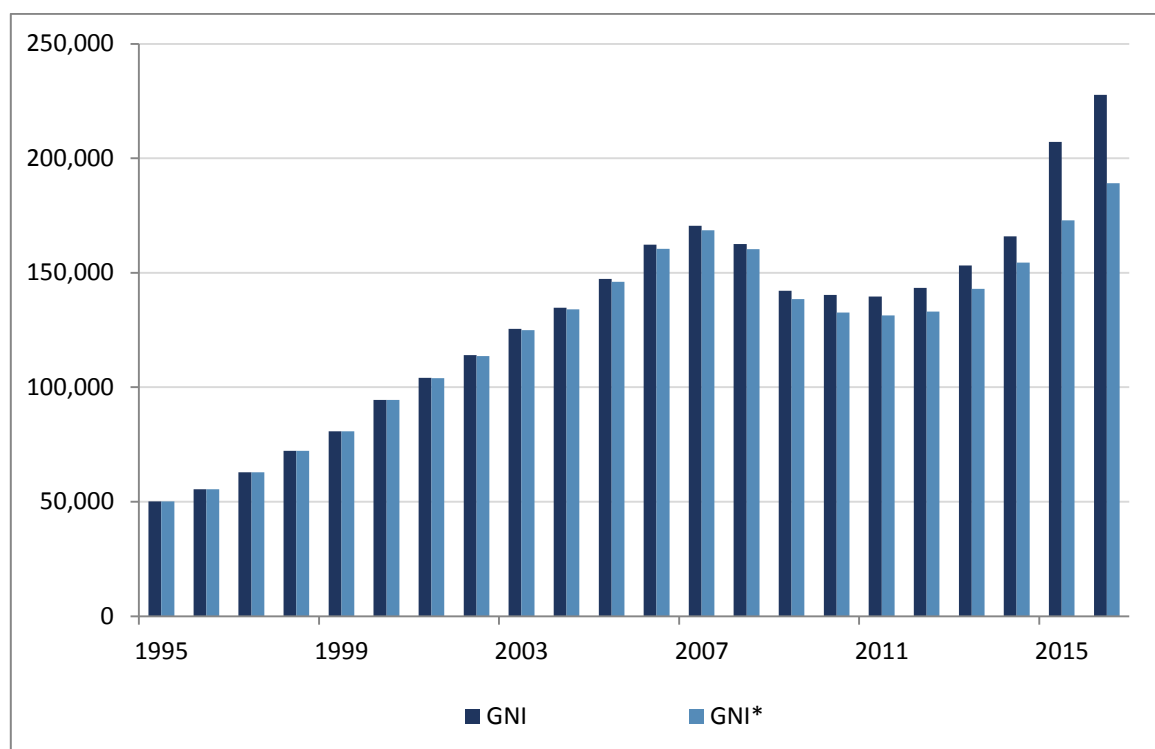
OUTPUT

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.

While growth in taxation revenues appeared to weaken during the first quarter of 2017, Quarter 2 receipts for headline items such as income tax, corporation tax and VAT have all indicated more robust growth. This allied to the continued strong performance of the Irish labour market and consumption registering year-on-year of over 2 per cent, leads us to increase our forecast for GDP to 5 per cent in 2017. We also marginally increase our growth rate for 2018 to 4 per cent.

In June the CSO published an adjusted indicator for domestic economic activity, GNI*, which is a modified measure of Gross National Income. The measure, which was recommended by the Economic Statistics Review Group (ESRG), seeks to remove from estimates of national income large and volatile items such as depreciation on foreign-owned domestic capital assets and retained earnings of redomiciled companies. GNI*, in value terms, is now available from 1995 to 2016 and is derived by subtracting post-tax net operating surplus of foreign investors and depreciation of domestic capital owned by foreign investors from GDP. GNI* was identical to GNI until 2000 and remained highly correlated up to 2009. Post-2009 a significant divergence emerged due to increases in factor income of redomiciled companies and the substantial rise in depreciation on IP imports in 2015 and 2016. For example, in 2015 and 2016, depreciation on IP imports accounts for over 70 per cent of the gap between GNI and GNI*.

Figure 9 plots both GNI and GNI*. In the *Commentary* we will also publish forecasts of GNI*. However, as we typically forecast both GNP and GDP on the basis of some ‘average’ level of factor income and depreciation, our forecasts of GNI* are likely to be highly correlated with the standard output concepts.

FIGURE 9 GROSS NATIONAL INCOME AND ADJUSTED GROSS NATIONAL INCOME (€ MILLION): 1995 - 2016

Source: Central Statistics Office.

In the previous *Commentary*, using output produced by COSMO, Garcia-Rodriguez examined the likely impact for Irish potential output of a hard Brexit. In this next box, again using output from COSMO, Garcia-Rodriguez examines the implication for the Irish economy of an increase in public investment as is likely to be announced in the Government's forthcoming Capital Plan.

BOX 1 THE IMPACT OF PUBLIC INVESTMENT BY ABIAN GARCIA RODRIGUEZ

By increasing growth and promoting private economic activity, the provision of infrastructure and public investment is one of the main prerogatives of any government. In order to reduce public expenditure in the aftermath of the economic and financial crisis, successive Irish governments have significantly reduced levels of capital investment. General government gross fixed capital formation dropped, from a peak of €9.7 billion in 2007 to €3.5 billion in 2012. Even though public investment has recovered some lost ground in recent years, the overall level is still well below that of the pre-crisis period.

To address this, the Government published a Capital Plan in 2014, which set out a six-year framework for investment in Ireland to 2021, with total state backed investment amounting to €42 billion over the period. Recent Government plans show an acceleration of this investment, with gross voted Exchequer capital spending due to rise from €4.2 billion in 2016 to €7.8 billion in 2021.

Such an increase will have a significant effect on the Irish economy, both in the short and the long term. The aim of this article, therefore, is to evaluate the impact of this increase of public investment on the Irish economy in the medium to long term and on the financial position of the Government. This is done through use of the macroeconomic model COSMO.

Some caveats to the analysis should be noted. First, COSMO does not include a ‘productivity channel’, where public investment improves the overall behaviour of the economy by raising its productivity. The following analysis focuses on the impact of public investment on the economy through its effect on internal demand, as opposed to potential long term benefits due to improvements in infrastructure. The existence and the size of these potential benefits would be heavily dependent on the composition of the investment plan. Second, due to the nature of COSMO, our analysis of the impact of public investment is a projection based on the historical reactions of the Irish economy to movements in this variable. Consequently, it could be the case that the impact of public investment in the future is smaller than in the past, due to decreasing returns to investment. On the other hand, investment is considered in aggregate terms, without distinguishing between different specific projects. It could also be the case, for example, that the composition of the investment plan is tilted towards more productivity enhancing projects, which would produce a larger impact than in the past. The results presented here should therefore be understood as a middle ground between these two potential outcomes, conditioned by the historical evolution of the economy.

In this exercise, we simulate two different paths of public investment with the goal of achieving the aforementioned €7.8 billion figure by 2021; the graphical representations can be seen in Figure B.1. Scenario 1 assumes a progressive and linear increase of public investment from the current levels to the desired 2021 figure. Scenario 2, on the other hand, assumes an extreme case where investment jumps in 2018 to the target level and stays there until 2021. The rationale behind this scenario is that there are some economic arguments in favour of frontloading an investment plan: on the one hand, public investment increases capital, potential output and therefore the long-run growth of the economy; therefore, the sooner this investment is realised the better. Similarly, the current environment of low interest rates would make it easier for the Government to finance capital projects. After 2021, the assumption is that public investment will grow at the same rate as the previous baseline projection.³

To improve comparability, Scenario 1 has additional investment in the year 2022 so that aggregate additional investment is the same across scenarios for the period of analysis 2017-2027. Finally, we assume that the plans are debt-financed. The goal of this assumption is to ensure that the simulation only captures the effect of the increase in investment and not, for example, the effect of a tax increase used to finance the plan. In any case, the evolution of the fiscal variables like the deficit or public debt will allow us to observe the potential need for the Government to create additional fiscal space to accommodate these investment plans.

³ Baseline from the Economic Outlook, December 2016.

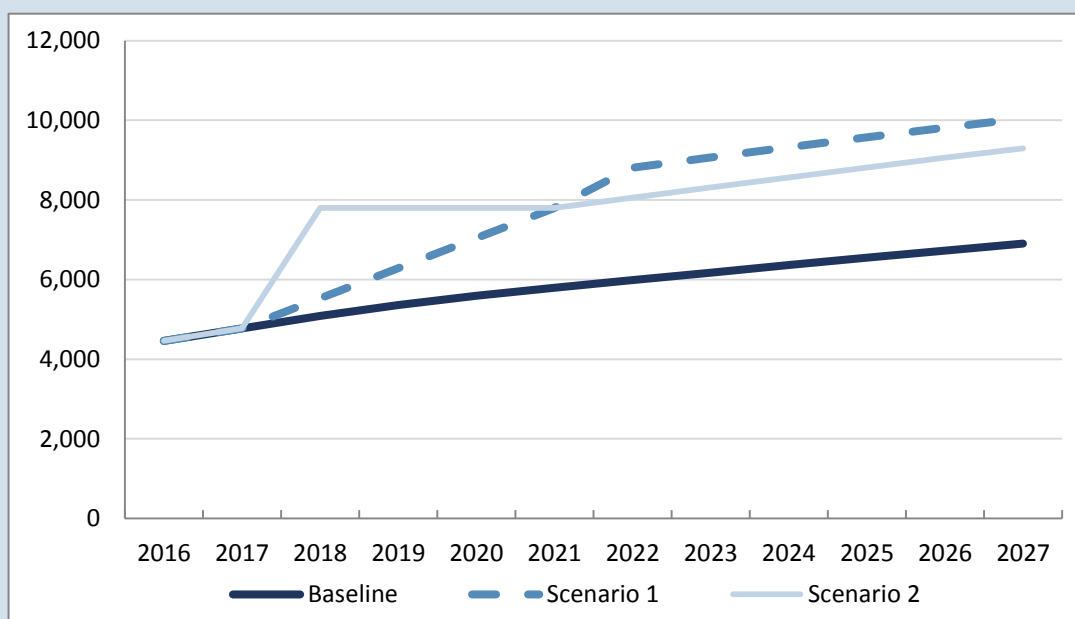
FIGURE B.1 OVERVIEW OF SCENARIOS OF PUBLIC INVESTMENT PLANS (€ MILLION)

Table B.1 presents the results of the simulation of the two scenarios for public investment. The table shows the average deviation from the baseline for each of the simulation periods, 2018-2022 and 2023-2027, as well as the average deviation from baseline for the whole simulation period. The only exception is the Government debt level, which is shown as the deviation from baseline on the last indicated period, to better capture the evolution of this flow variable.

TABLE B.1 IMPACT OF THE DIFFERENT PUBLIC INVESTMENT SCENARIOS, 2018-2027

	Scenario 1			Scenario 2		
Per cent deviation from Baseline Level, average:	2018-2022	2023-2027	Avg.	2018-2022	2023-2027	Avg.
Gross domestic product at basic prices	0.8	1.7	1.3	1.4	1.2	1.3
Potential output	0.6	2.0	1.3	1.3	1.7	1.5
Gross value added at basic prices, Traded sector	0.0	0.0	0.0	0.0	-0.1	0.0
Gross value added at basic prices, Non-traded sector	0.9	2.5	1.7	1.8	1.5	1.6
Total investment	1.7	4.8	3.3	3.4	2.9	3.1
Personal consumption of goods and services	0.9	2.0	1.4	1.6	1.2	1.4
Employed persons	1.1	2.5	1.8	2.0	1.7	1.8
Total wages	1.4	3.7	2.5	2.6	2.7	2.7
Deviation from Baseline, average:	2018-2022	2023-2027	Avg.	2018-2022	2023-2027	Avg.
Personal consumption deflator	0.0	0.1	0.0	0.0	0.0	0.0
Unemployment rate	-0.7	-1.4	-1.1	-1.2	-0.9	-1.0
General government balance, % GDP	-0.3	-0.7	-0.5	-0.5	-0.7	-0.6
Deviation from Baseline, end of period:	2020.0	2023.0	2027.0	2020.0	2023.0	2027.0
General government debt, % GDP	0.2	1.4	4.0	0.8	2.0	4.7

Irrespective of the scenario considered, an increase in public investment raises economic activity. More investment increases the capital stock of the economy, therefore pushing up potential output, which helps long-run growth. In the labour market employment goes up, with particular intensity in the public sector, and unemployment consequently goes down. The combination of more employment and more productive workers, due to the rise of capital intensity of the economy, helps push up wages, which in turn increases consumption. Therefore, the reaction in the economy is felt mostly through the non-traded sector because of the acceleration in internal demand, with a negligible effect on the traded sector. The reaction of prices is essentially flat.

If we compare both scenarios, the intensity of the effects is concentrated on the period where the main investment happens; during the first half of the period of analysis for Scenario 2, where investment was frontloaded, and during the second half for Scenario 1, where the increase in investment was progressive. As expected, the scenario where investment is frontloaded obtains slightly better results in terms of GDP and employment, because of the initial impact on potential output. However, the difference is small and the result for the public finances at the end of the period, measured by the level of public debt as a percentage of GDP, is worse.

For the public finances, the results are clear: despite the positive effect of the increase of public investment on economic activity, the plan results in a deterioration of the Government's fiscal position. In both scenarios considered, the government deficit as a percentage of GDP is on average slightly above 0.5 percentage points larger than the baseline. Therefore, the investment plan would have to be carefully implemented by the Government to comply with the fiscal rules.

In conclusion, the introduction of a plan raising public investment above the current projected baseline level would have a positive effect on the economy in the form of increased demand, employment and wages, but might require an additional effort from the Government to counteract the extra deficit which will arise. Two final remarks to qualify these results: first, despite the beneficial economic effects of a public investment plan, the current position in the economic cycle of the Irish economy should be taken into account. There is the potential for overheating in the economy and expanded government investment would contribute to this. As mentioned before, this analysis does not account for potential long-run positive effects on productivity; if these materialise they would increase the level of potential output in the economy. In any case, implementing a less pro-cyclical profile of government activity could help smooth out spending and investment when the next downturn occurs. Second, and related to the previous point, the present environment of economic growth and low interest rates for government debt in Ireland has an uncertain duration and could end abruptly. The current global outlook has a high degree of uncertainty with significant downside risk. Therefore the Government must ensure it has the fiscal scope to react to any sudden downturns which may occur.

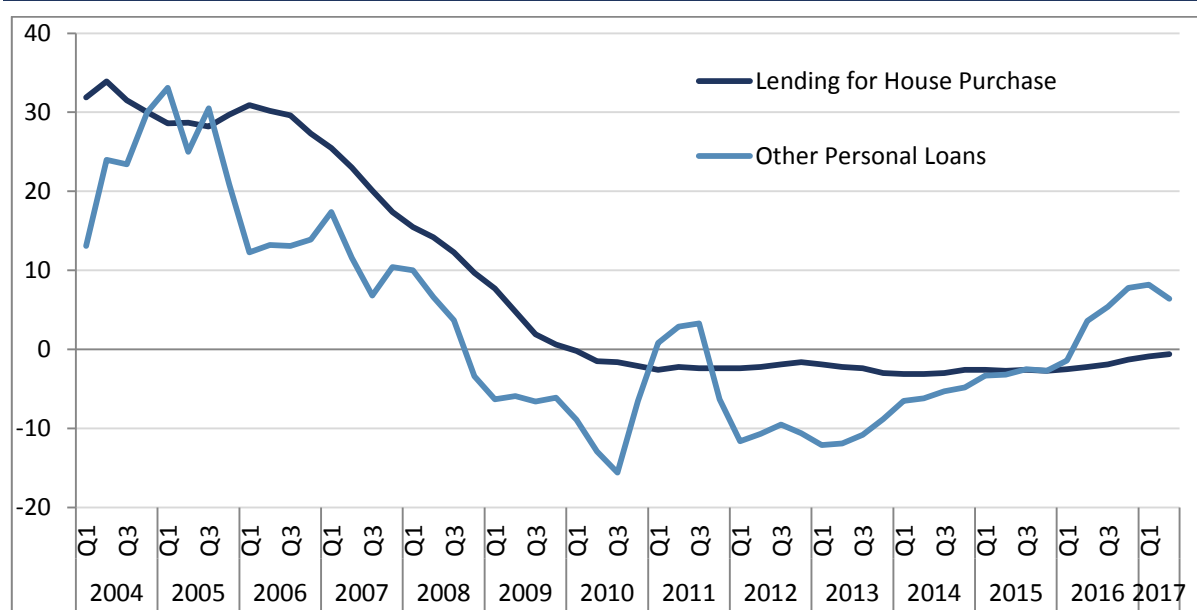
MONETARY AND FINANCIAL CONDITIONS

Trends in lending

As noted in the previous *Commentary*, the Irish financial sector has continued to normalise following a period of protracted contraction and instability. Figure 10 presents the growth rates of credit to households from Irish resident credit institutions. The data are split by loans for house purchase and other personal loans (auto finance, credit cards, student loans etc.). Overall credit for house purchase continues to decline, down -0.6 per cent year-on-year. However, a distinguishing feature of 2016 and the first quarter of 2017 has been a reduction in the pace of deleveraging; the rate of decline has moderated from -2.5 per cent in Quarter 2016 pointing towards the ongoing stabilisation in the residential housing finance market.

In Quarter 2, 2017, we observe an increase in the growth rate of lending for non-housing related household loans which are now up 6.4 per cent on a year-on-year basis. As these loans are mainly for consumption purposes and auto financing, the broader recovery in household spending is undoubtedly leading to an increase in demand for this type of financing. However, the rapid increase in the rate of growth of these loans which began in mid-2016 requires ongoing monitoring to ensure vulnerabilities are not building up through looser lending practices.

FIGURE 10 GROWTH RATES OF CREDIT TO HOUSEHOLDS (%)

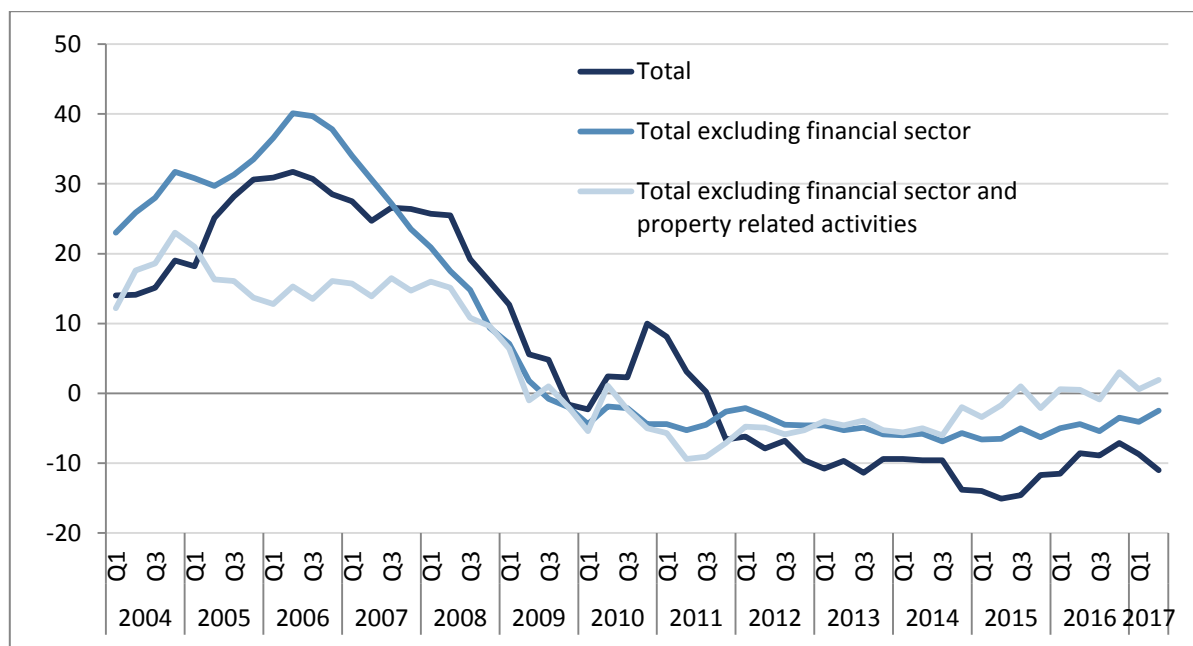


Sources: Central Bank of Ireland, Credit, Money and Banking Statistics.

Notes: Data are taken from Central Bank of Ireland data release A.18, Growth rates series codes 777 and 1,252.

Turning to the provision of credit to non-financial corporations, the overall stock of credit is continuing to decline, down by -11.0 per cent in Quarter 2, 2017 year-on-year. This represents an acceleration in the pace of deleveraging which is in contrast to the findings for households. While credit to firms outside the financial and property related sectors grew by 3.0 per cent in Quarter 4, 2016 year-on-year, this has slowed down to a growth rate of 1.9 per cent as of Quarter 2, 2017.

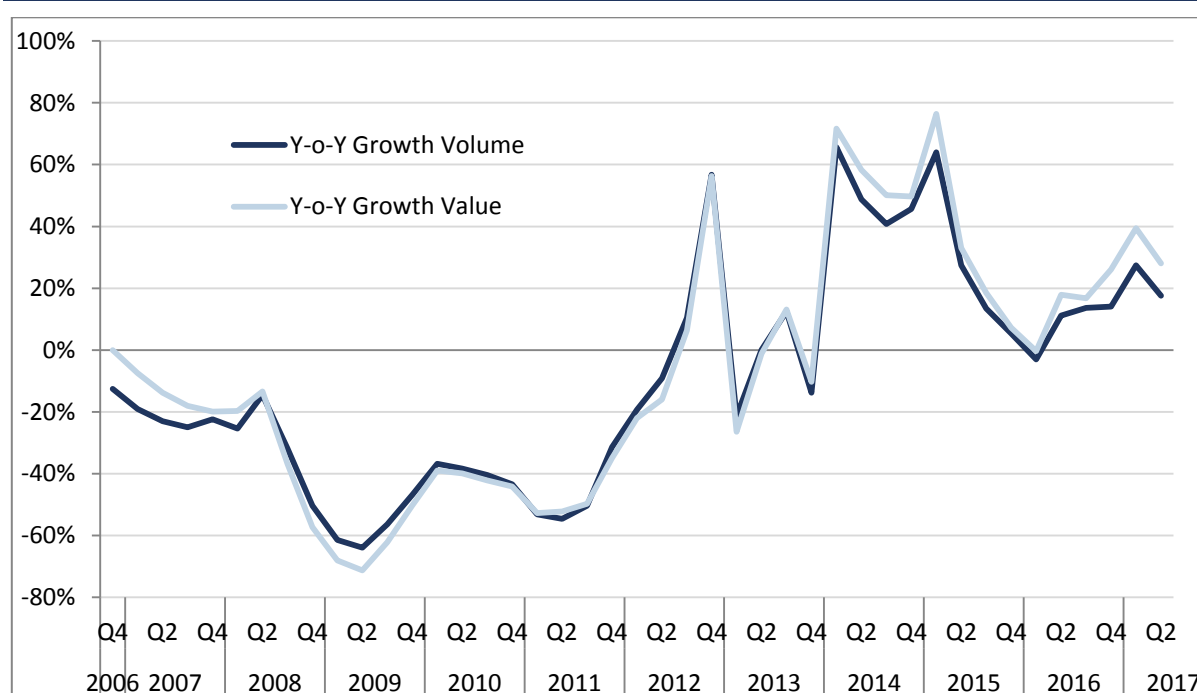
FIGURE 11 GROWTH RATES OF CREDIT TO PRIVATE SECTOR ENTERPRISES (%)



Sources: Central Bank of Ireland, Credit, Money and Banking Statistics.

Notes: Data are taken from Central Bank of Ireland data release A.14, Growth rates series codes 17, 17.1 and 17.2.

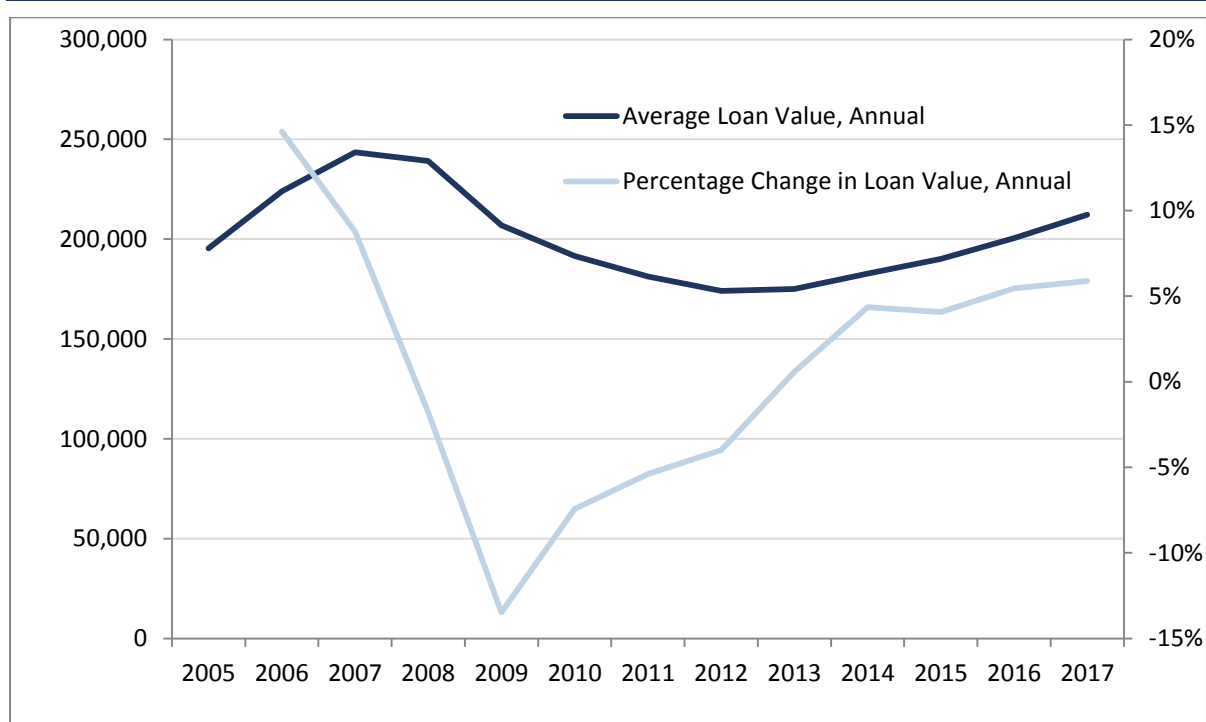
The latest quarterly figures suggest that the financial sector may have some way to go yet to fully unwind historical loan balances. Given the legacy issues in the Irish banking sector, a better understanding of current developments can be gleaned from new lending flows. New lending flows are important as they determine how much credit currently is available for households to consume and businesses to invest. House prices have climbed strongly in recent months and, in line with these trends, new mortgage credit has increased significantly. As can be seen in Figure 12, in Quarter 2, 2017 the volume of new mortgage drawdowns increased by 18 per cent year-on-year and the value of mortgages increased by 28 per cent year-on-year. While this represents some moderation in growth rates relative to Quarter 1, 2017, the figures point to an acceleration in mortgage lending as compared to one year ago.

FIGURE 12 YEAR-ON-YEAR GROWTH RATE OF NEW MORTGAGE DRAWDOWNS (%)

Sources: Banking and Payments Federation Ireland.

As well as monitoring the growth in lending, it is informative to understand developments in the average loan size (Figure 13) in the Irish mortgage market. The size of the loan matters as, through the debt-service ratio, it determines how vulnerable borrowers would be to an interest rate shock or an income shock. If indebtedness is increasing this can leave households vulnerable to any negative affordability events. As house prices rise, this will inevitably lead to households drawing down larger loans. Indeed, as of Quarter 2017, the total average loan value has risen to 87 per cent of peak levels from Quarter 1, 2008. While existing evidence would suggest that current lending activity is based on prudent credit risk assessment (Kingham et al., 2017⁴), constant monitoring of lending activity is required to ensure market stability through good lending practice.

⁴ Kinghan, C., P. Lyons, Y. McCarthy and C. O'Toole (2017). 'Macroprudential Measures and Irish Mortgage Lending: An Overview of Lending in 2016', Economic Letters 06/EL/17, Central Bank of Ireland 2017.

FIGURE 13 AVERAGE MORTGAGE LOAN SIZE (%)

Sources: Banking and Payments Federation Ireland.

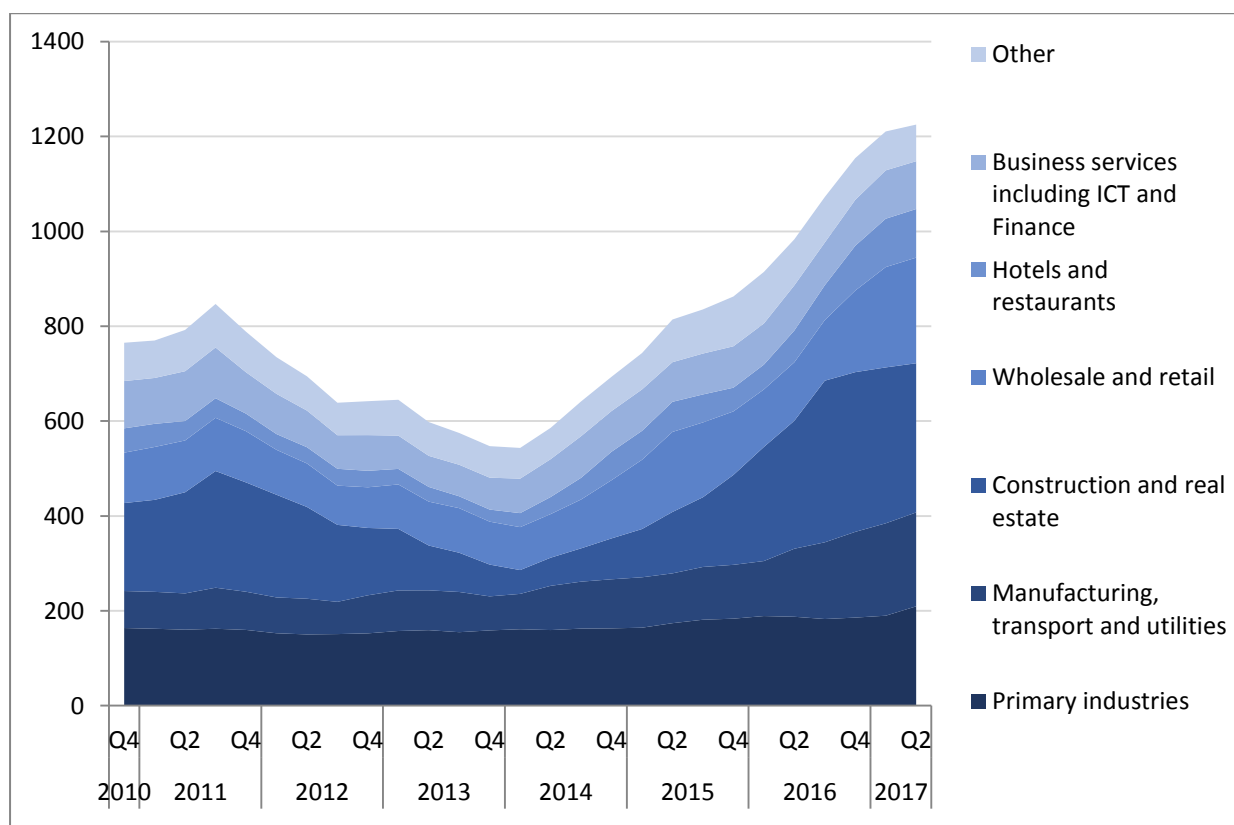
As noted in the previous *Commentary*, with such rapid increases in mortgage credit, it is important to understand whether such trends are sustainable or whether they constitute a financial stability risk. We still hold the view that existing evidence suggests the credit risk of new lending is low and as such does not at present pose a threat to banking sector stability. Kinghan et al. (2017) highlight the lending conditions under which Irish mortgages were originated in 2016; loan-to-value (LTV) and loan-to-income (LTI) ratios were broadly unchanged relative to 2015. However, these data do not cover the first half of this year and it will be important to review the loan level data which cover this period to ensure lending standards are not weakening substantially. If lending standards are loosening on a significant basis, and such rapid growth persists, corrective policy action may be required.

Another aspect of new lending that provides a guide to the health of the domestic economy is lending to small business. Indeed, SMEs have faced very challenging financing conditions since the onset of the financial crisis (Gerlach-Kristen et al., 2015⁵). More recently, loans to Irish small- and medium-sized enterprises (SMEs) have grown steadily in 2016 (Figure 14). This continues the trend in overall SME lending which began to increase in 2015 from mid-2014 lows.

⁵ Gerlach-Kristen, P., B. O'Connell and C. O'Toole (2015). Do Credit Constraints Affect SME Investment and Employment? *The Economic and Social Review*, Vol. 46, No. 1, pp. 51-86.

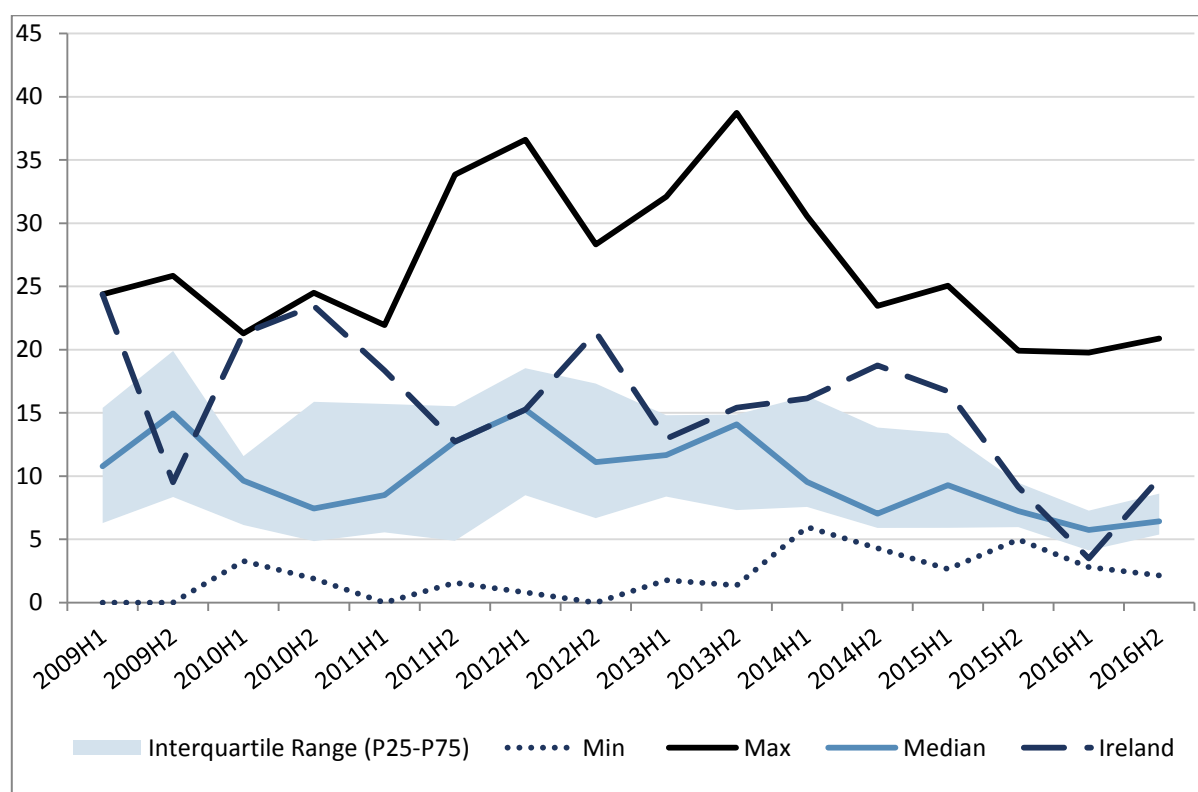
Gross new lending was €1,230 million in Quarter 2, 2017, up from €1,173 million one year earlier. Of note is the sectoral allocation of new financing which has begun to re-orientate recently towards the construction and domestically non-traded sectors. Increased credit extension to these sectors is consistent with the broadening of the recovery in the domestic economy.

FIGURE 14 QUARTERLY NEW LENDING TO IRISH SMES BY SECTOR (FOUR-QUARTER ROLLING AVERAGE)



Sources: Central Bank of Ireland.

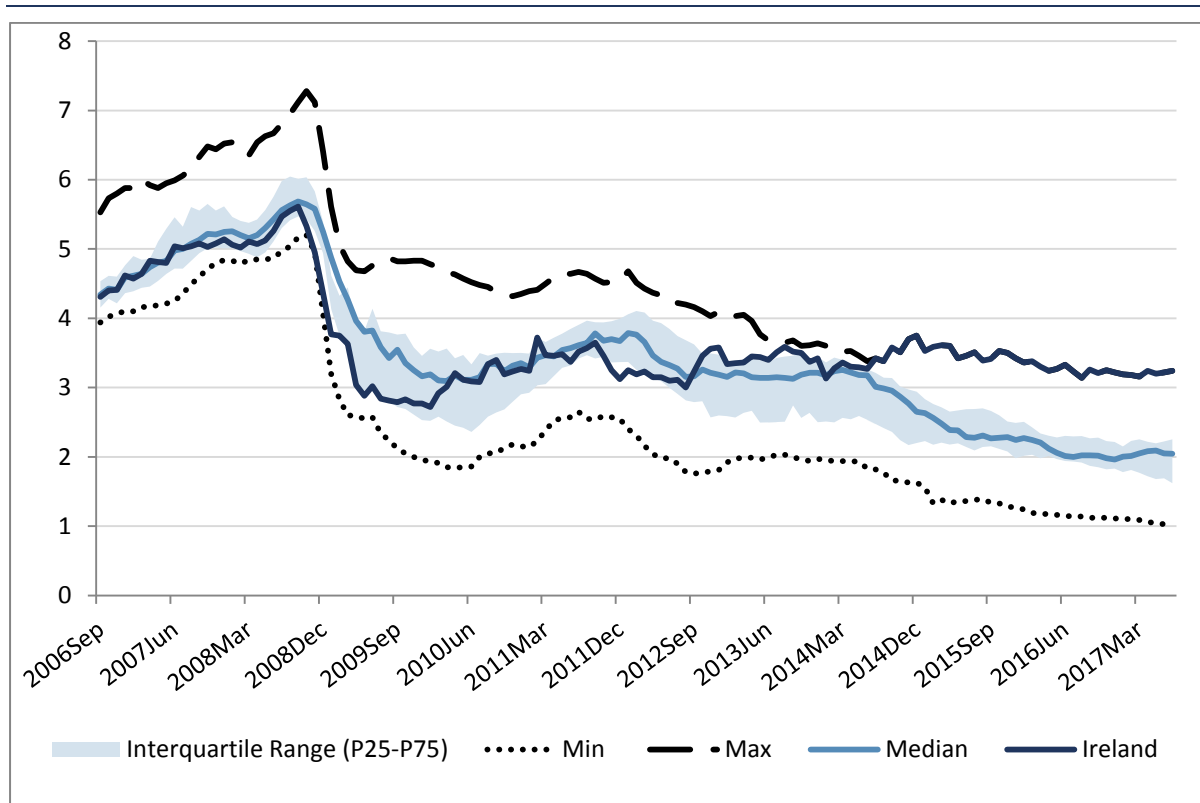
Further proof of the improved financing availability for Irish firms is the continued reduction in rejection rates for bank financing. Data from the ECB Survey on Access to Finance for SMEs (SAFE) provide a benchmark for rejection rates in Ireland relative to other European economies. These are presented in Figure 15. Following the financial crisis, rejection rates for Irish firms increased considerably, and were amongst the highest in the Eurozone. Since mid-2014 rejection rates have been declining in Ireland relative to other countries and by early 2016 were well below the median in the Euro Area. The most recent data for end 2016 indicate a pick-up in rejection rates, however more data are needed to understand whether this relates to a trend break or a once off.

FIGURE 15 AVERAGE REJECTION RATE FOR BANK LOANS - IRISH AND EUROPEAN SMES

Source: ECB SAFE Survey.

Interest rates and the cost of finance

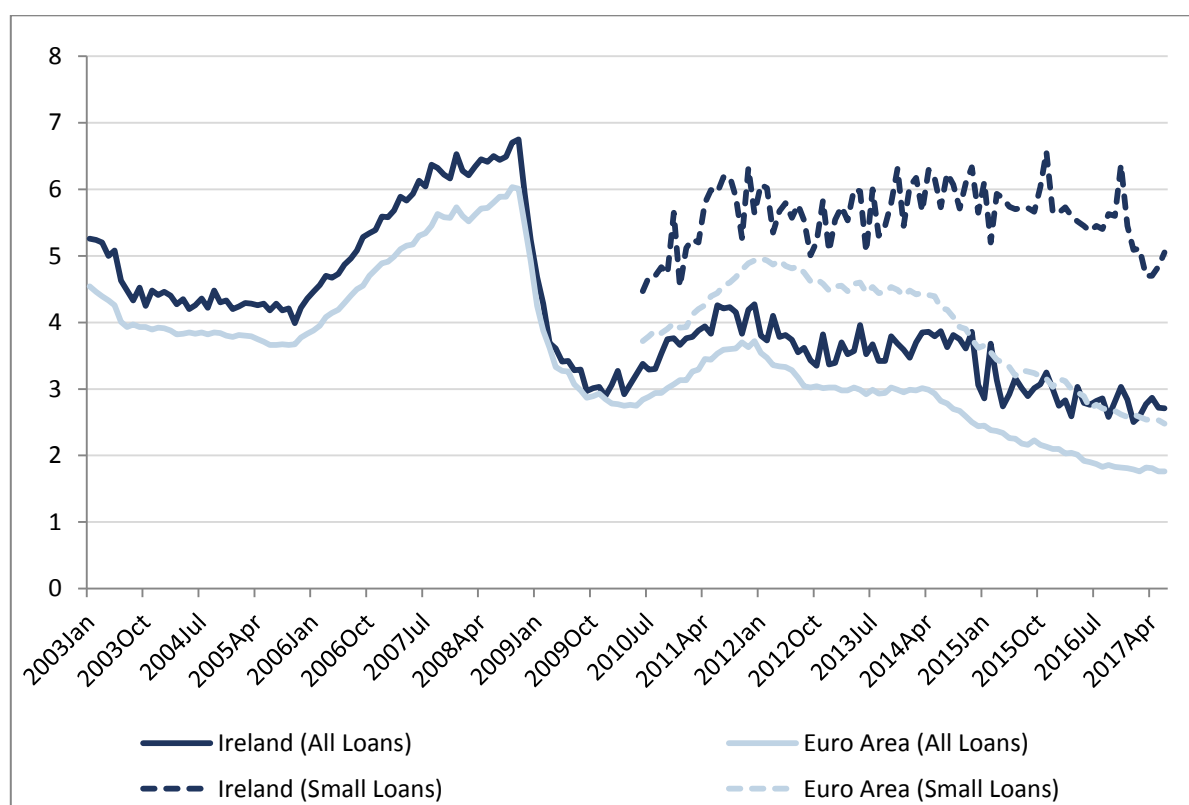
As we noted in the previous *Commentary*, the cost of finance in Ireland for both corporate and household credit is high in a European context. The standard variable rate (SVR) on new mortgage loans in Ireland stood at 3.38 per cent as of Quarter 1, 2017; this is down moderately year-on-year from 3.63 in Quarter 1, 2016. However, comparing Irish new house purchase loans relative to other Eurozone economies, it can be seen that new lending rates are the highest of the comparison group (Figure 16). As of July 2017, interest rates on new house purchase in Ireland were nearly 1.2 per cent higher than the median of the other countries presented. This gap has widened since mid-2014 when Irish interest rates began to decouple from the ECB policy rate.

FIGURE 16 INTEREST RATES ON NEW HOUSE PURCHASE LOANS TO HOUSEHOLDS – EUROPEAN COMPARISON

Source: ECB MFI data.

Notes: Countries included are: AT, BE, EE, ES, FI, FR, IE, IT, LT, NL, PT, SI. These countries are selected due to data availability. Data differ between this chart presented and the text as the ECB comparison data include restructured mortgages whereas the new business SVR is only for new drawdowns.

A similar picture emerges in relation to corporate interest rates. Figure 17 presents the interest rates on new business loans for non-financial corporates in Ireland relative to the average for the Eurozone. Two series are presented: 1) covering all loans and 2) capturing loans of less than €250,000 which is used as a proxy for loans for SMEs. In June 2017, the average rate on new loans for all Irish corporates was 2.71 per cent and the Eurozone average was 1.76 per cent. For small Irish corporate loans, the interest rate in June 2017 was 5.05 per cent compared to the Eurozone average of 2.48 per cent. Interest rates are down year-on-year for small corporates but remain considerably higher than for their European peers.

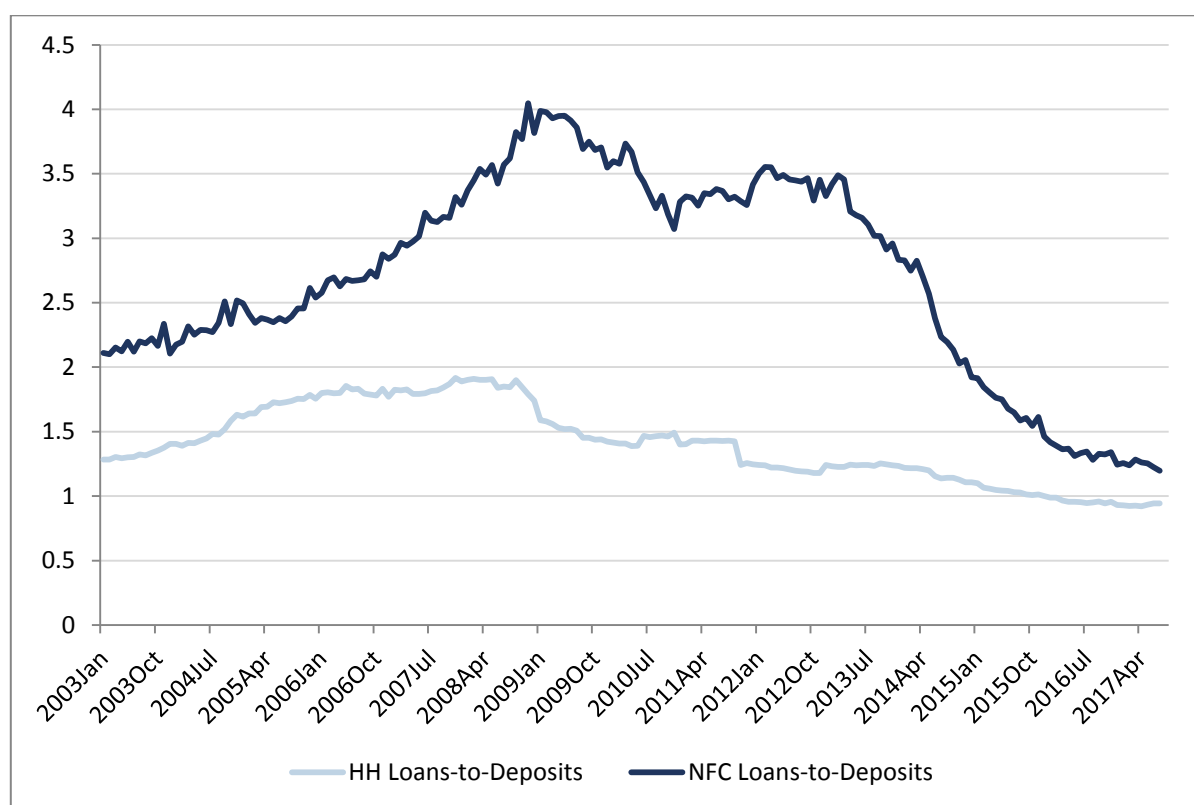
FIGURE 17 INTEREST RATES ON LOANS TO NON-FINANCIAL CORPORATES – EUROPEAN COMPARISON

Sources: ECB MFI data. Small loans refer to loans less than €250,000.

The evident dislocation in the transmission of policy rates to lending rates in Ireland which has occurred since 2014 poses challenges for the effectiveness of monetary policy. This dislocation has occurred while the ECB is following an extremely accommodative policy stance which cannot be maintained in the longer term. Any reversal in rates will pose considerable challenges for key sectors in the domestic economy given the degree of leverage amongst private sector firms and households.

Household and firm deposits

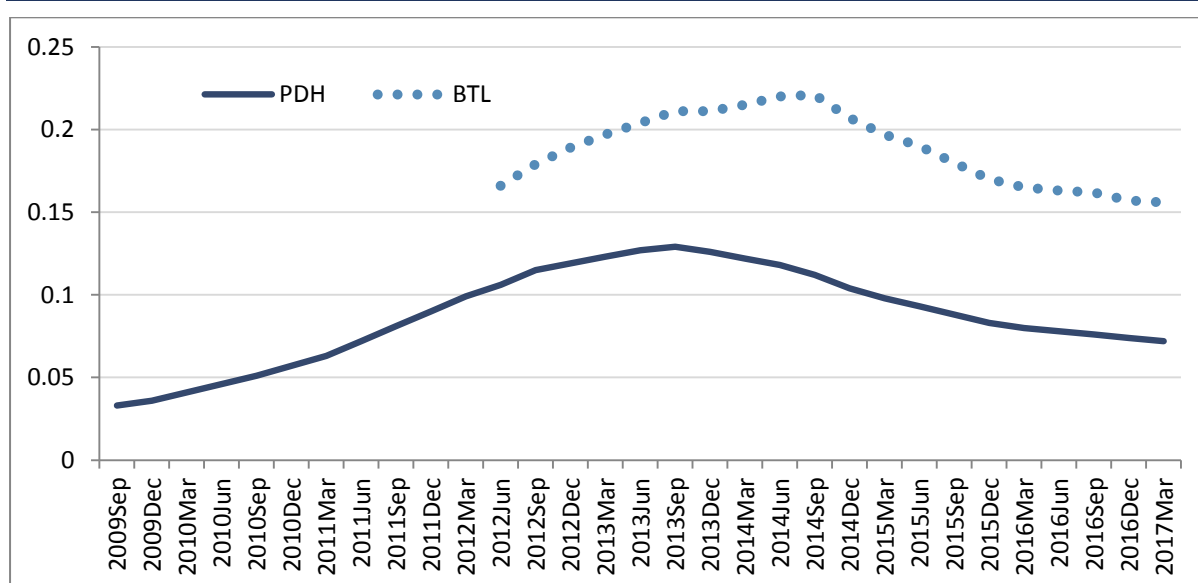
In June 2017, household and non-financial corporate deposits stood at €99.9 billion and €40.0 billion respectively, up from €96.9 billion and €38.1 billion year-on-year. Loan-to-deposit ratios, presented in Figure 18, continued to be less than 1 for households indicating they are net funders of the Irish banking sector. Corporate deposits remain lower than loans indicating they are net borrowers from the Irish banking sector.

FIGURE 18 LOAN-TO-DEPOSIT RATIOS FOR IRISH HOUSEHOLDS AND FIRMS

Sources: Central Bank of Ireland data. Table A.1 columns 1, 5, 12, 15. It must be noted that these loans and deposits relate to only those held on resident credit institutions reporting to the Central Bank of Ireland's Credit, Money and Banking data. Securitised loans serviced by these institutions are not included in the above calculations.

Loan performance

One of the most visible legacies of the Irish financial crisis has been the stubbornly high share of non-performing loans. This is particularly pertinent in the mortgage market where the share of principal dwelling house mortgages in arrears peaked at 12.9 per cent in Quarter 3, 2013. This represented 17.3 per cent of the value of outstanding mortgages. More recently, there has been a marked fall in the share of loans in arrears to 7.1 per cent as of Quarter 2, 2017. This constitutes a total of 10.8 per cent of the balance of outstanding PDH mortgages. The default rate on buy-to-let (BTL) loans has also reduced. The reduction in mortgage arrears has been driven by falling unemployment, recovering house prices as well as concerted policy action to provide modifications to distressed borrowers.

FIGURE 19 IRISH HOUSEHOLD MORTGAGE ACCOUNTS IN ARREARS BY TYPE OF LOAN (%)

Source: Central Bank of Ireland, Mortgage Arrears Statistics.

Notes: PDH refers to principal dwelling houses loans while BTL are buy-to-let loans. Loans are defined in arrears if they are greater than 90 days past due on their payments.

While further improvements in the domestic economy will act to reduce the share of non-performing loans held at Irish banks, in particular in the mortgage market, such legacy issues are surely a drag on the sector's operational activities. Continued policy action by the banking sector is required to deal with non-performing loans and to improve the sustainability of balance sheets which should provide better buffers to withstand economic shocks.

Summary of financial conditions

While the slowing in the pace of deleveraging plus the fall in non-performing loans both point to the continued normalisation of activity in the Irish banking sector, the recent data suggest this process is far from over. Although new lending for mortgages and business is increasing year-on-year, the cost of financing remains high and this can impact adversely on consumption and investment. The growth of credit for mortgages in particular needs constant monitoring to ensure credit risks do not materialise.

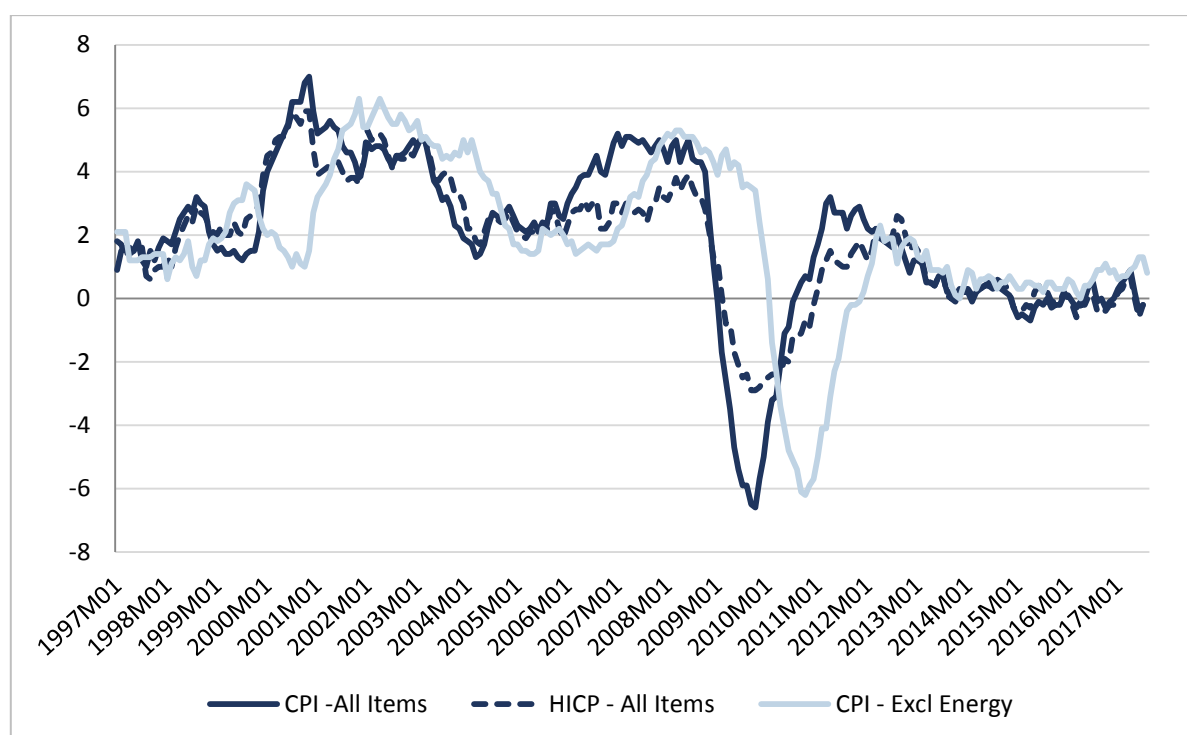
PRICES AND EARNINGS

The start of 2017 saw some upward pressure in the CPI, in June and July 2017 prices fell again while in August 2017 there was a slight recovery as shown in Figure 20 on a year-on-year basis. Consumer price increases continue to remain well below historical levels. In the most recent data, year-on-year changes in the CPI fell back to -0.4 and -0.2 per cent in June and July 2017 while increasing by 0.4 per cent in August. The Harmonised Index of Consumer Prices (HICP) declined

by -0.6 per cent in June and -0.2 per cent in July. However, like the CPI, it increased by 0.4 per cent year-on-year in August. The increase in overall prices in August 2017 was driven mainly by housing, water, electricity, gas and other fuels (up 3.2 per cent from August 2016), restaurants and hotels (up 2.6 per cent from August 2016) and communications (up 2.3 per cent from August 2016).

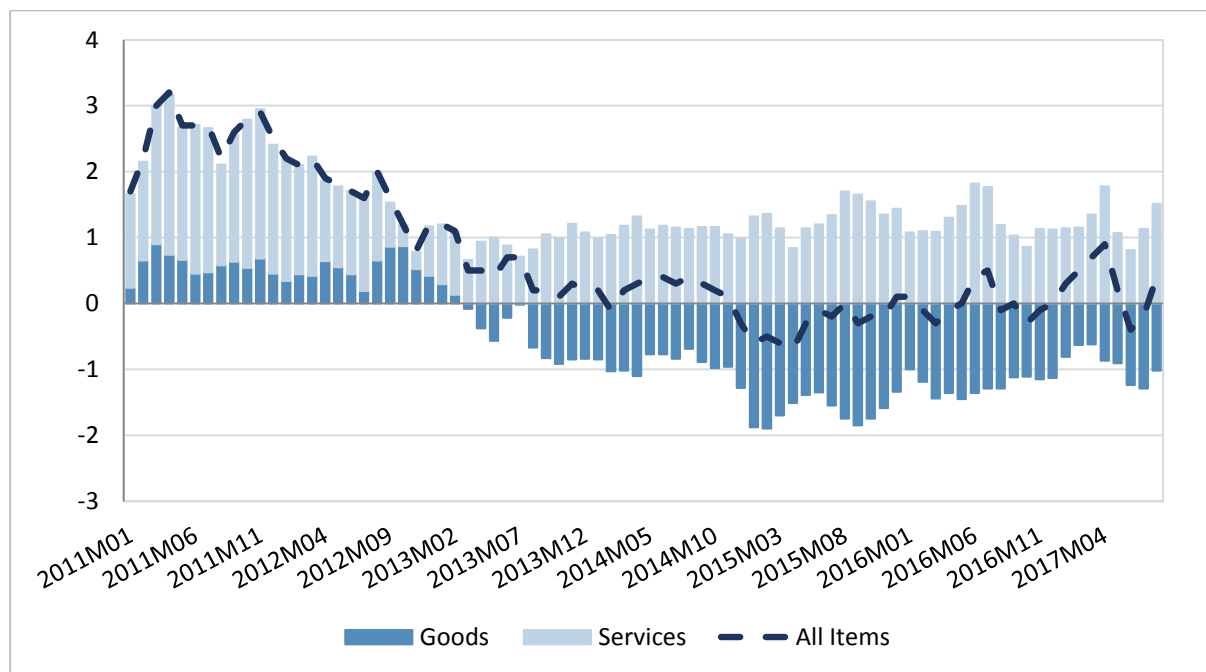
Negative influences on the CPI were due to continued decreases in clothing and footwear (down 4.8 per cent year-on-year to August 2017) and furnishings, household equipment and routine household maintenance (down 3.8 per cent year-on-year to August 2017). Prices for recreation and culture fell by 2.4 per cent and the prices for food and non-alcoholic beverages decreased by 1.7 per cent.

FIGURE 20 ANNUAL GROWTH IN INFLATION (%)



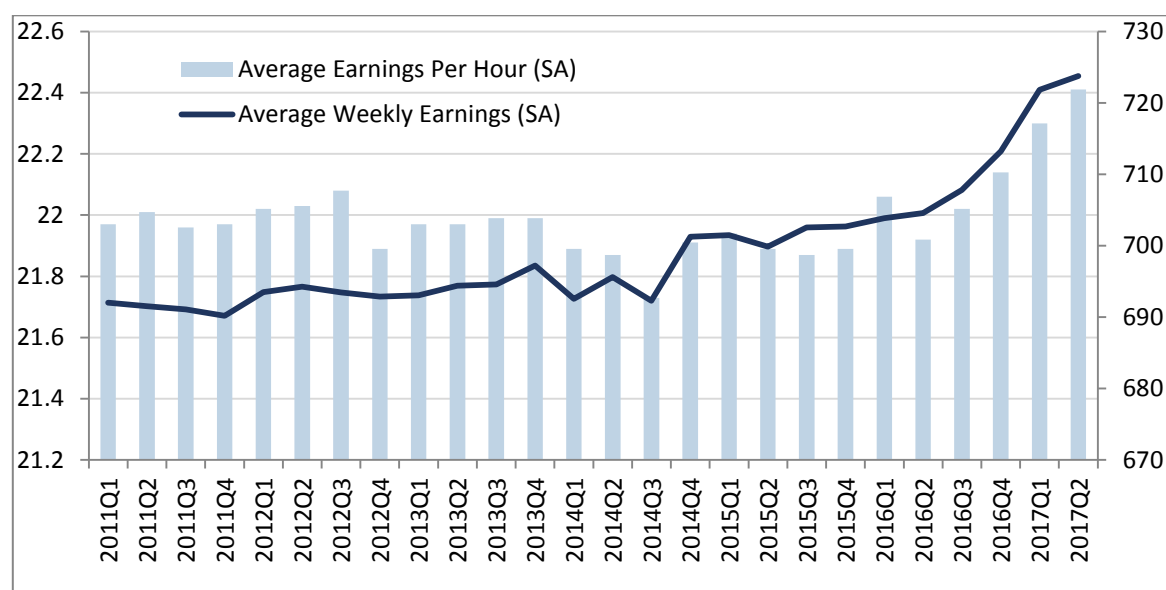
Source: Central Statistics Office.

The underlying recent trends in the CPI (Figure 21) have been steady for some time with goods contributing negatively to the overall inflation rate while the services component continues to exert a positive effect on overall prices. For the most part, this trend is continuing in 2017. While in early 2017, it appeared that the goods component had gradually become less negative, this trend has reversed in June, July and August as goods prices exerted further downward pressure on the CPI.

FIGURE 21 DECOMPOSITION OF ANNUAL (%) CPI GROWTH INTO GOODS AND SERVICES GROWTH

Source: Central Statistics Office.

Quarter 1 earnings data from the CSO show that seasonally-adjusted Average Hourly Earnings increased by 0.5 per cent compared to Quarter 4, 2016. On an annual basis they increased by 0.7 per cent up to €22.68. Of the 13 sectors in the economy, nine of them experienced an increase in Average Hourly Earnings. The largest increase was observed in the transportation and storage sector rising by 3.0 per cent. Other notable increases occurred in the construction and financial and real estate sectors rising by 2.5 per cent and 2.3 per cent respectively. This is consistent with the growing demand for labour in these sectors (Figure 22) due to the pick-up in construction activity in the first quarter of the year. Comparing the public and private sector, similar increases in Average Hourly Earnings were observed in the year to Quarter 1, 2017 of 0.7 and 0.9 per cent.

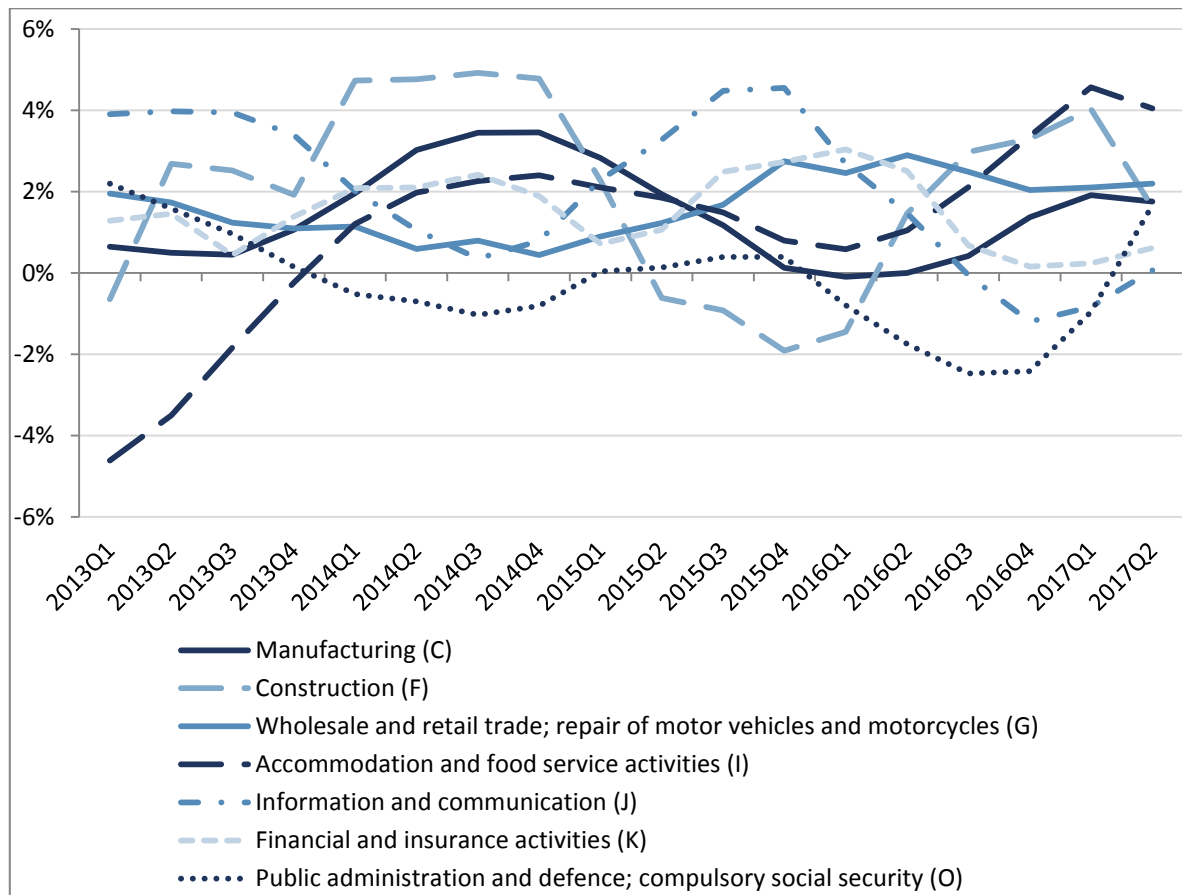
FIGURE 22 TRENDS IN AVERAGE EARNINGS PER WEEK AND PER MONTH

Source: Central Statistics Office.

Note: The y-axis on the LHS scale has a very low range of values.

As economic activity in the broader economy has recovered, pressures are beginning to appear in the labour market where average earnings are growing. Since Quarter 2, 2016, the average earnings per hour and the average weekly earnings have begun to increase pointing towards improved households earnings. As of Quarter 2, 2017, the average weekly earnings, on a seasonally-adjusted basis, stood at €723.74, this represents a modest increase from €721.74 in Quarter 1, 2017. Earnings per hour stood at €22.41 in Quarter 2, 2017 up from €22.3 in the previous quarter.

In terms of overall price pressures and competitiveness issues, it is important to track in which sectors wages are growing. If the growth in wages is mainly in domestically non-traded sectors, this can store up vulnerabilities in terms of a loss in competitiveness. The highest weekly wages in Quarter 2, 2017 were in financial services and ICT sectors at €1,113 and €1,090 respectively. Wage growth appeared to moderate in Quarter 2 in the manufacturing sectors and construction sectors, with growth of 1 per cent and 3 per cent respectively on an annualised basis. Earning in the wholesale and retail sector grew by 3 per cent on an annualised basis, up from 1 per cent in the previous quarter. Figure 23 presents a four-quarter moving average growth rate by sector to display the trends over time in earnings pressures. There is a strong positive trend in the construction and accommodation and food services sectors which began to trend upward from mid-2016. Public sector earnings are also increasing on an annualised basis.

FIGURE 23 FOUR-QUARTER MOVING AVERAGE GROWTH BY SECTOR IN WEEKLY EARNINGS

Source: Central Statistics Office.

Overall, trends in recent data indicate that some price and earnings pressures are emerging. Consumer prices have begun to increase in August, while housing costs are continuing to rise. We therefore expect consumer prices to increase by 1.1 per cent this year and 1.4 per cent in 2018. We have also revised upwards our forecasts for earnings on the back of recent increases in many sectors. We are now forecasting earnings to rise by 2.8 per cent this year and 3 per cent in 2018.

TABLE 2 INFLATION MEASURES

	2015	2016	2017	2018
	Annual % Change			
CPI	-0.3	0	1.1	1.4
Growth in Average Hourly Earnings	2.2	2.5	2.8	3.0

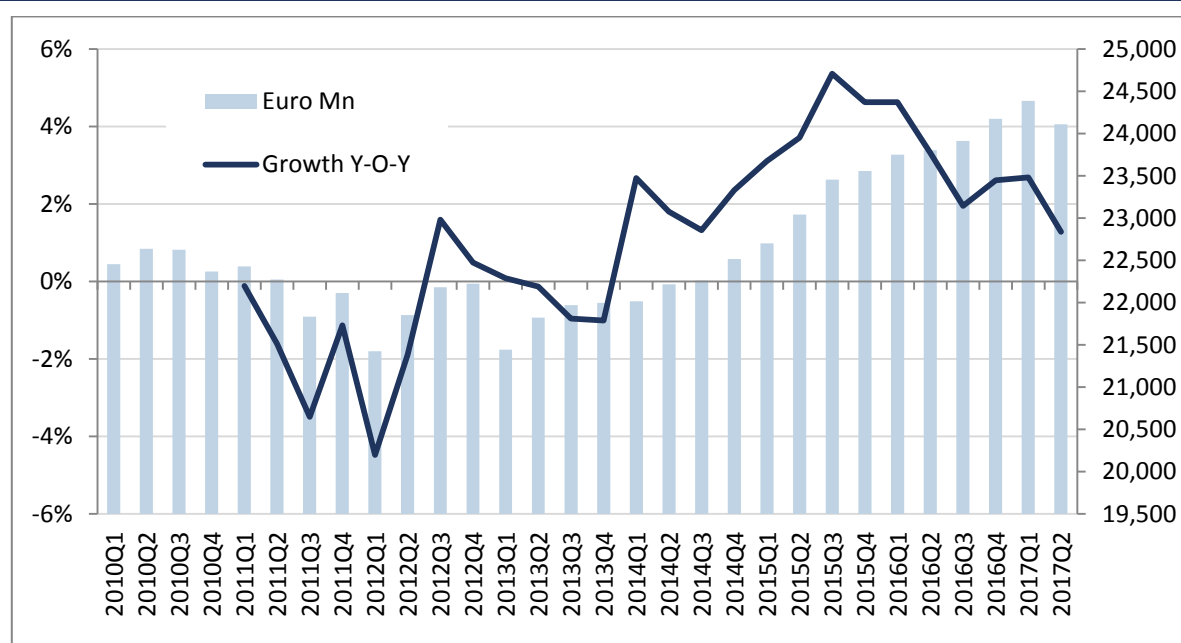
Sources: Central Statistics Office and ESRI forecasts.

DEMAND

Household Sector Consumption

A cornerstone of the recent economic recovery has been the strong growth in domestic consumption. In 2015, 2016 and for the first quarter of 2017, household consumption has continued to grow strongly. The recently released quarterly National Accounts show that on an annualised basis, personal consumption expenditure increased by 1.3 per cent in Quarter 2, 2017, down from 2.7 per cent in the previous quarter. On a quarter-on-quarter basis, consumption spending fell marginally. Slowing of consumption growth is mainly driven by the decline in motor sales as, with the weakening in Sterling, Irish consumers are increasingly purchasing second-hand cars from the UK. We discuss this in more detail below in the context of the retail sales data. Despite this development, we still see improvements in household balance sheets, the persistent fall in unemployment and modest increases in disposable incomes, as providing a supportive environment for further consumption growth.

FIGURE 24 QUARTERLY PERSONAL CONSUMPTION ON GOODS AND SERVICES – CONSTANT MARKET PRICES AND SEASONALLY ADJUSTED



Source: Central Statistics Office.

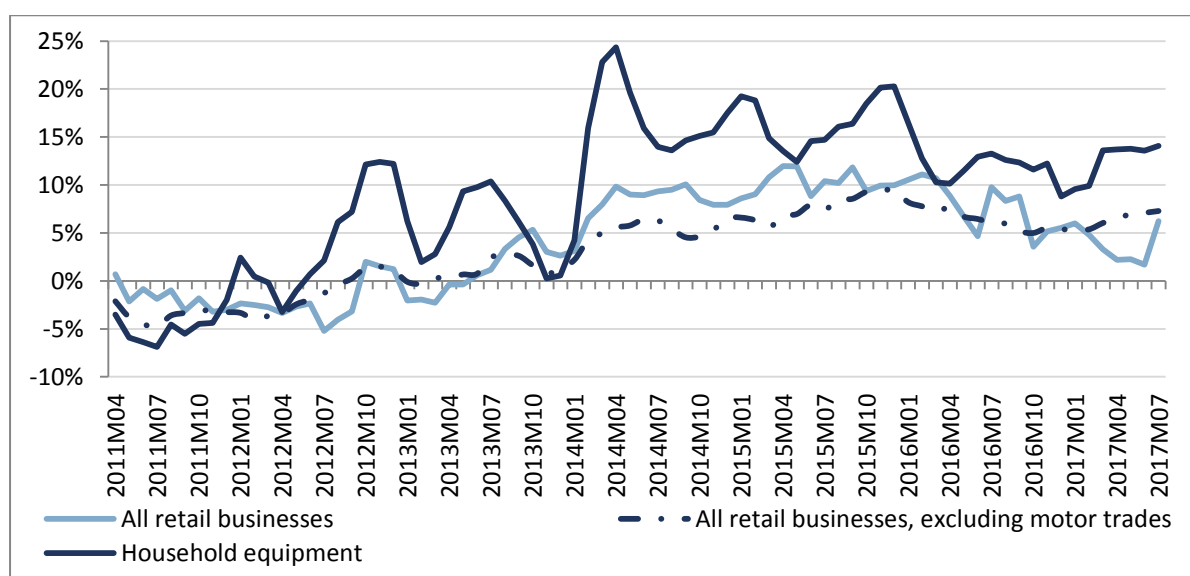
Another important leading indicator for household consumption is developments in retail sales. These indicators provide a snapshot into exactly what goods and services households are purchasing and where the growth is coming from. Table 3 presents retail sales for selected items in terms of the annual growth rate in the volume of sales. For all businesses retail sales are up 2 per cent in the year to July 2017. However, this reasonably modest increase masks considerable variation across different types of goods.

TABLE 3 ANNUAL GROWTH IN SELECT RETAIL SALES (VOLUME) ITEMS (JULY 2017)

Retail Business – NACE REV 2	Volume of Sales
	Annual % change
Motor trades	-6.4
Non-specialised stores (excluding department stores)	2.6
Department stores	6.6
Clothing, Footwear and Textiles	11.6
Furniture and lighting	18.1
All businesses excl. motor trades	7.0
All businesses	2.1

Source: Central Statistics Office.

Much of the sluggishness in retail sales comes from a reduction in activity in the motor industry, potentially impacted by the falling value of Sterling which cheapens imported cars from the UK. According to recent SIMI data, 44,503 second-hand cars from the UK were purchased by Irish citizens for the first half of 2017, representing a 45.9 per cent rise year-on-year on the numbers purchased in 2016. Considering retail sales without motor trade, we see a rapid increase in clothing, footwear and textiles (up 11.6 per cent year-on-year) and furniture and lighting (up 18.1 per cent year-on-year). The recovery in the housing market would appear to be feeding in to the expenditure on furniture and lighting. The overall trends in retail sales are documented in Figure 25. This chart presents a three-month rolling average of retail sales for the total sales, sales excluding the motor trade, and for household equipment. Of note is the high growth in housing equipment and the continued strength of all retail sales excluding the motor trade.

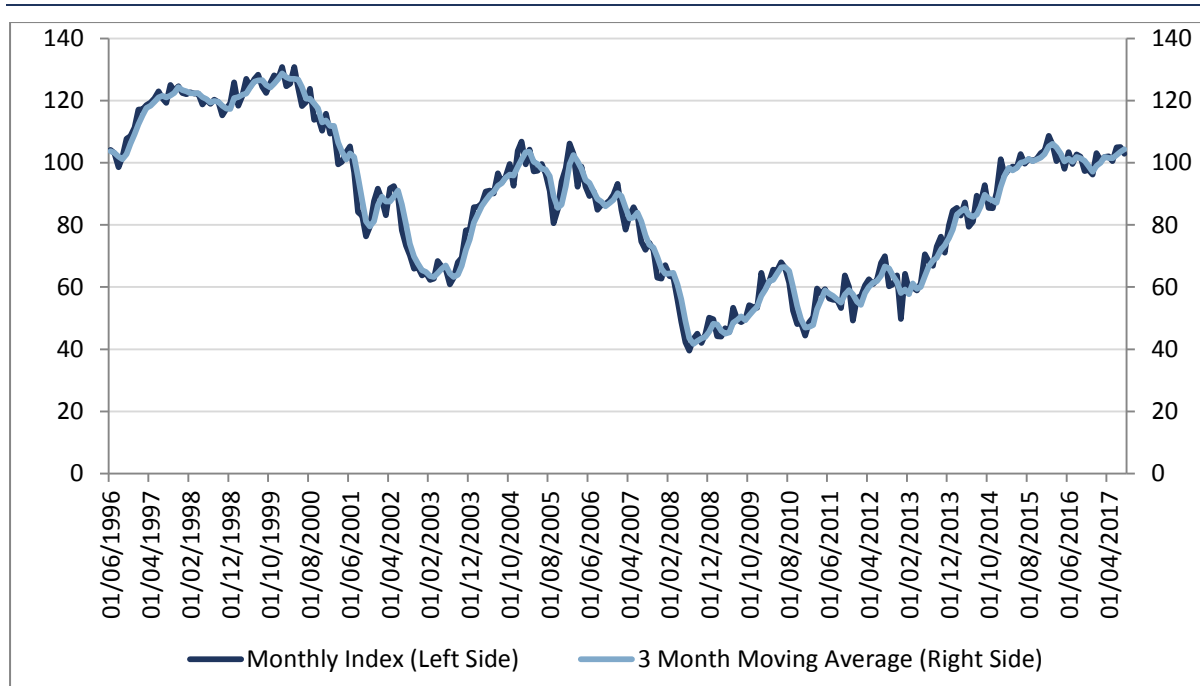
FIGURE 25 AVERAGE GROWTH IN RETAIL SALES INDEX VOLUME ADJUSTED (BASE 2005=100), THREE-MONTH ROLLING AVERAGE

Source: Central Statistics Office.

Figure 26 presents the ESRI/KBC Consumer Sentiment Index which tracks the monthly views of households on their current and future economic perspectives. While international geopolitical factors were likely to have contributed to a weakening of consumer sentiment in mid to late 2016, the first half of 2017 represented somewhat of a recovery in consumer sentiment. From January to July 2017, the index has grown strongly; however the index has softened in August 2017 reflecting pessimism amongst consumers in relation to views on making large household purchases. Greater investigation of the consumer sentiment index highlights the fact that households are still quite optimistic in regard to future developments, however this optimism stems from their views on the broader economy and the wider labour market. Consumers are much more pessimistic in regard to their own personal finances with current and future developments seen as resulting in greater budgetary pressures.

These findings would appear to highlight a degree of frustration amongst consumers with their views on the broader economy potentially influenced by the positive economic information in the news. However, many households are not seeing this feed into their own pockets.

FIGURE 26 ESRI/KBC CONSUMER SENTIMENT INDICATORS

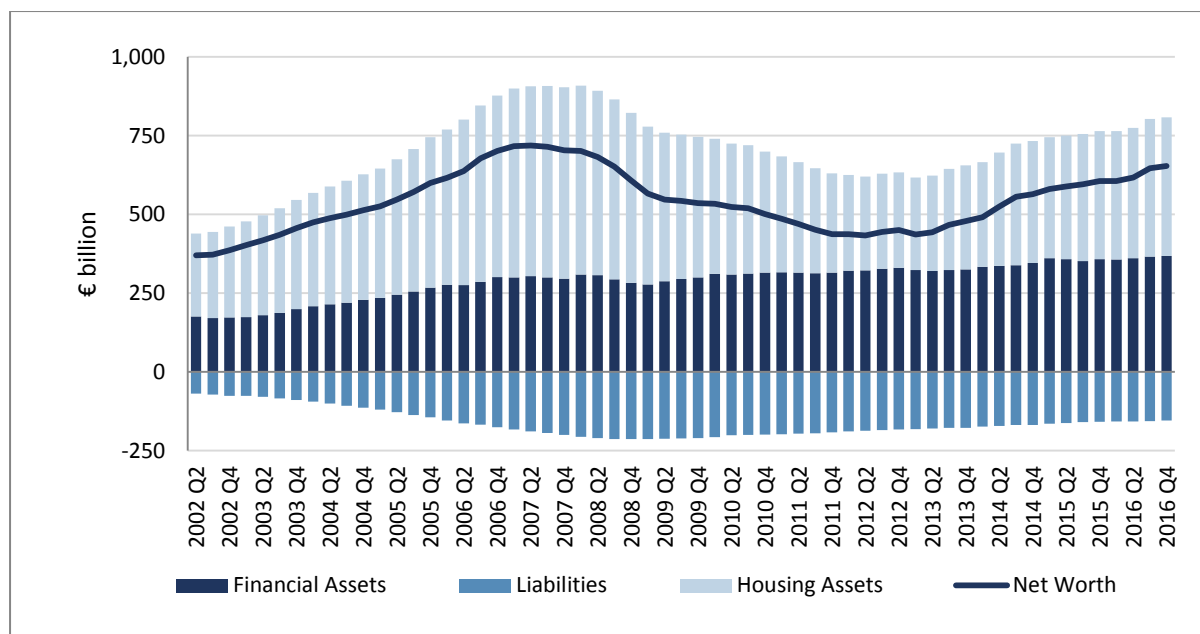


Source: ESRI/KBC.

Irish household net worth continues to grow into Quarter 4, 2016 as loan repayments reduce the stock of outstanding liabilities and rising asset prices raise the total value of domestic balance sheets. The trend in the overall position of Irish households' net worth, which is the stock of financial and housing assets

minus the stock of liabilities, is presented in Figure 27. The financial crisis considerably decreased net worth as housing assets fell sharply in value. The recovery in the housing market has contributed to a rise in housing wealth which has improved overall net worth. Financial assets have grown modestly since 2010. As households continued to pay down debt balances, the liabilities side is further shrinking.

FIGURE 27 IRISH HOUSEHOLD NET WORTH

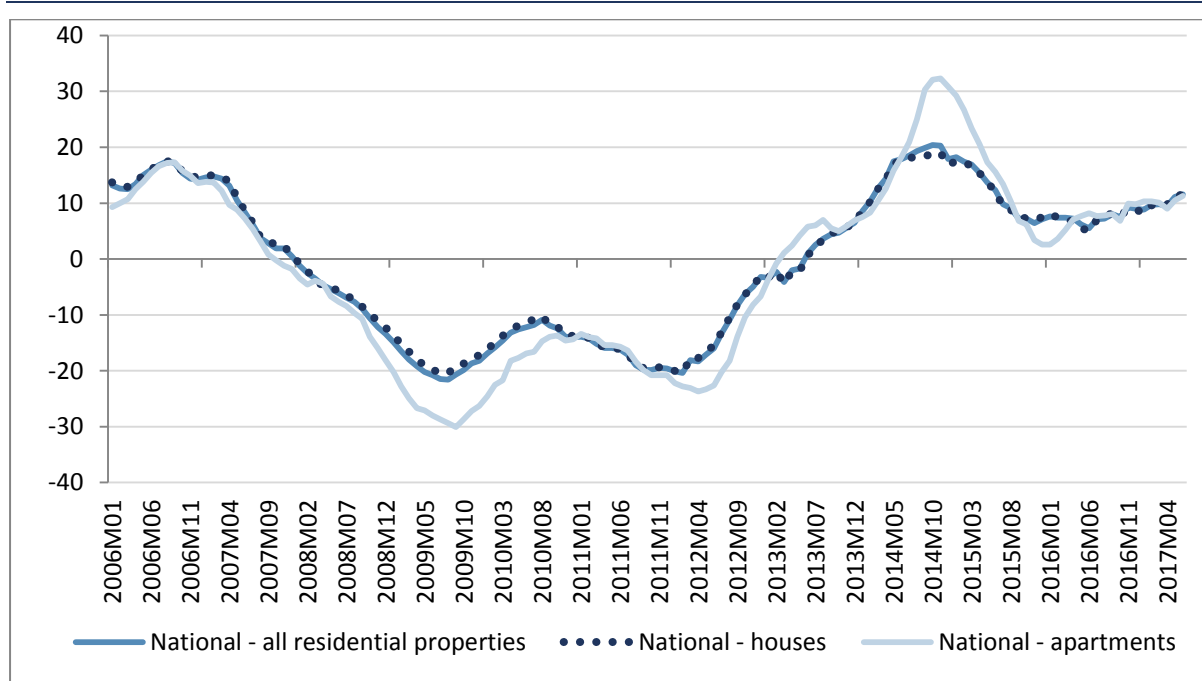


Source: Central Bank of Ireland, Quarterly Financial Accounts.

In general, we expect household consumption to continue to be a strong determinant of domestic economic activity as household balance sheets continue to be repaired through deleveraging and incomes rise modestly. We therefore expect consumption expenditure to grow by 2.6 per cent this year and 2.8 per cent in 2018.

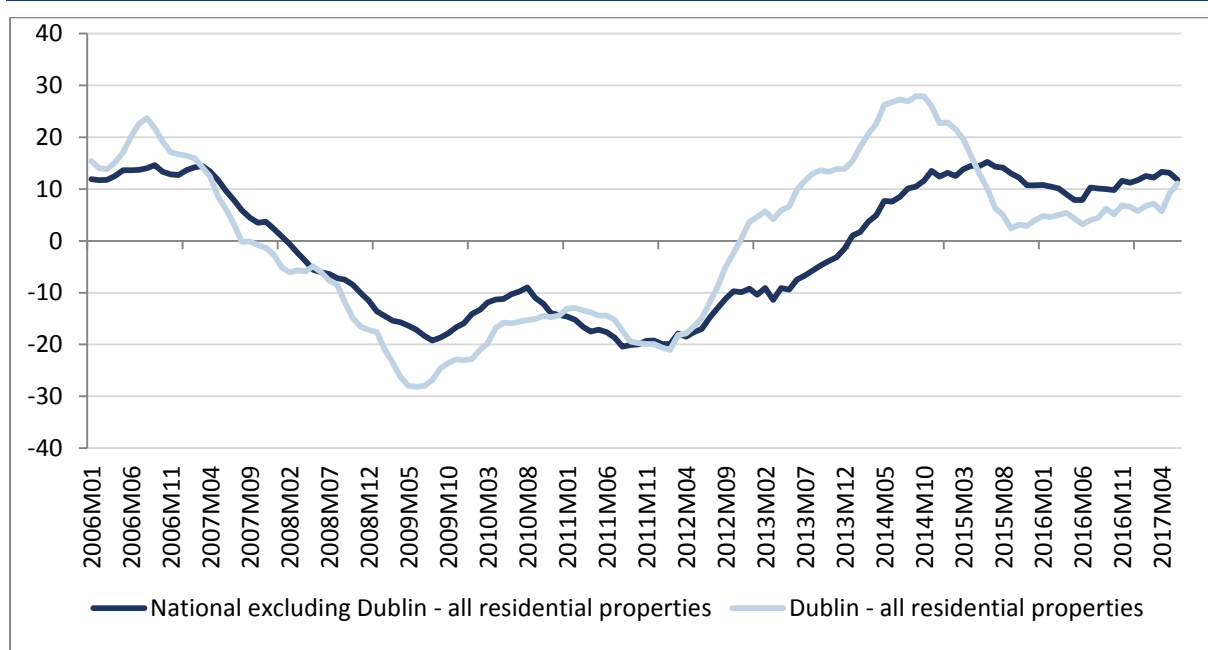
Property market developments

House price growth has continued to pick up into 2017 following an acceleration in the rate of increase during the second half of 2016. Figure 28 plots the year-on-year changes in residential property prices. The data are split out by property type as well as for the overall index. While prices have been accelerating throughout 2017, June and July have seen double digit annual growth: prices were up 11.1 per cent in the year to June and 11.6 per cent in the year to July. The rate of growth for houses is somewhat faster than that for apartments potentially reflecting household demand for family homes.

FIGURE 28 ANNUAL HOUSE PRICE GROWTH (%)

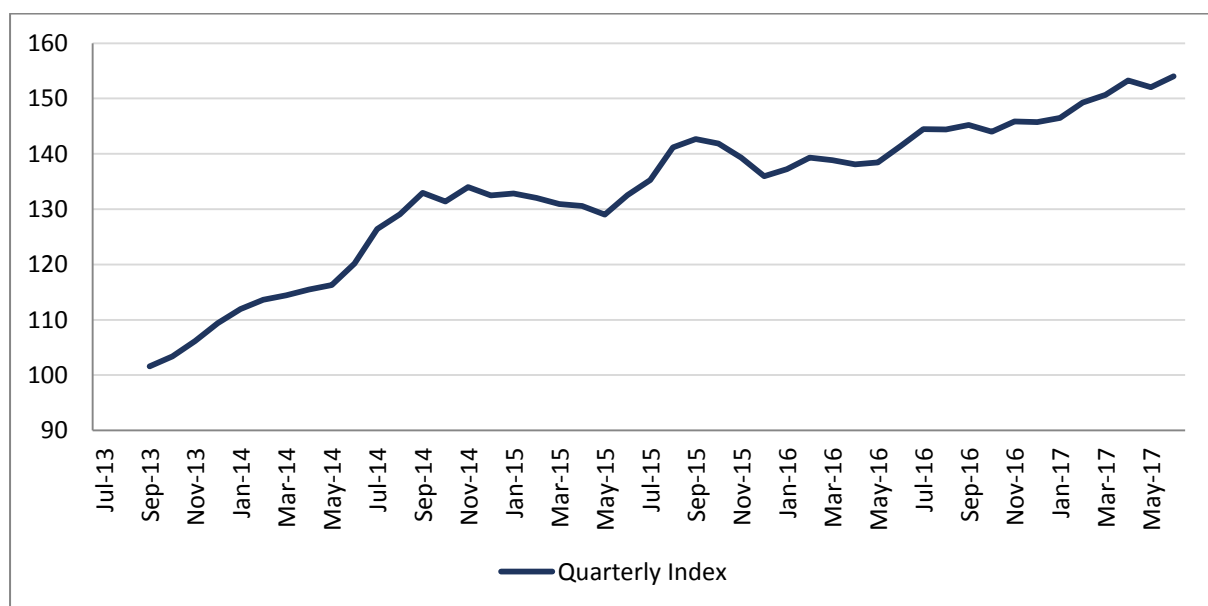
Source: Central Statistics Office.

House price developments are presented in Figure 29 on a geographic basis splitting out Dublin and the rest of Ireland. As housing pressures are most acute in the capital such a dichotomy provides insight into relative trends. It is clear that the deceleration of price growth in Dublin in early 2015 was much more acute than outside the capital. Among other factors, this potentially reflects the fact that the Central Banks' macroprudential rules in the housing market were more tightly binding for Dublin borrowers who needed to use high loan-to-value and loan-to-income ratios to purchase housing. Kinghan et al. (2017) provide some recent evidence of this. Furthermore, the looser loan-to-income cap for first time buyers purchasing properties less than €220,000 would have meant stricter limits in Dublin where average prices were higher. More recently the rest of the country has been growing very rapidly, posting double digit growth every month with one exception since July 2016. Prices in Dublin grew at 11.1 per cent in the year to June 2017 suggesting an acceleration in price increases in the capital where demand still greatly exceeds supply.

FIGURE 29 ANNUAL HOUSE PRICE GROWTH (%)

Source: Central Statistics Office.

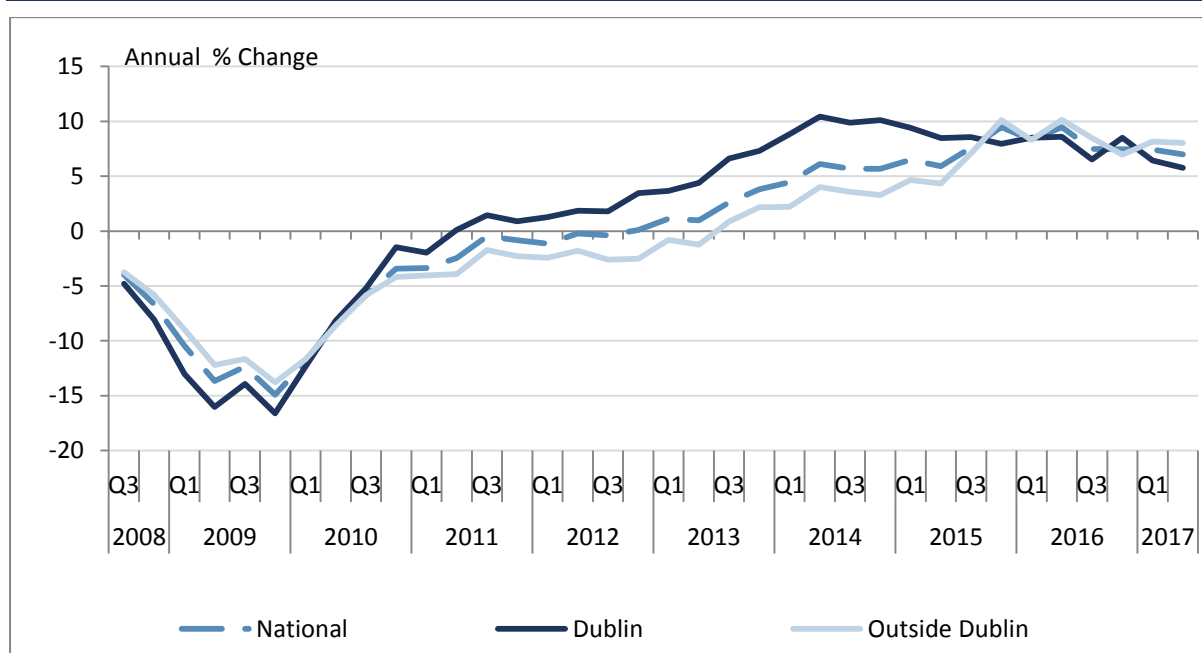
Further insight can be gleaned from the ESRI/AIB House Price Index which is presented in Figure 30 and plots the latest ESRI/AIB housing market indicator. The index, which comprises questions on attitudes to buying and selling property as well as expectations of house prices 12 months from now, has started to trend upwards from the mid-point of 2016. This growth continued into Quarter 2, 2017.

FIGURE 30 ESRI/AIB HOUSE PRICE INDEX

Source: Central Statistics Office.

While it is clear that excess demand in the housing market is leading to rapid increases in house prices, similar challenges are also being faced in the rental market where rents are also growing rapidly. The latest data from the RTB rental index confirm that rents nationally continue to increase at a significant rate. Rents in Quarter 2, 2017, nationally, increased by 7 per cent on an annual basis continuing the rise that has been observed since early 2013 as can be seen from Figure 31. While it does appear that there is some moderation in the rate of growth in Dublin, rents are now above their pre-crisis peak experienced in Quarter 4, 2007. Pressures in the rental market will continue to reduce housing affordability.

FIGURE 31 RESIDENTIAL TENANCIES BOARD NATIONAL RENTAL INDEX: Q3 2007 = 100



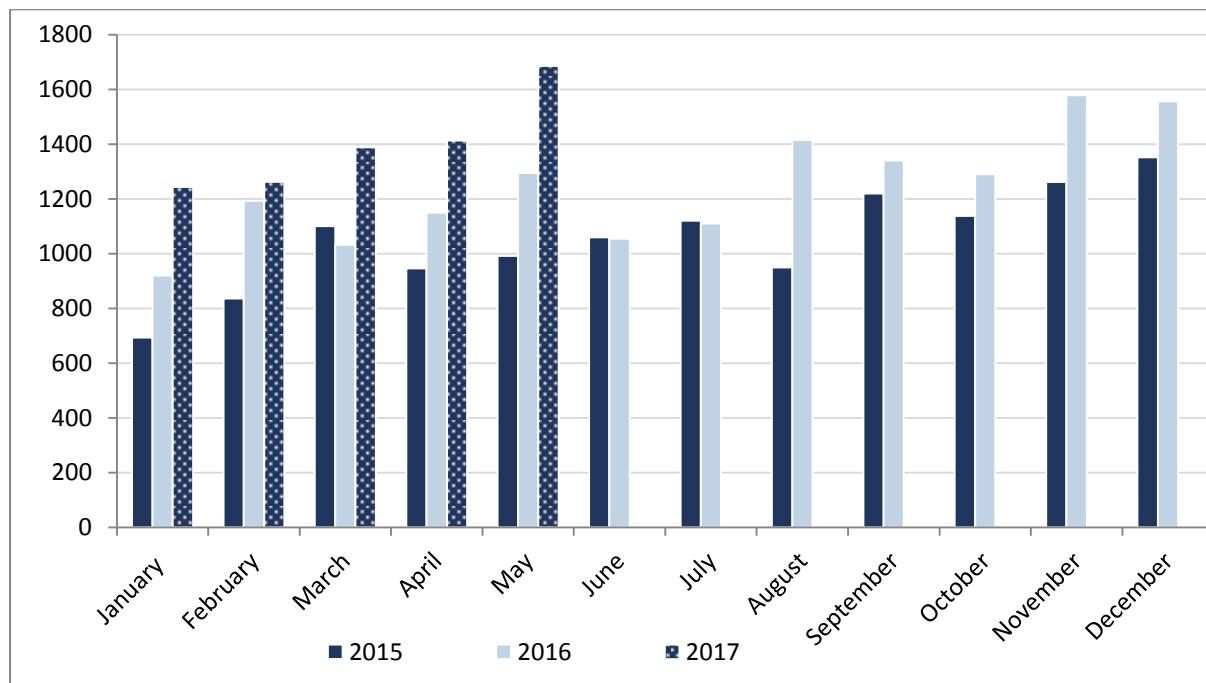
Source: Residential Tenancies Board (RTB).

Undoubtedly price pressures are due to the acute shortage of housing supply. Duffy et al. (2016)⁶ note that approximately 35,000 units are needed per annum to keep up with demand due to demographics and market fundamentals. As there has been a number of years where supply has been less than this, the number needs to be exceeded in the short run in order for supply to 'catch up'. At present a total of 12,600 completions were supplied in 2015 and just under 15,000 units last year. However, it does appear that housing supply is finally beginning to respond to increased demand. ESB connections data (our proxy for completions) up to May this year have far exceeded the monthly level in the previous two years. With continued demand-side pressures and a recovering

⁶ Duffy, D., N. McNerney and K. McQuinn (2016). 'Macroprudential policy in a recovering property market: too much too soon?' *International Journal of Housing Policy*, Vol. 16, Issue 4, pp. 491-523.

financial sector leading to better access to credit, we expect completions to continue to rise. We forecast that 19,000 units will be finalised in 2017, with the number increasing to 24,000 units in 2018.

FIGURE 32 MONTHLY LEVELS OF HOUSING SUPPLY



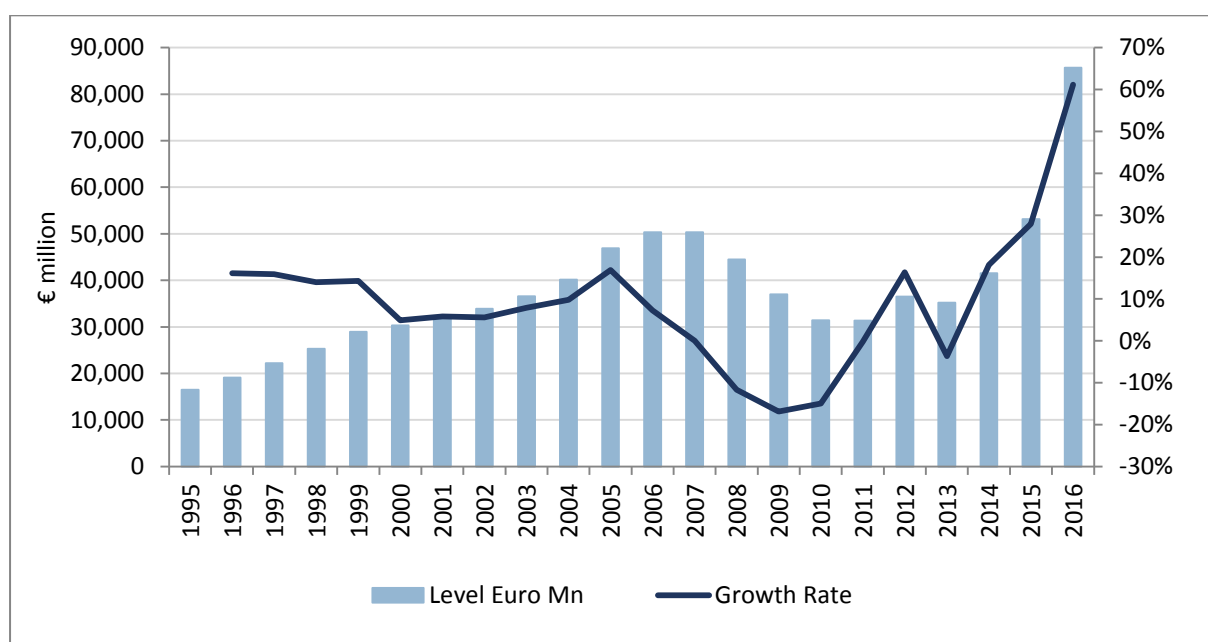
Sources: Department of Housing Planning and Local Government and QEC calculations.

SUPPLY

Investment

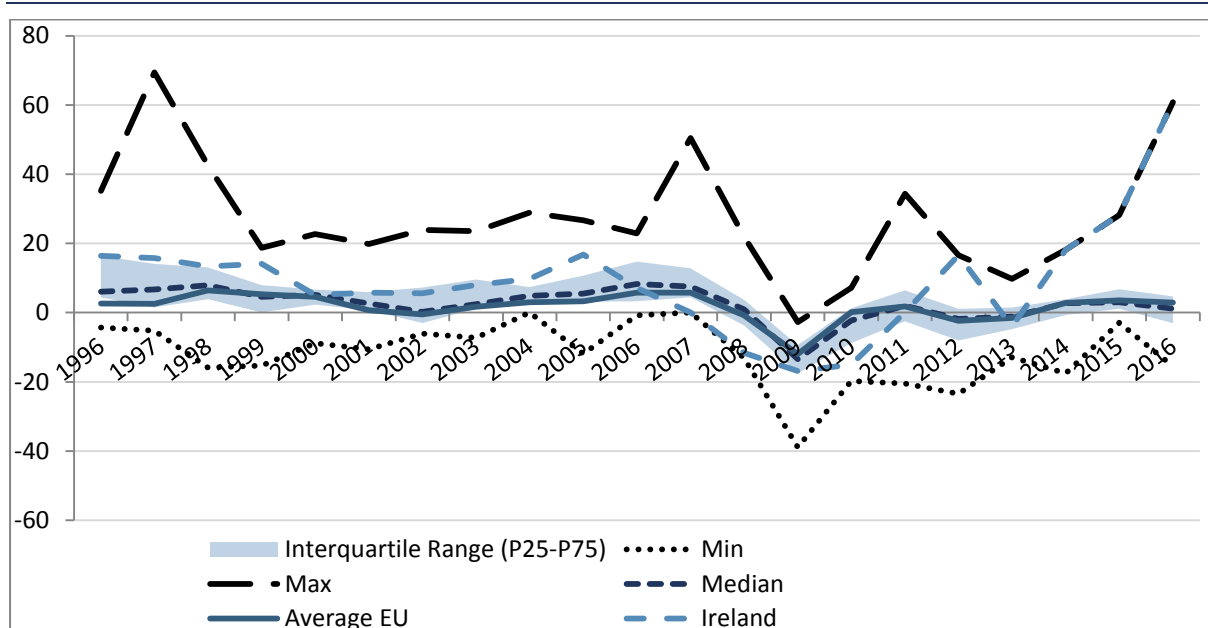
A noteworthy aspect of the financial crisis has been the dramatic decline, then relative stagnation, in capital investment across Europe (European Investment Bank, 2017).⁷ Following a heightened reliance on investment in building and construction, Ireland suffered very large peak-to-trough falls in capital investment from 2007 to 2011. More recently, investment has recovered somewhat. Total investment as measured by Gross Physical Capital Formation (GFCF) increased in 2014, 2015, and 2016 as shown by Figure 33. In 2016, annual growth was 61 per cent, up from 28 per cent in 2015. These apparent rises in investment are problematic in terms of understanding economic behaviour in Ireland as the growth is largely being driven by an increase in intangible assets which are more to do with changes in national accounting treatment than underlying economic activity.

⁷ European Investment Bank (2017). 'Investment and Investment Finance in Europe 2016', *European Investment Bank Annual Report*, Luxembourg.

FIGURE 33 GROSS FIXED CAPITAL FORMATION LEVELS AND GROWTH RATES (2010-2016)

Sources: Central Statistics Office and QEC calculations. Some data have been withheld by the CSO for data privacy reasons.

The scale of the increases can be better seen in an international context. Figure 34 presents the growth rates for capital investment for Ireland and selected other European countries over the period 1996-2016. While investment in Ireland has historically displayed a significant degree of volatility, the dramatic rise in the investment growth rate in 2014, 2015 and 2016 is evident as Ireland went from close to the European average in 2013 to the highest by a considerable degree in recent years.

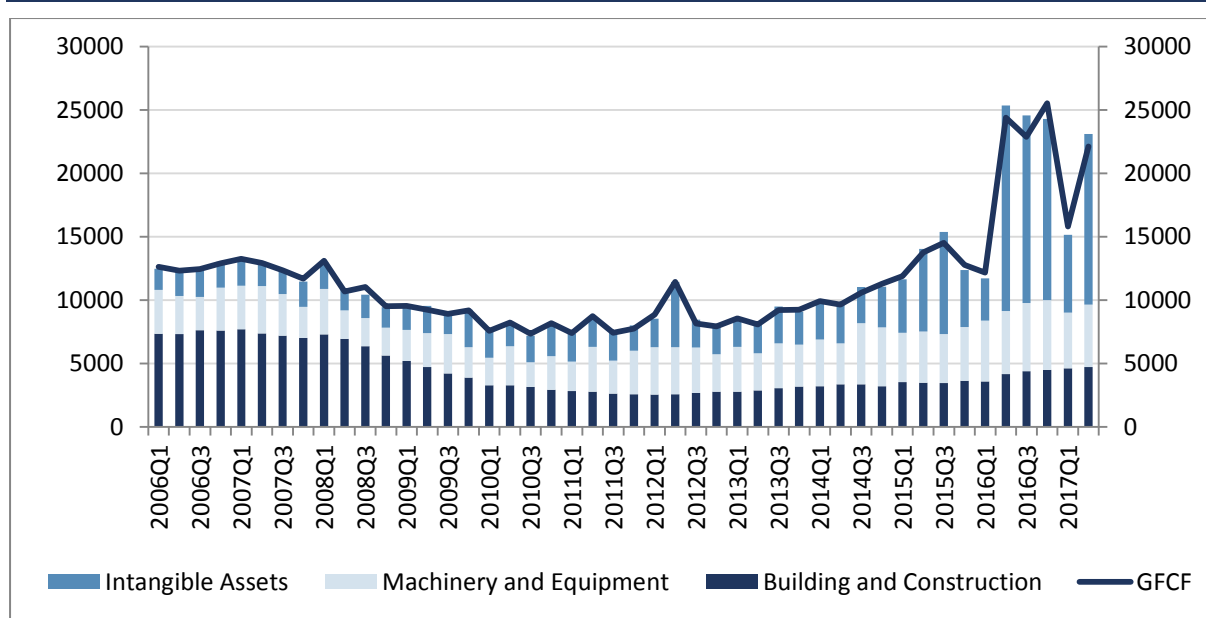
FIGURE 34 GROSS FIXED CAPITAL FORMATION GROWTH RATES – CHAIN LINKED VOLUMES (2005=100)

Source: Eurostat, countries included in comparison are: BE, BG, CZ, DK, DE, EE, IE, GR, ES, FR, Croatia, IT, CY, LT, LV, HU, NL, AT, PL, PT, RO, SI, SK, FI, SE, UK.

Figure 35 decomposes gross fixed capital investment on a quarterly basis into the underlying components of buildings and construction, intangibles, and machinery and equipment. It can be seen that the large spike in investment coincides with the significant increase in intangible assets which went from an average of €2,500 million per quarter in 2013 to over €12,000 million per quarter in 2016. The growth rate of building and construction activities is much more stable growing by a modest and consistent rate. Machinery and equipment investment, while not as volatile as intangibles, also displays a high degree of variation.

Typically, our knowledge of investment activity should relate to the degree to which firms' investment is driven by their fundamental profits and economic performance. Using the National Accounts, the current increases – driven by the relocation of assets by multinationals for within-company balance sheet, international operations strategies and after tax profitability management purposes – pose serious challenges in understanding the capital asset position of Irish companies. In particular, our ability to forecast such series is undermined when the drivers of activity are individual company strategies and not general economic factors.

FIGURE 35 COMPONENTS OF INVESTMENT AS A PROPORTION OF TOTAL

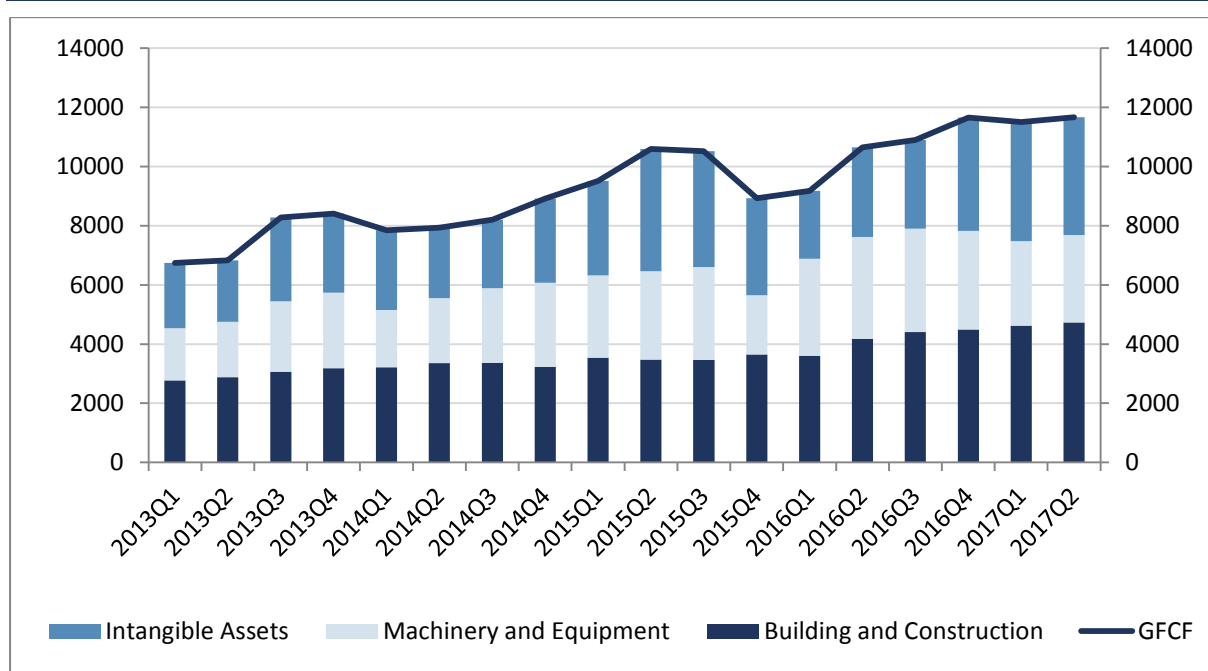


Source: Central Statistics Office, Quarterly National Accounts Data.

To attempt to address these issues the CSO has provided an adjusted series for gross fixed capital formation on a quarterly basis, modified GFCF, which adjusts for the effects of trade in aircraft by aircraft leasing companies and the importation of intellectual property. The adjusted figures overall and for building

and construction, intangibles and machinery and equipment are presented in Figure 36. It can be seen the adjusted data display a much more stable growth pattern with an upward trend evident from mid-2015 onwards. For the year 2016, the overall level of GFCF is, on average, 380 per cent higher than the modified figures for intangibles, and 50 per cent higher for machinery and investment. Building and construction is unaffected. On an annualised basis overall modified investment is up 10 per cent in the year to Quarter 2, 2017. This is composed of an increase of 13 per cent in buildings and construction, a 14 per cent decline in machinery and equipment and a 32 per cent increase in intangibles.

FIGURE 36 MODIFIED GROSS DOMESTIC CAPITAL FORMATION



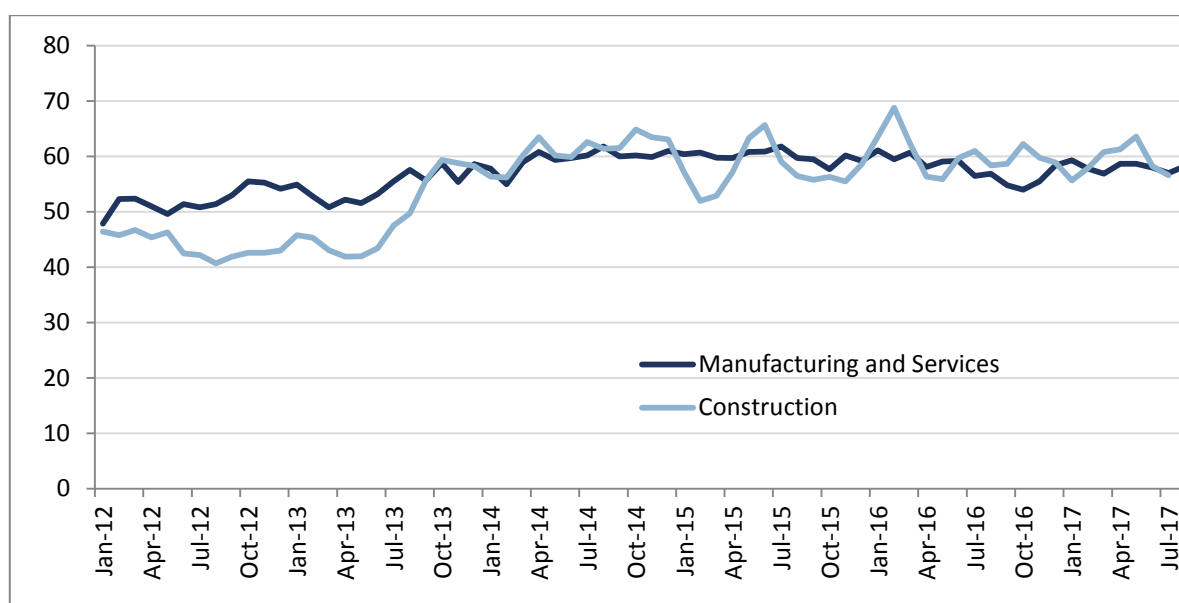
Source: Central Statistics Office, Quarterly National Accounts Data.

While the modified figures go some way to addressing the accounting challenges, the difficulties in providing a measure of gross fixed capital investment in a highly globalised and multinational dominated economy remain. Indeed, the degree to which Irish companies are investing or divesting remains poorly understood and is really the important consideration when it comes to policymaking and industrial development strategy. Further research is required to better understand the investment patterns of Irish companies relative to the large multinationals.

To provide some insight into the enterprises current thinking, the Markit Purchasing Manager's Index, provides another source of activity in the manufacturing, services and constructions sectors. It is shown in Figure 37.

A reading above 50 indicates an expansion and, in the first few months of 2017, we can see that the index is beginning to trend upwards for construction and remains well above 50 for manufacturing and services. The most recent data for June 2017 suggest the strength of the construction purchasing activity has moderated somewhat but it remains in expansion.

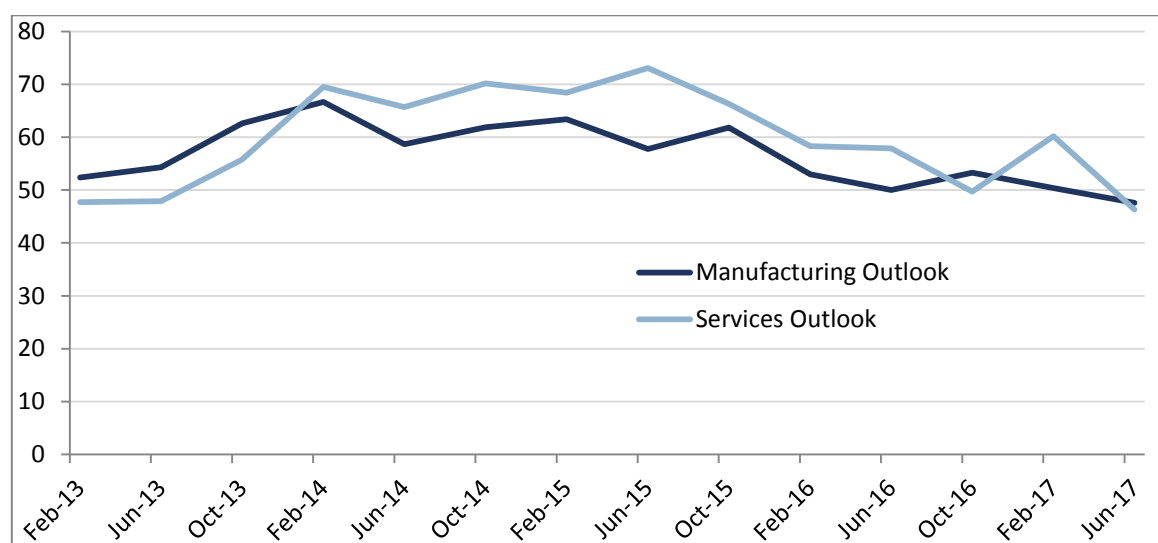
FIGURE 37 BUSINESS AND CONSTRUCTION PMI FOR IRELAND



Source: Markit.

The level of uncertainty in the global environment and ongoing Brexit discussions are potentially causing some headwinds for investment planning. A recent survey of companies undertaken by the Department of Business, Enterprise and Innovation shows some companies have already responded by reducing their investment activity in light of Brexit (DBEI, 2017).⁸ This uncertainty may be reflected in a weakening of the business outlook for purchasing activity as monitored by the Markit index presented in Figure 38. For both manufacturing and services activity the most recent June 2017 data indicate a softening of activity.

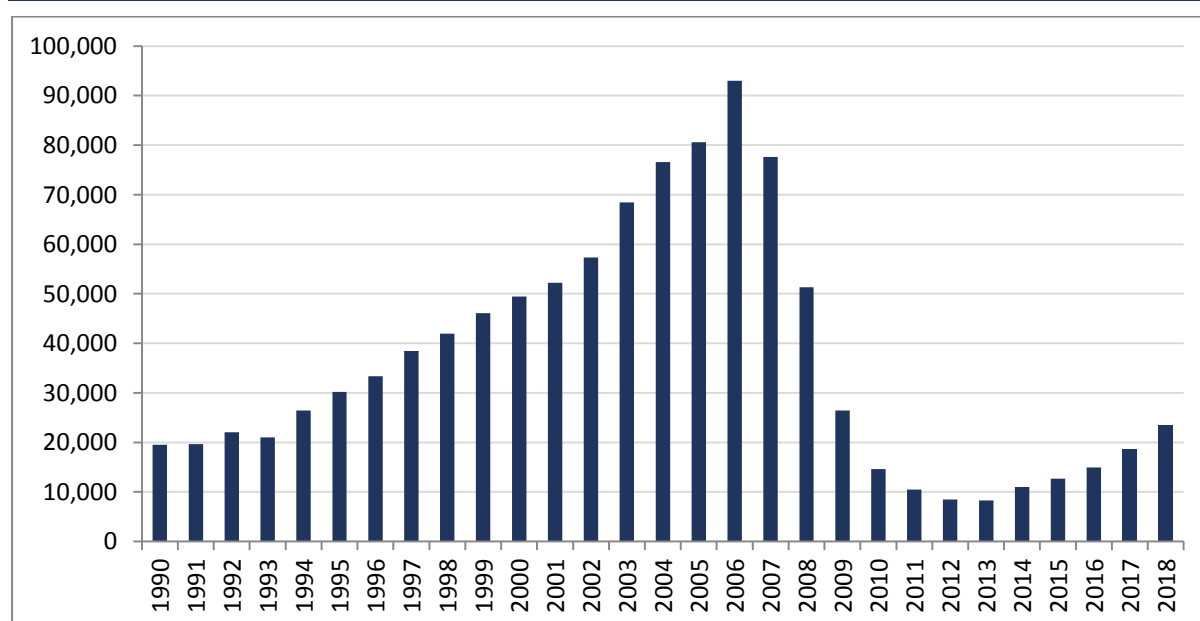
⁸ Department of Business, Enterprise and Innovation (2017). 'Survey on: Brexit – the view of Irish SMEs', available online at: <https://dbei.gov.ie/en/Publications/Brexit-the-view-of-Irish-SMEs.html>.

FIGURE 38 FORWARD-LOOKING INDICATORS FOR PURCHASING ACTIVITY

Source: Markit.

Despite the uncertainty in some forward-looking business indicators, our overall outlook for investment remains positive. The international uncertainties notwithstanding, the increased trend in building investment is expected to continue as it is underpinned by strong housing demand.

Consequently, we maintain an optimistic position for overall investment in 2017 and 2018. In particular, we expect annual average growth in investment of 15.6 per cent in 2017 and 12 per cent in 2018.

FIGURE 39 ANNUAL HOUSING COMPLETIONS (2017-2018 FORECASTS TO 2016 ACTUAL)

Sources: Department of Environment and QEC Forecasts.

In light of the Government's forthcoming updated Capital Plan and the significant increase in capital expenditure which is envisaged, in Box 2 Morgenroth draws out some important policy lessons to be learned from the previous period of increased public expenditure.

BOX 2 THE PUBLIC CAPITAL PROGRAMME BY EDGAR MORGENROTH

The debate on public capital tends to be focused on investment levels over the last few years, yet what matters for the economy is not how much was spent on infrastructure last year but the adequacy of the stock of infrastructure. The stock of infrastructure is the accumulated investment over many years accounting for the deterioration of what was put in place as well as obsolescence.⁹ It is, therefore, important to consider public investment over the long run.

Comparing Ireland's public investment spending as a share of GDP over the period 1970 to 2015 with that of other EU15 countries reveals that investment in Ireland was above average over that period.¹⁰ As GDP is not an ideal scaling factor for Ireland an alternative is to compare real investment per capita across countries. Using this variable Ireland's public investment is found to be just below the average for EU15 countries. However, Ireland's public investment is the second most volatile of the EU15 countries reflecting the pro-cyclical nature of public investment in Ireland, where expenditure is ramped up significantly when economic growth is strong and reduced during recessions.

Importantly, the value of the investment is not necessarily equal to its cost (see Pritchett, 1996). For example during the last two decades the motorway network was constructed, which has significantly reduced drive times, and thus yields a significant return. Constructing another set of motorways parallel to the existing motorway will yield little additional return but would be very costly (see Fernald, 1999). In this context it is also important to note that the current low financing costs do not imply that projects are cheap, they only imply that they are cheap to finance.

It is, therefore, more important to consider what projects are required and where, rather than only debating the level of investment. The projects with the highest return (value) are those that address key development constraints (e.g. transport bottlenecks) or important societal goals (e.g. addressing homelessness). In deciding on the right projects and their location, Ireland's climate change obligation as well as the need to adapt to climate change, for example in terms of flood defences, also need to be considered.

The medium- to long-term outlook for Ireland suggests that the economy is likely to grow significantly and that this will be accompanied by substantial population growth (see Bergin et al., 2016), which implies a need for more infrastructure. The development pattern over the last two decades has been for growth to be concentrated in Dublin and surrounding

⁹ Significant portions of the London Underground were constructed in the 19th Century; similarly, most of the Irish railway network was also constructed in the 19th Century. In addition, most regional and local roads were constructed many decades ago. The age of some infrastructure also implies increased investment in maintenance and replacement.

¹⁰ Based on data from the DG ECFIN AMECO database.

countries, resulting in significant sprawl and congestion in that part of Ireland, while other parts have lost population and services. This has had negative impact on quality of life, has economic costs and has also significant negative environmental consequences, both in terms of climate change and local pollution.

It will be important to achieve a more efficient spatial development pattern in the future where regional development is more balanced but where the special role of Dublin is not undermined. To this end the Department of Housing, Planning, Communities and Local Government (DHPCLG) is currently preparing a new National Planning Framework (see DHPCLG, 2017). In the past the National Development Plans were either not informed by any spatial development strategy or they were poorly aligned which reduced the effectiveness of the National Spatial Strategy significantly (see Morgenroth, 2013). In this context it is significant to note that the Minister for Finance, Public Expenditure and Reform has committed to align the public capital programme with the National Planning Framework (NPF) that will replace the National Spatial Strategy (NSS).

A key constraint in rebalancing growth across the country has been the lack of scale of the second tier cities compared to Dublin, which limits their potential as a driver for growth of their wider hinterland, thus reinforcing the importance of Dublin. Therefore the NPF should aim to develop the scale of these cities, while allowing Dublin as the only city of international scale to continue to grow. Achieving such a more compact spatial development pattern would not only have regional development benefits but would also help in addressing climate change challenges. Importantly such an outcome can only be achieved by targeting infrastructure appropriately. Continuing with the current approach that spreads investment widely will perpetuate the current development patterns that increase the dominance of Dublin. Investment in second tier cities, through channels such as water and wastewater infrastructure as well as public transport, will instead need to be facilitated if we are to allow for a more balanced distribution of growth to occur within the State.

The highly cyclical nature of public investment has a number of negative implications. Firstly, at times of low public investment, employment in related sectors – and particularly in construction – declines with some workers leaving the country while other leave the sectors altogether. Firms also reduce their investment and sell off machinery that is not needed. Thus the capacity of the sectors reduces significantly, which means that when public investment is ramped up there is not enough capacity to supply this demand resulting in inflation. It is thus not surprising to find that investment inflation in Ireland was the highest of all EU15 countries over the period 1970 to 2015. According to National Accounts data, prices for roads have increased by almost 50 per cent between 1995 and 2016, while consumer prices increased by just over 34 per cent. Importantly, the price of road construction increased by almost double the rate of the Consumer Price Index over the period 1995 to 2007 when public investment was significantly ramped up in Ireland and at a time when housing construction was also increased significantly.

A second implication of the cyclicity of public investment is that during periods of low investment expenditure on maintenance is often also reduced which impacts negatively on the condition of the existing infrastructure stock, increasing the need for more expensive replacement. The investment cycle also leads to cyclical maintenance and replacement cycles and of course during periods of low investment a backlog of projects builds up that if dealt with will perpetuate the cyclical nature of investment.

In summary, while there is undoubtedly a need to increase public investment, the benefits of investment are crucially dependent on the identification of the right projects in the right places. If Ireland is to achieve more sustainable and regionally balanced development then public investment needs to support the National Planning Framework. Importantly, the recent experience has shown that ramping up investment at a time when housing construction output is also increasing can lead to significant construction price inflation.

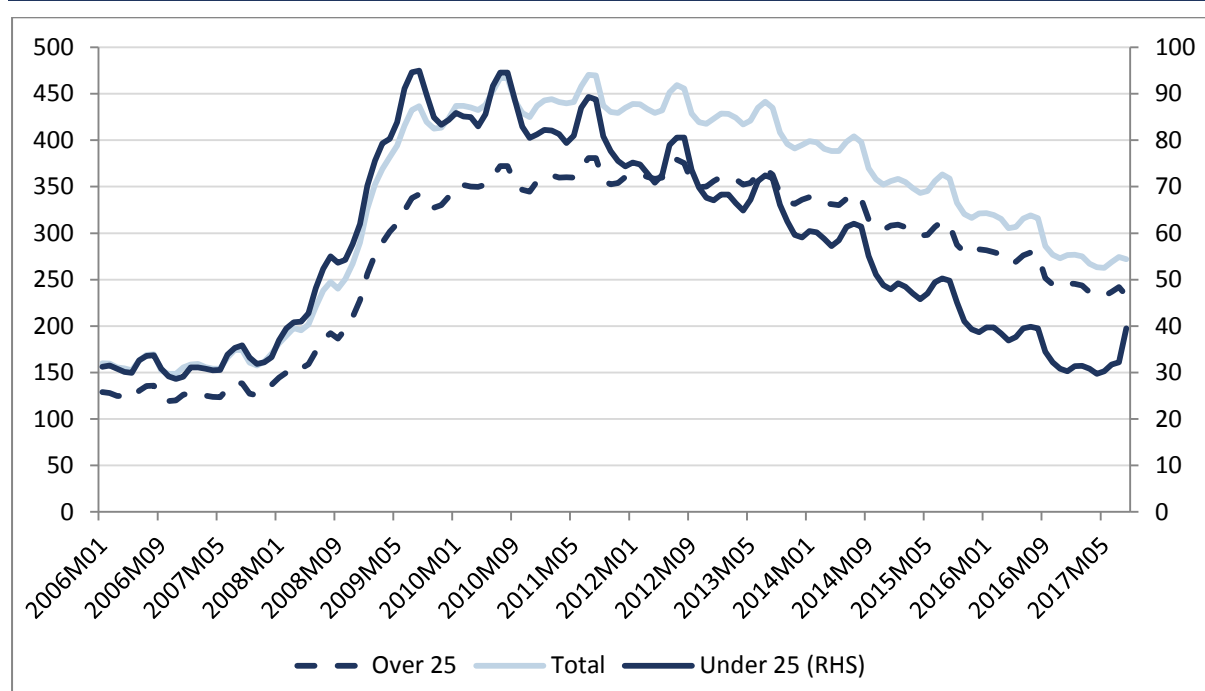
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LABOUR MARKET

Unemployment

Given the continuing strong performance of the economy, the number of people out of work in the Irish labour market continues to decline through 2017. On a seasonally-adjusted basis the Live Register recorded a monthly decrease of 7,300 (-2.9 per cent) in August 2017, resulting in a seasonally-adjusted total of 256,800. This represents an annual decrease of 51,762 (-16.4 per cent). As can be seen from Figure 40, the number of persons on the Live Register in August 2017 is now the lowest number recorded in the seasonally-adjusted series since October 2008.

FIGURE 40 NUMBERS ON THE LIVE REGISTER ('000) BY AGE: MONTH 1, 2006 TO MONTH 8, 2017

Source: Central Statistics Office.

Whereas during the initial phase of the economic recovery, it was the shorter-term unemployed who had the largest decline in the Live Register, since mid-2015 it is those in longer-term unemployment who are now experiencing the more significant falls.

In terms of the last occupation held by those on the Live Register, Table 4 summarises the annual change between 2016 and 2017.

TABLE 4 PERSONS ('000) ON THE LIVE REGISTER CLASSIFIED BY LAST HELD OCCUPATION

Sector	2016 M08	2017 M08	% Change
Managers and administrators	14.0	12.2	-13
Professional	21.9	17.9	-18
Associate professional and technical	9.5	8.6	-9
Clerical and secretarial	37.1	30.1	-17
Craft and related	54.8	44.7	-18
Personal and protective services	40.0	33.4	-16
Sales	33.9	28.3	-17
Plant and machine operatives	48.1	40.0	-17
Other groups	36.8	31.5	-14
No occupation	20.0	16.9	-15

Source: Central Statistics Office.

Notwithstanding the recent pick-up in construction sector, the occupational group with the largest number of people on the Live Register is still the craft and related sectors. However, the craft and related sector also registers the largest decrease over the past year.

On a month-to-month basis, the seasonally-adjusted unemployment rate fell marginally in August to 6.3 per cent. The figure is down from 7.9 per cent in August 2016.

Employment

The latest employment data show that the number of persons in employment is now 2,063,000, which represents a 2.4 per cent increase on Quarter 2, 2016. Full-time employment increased by 77,800 (+5.0 per cent) to 1,630,800 during the same period and accounted for 79.0 per cent of total employment in Quarter 2, 2017. On the other hand, part-time employment fell by 29,700 (-6.4 per cent) to 432,200 and accounted for 21.0 per cent of total employment. The number of persons in employment has increased by 201,700 (+10.8 per cent) between Quarter 2, 2011 and Quarter 2, 2017. Full-time employment (+207,000) accounted for virtually all of this increase while there was a very slight increase in part-time employment. This indicates some significant changes in the composition of employment in the Irish labour market.

Total labour supply can be decomposed into total numbers employed times the average workweek. McQuinn and Whelan (2015),¹¹ for example, have noted the decline in the average workweek across Euro Area countries, the United Kingdom and the United States. In Table 5 the average workweek for the main NACE Rev2 sectors is presented for 2017. Growth rates between 1998 and 2017 are also presented.

¹¹ McQuinn, K. and K. Whelan (2015). 'Europe's Long-Term Growth Prospects: With and Without Structural Reforms', ESRI Working Paper, WP501.

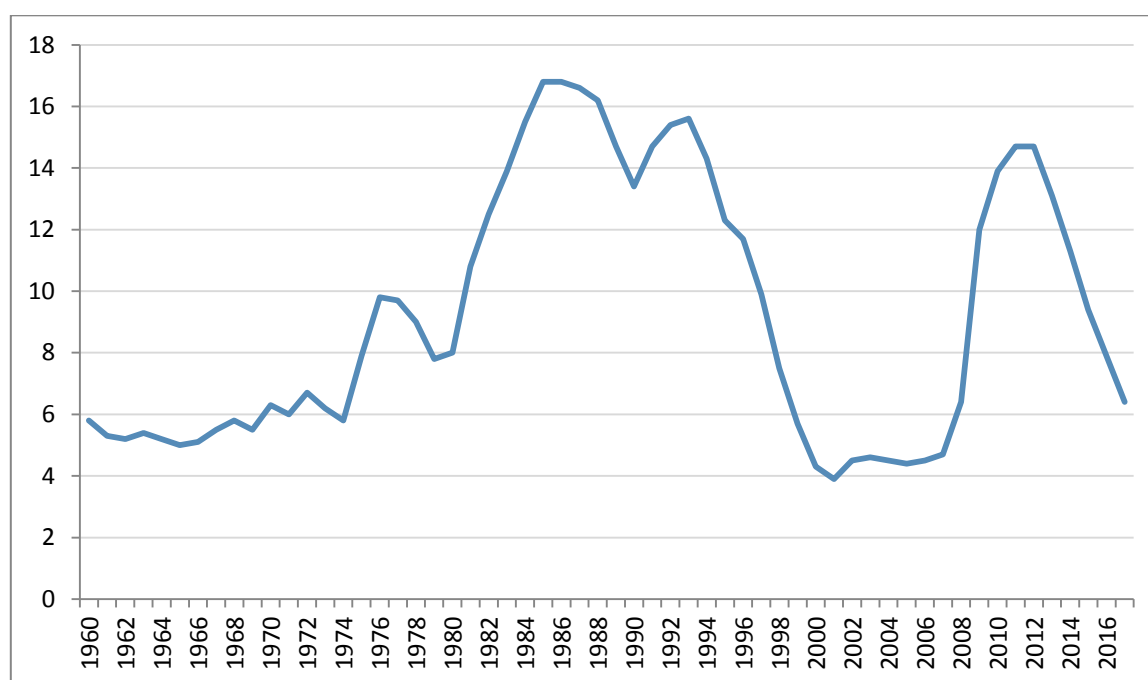
TABLE 5 AVERAGE USUAL HOURS WORKED PER WEEK BY PERSONS AGED 15 YEARS AND OVER IN EMPLOYMENT (ILO) ('000) BY QUARTER AND NACE REV 2 ECONOMIC SECTOR: 1998 - 2017

Sector	2017 Q1	1998 Q1 – 2017 Q1 %
Agriculture Forestry and Fishing	48.2	-10
Industry	38.9	-3
Industry and Construction	39.0	-4
Construction	39.1	-6
Services	34.4	-5
Wholesale and retail trade	33.8	-10
Transportation and Storage	38.1	-10
Accommodation and Food Services	31.3	-10
Information and Communication	39.3	0
Financial, Insurance and Real Estate	38.3	0
Professional and Scientific	38.7	-4
Administrative and support	33.3	-1
Public Administration	37.1	-3
Education	29.5	1
Human Health	33.1	-2
Other NACE	32.3	-3

Source: Central Statistics Office.

Of all sectors, agriculture forestry and fishing has the longest workweek at 48.2 hours; this is somewhat greater than the sector with the next longest workweek, construction at 39.1 hours. However, similar to the results found in McQuinn and Whelan (2015) for a cross-country sample, it appears that the average Irish workweek is on a long-term downward trend. From the table it is clear that only one sector, education, registers an increase in the average workweek over the period 1998 to 2017.

One issue of importance in the short-term is gauging whether the Irish economy is operating near to or in excess of its potential level. This is particularly pertinent in the framing of the most appropriate fiscal policy. Given the anomalies with the National Accounts, there are difficulties with generating traditional estimates of the output gap. One way to evaluate the growth capacity within the economy is to examine long-run trends in the unemployment rate. Figure 41 plots Irish unemployment rates from 1960 to the present.

FIGURE 41 IRISH UNEMPLOYMENT RATE (%): 1960 - 2017

Source: Central Statistics Office.

As can be seen the Irish labour market is characterised by significant volatility since 1960 with adverse periods in the 1980s and the late 2000s standing out. From this it is quite difficult to ascertain a long-run unemployment rate; however if we focus on the period 1999-2008, it is apparent that the unemployment rate was some way below the current 6.3 per cent. Over that period the unemployment rate averaged exactly 5 per cent. If we take the period 1960 to 1974, the average unemployment rate was 5.6 per cent – again somewhat less than the current rate. What this suggests is that if one treats the 1980s and the post-2008 period as being somewhat uncharacteristic of the Irish labour market, then there is still some spare capacity left in the market. In compiling a new measure of labour utilisation, the Non-Employment Index (NEI), Byrne and Conefrey (2017)¹² come to broadly the same conclusion.

Labour market forecasts

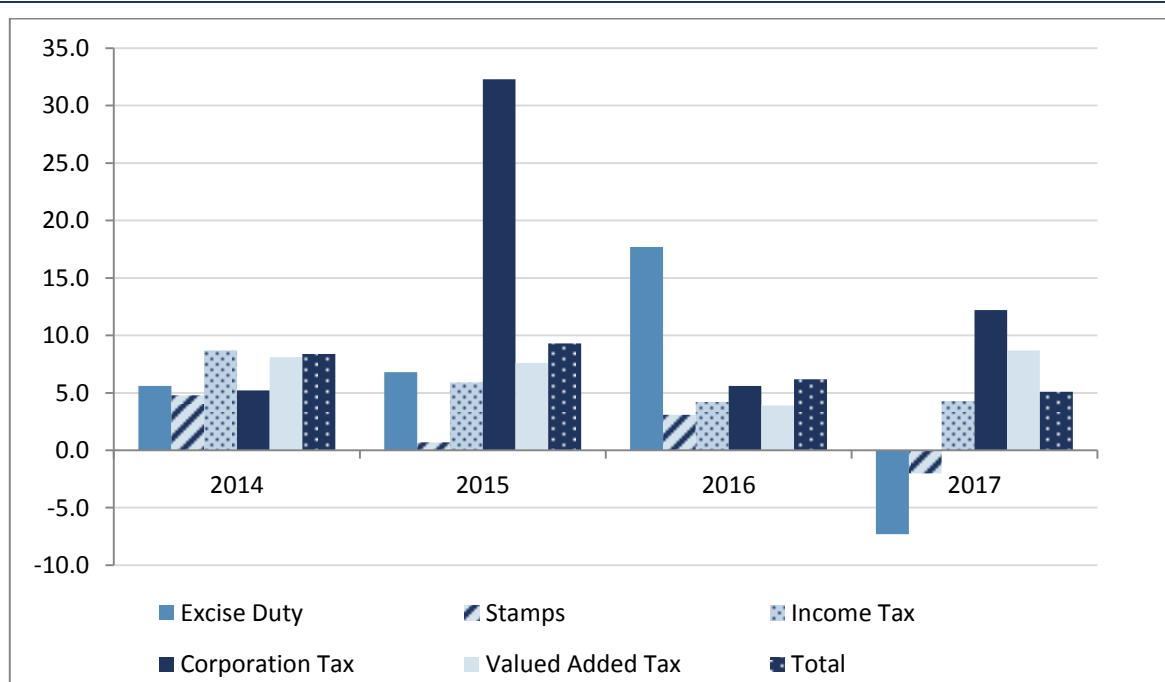
While we have revised our growth forecasts upwards somewhat, we have left our forecasts for the labour market relatively unchanged since the last *Commentary*. Therefore, we believe that the unemployment rate will average 6.1 per cent through 2017 and 5.4 per cent through 2018. Employment is set to exceed 2.24 million by the end of 2017 and increase up to 2.27 by the end of 2018.

¹² Byrne S. and T. Conefrey (2017). 'A Non-Employment Index for Ireland. Central Bank of Ireland', Economic Letter, Vol. 2017, No. 9.

PUBLIC FINANCES

The first quarter of 2017 saw weak returns for most of the headline taxation items with the resulting total being less than the expected (profile) level for that period. However, in Quarter 2 it is evident that the growth rate across most items and particularly large items such as income tax, corporation tax and customs has all improved. Figure 42 illustrates the annual changes in taxation returns for the period January-August for the last four years for the main tax categories as well as the overall total amount.

FIGURE 42 ANNUAL CHANGES IN MAJOR TAX SUB-COMPONENTS (%) FOR THE PERIOD JANUARY - AUGUST



Source: QEC calculations.

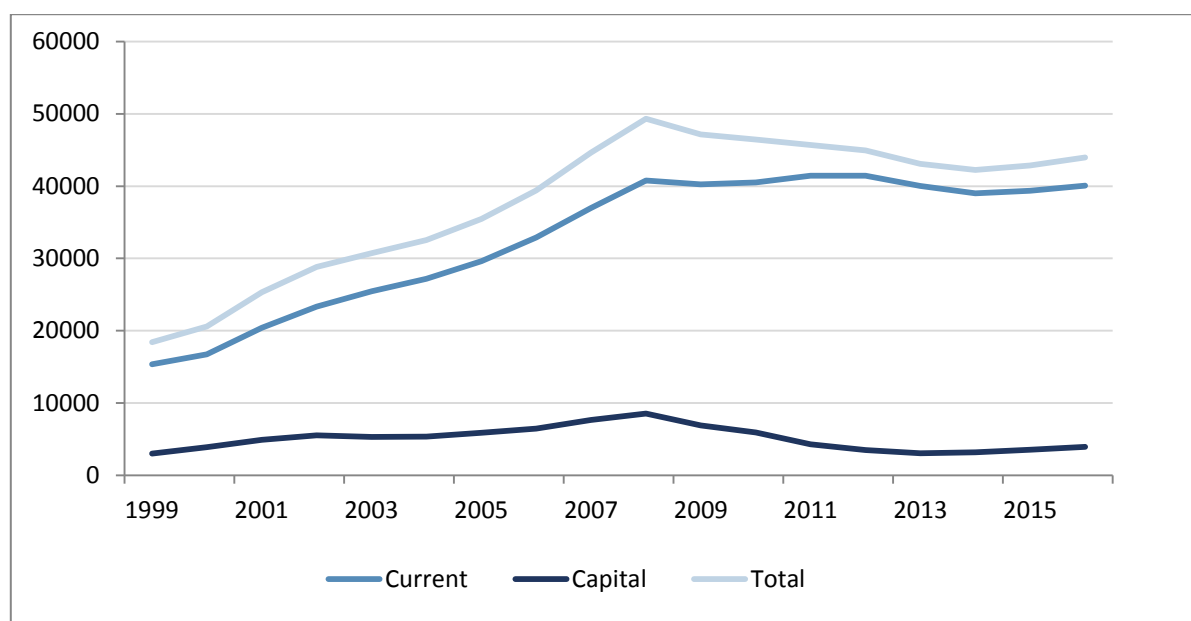
While overall growth rates are slightly less than in previous years, the pace of increase is still significant and looks set to meet expected levels for the current year.

The increase in income tax for the year to date at 5.1 per cent and the accelerated increase in PRSI receipts are now more in line with developments in the Irish labour market. With employment growing at an annualised rate of 2.4 per cent and the unemployment rate at 6.3 per cent, the growth in labour-related taxation items earlier in the year had looked somewhat weak. However, it would appear recent developments in revenue growth are more correlated with observed developments in the labour market.

Overall, when combining forecasts on the revenue side with likely developments in Government expenditure, we forecast a deficit for the present year of 0.5 per cent of GDP. We also believe that a mild deficit of 0.2 per cent is likely in 2018.

Given the proximity of the budget it is appropriate to examine recent trends in Government expenditure. In Figure 43 we plot total net voted Government expenditure since 1999. This is split into both current and capital components.

FIGURE 43 IRISH GOVERNMENT NET VOTED EXPENDITURE (€ MILLIONS): 1999 - 2016

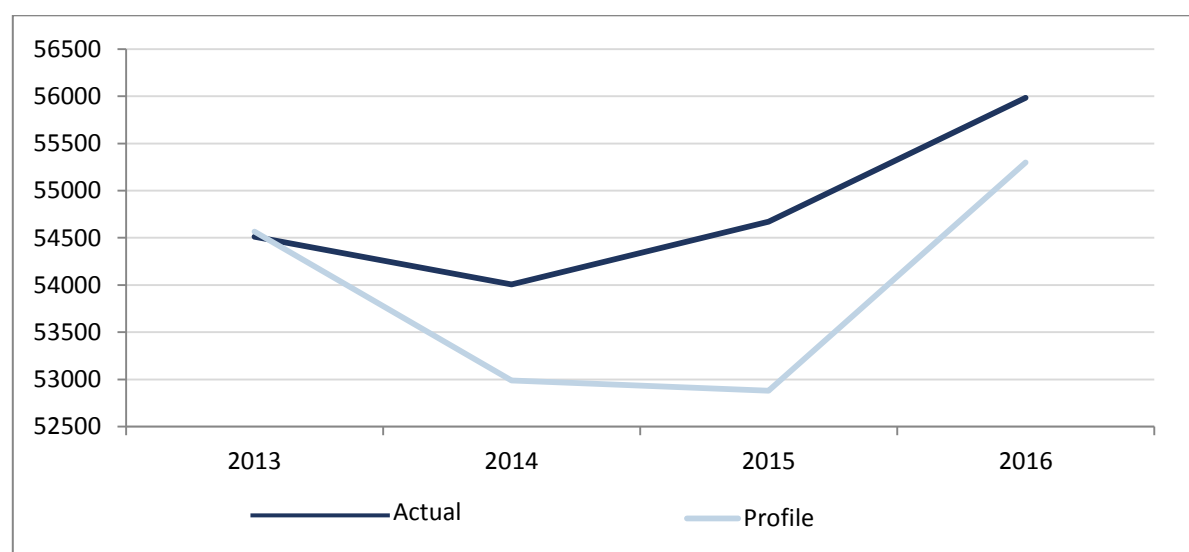


Source: Department of Finance.

From the graph, the substantial increase in Government expenditure during the pre-2007 period is evident. Post-2008 total expenditure did reduce, however it is clear that most of the reduction occurred on the capital side as opposed to expenditure on current items. From 2008 onwards current expenditure remained constant at around €40 billion, whereas capital expenditure which peaked in 2008 at €8.5 billion fell to just over €3 billion in 2013.

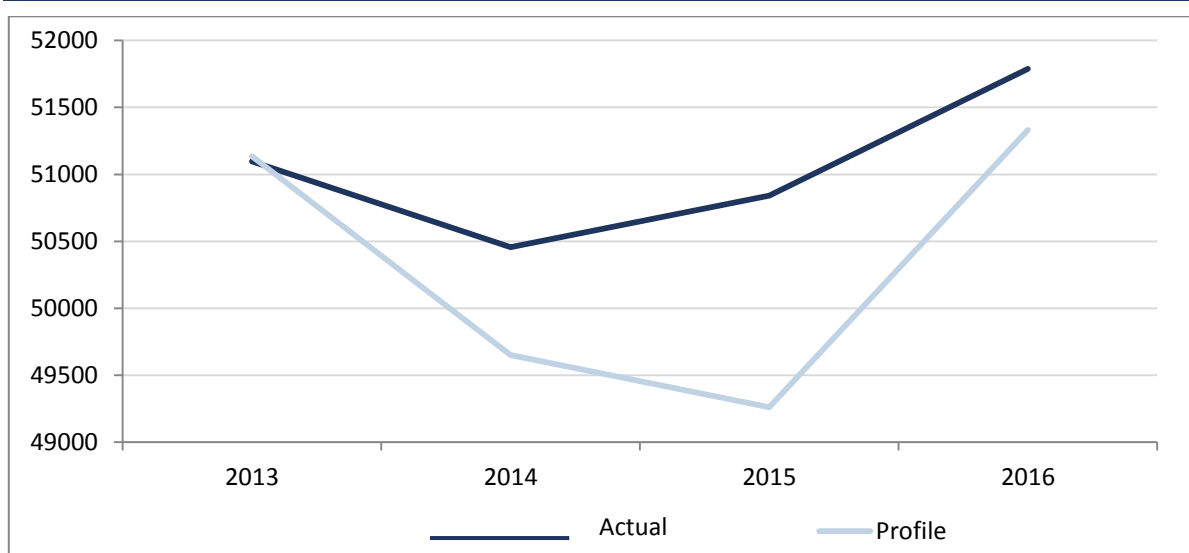
Since 2013 the Government also publishes forecasts of both capital and current expenditure for the year ahead.¹³ Figure 44 plots actual and forecast total expenditure since 2014; in all cases actual expenditure is greater than the forecast with the difference particularly large in 2015.

¹³ These forecasts are for gross as opposed to net expenditure. Net expenditure is lower than gross spend, because it takes account of 'appropriations-in-aid', i.e. fees, levies and other receipts which Departments and agencies may retain and use towards their overall spend.

FIGURE 44 ACTUAL AND PROFILE TOTAL GOVERNMENT EXPENDITURE (€ MILLION); 2014 - 2016

Source: Department of Finance.

Figure 45 plots the same graph for current expenditure. It is clear that most of the 'forecast error' is on the current side. The average scaling factor between the actual and profile amounts is 1.02; on that basis, expenditure for the present year is more likely to be €54,551 million as opposed to the forecast amount of €53,530 million.

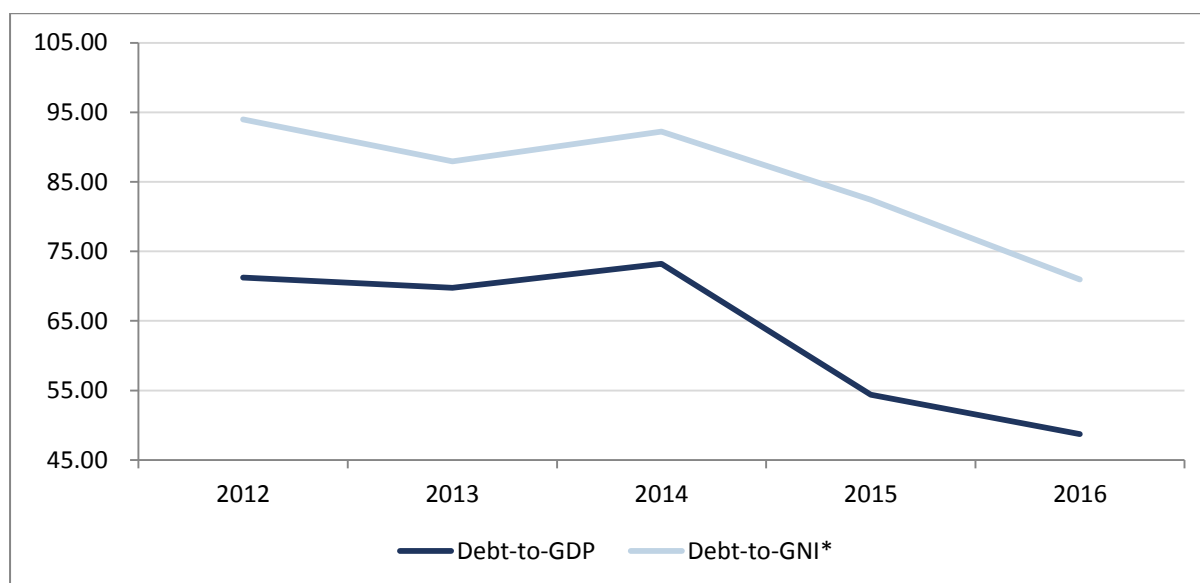
FIGURE 45 ACTUAL AND PROFILE CURRENT GOVERNMENT EXPENDITURE (€ MILLION); 2014 - 2016

Source: QEC calculations.

The publication by the CSO of the adjusted level indicator of the size of the domestic economy, GNI*, is particularly useful in assessing the public finances. By reflecting more accurately the underlying nature of economic activity in the domestic economy it provides arguably a clearer picture as to the ability of the

economy to service its sovereign debt obligations. In Figure 46, following previous *Commentaries* where we had plotted the debt-to-GDP with an adjusted GDP series, in this case we now plot the debt-to-GDP ratio along with a plot of the debt-to-GNI*. In both cases the ratio is declining in a persistent manner, however it is important to note that in 2016, the debt-to-GDP ratio is 22.3 percentage points lower than debt-to-GNI*.

FIGURE 46 DEBT-TO-GDP AND GNI* RATIOS (%)



Source: QEC calculations.

In a box in the Output section Garcia-Rodriguez examines the implications of the Government's aim to increase capital expenditure to €7.8 billion by 2021. While there are positive outcomes in terms of higher growth and lower unemployment as a result of such an increase, Garcia-Rodriguez also estimates that this will increase the general government balance by 0.5 per cent over the period. Consequently, the plan will have to be carefully implemented so as to comply with the fiscal rules.

General Assessment

The Irish economy continues to increase at a significant pace in 2017. While certain taxation items registered relatively weak growth in the earlier part of the year, more recent Exchequer returns indicate that the total taxation take for 2017 is on course to meet expectations. At this point in the year, overall receipts are up by almost 5 per cent with respect to the same time last year. Additionally, the labour market has witnessed continued improvement throughout 2017 with unemployment now down to just over 6 per cent. Employment growth, which is currently broadly based throughout the economy, is approximately 2.5 per cent per annum. On the basis of the stronger revenue numbers we now revise upwards our growth forecast for GDP to 5.0 per cent for the present year. We also marginally increase our forecast for GDP in 2018 to 4.0 per cent. While there is ongoing debate as to the exact degree of output growth due to different national accounting issues, the strength of the tax returns alongside the persistent decline in unemployment indicates that economic activity is continuing apace.

The pressing challenge for policymakers at present is the need to frame the most appropriate fiscal policy given the pace of economic growth. In particular, is the economy at or near its sustainable (potential) level of output? Some commentators have, for example, called for a contractionary fiscal policy in light of the economy's recent performance.

Framing a prudent budgetary policy in the present context is challenging for a number of reasons; while the economy is exhibiting particularly strong growth rates, which would suggest that fiscal policy should at least remain relatively neutral, after the financial downturn there is a clear need for greater investment in key areas such as social housing, the water network, primary day care centres etc. The situation is further complicated by the uncertainty concerning the 'true' rate of economic growth owing to the different issues surrounding the Irish National Accounts. Accurate estimation of key fiscal metrics such as the output gap necessitates that the reported level of GDP underpinning the estimate is truly reflective of the actual domestic increase in economic activity. Thus, the current budgetary policy faces a delicate balancing act of simultaneously ensuring the economy does not overheat while ensuring sufficient levels of investment occur over the medium term.

Given the difficulties with the National Accounts at present, it is very challenging to get a formal assessment of the Irish output gap. Although the unemployment

rate has fallen quite sharply to 6.3 per cent there is still some capacity left in the Irish labour market and recent trends in both wage growth and general inflation are still reasonably moderate. Overall, therefore, this would indicate that traditional estimates of sustainability do not indicate that the economy is overheating. While the new modified measure of the current account balance does indicate a deficit in 2015 and 2016, as noted in the Trade section of the *Commentary*, a large portion of the foreign borrowing contributing to the deficit position is mainly due to the purchase by large multinationals of intellectual property assets from their foreign parents and the cost of aircraft purchases.

However, a further issue which arises in estimating sustainable levels of activity in an economy is the greater need, post the financial crisis, to incorporate information about the financial cycle into measures of potential output and output gaps. A significant body of work at the Bank of International Settlements (BIS)¹⁴ has examined how information about the financial cycle can yield measures of potential output and output gaps that are not only estimated more precisely, but also much more robust in real time. This would seem to be particularly important in the Irish context where the presence of the large construction-related credit bubble in the lead up to 2007 was one of the main reasons for the substantial imbalances which took place in the Irish economy.

Since the economic recovery started in 2013, the performance of the Irish credit market has lagged behind the real economy; stocks of credit have been falling consistently since 2008 and positive growth rates in new lending have only lately started to emerge.

Consequently, when estimates of the financial cycle and more traditional estimates of the output gap are examined in the present climate, it suggests the economy is not yet overheating. However, the growth of residential property prices coupled with the pace of acceleration in mortgage credit suggest that sector specific pressures may be building. For example in the residential property market where demand far exceeds current supply, policymakers should ensure that existing, significant demand-side pressures are not further exacerbated through fiscal measures such as a revision of the help-to-buy scheme or any loosening of macroprudential rules in the mortgage market.

¹⁴ Borio C. (2012). 'The financial cycle and macroeconomics: What have we learnt?', Bank of International Settlements Working Papers, No. 395.
 Borio C., Disyatat and M. Juselius (2013). 'Embedding information about the financial cycle', Bank of International Settlements Working Papers, No. 404.
 Borio C., Disyatat and M. Juselius (2014). 'A parsimonious approach to incorporating economic information in measures of potential output', Bank of International Settlements Working Papers, No. 442.

Combining these different threads of analysis would suggest that, at present, the most appropriate course of action for the Government to take is a neutral fiscal stance. Namely that fiscal policy should neither seek to additionally stimulate nor contract economic activity above and beyond what is forecast to occur. While there is some research to indicate that Irish households may move on to higher rates of taxation at relatively lower income levels than comparator OECD countries, if changes in the taxation system do occur, it would be advisable for these measures to be neutral overall i.e. offset by increases in taxation elsewhere.

The Government is also set to publish a review of the Capital Plan, the aim of which is to inform decisions on revised capital allocations in the context of Budget 2018. The increased level of economic activity and the improvement in the fiscal accounts has led to calls for greater levels of public investment. To assess the potential implications of a greater level of investment on economic activity, we have included a box in the *Commentary* by Garcia-Rodriguez. Garcia-Rodriguez illustrates that increasing capital expenditure to €7.8 billion will lead to greater levels of economic activity in terms of higher output growth and lower unemployment vis-à-vis baseline levels. Quantifying the impacts of such a plan is particularly important in light of potential overheating which may occur in the domestic economy. As also noted in the box, the Capital Plan has implications for the public finances.

In another box in the *Commentary* Morgenroth outlines lessons to be learned from the previous period of significant capital investment undertaken by the State. Morgenroth notes that merely because financing costs are currently low does not imply that capital projects are cheap, only that they are cheap to finance. In the present context, Morgenroth argues that projects with the highest return (value) are those that address key development constraints (e.g. transport bottlenecks) or important societal goals (e.g. addressing homelessness). Also policy coherence is imperative in this regard as any significant increase in capital expenditure must support and complement the recently published National Planning Framework (NDF).

The most significant policy challenge facing both the current and next government is the challenge of successfully ‘managing the boom’. Namely, how to progress from an economy such as Ireland’s which is rapidly recovering from a significant economic and financial shock and consequently enjoying elevated rates of economic growth into a more stable period of sustainable activity over the medium term.

As increasing attention is devoted to implications for the Irish economy of Brexit, a hard border on the island of Ireland would act as a significant impediment to the increasingly integrated nature of certain sectors of the economy such as the agri-food industry (Lawless and Studnicka, 2017).¹⁵ If costly customs inspections as well as all the other border formalities and barriers to trade which existed before 1992 are to be avoided, then the UK must remain a member of the Customs Union. If the UK does leave both the Customs Union and the Single Market, the cost of doing business for many Irish firms with counterparts in Northern Ireland or the rest of the UK will increase. The negotiating position currently employed by the EU Commission seeks to achieve agreement on three core issues (the cost of the Brexit ‘divorce’, the rights of EU citizens in the UK and the nature of the border on the island of Ireland) before the exact nature of the UK’s trading position with the EU is established. One issue potentially with this strategy is that the nature of the border on the island of Ireland is inextricably linked to the nature of the trade relationship between the UK and the EU. Therefore, can both issues be successfully negotiated separately of one another? If, for example, the UK were to remain part of the Customs Union, then the border issue would, in large part, resolve itself.

In a Special Article in the *Commentary*, Redmond, McGuinness and Kelly examine whether recent changes in the qualifying age for the Irish contributory state pension have had a causal effect on the overall retirement rate. Overall, the authors find no clear evidence that the change in the qualifying age had a causal effect on the overall retirement rate or the employment and unemployment rates of 65-year-olds in 2014. From a policy perspective the results are of interest as they provide some idea as to how responsive the labour market might be to measures aimed at increasing labour force participation.

¹⁵ Lawless, M. and Z. Studnicka (2017). ‘Potential impacts of WTO tariffs on cross-border trade’, InterTradeIreland, available online at: www.intertradeireland.com.

DETAILED FORECAST TABLES

FORECAST TABLE A1 EXPORTS OF GOODS AND SERVICES

	2015	% change in 2016		2016	% change in 2017		2017	% change in 2018		2018
	€ bn	Value	Volume	€ bn	Value	Volume	€ bn	Value	Volume	€ bn
Merchandise	195.6	-4.8	4.0	186.3	-3.7	4.5	179.3	5.2	4.0	188.6
Tourism	4.3	8.4	7.4	4.7	5.0	4.0	4.9	3.0	4.0	5.1
Other Services	117.3	9.0	8.0	127.9	30.0	14.0	166.2	11.2	8.0	184.9
Exports Of Goods and Services	317.2	0.5	3.4	318.8	9.9	3.9	350.4	8.0	4.7	378.5
FISM Adjustment	9.4			16.2			18.2			19.8
Adjusted Exports	326.6	2.6	4.6	335.0	10.0	4.5	368.7	8.0	4.9	398.3

FORECAST TABLE A2 INVESTMENT

	2015	% change in 2016		2016	% change in 2017		2017	% change in 2018		2018
	€ bn	Value	Volume	€ bn	Value	Volume	€ bn	Value	Volume	€ bn
Housing	4.4	17.5	13.3	5.2	45.3	42.8	7.6	19.2	21.0	9.0
Other Building	7.8	31.1	23.3	10.3	25.4	20.0	12.9	26.6	20.0	16.3
Transfer Costs	0.9	23.9	16.8	1.1	12.4	7	1.3	9.2	3.0	1.4
Building and Construction	14.2	24.9	18.4	17.7	29.6	25.2	22.9	22.5	18.7	28.1
Machinery and Equipment	39.0	79.4	76.7	70.0	16.2	13.3	81.3	14.0	10.2	92.8
Total Investment	53.2	64.9	61.2	87.7	18.9	15.6	104.3	15.9	12.0	120.9

FORECAST TABLE A3 PERSONAL INCOME

	2015	% change in 2016		2016	% change in 2017		2017	% change in 2018		2018
	€ bn	%	€ bn	€ bn	%	€ bn	€ bn	%	€ bn	€ bn
Agriculture, etc.	3.2	1.7	0.0	3.2	2.0	0.1	3.3	2.5	0.1	3.4
Non-Agricultural Wages	76.1	5.4	4.2	80.3	6.5	5.2	85.5	5.5	4.7	90.2
Other Non-Agricultural Income	21.2	26.3	5.6	26.8	47.8	12.8	39.6	24.7	9.8	49.4
Total Income Received	100.6	9.7	9.7	110.3	16.4	18.1	128.4	11.3	14.1	143.0
Current Transfers	23.9	3.0	0.8	24.7	0.5	0.1	24.8	-4.2	-1.0	23.8
Gross Personal Income	124.5	8.4	5.5	135.0	13.5	18.2	153.2	8.8	13.5	166.7
Direct Personal Taxes	28.2	4.1	1.2	29.4	3.5	0.6	30.4	2.5	0.8	31.2
Personal Disposable Income	96.3	9.3	7.1	105.6	17.2	5.0	122.8	10.4	12.8	135.6
Consumption	92.7	4.2	3.9	96.6	4.1	4.0	100.6	4.0	4.1	104.7
Personal Savings	3.6	152.1	5.4	9.0	147.0	13.2	22.2	39.2	8.7	30.9
Savings Ratio	3.7			8.5			18.1			22.8
Average Personal Tax Rate	22.6			21.7			19.8			19.4

FORECAST TABLE A4 IMPORTS OF GOODS AND SERVICES

	2015	% change in 2016		2016	% change in 2017		2017	% change in 2018		2018
	€ bn	Value	Volume	€ bn	Value	Volume	€ bn	Value	Volume	€ bn
Merchandise	86.9	1.5	8.2	88.2	0.1	-2.0	88.3	10.0	7.7	97.1
Tourism	5.1	9.5	8.9	5.6	4.3	2.8	5.9	4.5	3.0	6.1
Other Services	147.8	22.2	21.4	180.6	15.4	11.0	208.4	12.1	7.8	233.7
Imports of Goods and Services	239.9	14.4	16.4	274.4	10.0	6.2	302.6	11.3	7.7	336.9
FISM Adjustment	0.0			0.0			-0.8			-0.9
Adjusted Imports	239.9	14.4	16.4	274.4	10.0	6.2	301.8	11.3	7.7	336.0

FORECAST TABLE A5 BALANCE OF PAYMENTS

	2015	2016	2017	2018
	€ bn	€ bn	€ bn	€ bn
Exports of Goods and Services	317.2	318.8	350.4	378.5
Imports of Goods and Services	239.9	274.4	302.6	336.9
Net Factor Payments	-52.1	-45.3	-50.4	-52.6
Net Transfers	-3.3	-3.3	-3.3	-3.3
Balance on Current Account	21.9	-4.2	-5.8	-14.2
As a % of GNP	10.6	-1.9	-2.3	-5.3

FORECAST TABLE A6 EMPLOYMENT AND UNEMPLOYMENT, ANNUAL AVERAGE

	2015	2016	2017	2018
	'000	'000	'000	'000
Agriculture	109.9	112.8	109.5	109.5
Industry	373.7	393.8	417.1	433.0
Of which: Construction	125.5	135.9	148.8	161.5
Services	1,474.1	1,506.6	1,557.6	1,591.5
Total at Work	1,963.5	2,020.0	2,086.8	2,134.0
Unemployed	203.6	173.0	136.2	120.9
Labour Force	2,167.2	2,193.0	2,222.9	2,254.9
Unemployment Rate, %	9.4	7.9	6.1	5.4

Special Article

DID INCREASING THE STATE PENSION AGE IN IRELAND AFFECT THE RETIREMENT RATE OF 65-YEAR-OLDS?

Paul Redmond, Seamus McGuinness and Elish Kelly¹

ABSTRACT

In January 2014, the qualifying age for the Irish contributory state pension increased from 65 to 66 years. Individuals born after 1 January 1949 could no longer qualify for the pension at age 65, while individuals born before this date could still qualify, provided they had the required social insurance contributions. In this paper, we examine whether this change in the qualifying age had a causal effect on the retirement rate of 65-year-olds in Ireland. To do this, we compare the retirement rates of two groups of 65-year-olds in 2014; one group was born just after the cut-off date, thereby making them ineligible for the state pension at age 65, while the other group was born just before the cut-off date, making them potentially eligible, subject to meeting the insurance contribution requirements. We do not find clear evidence that the change in the retirement age had a causal effect on the retirement rate or the employment and unemployment rates of 65-year-olds in 2014.

INTRODUCTION

Prior to 2014, the transition state pension in Ireland was payable at age 65 to individuals who retired from insurable employment and satisfied certain social insurance contribution conditions. The transition state pension was payable for only one year from age 65, after which the person was automatically transferred to the contributory state pension at the age of 66.² In 2014, the transition state pension was abolished, thereby increasing the pension qualification age to 66 years.³ The implementation of the policy in 2014 was based on a person's date of birth, such that individuals born before January 1949 could still qualify at age 65, whereas those born on or after 1 January 1949 had to wait until age 66. As a result, a 65-year-old in 2014 who was born in December 1948 and had the required social insurance contributions could receive the state pension, while a

¹ The work carried out in this article was funded by the Department of Social Protection and we would like to thank all individuals in the Department who provided assistance during the project. We would also like to thank the Central Statistics Office (CSO) for providing us with access to the Quarterly National Household Survey (QNHS) with the additional month of birth information required to conduct this study. Finally, we are grateful to Alan Barrett and an anonymous referee for providing valuable comments on an earlier draft.

² There also exists a non-contributory state pension in Ireland which is a means-tested payment to individuals who are aged 66 and over and do not qualify for the contributory state pension.

³ These changes were outlined by the Irish government in March 2010, thereby giving individuals affected by the policy change almost four years advance notice of the pension age change.

65-year-old individual born in January 1949 (one month younger) with the same contributions had to wait until age 66 to receive the state pension.

We exploit this sharp cut-off in the pension qualification age to analyse whether the policy change had a causal effect on the retirement rate of 65-year-olds in 2014 using a regression discontinuity design. This is undertaken using data from the Quarterly National Household Survey (QNHS), Ireland's labour force survey, which is conducted by the Central Statistics Office (CSO). The identification strategy can be explained in a straightforward way. Consider a scenario where we have data in 2014 on two groups of individuals; one group was born on 31 December 1948 and the other on 1 January 1949. Both groups are 65, with one group being only one day older. However, the older group qualifies for the pension at 65 while the younger group does not. Comparing the retirement outcomes of both groups allows us to assess whether the policy change had a causal effect on the retirement rate. In addition to being virtually the same age, there is no reason to suspect that these two groups will be systematically different with respect to other characteristics (both observable and unobservable) that might impact on the retirement decision. Therefore, any difference in retirement outcomes can be attributed to a causal effect of the policy.

While the policy change lends itself to a regression discontinuity analysis, it is important to point out some data limitations which impact the study. The finest level of information available to us on an individual's birth date was their month of birth. As such, individuals are grouped into discrete monthly bins and identification relies on comparing the outcomes of those born in the month prior to the cut-off date, i.e., just qualified (based on age), to those born in the month after the cut-off date, i.e., barely missed out. As we are focusing on a narrow subset of the population, there is a relatively small number of observations. For example taking a three-month period on either side of the cut-off provides us with 431 observations; 238 individuals who just missed out on qualifying, i.e., were born between January and March 1949, and 193 individuals who just barely qualified, i.e., were born between October and December 1948.⁴ Small sample sizes are common in RD studies due to the narrow focus on a subset of the population. Expanding the analysis to include individuals further away from the threshold increases the sample size. However, given that identification relies on comparing people to the immediate left and right of the cut-off, the estimates should not be overly reliant on these observations. In this paper, we address this issue by verifying the robustness of our results to a restrictive specification which focuses on a very narrow bin width on either side of the month of birth cut-off.

⁴ These are the unweighted sample sizes. There is a weighting factor in the data which is designed to ensure it is representative of the population. We verify the results do not change when we estimate discontinuities using the weighting factors.

An additional consideration relates to the ‘bite’ of the policy among the sample of individuals studied, i.e., the number of 65-year-olds in 2014 that were actually affected by the policy change. Given the transition state pension was based on satisfying certain social insurance contributions, not everybody in the sample will be affected by the policy change. Conditioning only on 65-year-olds who were entitled to the state pension would require a larger and more detailed dataset that would allow us to identify people with the required insurance contributions and to ensure there was a large enough sample of these individuals for meaningful estimates. Ideally, this would be a linked administrative dataset between Revenue and the Department of Social Protection, which, in addition to providing details on the types of benefits received, would show an individual’s employment history. Should the data be made available, future research could examine the causal effect of the pension age change on the retirement decision, conditioning on individuals who had the required social insurance contributions.⁵ However, in this study, we examine the retirement rates of all 65-year-olds in 2014. Therefore our analysis provides evidence of the causal effect of the policy change on the overall retirement rate of 65-year-olds. In light of the data issues highlighted above, an additional contribution of this paper is to highlight potential avenues for further work and to make suggestions as to the type of data that would facilitate research which would be useful to inform the policy debate in this area.

While the data do not allow us to identify a person’s eligibility based on their social insurance contributions, we make use of the QNHS question which captures information on whether a person has ever been in employment.⁶ If a person has never been employed then they will not have the required contributions to qualify for the transition state pension. Therefore, in addition to reporting estimates of the causal effect of the policy change on the overall retirement rate of 65-year-olds, we also report results where we condition only on individuals who have some previous employment experience. While this does not fully address the data issues outlined above, it goes some way towards narrowing the analysis to individuals who are likely to qualify for the transition state pension by focusing only on those who have some social insurance contributions. However, only 7 per cent of all 65-year-olds in our analysis report having no previous employment experience and excluding these individuals from the analysis has very little impact on the estimates and does not change the overall results of the paper.

⁵ Such information (social insurance contributions) is not collected by the QNHS data, which are the data used to conduct this analysis.

⁶ There is also information on when an individual started work for their current employer. However, we cannot use this as it does not give information on their full employment history.

Relatively few studies examine how changes in retirement age rates affect retirement decisions. The research which does address this question utilises large administrative datasets (Staubli and Zweimuller, 2013; de Grip et al., 2013; Puur et al., 2015; Sanchez-Martin et al., 2014; Vestad, 2013). Staubli and Zweimuller (2013) examine the labour market effects of increasing the early retirement age in Austria and find that raising the retirement age increased employment of affected men by 9.75 percentage points and affected women by 11 percentage points. They also find that a large number of affected individuals bridge the gap to retirement by drawing on unemployment benefits; specifically, there was a 12.51 percentage point increase in registered unemployment among men and 11.77 percentage points among women. Other work has shown that increasing the pension age increases the actual retirement age (Puur et al., 2015) as well as the expected retirement age of employees (de Grip et al., 2013) and can lead to increases in labour supply (Vestad, 2013; Sanchez-Martin et al., 2014) and lower pension costs (Sanchez-Martin et al., 2014).

The paper proceeds as follows. In the next section we describe the data and present some descriptive statistics relating to the sample of 65-year-old individuals in 2014. The following section outlines the methodology and the Results section presents the main results as well as various robustness and sensitivity checks. The final section concludes and discusses some potential explanations for the lack of any clear evidence of a causal effect of the policy change on retirement rates.

DATA

We use data from the 2014 Quarterly National Household Survey (QNHS). Given that we are studying the effect of a change to the pension qualification age, and that identification in the RD design relies on people close to the qualification threshold, we focus our analysis on an older segment of the population. Individuals who were not close to 65 years at the time the policy was implemented will not be affected by the policy change, and therefore these individuals should not influence our estimates.

There is a trade-off when it comes to choosing the sample of individuals to include in an RD study. Focusing on observations that lie very close to the assignment threshold is beneficial as it is these types of individuals upon which identification hinges, however this can often lead to a very small sample size. Expanding the analysis to include individuals further from the threshold can increase the sample size, however, the results should not be overly reliant on these individuals. The age threshold in this study is whether a person was born

before or after 1 January 1949. An alternative way of defining the threshold is a person's age (in months) at the time the policy was implemented. People who were at least 780 months old at January 2014 were born before 1 January 1949 and qualify, while those aged 779 months or younger were born after. In this paper we take two approaches. We begin our analysis with a broad age range by including individuals aged between 681 months (56.75 years) and 879 months (73.25 years) at the time the policy was implemented (on 1 January 2014). This gives us a relatively large sample size of 14,911 individuals. We then verify whether the results from our baseline specification are robust to an alternative age-restricted specification, which focuses only on individuals who were aged 65 in 2014, i.e., people who were aged between 768 and 791 months at the time the policy was introduced. This reduces our sample size from 14,911 to 1,829; there were 940 individuals aged 65 in 2014 whose date of birth meant they missed out by between one and 12 months on qualifying for the pension at age 65. There were 889 individuals aged 65 in the older 12 month age range who could, based on their age, qualify for the pension at age 65.

Our dependent variable is the probability of being in retirement and is based on an individual's self-reported main labour status. Table 1 shows the distribution of 65-year-olds in 2014 by main labour status. Almost 40 per cent of 65-year-olds were retired from employment in 2014, making this the largest category. A large number were also working for payment or profit (27 per cent) and engaged in home duties (21 per cent). Approximately 10 per cent report being unable to work due to permanent sickness or disability while almost 4 per cent are unemployed, having lost or given up their previous job.

Table 2 splits 65-year-olds in 2014 into two groups; those whose date of birth meant they could not qualify for the state pension at age 65 (born after 1 January 1949) and those whose date of birth meant they could still potentially qualify for the pension (born before 1 January 1949). Descriptive statistics are presented for both groups as well as statistics on their main labour status. The retirement rate of the group born before 1 January 1949 is 43 per cent compared to 36 per cent for the group born after 1 January 1949. However the difference between the two rates cannot be taken as a causal effect of the change in qualification age on retirement rates. The group born before 1 January 1949 are, on average, eight months older than the group born after 1 January 1949 and, as such, we would expect their retirement rates to be higher. This serves to motivate the benefits of using the regression discontinuity design, which overcomes this issue by comparing the average retirement rates of individuals just to the left and right of the qualification threshold who are closer in age.

TABLE 1 MAIN LABOUR STATUS OF 65-YEAR-OLDS IN 2014

Main Labour Status	Frequency	Per Cent
Working for payment or profit	538	26.58
Looking for first regular job	*	*
Unemployed, having lost or given up previous job	75	3.71
Actively looking for work after voluntary interruption of working life for personal or domestic reasons	*	*
Student or pupil	*	*
Engaged in home duties	433	21.39
Retired from employment	786	38.83
Unable to work due to permanent sickness or disability	180	8.89
Other	*	*

Source: CSO Quarterly National Household Survey.

Note: Estimates for numbers of persons or averages where there are less than 30 persons in a cell are not produced as estimates are too small to be considered reliable.

TABLE 2 AVERAGE CHARACTERISTICS OF 65-YEAR-OLDS IN 2014

	Born before 1 Jan 1949	Born after 1 Jan 1949
Gender (% male)	51.6%	49.4%
Highest educational attainment (ISCED 11)	2.61	2.73
Married	70.3%	73.9%
Widowed	9.3%	7.3%
Age at 1 Jan 2014 (months)	784	776
Main Labour Status		
Working for payment or profit	25.1%	26.5%
Looking for first regular job		*
Unemployed, having lost or given up previous job	*	*
Actively looking for work after voluntary interruption of working life for personal or domestic reasons		*
Student or pupil	*	*
Engaged in home duties	21.4%	22.1%
Retired from employment	43.0%	35.6%
Unable to work due to permanent sickness or disability	7.7%	10.3%
Other	*	*

Source: CSO Quarterly National Household Survey.

Note: Estimates for numbers of persons or averages where there are less than 30 persons in a cell are not produced as estimates are too small to be considered reliable.

METHODOLOGY

Regression discontinuity is a quasi-experimental research design that allows for the causal analysis of a treatment, when assignment to that treatment changes

discontinuously at a pre-defined threshold.⁷ Regression discontinuity analysis can be implemented either parametrically or non-parametrically (Lee and Lemieux, 2010). The parametric approach involves fitting a conditional mean function to the data on either side of the cut-off that determines treatment, using polynomials of various orders. The non-parametric approach is based on estimating a regression function in a neighbourhood of the cut-off, using a specified bandwidth and kernel. With a large number of observations and continuous data, the non-parametric estimator is desirable as it focuses the analysis on observations close to the cut-off (Skovron and Titiunik 2015; Gelman and Imbens 2014). However with discrete data that are reported in coarse intervals, such as the month of birth data used in this study, non-parametric methods may be of limited use. As noted by Lee and Card (2008), with coarse data an irreducible gap exists between the treatment group just above the cut-off and the control group just below, and as such it may not be possible to estimate a causal effect in the absence of a parametric assumption.

The treatment under investigation in this study is whether or not an individual could qualify, provided they had the required social insurance contributions, for the transition state pension in Ireland at age 65. The variable which determines treatment assignment is known as the forcing variable, which in this case is date of birth. We were unable to source day of birth data, however we have data on month of birth. We can set up the forcing variable as an individual's age, in months, at January 2014 (the implementation date of the policy). Those born in December 1948 are 780 months old in January 2014 and those born in January 1949 are 779 months. Therefore, T_i is defined as a treatment dummy which indicates whether an individual can qualify, based on their month of birth, for the pension at age 65 in 2014, such that,

$$T_i = \begin{cases} 1 & \text{if age of individual } i \text{ at Jan 2014} \geq 780 \text{ months} \\ 0 & \text{if age of individual } i \text{ at Jan 2014} < 780 \text{ months} \end{cases}$$

As such, the treated group are those individuals who can potentially qualify for the state pension at age 65, while the untreated are those who do not qualify. Any discontinuity in outcomes that exist as a result of the treatment should be evident at the 780 month threshold, i.e. a sharp jump in the probability of retirement for the 780 month group compared to the 779 month group. We focus our analysis on data from Quarters 2 and 3 of 2014. This ensures that the 780 month and 779 month groups, upon which identification hinges, are both aged 65 at the time of survey. If we were to include data for Quarter 4, 2014, then it could be the case that some of the 780 month group would be 66 at the time of survey, whereas all of the 779 month group would be 65. Likewise,

⁷ For a detailed exposition of the regression discontinuity estimator and its properties, see Lee and Lemieux (2010).

including Quarter 1 data from 2014 would mean that some of the 779 group would still be 64 at the time of survey.⁸

We employ a parametric regression discontinuity specification, which involves running separate regressions on both sides of the threshold of the outcome of interest on the forcing variable. We estimate the following regressions for those to the left of the 780 month threshold, i.e. the individuals who do not qualify for the state pension until age 66, and those to the right of the threshold, i.e. the individuals who could qualify, based on their month of birth, for the pension at age 65 (the treated),

$$RetiredL_i = \alpha_L + \beta \cdot f_L(AgeatJan14_i - 780) + \varepsilon_i \quad (1)$$

$$RetiredR_i = \alpha_R + \beta \cdot f_R(AgeatJan14_i - 780) + \varepsilon_i \quad (2)$$

where f_L and f_R are polynomials in the forcing variable. The inclusion of the polynomial terms underlies the importance of getting the specification correct in order to avoid mistaking a non-linearity in the conditional expectation function for a discontinuity. The threshold value of 780 is subtracted from the forcing variable for convenience; the estimated discontinuity is then simply the difference between the intercepts, $\alpha_R - \alpha_L$. Instead of estimating two separate regressions, it is straightforward to estimate a single pooled regression which gives identical results and has the advantage of yielding a direct estimate of the discontinuity and standard errors. The pooled regression is

$$Retired_i = \alpha + \beta \cdot T_i + \rho \cdot f(Age_i - 780) + \gamma \cdot T_i \cdot f(Age_i - 780) + \varepsilon_i \quad (3)$$

where T_i is the treatment dummy defined above and β is an estimate of the causal effect of the pension age change on the probability of retirement. An interaction term between the treatment dummy and the polynomial is also included.

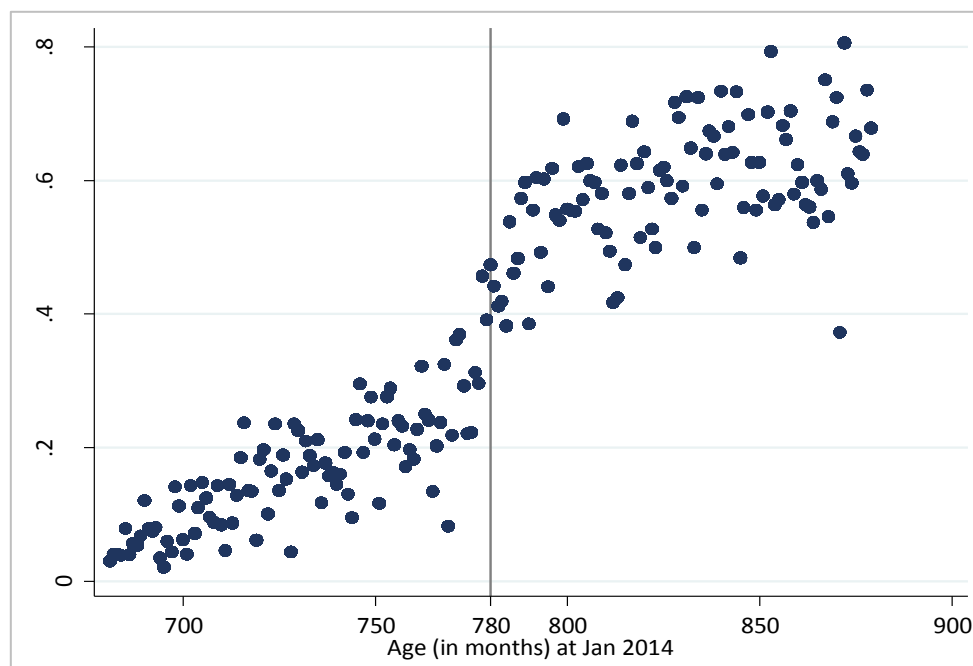
RESULTS

As a first step, before running the regression model (Equation 3), we calculate average outcomes for each of the discrete age points in the forcing variable. This is shown in Figure 1 for individuals aged between 681 months (56.75 years) and 879 months (73.25 years) at the time the policy was implemented (on 1 January 2014). The average retirement probability by age (in months) at January 2014 is calculated based on the main labour status of respondents (see Table 1). A dummy variable is created which equals one if the main labour status of

⁸ We verify that the results are robust to including all four quarters of data.

respondents is ‘retired from employment’ and zero otherwise.⁹ Averages of this dummy variable are calculated for each age category and are plotted in Figure 1. A vertical line is inserted in the graph to show the month-of-birth threshold. The average retirement probabilities are increasing with age, which explains the upward sloping averages. However, from this graph it is not immediately apparent whether a discontinuity exists at the threshold. Close inspection reveals that the groups who just barely missed out on treatment, upon which identification relies heavily, have similar retirement probabilities to those who just qualified. This becomes clearer when we look at Table 3 which lists the retirement probabilities for individuals depending on their age (in months) at January 2014. The retirement probability for the 778 group is roughly the same as the 780 group, and is higher than the 781-784 groups. Moreover, if we were to expand our bin widths to include two months of data, then the difference in retirement probabilities between those who barely qualified (the 780 and 781 group) would barely differ from those who just missed out (the 778 and 779 group). As such, there is no clear evidence that the change in the retirement age had a causal effect on the retirement rate.

FIGURE 1 AVERAGE RETIREMENT PROBABILITIES



Source: CSO Quarterly National Household Survey.

⁹ We verify the results are robust to an alternative setup whereby the zeros in our retirement dummy are just those who are either employed or unemployed. This reduces our sample size and produces noisier estimates, however the main results remain unchanged.

TABLE 3 AVERAGE RETIREMENT PROBABILITIES BY AGE AT JANUARY 2014

Age at Jan 2014	Month and Year of Birth	Mean	Obs
771	Sept 1949	0.36	72
772	Aug 1949	0.37	73
773	July 1949	0.29	89
774	June 1949	0.22	77
775	May 1949	0.22	90
776	April 1949	0.31	80
777	March 1949	0.30	81
778	Feb 1949	0.46	70
779	Jan 1949	0.39	87
780	Dec 1948	0.47	57
781	Nov 1948	0.44	68
782	Oct 1948	0.41	68
783	Sept 1948	0.42	74
784	Aug 1948	0.38	89
785	July 1948	0.54	78
786	June 1948	0.46	89
787	May 1948	0.48	89
788	April 1948	0.57	82
789	March 1948	0.60	62

Source: CSO Quarterly National Household Survey.

We employ a parametric specification (Equation 3) using polynomials of different orders, beginning with a linear specification, i.e., a first order polynomial. The conditional expectation function and the local averages are shown in Figure 2. The estimate of the discontinuity from this linear specification is quite large and statistically significant and taken in isolation this would indicate that the individuals who barely missed out on the treatment (those just below the threshold) are 17.5 percentage points less likely to be in retirement in 2014 than those who just barely qualified for treatment. However, in parametric regression discontinuity specifications, a linear model is often not the most suitable specification and in order to be confident in the estimates, they should be robust to more flexible, higher order polynomial specifications. There is no fixed rule for choosing which order of polynomial is most suitable and often the local averages provide a guide as to which conditional mean function appears to be the best fit to the data. However, Lee and Card (2008) provide some guidance to evaluate whether a low order polynomial, such as the first order specification in Figure 2, may be too restrictive, thereby calling into question the reliability of such results. They suggest using a goodness of fit statistic;

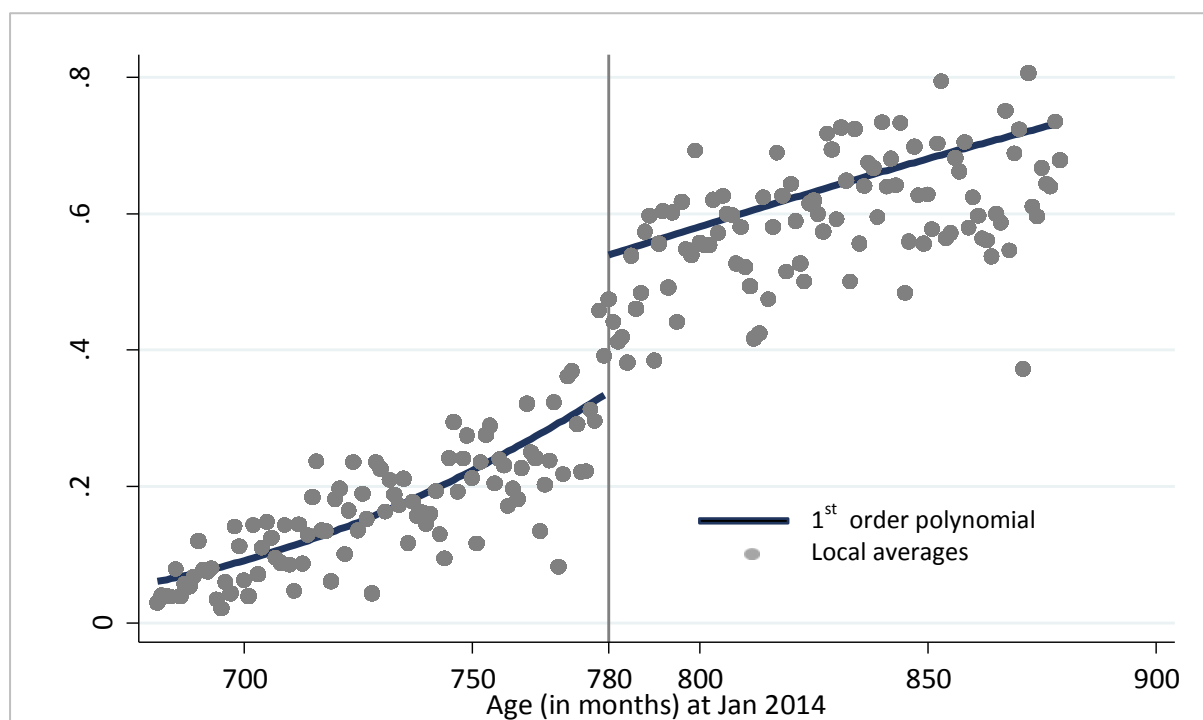
$$G = \frac{(ESS_R - ESS_{UR})/(J - K)}{ESS_{UR}/(N - J)},$$

where ESS_R is the error sum of squares from the polynomial (restricted) model and ESS_{UR} is the error sum of squares from an unrestricted model which regresses the outcome variable on a full set of dummy variables for each of the discrete forcing variable bins. J denotes the number of bins, N the number of observations and K the number of parameters estimated in the restricted model. The statistic is distributed as $F(J-K, N-J)$. If the statistic exceeds the critical value, this implies that our low order polynomial may be too restrictive.

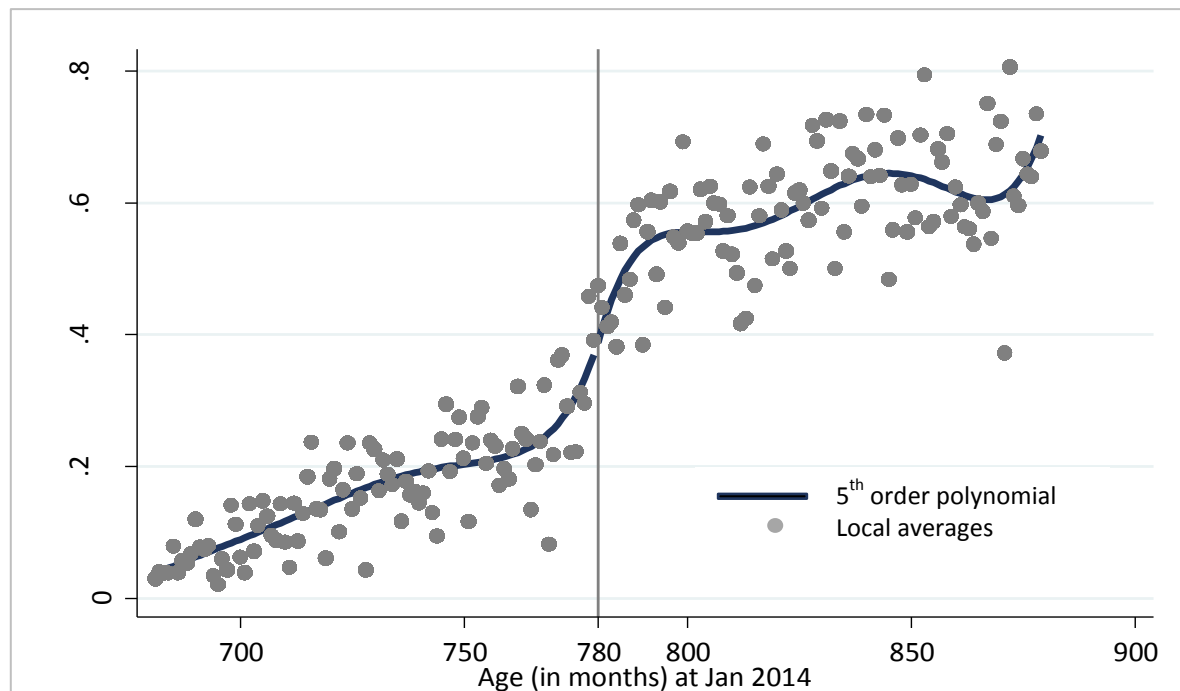
The goodness of fit statistic indicates that the linear specification used in Figure 2 is restrictive.¹⁰ As such, the linear specification may be mistaking a non-linearity for a discontinuity. In Table A1 we present results using different polynomial specifications, ranging from a linear specification to a sixth order polynomial. The estimated discontinuity decreases quite quickly as we use more flexible functional forms, eventually disappearing in the fifth order specification. This relates to our previous discussion of Table 3, which shows that the retirement rates of individuals in the two bins just to the left of the threshold are very similar, or even larger, than those in the five bins just to the right of the threshold. This influences the conditional expectation function in the more flexible parametric functional forms, which can be seen in Figure 3, which plots the conditional expectation function of the fifth order polynomial. In this graph, no discontinuity exists at the threshold.¹¹

¹⁰ The test statistic is 1.8 and the critical value is 1.17.

¹¹ The fifth order polynomial is clearly a more flexible specification, yet the goodness of fit test statistic (1.6) is still above the critical value (1.18). As mentioned, the Lee and Card (2008) test is not a precise test as to which order polynomial to use, but rather should be applied when a significant result is detected to give reassurance of the model's suitability. The fact that the discontinuity disappears at the more flexible fifth order polynomial, which is still restrictive as per the Lee and Card (2008) test is conclusive. We can keep moving to more flexible, higher order polynomials, which would produce lower test statistics, but the results are still not statistically significant.

FIGURE 2 FIRST ORDER POLYNOMIAL SPECIFICATION

Source: CSO Quarterly National Household Survey.

FIGURE 3 FIFTH ORDER POLYNOMIAL SPECIFICATION

Source: CSO Quarterly National Household Survey.

As mentioned, the data are not ideally suited to non-parametric estimates due to the coarsely distributed forcing variable. Nonetheless, as an additional robustness check we also report estimates using a non-parametric local linear regression, as in Calonico et al. (2014). While the method used is local linear regression, our

data are in monthly bins to the left and right of the threshold, and therefore even this non-parametric method relies on observations away from the cut-off, although these are given a lower weight.¹² The results of the non-parametric method indicate that there is no statistically significant effect of the policy change on retirement rates (see the last column of Table A1).

In the last row of Table A1, we report results of a model which conditions only on individuals with some previous employment experience. The coefficients remain relatively consistent with the baseline model, both in terms of their magnitude and statistical significance. As with the baseline model, the estimates are not statistically significant for higher order polynomials and the non-parametric specification.

Age-restricted specification

Identification in the RD design relies on comparing individuals close to the threshold. This is particularly relevant in our study, as individuals far from the threshold may not be affected by the policy change. For example, the pension age changing from 65 to 66 may have less of an impact on the retirement decision of a 60-year-old compared to a 65-year-old.¹³ Likewise, a person who is already 66 years old (792 months) at January 2014 will not be affected by the policy change. There is an additional consideration with our data which relates to the age at which a person's outcome is observed. We use outcome data from Quarters 2 and 3 of 2014, which ensures that all individuals in a three-month bin to the left of the cut-off are 65 years of age. However, beyond this, there are some individuals who are 64 when surveyed.¹⁴ This is shown in Table 4, which shows the average age (in years) at the time of survey (reference month) for each of the forcing variable months. For example, this indicates that all of the individuals who were 777 months old at January 2014 were 65 years old at the reference month, whereas the average age of individuals in the 776 group was 64.91 years, meaning some were still 64 years old when their labour status was recorded.

¹² The local linear regression uses a triangular kernel and an optimal sized bandwidth as per Imbens and Kalyanaraman (2012).

¹³ It may affect their decision to retire as it will impact the amount of time they have to wait upon retirement before receiving the state pension.

¹⁴ For example, a person who was 774 months old at January 2014 and who was surveyed in April 2014 will still be 64 at the time of survey.

TABLE 4 AVERAGE AGE DURING REFERENCE MONTH

Age (in months) at Jan 2014	Average Age (in years) at Reference Month	N
771	64.08	72
772	64.30	73
773	64.43	89
774	64.61	77
775	64.74	90
776	64.91	80
777	65.00	81
778	65.00	70
779	65.00	87
780	65.00	57
781	65.00	68
782	65.00	68
783	65.07	74
784	65.29	89
785	65.44	78
786	65.57	89
787	65.75	89
788	65.94	82
789	66.00	62

Source: CSO Quarterly National Household Survey.

While the inclusion of a large number of bins either side of the threshold is useful for analysing the continuity of the conditional mean function and increasing the sample size, the main results should not be overly reliant on these observations. We examine whether our main results are consistent with an alternative specification in which we use all available data from 2014 and condition on individuals who are 65 when their labour status is recorded. This automatically discards individuals whose age is ± 12 months of the 780 month threshold at January 2014, reducing the total sample size from 14,911 to 1,829. However, while our sample size is smaller, we are limiting our analysis to 65-year-olds and therefore we can be confident that our analysis is focusing on individuals whose age implies that they were potentially affected by the policy change. Table 5 shows the average retirement probabilities in 2014 of all individuals who were aged 65 in that year and Figure 4 displays the results graphically. Visual inspection of the average retirement probabilities suffices in this instance as we are including only 12 bins on either side of the cut-off, meaning parametric RD estimates of the conditional mean function provide little additional useful information. The slightly older 65-year-olds to the right of the threshold were potentially entitled to the state pension at age 65, whereas the slightly younger 65-year-olds to the left of the threshold were not. Again, this analysis does not provide convincing evidence of a causal effect of the policy change on the retirement rate of 65-year-olds in 2014. The average retirement rate of 65-year-olds who missed out on qualifying by at most two months was 41.6 per cent,

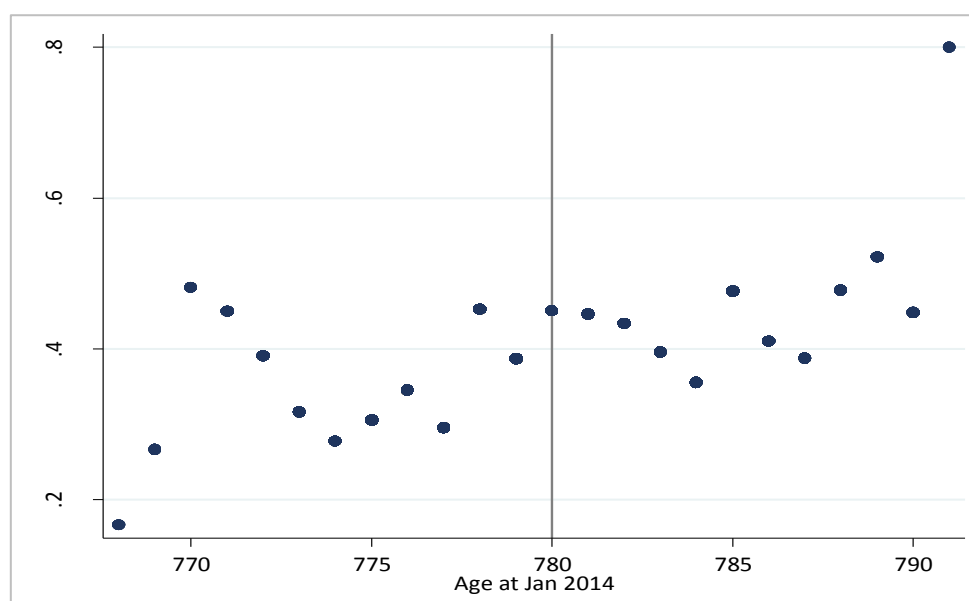
compared to 45 per cent for the slightly older 65-year-olds who just barely qualified by at most two months. As before, the retirement rates of the 778 group, who just missed out, were equal to or higher than the rates for the 780-784 groups, which again suggests the absence of a policy effect.

TABLE 5 AVERAGE RETIREMENT PROBABILITIES OF 65-YEAR-OLDS IN 2014

Age (in months) at Jan 2014	Pr(Retired)	N
771	[0.45]	40
772	0.39	64
773	0.32	79
774	0.28	90
775	0.31	108
776	0.34	110
777	0.30	115
778	0.45	126
779	0.39	160
780	0.45	111
781	0.45	121
782	0.43	113
783	0.40	106
784	0.36	104
785	0.48	86
786	0.41	78
787	0.39	67
788	[0.48]	46

Source: CSO Quarterly National Household Survey.

Notes: Estimates for numbers of persons or averages where there are less than 30 persons in a cell are not produced as estimates are too small to be considered reliable. Parentheses [] indicate where there are 30-50 persons in a cell. Such estimates are considered to have a wider margin of error and should be treated with caution.

FIGURE 4 AVERAGE RETIREMENT PROBABILITIES OF 65-YEAR-OLDS IN 2014

Source: CSO Quarterly National Household Survey.

Robustness, validity and sensitivity analysis

Identification in the regression discontinuity design is based on the assumption that individuals just to the left of the threshold possess similar observable and unobservable characteristics to those just to the right of the threshold, with the only difference between the two groups being that one barely qualified for treatment and one just missed out. While we cannot test whether the two groups are similar in their unobservable characteristics, we can test for comparability in observed characteristics. As mentioned above, of particular importance in this study is the age of the individual (in months) at the time of survey in 2014. Retirement is a function of age and if a systematic difference existed between the 780 group and the 779 group in terms of their age (in months) at the time of survey, then this could bias the results. To see this, consider an example. The data captures outcomes of individuals surveyed in Quarters 2 and 3 of 2014. If the 779 group were all surveyed in September 2014 and the 780 group were all surveyed in April 2014, that would mean that the 779 group at the time of survey, when the retirement outcome is captured, would be six months older than the 780 group. Therefore, this could bias our results, as our estimate would reflect the higher probability of retirement for the 779 group and the lower probability of the 780 group which is due to differences in age, as opposed to the causal effect of treatment. Table 6 confirms that this is not an issue with our data. There is no systematic difference between the ages of the two groups at the time of survey.

We also carry out a sensitivity analysis to see if the results change when a person's age (in months) at the time of survey is included as an additional

explanatory variable in Equation 3. The results are not sensitive to the inclusion of this variable, as shown in the second row of results in Appendix Table A1.

TABLE 6 AGE AT TIME OF SURVEY (IN MONTHS)

Age at Jan 2014	Average Age at Time of Survey	Obs
780	785.5088	57
779	784.6207	87

Source: CSO Quarterly National Household Survey.

Additional covariates are examined to investigate whether differences exist between the 780 and 779 groups, including; gender, highest educational attainment, the probability of being married and the probability of being widowed. The average scores for both groups on each of these characteristics are shown in Table 7 and, as we can see, both groups are comparable. These covariates are then added into the parametric specification, along with age at time of survey, and the results are presented in the third row of Table A1. The estimates are not sensitive to the inclusion of the additional covariates, which indicates that the estimate is not being influenced by systematic differences in characteristics between the groups to the right and the left of the threshold.

TABLE 7 COMPARISON OF CHARACTERISTICS

Characteristic	Mean	
	779 group	780 group
Highest educational attainment (ISCED 11)	2.7	2.2
Probability of being male	0.49	0.53
Probability of being married	0.72	0.74
Probability of being widowed	0.11	0.09

Source: CSO Quarterly National Household Survey.

The graphical plots of the local average retirement rates (Figures 1 and 4) do not provide clear evidence of a discontinuity at the treatment threshold (780 months). Moreover, any significant discontinuity at the threshold for the low order polynomial specifications vanishes when we introduce a more flexible functional form, as in Figure 3. However, a notable feature that emerges from the graphs and the table of local averages (both Tables 1 and 3), is an apparent jump in the retirement probabilities at the 778 group. In both the baseline and age-restricted models, moving from the 777 to the 778 group sees a 16 percentage point increase in the retirement rate, from 30 per cent to 46 per cent. While the relatively low sample sizes can generate noisy estimates, the increase in retirement rates at 778 appears large and is statistically significant.

It is common practice in RD designs to carry out placebo tests which test for discontinuities away from the treatment threshold. If significant discontinuities are found at placebo points without any theoretical justification, this calls into question the reliability of the results at the threshold. We carry out a placebo test by designating the 778 group as a false cut-off and testing for discontinuities. The apparent jump at the 778 group is also of interest as it raises questions as to whether there was treatment contamination for those who just missed out on qualifying for the pension at age 65, i.e., did some individuals from the 778 and 779 group still manage to avail of the state pension at age 65? If so, the regression discontinuity design would be invalidated.¹⁵ The results for each of the polynomial specifications are shown in the fourth row of results in Table A1. The estimates of the discontinuities at this point are larger in magnitude and show greater statistical significance at higher order polynomials and are statistically significant in the non-parametric specification. Therefore, the results using the 778 month cut-off are more consistent with a causal effect of the policy compared to the actual 780 month cut-off. While this is potentially attributable to noisy estimates as a result of relatively small sample sizes, given the estimator used in the analysis, the result also raises questions as to whether treatment spill-over occurred for individuals just to the left of the threshold.

Further investigation of this apparent jump in the retirement outcomes of the 778 group suggests that it may relate to individuals' labour outcomes changing from 'engaged in home duties' to 'retired'. Compared to the 777 group, the 778 group has approximately 15 per cent less people engaged in home duties and 15 per cent more who are retired. The questions relating to potential treatment spill-over remain if people engaged in home duties had the required insurance contributions and were granted the transition state pension despite barely missing out on the age threshold. However, the sample sizes are small, especially when we condition on individual categories, such as people engaged in home duties, making it difficult to draw concrete conclusions. Again, further analysis of this issue would require a richer dataset, ideally linking Revenue data to the Department of Social Protection data.

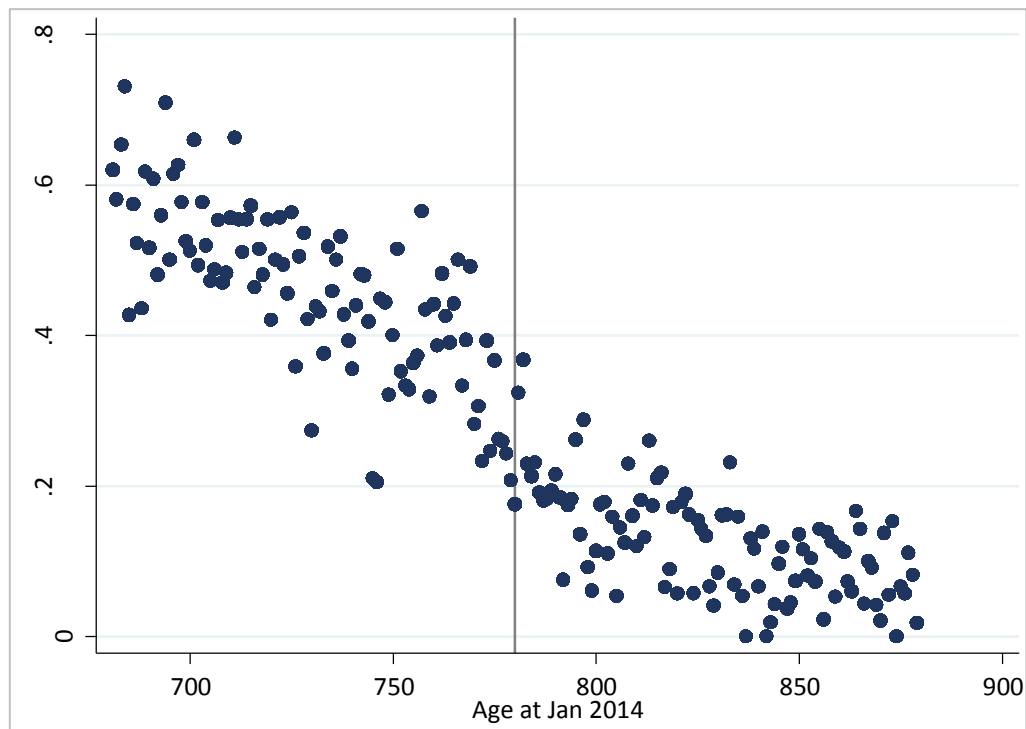
Employment

We carry out the same type of descriptive analysis as in Figure 1, but instead of using retirement as the outcome variable, we use employment. A dummy variable is created which indicates whether a person is 'working for payment or profit' during the reference month. We calculate averages of this outcome for

¹⁵ While we have no direct evidence that this occurred, the possibility of treatment spill-over should always be considered in studies of this nature.

each age category and Figure 5 shows the average employment in each of the monthly forcing variable bins. There is no clear evidence of a discontinuity at the threshold. As with the retirement outcome, when we run the RD regression (Equation 3), the discontinuity in the employment outcome is not robust to a flexible functional form, nor is it statistically significant when estimated using local linear regression (see Appendix Table A2).

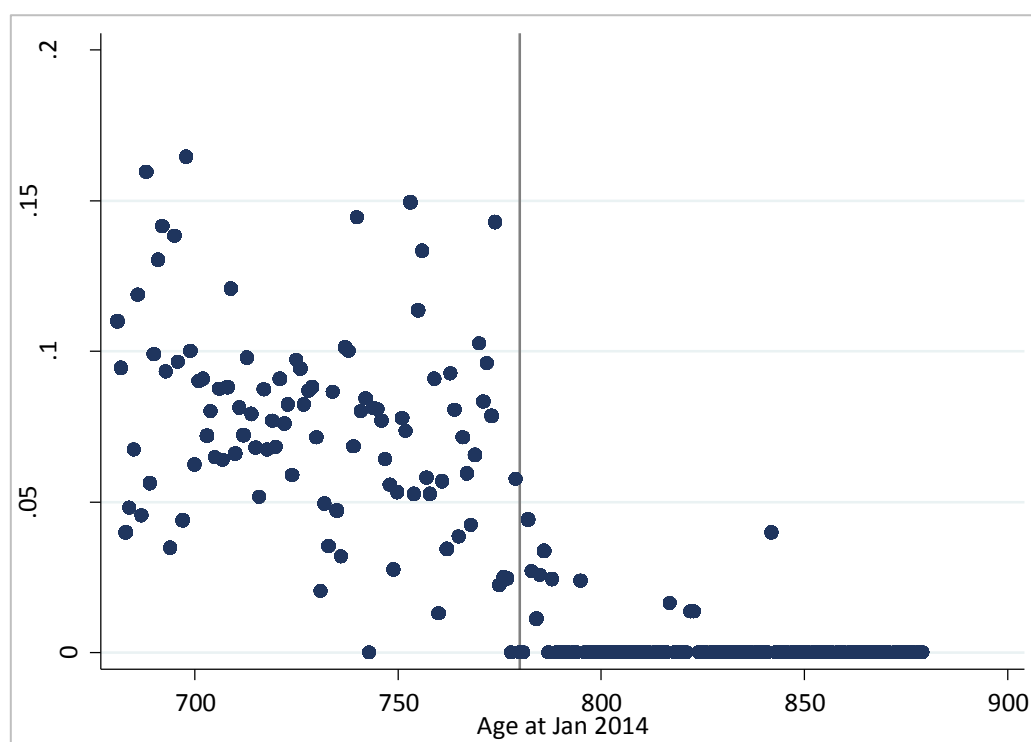
FIGURE 5 AVERAGE EMPLOYMENT



Source: CSO Quarterly National Household Survey.

Unemployment

We carry out the same descriptive analysis using unemployment as our outcome variable. A dummy is created which indicates whether a person's labour status is 'unemployed, having lost or given up previous job'. Figure 6 shows the average unemployment in each of the monthly forcing variable bins. Again, there is no clear evidence of a discontinuity. When we run the RD regression (Equation 3), the estimates are not statistically significant when flexible function forms are used in the parametric estimation, nor are they significant when estimated using local linear regressions (see Appendix Table A3).

FIGURE 6 AVERAGE UNEMPLOYMENT

Source: CSO Quarterly National Household Survey.

CONCLUSION

In 2014, the qualification age for the transition state pension in Ireland increased from 65 years to 66 years. A sharp qualification threshold was implemented, such that individuals born before January 1949 could still qualify for the transition pension at age 65, whereas individuals born on or after January 1949 had to wait until age 66. By exploiting this sharp threshold using a regression discontinuity design, we were able to estimate, using data from the QNHS, the causal effect of the policy change on the retirement rate of 65-year-olds in 2014. Our analysis does not provide clear evidence of a causal effect of the policy on retirement rates. There are several potential explanations for this. To qualify for the transition state pension, an individual must have the required social insurance contributions. Not all 65-year-olds will meet this requirement and therefore the ‘bite’ of the policy may be limited as not all 65-year-olds are impacted by the change. Therefore, this may limit the effect of the policy change on the overall retirement rates of 65-year-olds. For example, if only a small percentage of the 65-year-olds in our sample were affected by the change, it is possible that the retirement rates of this subsample could be impacted and yet this would not show up as a strong impact on the overall retirement rate.

In addition, people’s contracts may specify a retirement age of 65, or even where none is specified, there may be an expectation that people will retire at this age. As such, these individuals may still have to retire despite not qualifying for the

transition pension. Moreover, the age at which an individual's occupational pension begins may remain at 65. Therefore, the one-year income gap created by not qualifying for the state pension may not be too severe for some individuals. It has also been the case that some 65-year-olds who did not qualify for the transition state pension were receiving Jobseeker's Benefit as a temporary payment until they reached the age of 66. The Department of Social Protection were aware that this was a temporary stop-gap measure to bridge people's retirement income with little expectation that these individuals would find work. In this scenario, whereby the transition state pension is unavailable, but Jobseeker's Benefit becomes a type of de facto pension payment which takes the place of the transition state pension, it is perhaps not surprising that the retirement rates are unaffected. This relates to how the outcome variable, i.e. the retirement rate, is constructed. This is based on an individual's self-reported main labour status, which could give rise to a number of complications when evaluating the causal effect of the policy change. For one, it is unclear how individuals who could not receive the state pension at age 65, due to being born after 1 January 1949, but received jobseeker's benefit as a type of de facto pension are categorised. Some of these individuals may report themselves as being unemployed, but others may report themselves as being in retirement. More detailed data would allow further investigation of this issue.

Finally, in studies of this nature, the possibility of treatment spill-over should be considered. The retirement rates of those who barely missed out on qualifying for the pension at age 65, namely the 778 and 779 group, are in line with the retirement rates of the people who qualified. If some individuals from these groups still managed to avail of the state pension at age 65, this could help explain the lack of any clear treatment effect. However, we have no direct evidence that this occurred and our data does not allow for further investigation of this issue.

We conclude with suggestions surrounding future work and improved data availability. Our analysis has focused on the retirement rate of 65-year-olds in 2014. An avenue for future research would be to condition the analysis on individuals who had the required social insurance contributions, thereby ensuring that the policy change affected all individuals being studied. This would overcome concerns surrounding the limited bite of the policy among the full sample of 65-year-olds. However, this would require a larger, more detailed dataset, which would provide data on an individual's employment and social insurance contribution history and ensure that enough observations existed to produce meaningful estimates. A linked administrative dataset between Revenue and the Department of Social Protection may be useful in this regard. In addition, while we use month of birth data in this analysis, day of birth data would be more desirable, especially in a dataset with larger sample sizes.

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TABLE A1 THE EFFECT OF THE CHANGE IN THE STATE PENSION AGE ON THE PROBABILITY OF RETIREMENT

	Order of Polynomial						
VARIABLES	1 st	2 nd	3 rd	4 th	5 th	6 th	Local Linear Regression
T	0.175***	0.167***	0.105***	0.070*	-0.0016	-0.0207	0.057
	(0.0154)	(0.0230)	(0.0305)	(0.038)	(0.0456)	(0.0536)	(0.0379)
Additional controls	No	No	No	No	No	No	No
Observations	14,911	14,911	14,911	14,911	14,911	14,911	3,217
T	0.175***	0.167***	0.105***	0.071*	-0.00164	-0.0207	0.057
	(0.0154)	(0.0230)	(0.0305)	(0.038)	(0.0456)	(0.0536)	(0.0379)
Additional controls	Age at Interview	Age at Interview	Age at Interview	Age at Interview	Age at Interview	Age at Interview	Age at Interview
Observations	14,911	14,911	14,911	14,911	14,911	14,911	3,217
T	0.181***	0.168***	0.096***	0.067*	-0.00852	-0.0051	0.057
	(0.0159)	(0.0238)	(0.0313)	(0.039)	(0.0461)	(0.0544)	(0.0379)
Additional controls	All	All	All	All	All	All	All
Observations	14,696	14,696	14,696	14,696	14,696	14,696	3,217
Placebo Test							
T (778 months)	0.179***	0.168***	0.111***	0.0816**	0.0026	-0.0039	0.117***
	(0.0153)	(0.0229)	(0.0303)	(0.0378)	(0.0505)	(0.0531)	(0.0375)
Additional controls	No	No	No	No	No	No	No
Observations	14,911	14,911	14,911	14,911	14,911	14,911	3,063
Individuals with employment experience							
T	0.189***	0.176***	0.102***	0.054	-0.023	-0.046	0.025
	(0.0164)	(0.0245)	(0.0325)	(0.040)	(0.048)	(0.057)	(0.044)
Additional controls	No						
Observations	13,774	13,774	13,774	13,774	13,774	13,774	2,514

Source: CSO Quarterly National Household Survey.

Note: The first three rows of results show the estimates from the baseline model with and without covariates. The fourth row estimates the placebo model and the fifth row conditions only on individuals with previous employment experience.

TABLE A2 THE EFFECT OF THE CHANGE IN THE STATE PENSION AGE ON THE PROBABILITY OF EMPLOYMENT

	Order of Polynomial				
VARIABLES	1 st	2 nd	3 rd	4 th	Local Linear Regression
T	-0.109*** (0.0153)	-0.076*** (0.0227)	-0.050 (0.038)	0.013 (0.0387)	0.064 (0.0418)
Additional controls	No	No	No	No	No
Observations	14,911	14,911	14,911	14,911	2,208
Individuals with employment experience					
T	-0.119*** (0.0163)	-0.088*** (0.0242)	-0.065* (0.0323)	-0.004 (0.0412)	0.048 (0.044)
Additional controls	No	No	No	No	No
Observations	13,774	13,774	13,774	13,774	2,021

Source: CSO Quarterly National Household Survey.

Note: The first row of results shows the estimates from the baseline model. The second row conditions only on individuals with previous employment experience.

TABLE A3 THE EFFECT OF THE CHANGE IN THE STATE PENSION AGE ON THE PROBABILITY OF UNEMPLOYMENT

	Order of Polynomials				
VARIABLES	1 st	2 nd	3 rd	4 th	Local Linear Regression
T	-0.028*** (0.008)	-0.024*** (0.008)	-0.009 (0.0062)	-0.003 (0.0023)	-0.018 (0.0127)
Additional controls	No	No	No	No	No
Observations	14,911	14,911	14,911	14,911	3,061
Individuals with employment experience					
T	-0.033*** (0.0097)	-0.028*** (0.0095)	-0.011* (0.0067)	-0.004 (0.0033)	-0.025* (0.0138)
Additional controls	No	No	No	No	No
Observations	13,774	13,774	13,774	13,774	2,942

Source: CSO Quarterly National Household Survey.

Note: The first row of results shows the estimates from the baseline model. The second row conditions only on individuals with previous employment experience.