QUARTERLY ECONOMIC COMMENTARY

SUMMER 2019

KIERAN MCQUINN, CONOR O'TOOLE, MATTHEW ALLEN-COGHLAN
AND PHILIP ECONOMIDES

EVIDENCE FOR POLICY

ESRI ECONOMIC & SOCIAL
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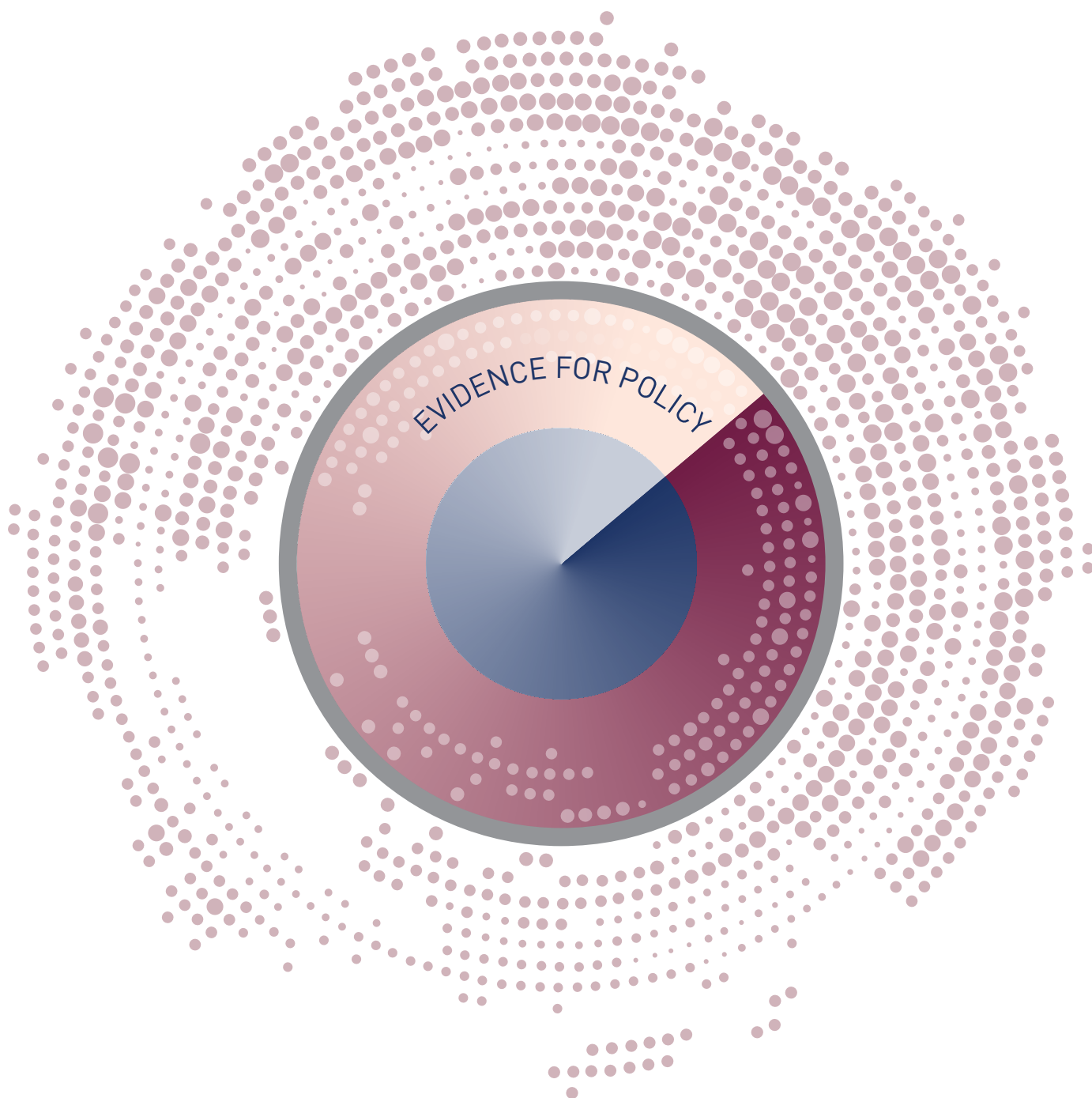
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The forecasts in this *Commentary* are based on data available by 13 June 2019

Draft completed on 14 June 2019

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THE AUTHORS

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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.

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SUMMARY TABLE

	2016	2017	2018	2019	2020
Output (Real Annual Growth %)					
Private Consumer Expenditure	4.0	1.6	3.0	2.5	2.3
Public Net Current Expenditure	3.5	3.9	6.4	7.0	5.3
Investment	51.7	-31.0	9.8	7.1	7.6
Exports	4.4	7.8	8.9	4.2	4.3
Imports	18.5	-9.4	7.0	6.0	5.9
Gross Domestic Product (GDP)	5.0	7.2	6.7	4.0	3.2
Gross National Product (GNP)	11.5	4.4	5.9	3.4	2.6
Prices (Annual Growth %)					
Consumer Price Index (CPI)	0.0	0.3	0.5	1.4	1.7
Growth in Average Hourly Earnings	2.5	1.5	4.2	4.4	4.6
Labour Market					
Employment Levels (ILO basis ('000))	2,133	2,195	2,250	2,324	2,375
Unemployment Levels (ILO basis ('000))	195	158	145	110	102
Unemployment Rate (as % of Labour Force)	8.4	6.7	5.7	4.5	4.1
Public Finance					
General Government Balance (€bn)	-1.8	-0.8	0.0	-0.7	-1.2
General Government Balance (% of GDP)	-0.7	-0.3	0.0	-0.2	-0.3
General Government Debt (% of GDP)	73.5	68.5	64.8	62.8	58.0
External Trade					
Balance of Payments Current Account (€bn)	-11.4	24.9	29.0	23.2	18.5
Current Account (% of GNP)	-5.1	10.7	11.5	8.8	6.7

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

NATIONAL ACCOUNTS 2018

A: EXPENDITURE ON GROSS NATIONAL PRODUCT

	2017	2018	Change in 2018		
	€ bn	€ bn	Value	Price	Volume
Private Consumer Expenditure	99.9	104.3	4.4	1.4	3.0
Public Net Current Expenditure	29.6	32.0	8.1	1.5	6.4
Gross Fixed Capital Formation	69.0	79.4	15.1	4.8	9.8
Exports of Goods and Services	352.6	383.8	8.9	0.0	8.9
Physical Changes in Stocks	3.5	1.6			
Final Demand	554.6	601.1	8.4	0.9	7.4
less:					
Imports of Goods and Services	263.3	284.4	8.7	1.0	7.7
Statistical Discrepancy	2.8	1.8			
GDP at Market Prices	294.1	318.5	8.3	1.5	6.7
Net Factor Payments	-61.0	-66.6			
GNP at Market Prices	233.1	251.8	8.0	1.9	5.9

B: GROSS NATIONAL PRODUCT BY ORIGIN

	2017	2018	Change in 2018	
	€ bn	€ bn	€ bn	%
Agriculture, Self Employed Income	3.5	3.8	0.3	9.4
Agriculture, Employee Remunerations	0.7	0.7	0.0	0.0
Non-Agriculture, Employee Remunerations	85.7	91.8	6.1	7.1
Other	113.3	117.3	4.0	3.5
Adjustments: Stock Appreciation	0.0	0.2		
Statistical Discrepancy	-2.8	-3.0		
Net Domestic Product	250.6	271.7	21.1	8.4
Net Factor Payments	-61.0	-66.6	-5.7	9.3
National Income	189.6	205.1	15.4	8.1
Depreciation	72.0	74.8	2.8	3.9
GNP at Factor Cost	261.6	279.8	18.3	7.0
Taxes less Subsidies	-28.4	-28.0	0.4	-1.5
GNP at Market Prices	233.1	251.8	18.7	8.0

C: BALANCE OF PAYMENTS ON CURRENT ACCOUNT

	2017	2018	Change in 2018
	€ bn	€ bn	€ bn
X – M	89.3	99.5	10.2
F	-59.8	-65.4	-5.6
Net Transfers	-4.6	-5.1	-0.5
Balance on Current Account	24.9	29.0	4.1
as % of GNP	10.7	11.5	1.6

NATIONAL ACCOUNTS 2019

A: EXPENDITURE ON GROSS NATIONAL PRODUCT

	2018	2019	Change in 2019		
	€ bn	€ bn	Value	Price	Volume
Private Consumer Expenditure	104.3	108.7	4.2	1.7	2.5
Public Net Current Expenditure	32.0	35.1	9.7	2.5	7.0
Gross Fixed Capital Formation	79.4	87.7	10.3	3.0	7.1
Exports of Goods and Services	383.8	405.2	5.6	1.3	4.2
Physical Changes in Stocks	1.6	3.0			
Final Demand	601.1	639.6	6.4	1.8	4.6
less:					
Imports of Goods and Services	284.4	305.9	7.6	1.5	6.0
Statistical Discrepancy	1.8	-0.1			
GDP at Market Prices	318.5	333.5	4.7	0.7	4.0
Net Factor Payments	-66.6	-70.4			
GNP at Market Prices	251.8	263.2	4.5	1.1	3.3

B: GROSS NATIONAL PRODUCT BY ORIGIN

	2018	2019	Change in 2019	
	€ bn	€ bn	€ bn	%
Agriculture, Self Employed Income	3.8	3.9	0.1	2.6
Agriculture, Employee Remunerations	0.7	0.7	0.0	0.0
Non-Agriculture, Employee Remunerations	91.8	99.2	7.4	8.1
Other	117.3	120.3	3.0	2.6
Adjustments: Stock Appreciation	0.2	0.2		
Statistical Discrepancy	-3.0	-3.0		
Net Domestic Product	271.7	285.1	13.4	4.9
Net Factor Payments	-66.6	-70.4	-3.7	5.6
National Income	205.1	214.8	9.7	4.7
Depreciation	74.8	77.5	2.7	3.6
GNP at Factor Cost	279.8	292.2	12.4	4.4
Taxes less Subsidies	-28.0	-29.0	-1.0	3.6
GNP at Market Prices	251.8	263.2	11.4	4.5

C: BALANCE OF PAYMENTS ON CURRENT ACCOUNT

	2018	2019	Change in 2019
	€ bn	€ bn	€ bn
X – M	99.5	99.2	-0.3
F	-65.4	-70.4	-5.0
Net Transfers	-5.1	-5.6	-0.6
Balance on Current Account	29.0	23.2	-5.8
as % of GNP	11.5	8.8	-2.2

NATIONAL ACCOUNTS 2020

A: EXPENDITURE ON GROSS NATIONAL PRODUCT

	2019	2020	Change in 2020		
	€ bn	€ bn	Value	Price	Volume
Private Consumer Expenditure	108.7	113.3	4.2	1.9	2.3
Public Net Current Expenditure	35.1	37.4	6.5	1.1	5.3
Gross Fixed Capital Formation	87.7	97.4	11.1	2.5	7.6
Exports of Goods and Services	405.2	428.7	5.8	1.5	4.3
Physical Changes in Stocks	3.0	3.0			
Final Demand	639.6	679.8	6.3	2.0	4.5
less:					
Imports of Goods and Services	305.9	329.1	7.6	1.7	5.9
Statistical Discrepancy	-0.1	-0.1			
GDP at Market Prices	333.5	350.5	5.1	1.9	3.2
Net Factor Payments	-70.4	-74.9			
GNP at Market Prices	263.2	275.7	4.7	1.6	2.6

B: GROSS NATIONAL PRODUCT BY ORIGIN

	2019	2020	Change in 2020	
	€ bn	€ bn	€ bn	%
Agriculture, Self Employed Income	3.9	4.0	0.1	2.6
Agriculture, Employee Remunerations	0.7	0.7	0.0	0.0
Non-Agriculture, Employee Remunerations	99.2	106.1	6.9	6.9
Other	120.3	123.9	3.6	3.0
Adjustments: Stock Appreciation	0.2	0.2		
Statistical Discrepancy	-3.0	-3.0		
Net Domestic Product	285.1	300.3	15.2	5.3
Net Factor Payments	-70.4	-74.9	-4.5	6.4
National Income	214.8	225.4	10.7	5.0
Depreciation	77.5	80.1	2.6	3.4
GNP at Factor Cost	292.2	305.5	13.3	4.6
Taxes less Subsidies	-29.0	-29.9	-0.8	2.9
GNP at Market Prices	263.2	275.7	12.5	4.7

C: BALANCE OF PAYMENTS ON CURRENT ACCOUNT

	2019	2020	Change in 2020
	€ bn	€ bn	€ bn
X – M	99.2	99.5	0.3
F	-70.4	-74.9	-4.5
Net Transfers	-5.6	-6.1	-0.5
Balance on Current Account	23.2	18.5	-4.7
as % of GNP	8.8	6.7	-1.7

The Irish Economy – Forecast Overview

While a number of international concerns continue to cast a shadow on the domestic economy, both taxation receipts and labour market indicators suggest that the Irish economy continues to perform strongly in 2019. Output is still forecast to grow by 4.0 per cent in 2019 before moderating somewhat at 3.2 per cent in 2020. Unemployment is set to fall to 4.5 per cent by the end of the present year and to 4.1 per cent at the end of the next year. All forecasts, unless otherwise stated, maintain the *Commentary*'s baseline assumption that the trading status of the United Kingdom remains equivalent to that of a full European Union Member State.

The Irish economy appears to be operating at its full potential level. The continued strong performance of the labour market has resulted in a significant increase in both nominal and real wages in recent years. While wage increases due to productivity are warranted, care must be exercised to ensure that the competitiveness of the domestic economy is maintained. Fiscal policy will be important in tempering the degree of demand-side pressures in the domestic economy in that regard.

Greater vigilance will also be required to ensure that large infrastructural projects, which are essential for sustainable growth, are delivered on an efficient basis. A number of high profile cases have emerged recently where the final costs of certain projects seems to be significantly different from initial estimates. Given the pace of growth in the economy at present, increases in expenditure must focus on capital projects that increase the productive capacity of the economy.

While the performance of the economy continues to exceed that of most other European countries, it is subject to heightened levels of uncertainty. Consumer and producer sentiment indices have all reported significant declines in investor confidence about future prospects for the Irish economy. Inevitably, much of this uncertainty reflects the ongoing process of the UK withdrawal from the European Union. While analysis of the impacts of the UK withdrawal has inevitably focussed on the future impacts on the domestic economy, it is clear that Brexit has already had a materially negative impact on the Irish economy. Ongoing trade frictions between the United States and China are also potentially contributing to lower investment due to global uncertainties.

Finally, research published in the *Commentary* highlights the importance of carbon taxes as a policy lever. Tovar Reaños and Lynch (2019) demonstrate that carbon taxes can help both to effectively reduce the level of carbon emissions in the economy, while also addressing issues of income inequality.

The International Economy

The international economy section has now been amended to also include a section on international financial developments. This has previously been in the Monetary and Financial section. Therefore, the section now deals initially with the overall performance of the domestic economy's main trading partners, then international financial developments, and finally the implications for the traded sector of the domestic economy.

The increase in trade tensions and in particular the adoption of new tariffs rates between the world's two largest economies, the US and China, has had an adverse impact on global economic activity. While importers of Irish goods have largely been exempt from protectionist measures, the indirect effects of the resulting slowdown in multilateral trade activity could limit the growth potential for the Irish economy. This slowdown has also been observed in a European context. These uncertainties have been incorporated into the IMF's *World Economic Outlook* as of April 2019, which revised world output growth down yet again, declining from 3.5 in the January issue to 3.3 per cent for 2019.[1]

According to flash estimates of year-on-year real GDP growth, economic activity for the EU28 remained at 1.5 per cent while the Euro Area grew by 1.2 per cent. France, Germany, Spain and Italy experienced a 1.1, 0.7, 2.4 and 0.1 per cent annual increase in real GDP, respectively. These remain broadly similar to annual growth rates exhibited in Q4 2018. As highlighted in Figure 1, the moderation in economic activity appears to be largely driven by weaker private consumption and poor export performance. As of March 2019, EU28 unemployment fell to 6.4 per cent. Inflation in the Euro Area averaged 1.4 per cent in Q1 2019, rising to 1.7 per cent in April.

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[1]   International Monetary Fund (2019). *World Economic Outlook*, D.C.: International Monetary Fund, April 2019.

FIGURE 1   EU28 – CONTRIBUTIONS TO YEAR-ON-YEAR GDP GROWTH (PERCENTAGE POINT CONTRIBUTIONS)
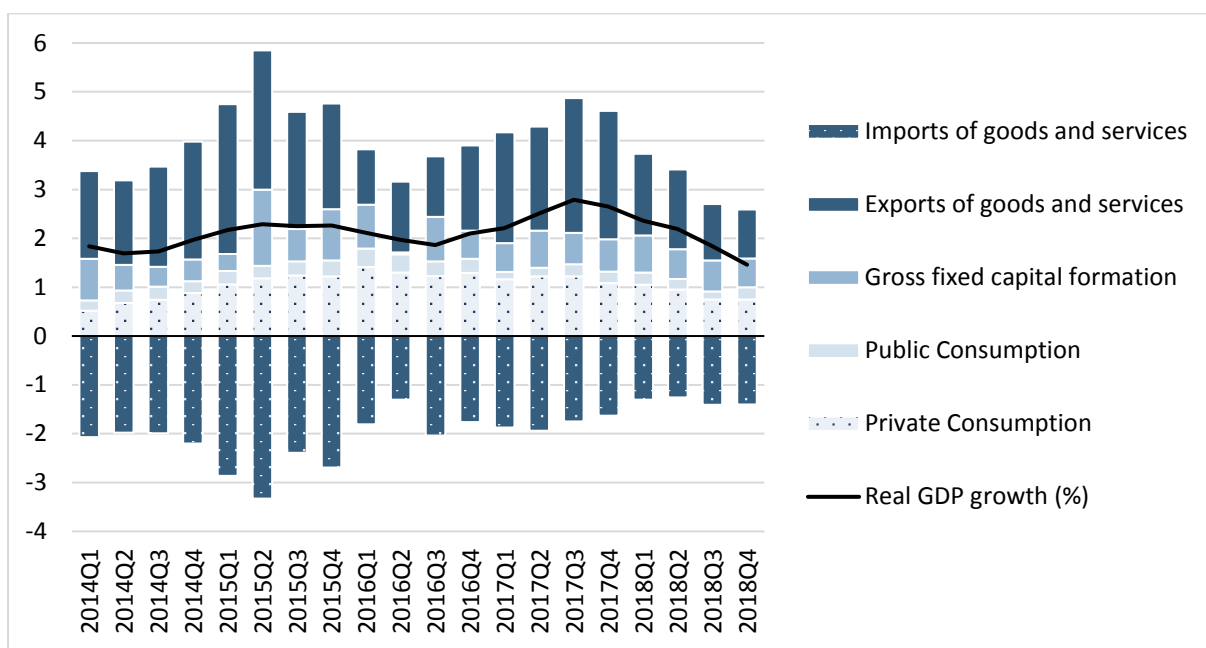

Sources: Eurostat, GDP and main components.

As of April 2019, the EU began trade negotiations with the US, aiming to address both a product conformity assessment (which seeks to enable firms to more easily prove products meet technical requirements) and a reciprocal elimination of tariffs on industrial products. A recent analysis of the proposed tariff change estimates that EU and US exports would grow by 8 per cent and 9 per cent, respectively, after the policy change.[2] Given the EU's recent difficulty in maintaining trade competitiveness as well as increased frictions in US-China trade, these negotiations do present opportunities for global economic development and trade liberalisation.

Real GDP growth in the United Kingdom improved significantly in Q1 2019, driven largely by high levels of stockpile accumulation and strong production sector performance relative to services (Figure 2). Gross value added indices for both the production and manufacturing sectors yielded moderate annual growth for the quarter, following a sizeable decline in 2018. Unemployment has fallen to 3.8 per cent in Q1 2019, its lowest rate since the 1970s. As vacancies grow and labour supply shortages manifest, competitive pressures are likely to fuel further increases to nominal incomes. In Q1 2019, average weekly earnings grew year-on-year by 3.2 per cent (+1.3 per cent in real terms). As seen in 2017, real earnings growth can be quite sensitive to currency depreciation. Given that the

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[2]   European Commission (2019). 'Liberalization of tariffs on industrial goods between the United States of America and the European Union: An economic analysis', Brussels: European Commission.

UK has a high import dependency ratio for items such as food and medicine, any shift in the value of the pound results in significant inflationary pressure and undermines real earnings growth.

FIGURE 2   KEY UK ECONOMIC INDICATORS, YEAR-ON-YEAR CHANGE (%)
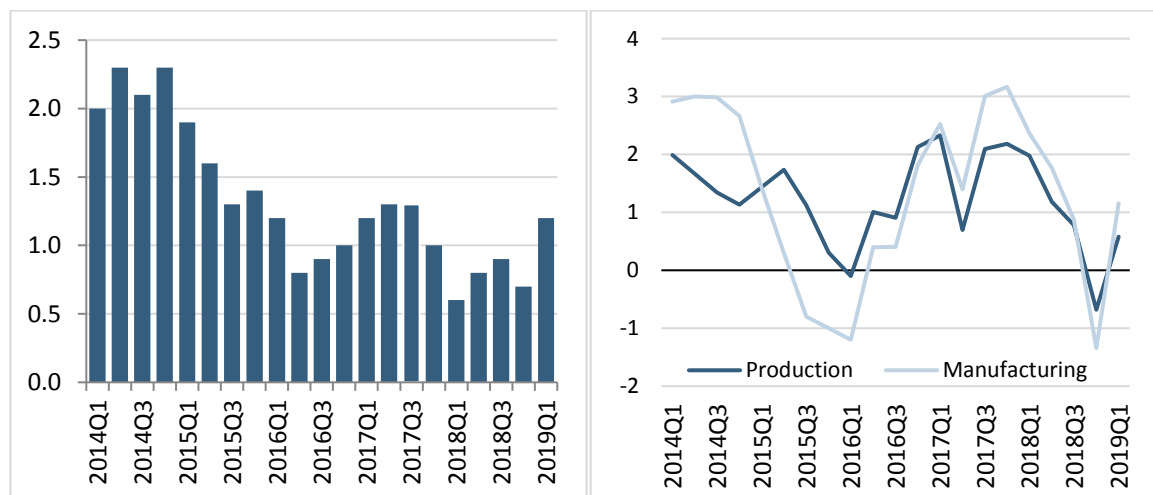
Sources: ONS, gross domestic product, latest quarter on corresponding quarter of previous year (LHS); ONS, GDP output approach – low-level aggregates, GVA chained volume index (constant prices), latest quarter on corresponding quarter of previous year (RHS).

A No-Deal Brexit outcome was narrowly avoided in March, following an extension of the withdrawal date to 31 October 2019. With a new Conservative leader due to be selected before the end of July, uncertainty regarding the UK government's anticipated stance on Brexit will likely intensify over the coming weeks. The main opposition party, the Labour Party, has suggested a potential Customs Union relationship between the UK and the EU. A Customs Union implies no tariffs or quotas for multilateral goods trade, however the trade of services would face greater frictions, particularly for financial markets, and a lack of freedom of movement would further undermine competitiveness. A recent National Institute of Economic and Social Research (NIESR) study assesses the long-run impact of such a deal on the UK. Hantzsche and Young (2019) estimate that under a Customs Union deal, the UK economy would be 3.1 per cent smaller after ten years relative to the UK remaining in the EU. Reduced migration contributes to 1.3 percentage points of this loss, while greater frictions in the trade of services results in a 1.5 percentage point contribution. Goods are softly impacted, contributing to 0.3 percentage points of the overall GDP loss.[3]

The US economy grew at an annual rate of 3.2 per cent in Q1 2019. This was driven largely by a 3.7 per cent reduction in imports. Similar to the first quarter of last year, consumption made a lacklustre contribution to overall growth. As of

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[3]   Hantzsche, A. and G. Young (2019). *The Economic Impact on the United Kingdom of a Customs Union Deal with the European Union*, London: National Institute of Economic and Social Research.

March 2019, the US unemployment rate declined to 3.6 per cent; as with the UK, this rate is a historically low rate, which has not been observed since the late 1960s. While there has been some debate about the quality of jobs in the labour market, it is important to note that the percentage of multiple job holders in the US has remained stable at approximately 5 per cent of total employment since 2005 and that the share of those employed working part time remains at a ten-year low of 17 per cent.

The US trade balance for goods improved slightly in Q1 2019 relative to the same period last year, following a 2.4 per cent year-on-year increase in goods exports while imports of goods only grew by a modest 0.6 per cent. Figure 3 highlights a significant decline in bilateral trade between the US and China. The introduction of new tariffs throughout 2018 and the increase in tariff rates following failed US-China trade negotiations in the first half of 2019 are likely to lead to a further deterioration in overall US trade activity.

FIGURE 3   US-CHINA SEASONALLY-ADJUSTED IMPORTS AND EXPORTS, Y-O-Y GROWTH (%)
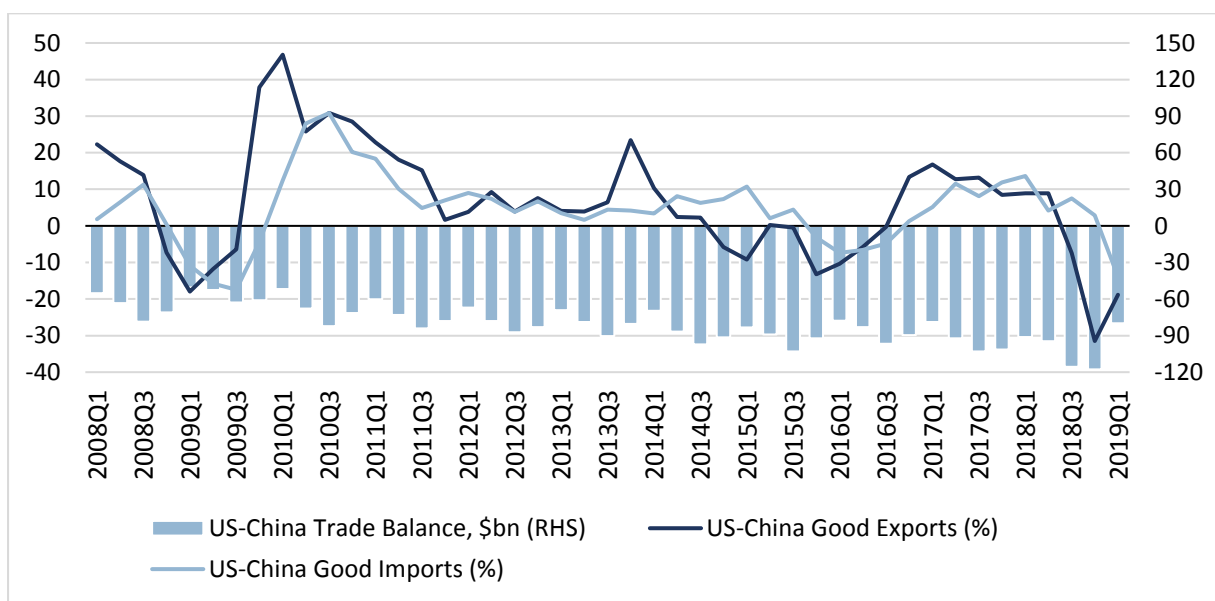
Source: United States Census Bureau, US Export and Import data for goods.

Real GDP in China increased by 6.4 per cent in Q1 2019, year-on-year. Though the widely expected slowdown in economic activity has yet to occur, policymakers are taking precautionary measures to dampen any future shocks to the domestic economy. In particular, the difficulties in the Chinese economy are related to the ongoing trade dispute with the US, a tightening of financial market regulations and various measures put into action to curb speculative bubbles forming in the real estate sector. The recent introduction of the government's fiscal stimulus programme aims to prop up the relatively weakened economy. Given the

increase in US tariff rates in May, further action may be required to maintain the government's GDP growth target of between 6.0 to 6.5 per cent.

Strong public investment and an improvement in Japan's trade balance resulted in real GDP growth of 2.1 per cent in Q1 2019, year-on-year. Similarl to developments among other strong global players, overall trade activity declined. The improvement in the trade balance came about due to a decline in imports which were larger than the decline seen in exports. As of December 2018, final estimates suggest there has been an 8.9 per cent decline in the size of the working population over the past ten years. Job vacancy ratios remain at record levels while unemployment rose slightly to 2.5 per cent in March. Fiscal pressures continue to accumulate as Japan faces ever growing challenges from growth in public debt and an ageing population. Unpopular sales tax hikes are likely to continue being imposed in 2019 in order to address such challenges. Sales tax receipts are expected to account for roughly a third of total tax revenue relative to 18 per cent in the late 1980s.

Figure 4 summarises the forecasts for GDP growth produced by the major institutions of their respective economies. Each forecast signals minimum and maximum forecasts with point values identifying the median of forecasts. These forecasts suggest a broad-based expectation of a moderation in economic growth across the majority of developed economies.

FIGURE 4   REAL GDP GROWTH (% CHANGE, YEAR-ON-YEAR)
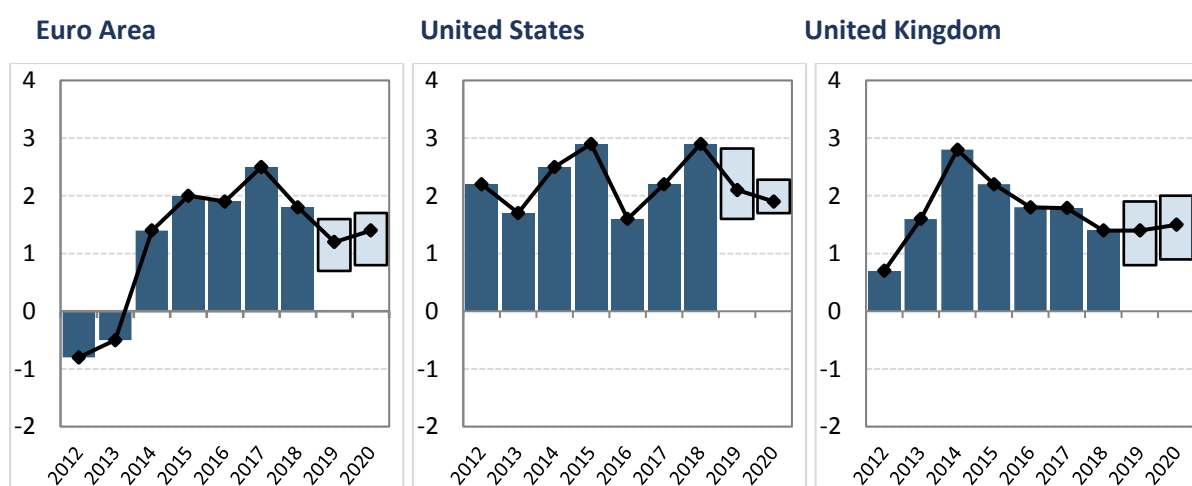
Sources: FocusEconomics, IMF, OECD, HM Treasury and Federal Reserve.

Recent Trade Tariffs

According to a recent analysis by the Peterson Institute for International Economics, prior to the US administration's imposition of various tariffs, the

average tariff rate on US imports from China was 3.1 per cent, reflective of WTO 'Most Favoured Nations' tariff rates.[4] As of September 2018, US elevated tariffs applied directly on Chinese goods resulted in the average tariff rate climbing to 12.4 per cent. Following failed trade negotiations up until May 2019, the US administration raised tariff rates on $200 billion worth of Chinese products from 10 to 25 per cent, leading to the overall tariff rate now averaging 18.3 per cent. The study finds this rate may rise further, should threats of imposing these 25 per cent tariff rates to nearly all US imports of Chinese goods be acted upon. Coupled with high tariffs on the remainder of Chinese imports, this would cause the overall average tariff rate to increase to 27.8 per cent. Such a broad imposition of high tariffs between the world's two largest economies would have a significantly adverse impact on global growth. Should global trade activity diminish, opportunities for small open economies like Ireland become increasingly limited.

Possibly expecting the next phase of the trade war to proceed, the IMF published a brief analysis which models how a 25 per cent tariff rate on all US imports of Chinese goods would affect the global economy.[5] In the case of China and the US, bilateral trade falls by 25 to 30 per cent after a year, ranging further from 30 to 70 per cent in the long run across various models. Both economies would face real GDP losses, ranging from 0.3 to 0.6 percentage points for the US and 0.5 to 1.5 percentage points for China. For third countries, the net effect on exports is positive, particularly in the cases of Canada and Mexico, though this will involve reduced exports to China and large increases in exports to the US. Overall, the IMF analysis estimates a global reduction in real GDP of just under 0.25 percentage points, should the US proceed with threats of further tariff extensions.

International Financial Developments

As a result of Ireland's openness to international trade and capital flows, fluctuations in international financial markets can have a significant impact on the domestic economy. Escalating international trade tensions, primarily between the United States and China, pose a threat to both global economic growth and financial markets in the latter half of 2019. Other downside risks such as slowing growth in Europe and uncertainty around Brexit could also have a significant negative impact on financial markets going forward.

[4]   Brown, P. and E.Y. Zhang (2019). 'Trump's 2019 Protection Could Push China Back to Smoot-Hawley Tariff Levels', Washington D.C.: Peterson Institute for International Economics.

[5]   Caceres, C., D. Cerdeiro, R. Mano, R. Portillo and M. Santoro (2019). 'The Global Macro and Micro Effects of a US-China Trade Dispute: Insights from Three Models', *World Economic Outlook*, April 2019, Washington D.C.: International Monetary Fund.

Following a period of relative tranquillity through much of 2019, the VIX Volatility Index increased sharply in May. This measure of investor fear had been relatively low in the preceding months as investors had been optimistic about the prospect of the United States and China agreeing a bilateral trade deal. However, following the unexpected escalation in trade tensions between the two countries the Index spiked again in May. In light of these trade tensions and the general decline in optimism for the global economy, central banks remain accommodative with policy rates in the Federal Reserve, European Central Bank, the Bank of England and the Bank of Japan unlikely to increase through the second half of the year.

FIGURE 5   VIX VOLATILITY INDEX (%)
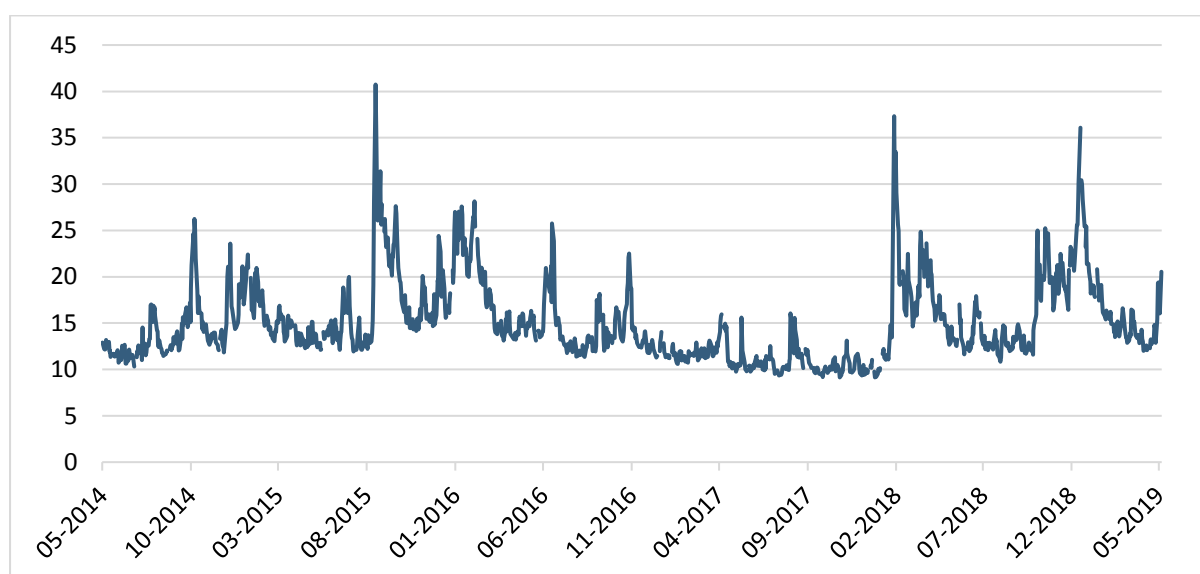
Source: St Louis Fed Database, from Chicago Board Options Exchange.

As the outlook for the Eurozone remains weak in the face of growing international instability, the ECB continues to provide a stimulus to the monetary union through its accommodative monetary policy stance. The Eonia rate, which is the rate at which banks can lend to each other overnight, stood at just above -0.4 per cent in May, which is in line with the negative policy rates set by the ECB. With the ECB signalling an intent to keep rates on hold until at least the middle of 2020, this accommodative stance looks set to remain in place for the foreseeable future.

FIGURE 6   EURO OVERNIGHT INDEX AVERAGE, EONIA (%)
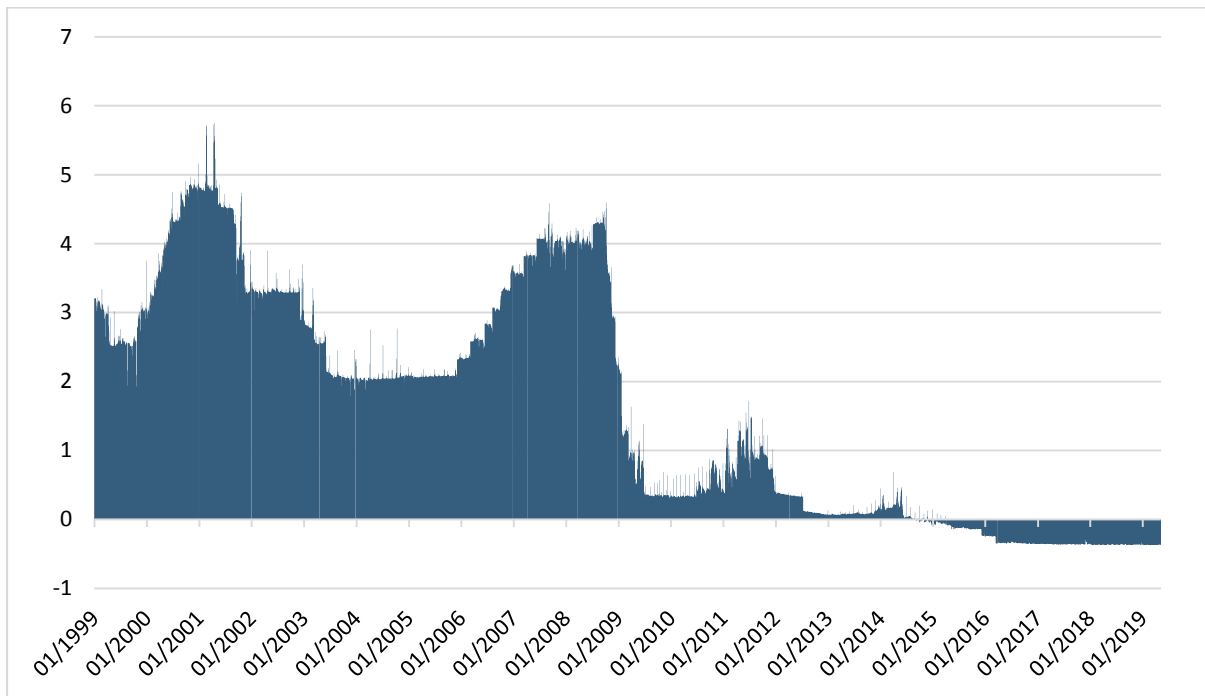
Source: European Central Bank, Statistical Data Warehouse.

Due to the low inflation environment that persisted over the last decade, the ECB and other central banks turned to unconventional monetary policy in order to provide monetary stimulus. This stimulus came in the form of Quantitative Easing (QE) whereby Central Banks purchased large amounts of sovereign and corporate debt in financial markets in order to increase the money supply, lower the cost of credit, increase liquidity and loosen the credit supply.

Figure 7 illustrates the significant growth in assets on central bank balance sheets over the past decade. Following the initiation of QE by the Federal Reserve and then the BOE, the ECB introduced its own QE programme in 2015. Over the next three years the number of assets purchased by the ECB increased significantly, reaching a peak of value of nearly €4.7 trillion in January 2019. Having been credited with boosting economic growth and preventing deflation, the ECB announced in December 2018 that it would begin unwinding its asset purchase programme. However, with policy rates still negative and inflation still below the desired rate the ECB has hinted at a possible return of unconventional monetary policy should the need arise.

FIGURE 7   CENTRAL BANK BALANCE SHEETS ($MILLION)
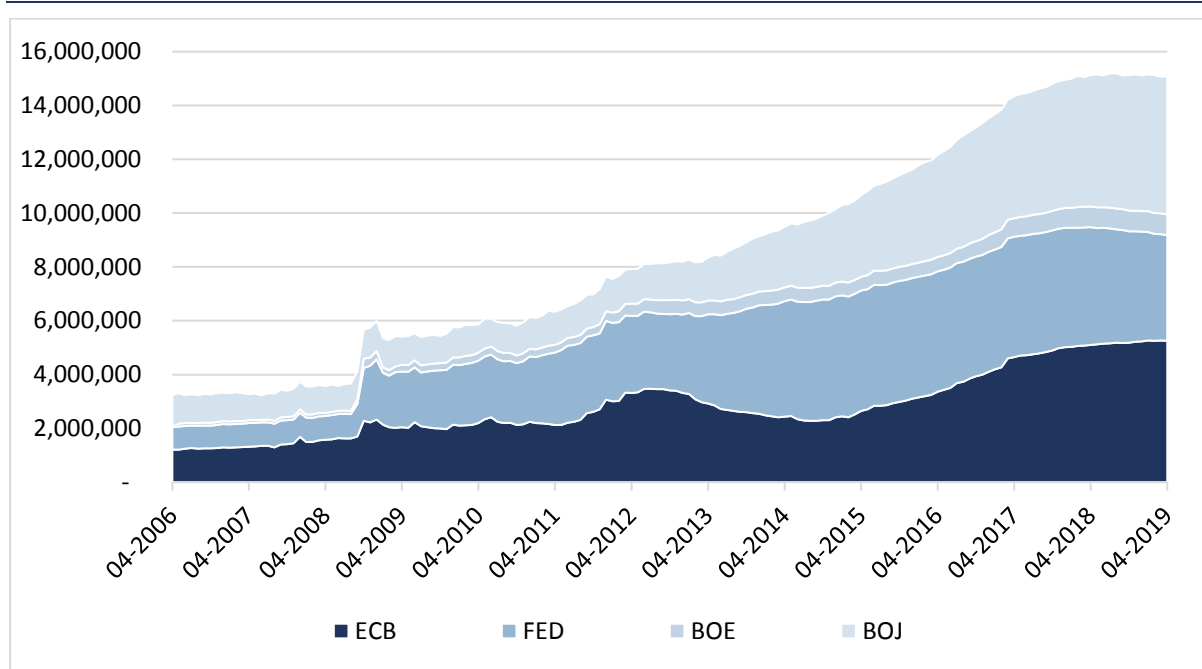
Source: European Central Bank, Federal Reserve, Bank of England, Bank of Japan.

Accommodative monetary policy through low policy rates and QE has kept government bond yields low into 2019. Further downward pressure is also being exerted on sovereign yields as investor concerns about the near term prospects for the global economy grow, increasing the demand for developed country sovereign bonds which are generally considered to be safe assets. Ten-year government bond yields for a select group of advanced countries are presented in Figure 8. The ten-year yield for Ireland fell to 0.56 per cent in March, the lowest level since 2016. This is particularly beneficial due to the large level of outstanding debt currently being repaid by the Irish Exchequer.

FIGURE 8   TEN-YEAR GOVERNMENT BOND YIELDS (%)
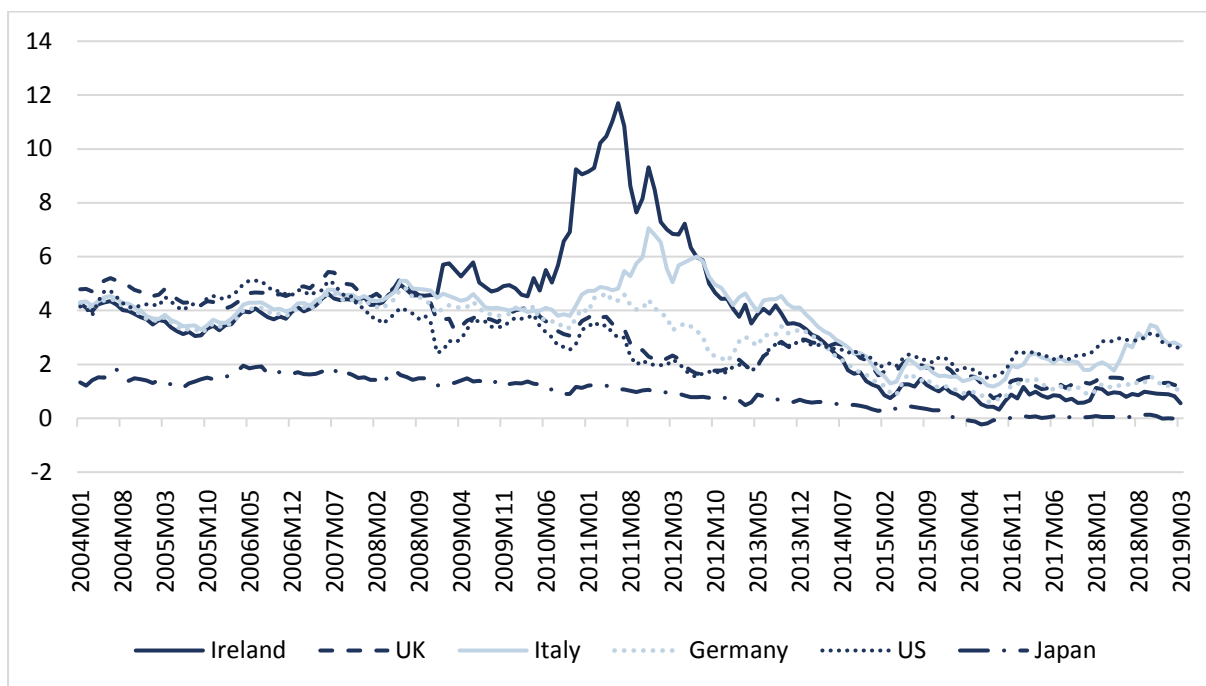
Source: St. Louis Fed database.

Figure 9 shows the level of credit loaned to the private non-financial sector (PNFS) for both emerging and advanced economies. While credit to the PNFS has remained relatively stable in advanced economies, there has been a significant increase in the level of borrowing in emerging economies following the financial crisis. Whereas credit to the PNFS in emerging economies was worth just 76 per cent of GDP in Q4 2008, as of Q1 2018 it has grown to over 144 per cent of GDP.

Despite the fall in credit to emerging economies in Q3 and Q4 of 2018, the level of leverage remains high by historical standards. This increase in leverage comes during a period of persistently low interest rates in advanced economies with investors looking for greater yields elsewhere.[6] One possible risk faced by corporations in emerging economies is the possibility of monetary policy normalisation in advanced economies, incentivising investors away from lending to corporations in emerging markets. A sudden withdrawal of credit would likely have a significant destabilising impact on the domestic markets of emerging economies with the potential for cross-border contagion effects. This in turn could negatively impact development and trade in these regions and potentially weaken the global outlook for trade even further.

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[6]   See Bräuning, Falk and Victoria Ivashina (forthcoming). 'US Monetary Policy and Emerging Market Credit Cycles'. *Journal of Monetary Economics*.

FIGURE 9   CREDIT TO PRIVATE NON-FINANCIAL SECTOR BY DEVELOPMENT CATEGORY
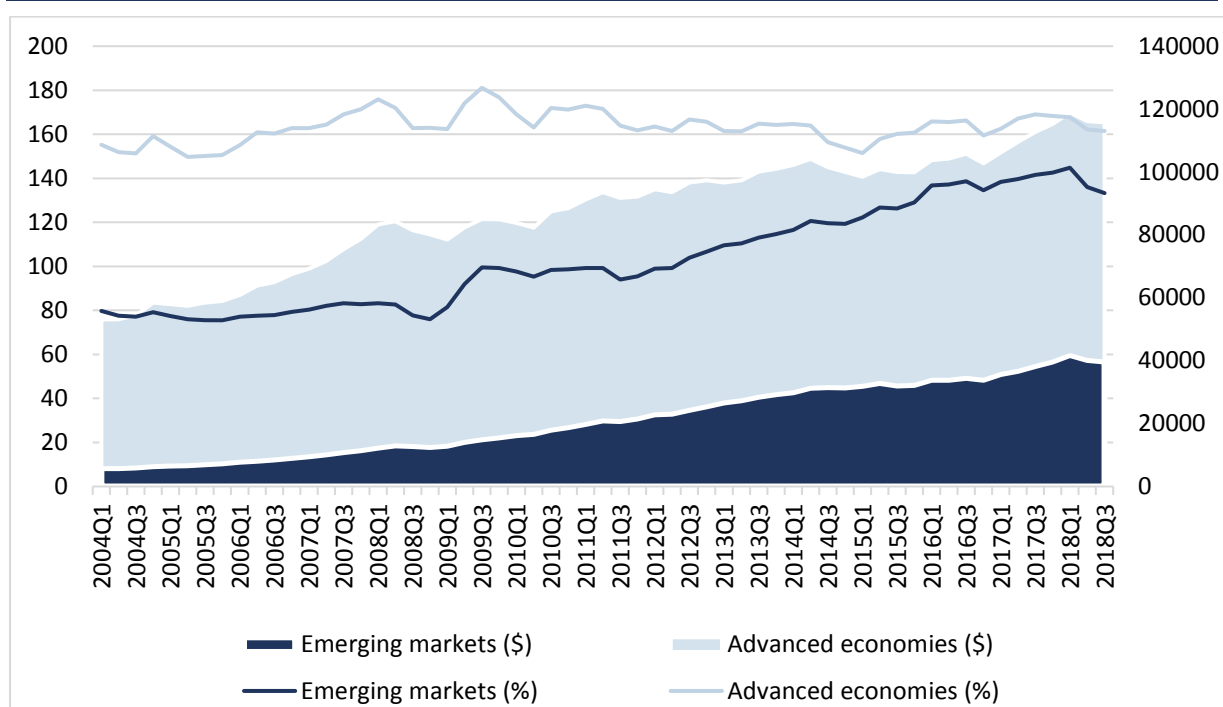
Source: Bank for International Settlements.
Note: Credit as a percentage of GDP featured on LHS and USD value ($ billion) on RHS.

Figure 10 displays exchange rates of the Euro (EUR) to the US Dollar (USD), the British Pound Sterling (GBP), the Swiss Franc (CHF) and the Chinese Renminbi (CNY). These are the currencies of Ireland's largest trading partners outside the Eurozone and their values against the EUR impact on the competitiveness of Irish companies in the international market. Since the onset of Brexit there has been a substantial strengthening of the EUR/GBP rate. On 24 June 2016, the day after the Brexit referendum, the EUR/GBP appreciated by over 6 per cent and by the end of the year was nearly 16 per cent higher than it had been 12 months earlier. As fears of a No-Deal Brexit temporarily subsided in Q2 2019, GBP has strengthened relative to EUR but remains significantly weaker than it was at the start of 2016.

Meanwhile, the EUR/USD rate has been weakening since the first quarter of 2018. This is likely due to strong growth in the US economy in comparison to the Euro Area over this period. With Euro Area interest rates set to remain constant, a rate hike by the Federal Reserve in 2019 would likely lead to further depreciation of the EUR/USD rate. Though the EUR/CNY rate had been trending downwards since Q3 2018 there was a sharp increase in the exchange rate in May. This was likely due to capital leaving China as investors fear the negative impact an escalated trade war with the US could have on the Chinese economy.

FIGURE 10   EUR EXCHANGE RATE TO USD, GBP, CHF (JANUARY 2016, BASE=100)
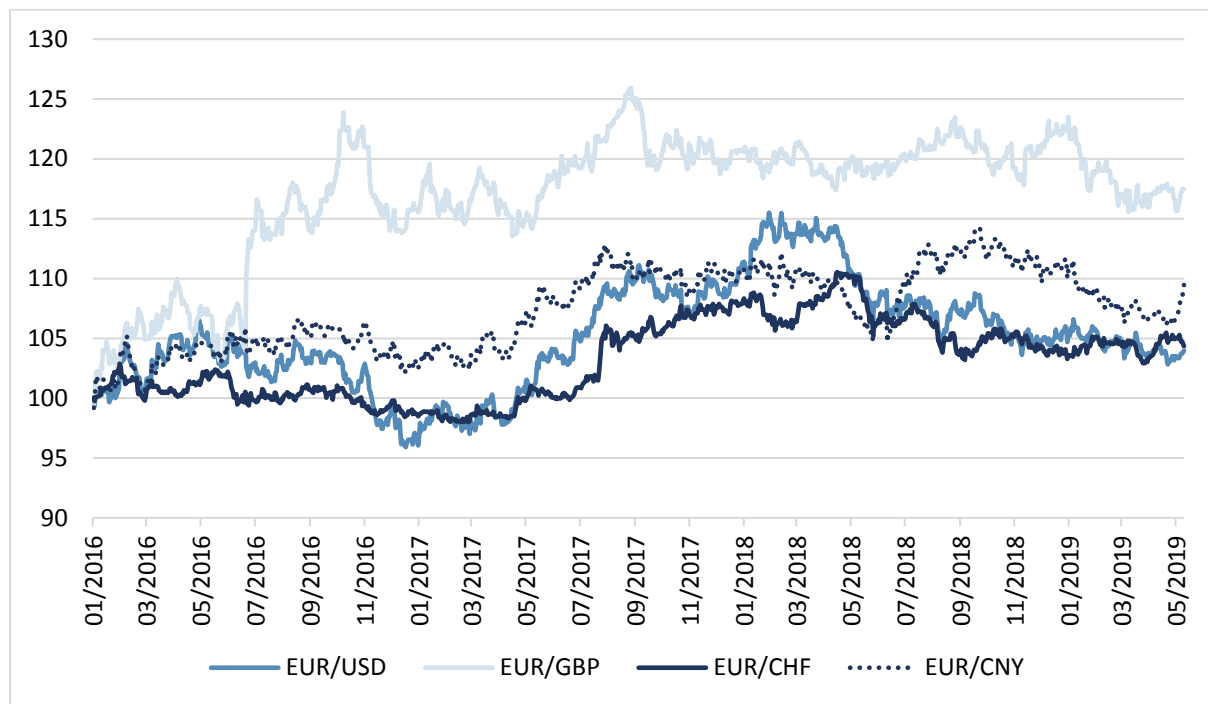
Source: Yahoo Finance.

IMPLICATIONS FOR IRISH EXPORTS, IMPORTS AND THE BALANCE OF PAYMENTS

Goods

As with the observed slowdown in global trade activity, growth of Irish imports and exports weakened in Q1 2019. As displayed in Figure 11, seasonally-adjusted cross-border goods exports increased by 11.7 per cent in Q1 2019 relative to the same period last year. Much like the opening quarter of the previous year, imports changed modestly, increasing by 1 per cent year-on-year. This resulted in a net contribution to the overall trade balance of €3.7 billion, given that import growth has slowed far more sharply.

FIGURE 11   ANNUAL GROWTH RATE (%) IN CROSS-BORDER IRISH EXPORTS AND IMPORTS
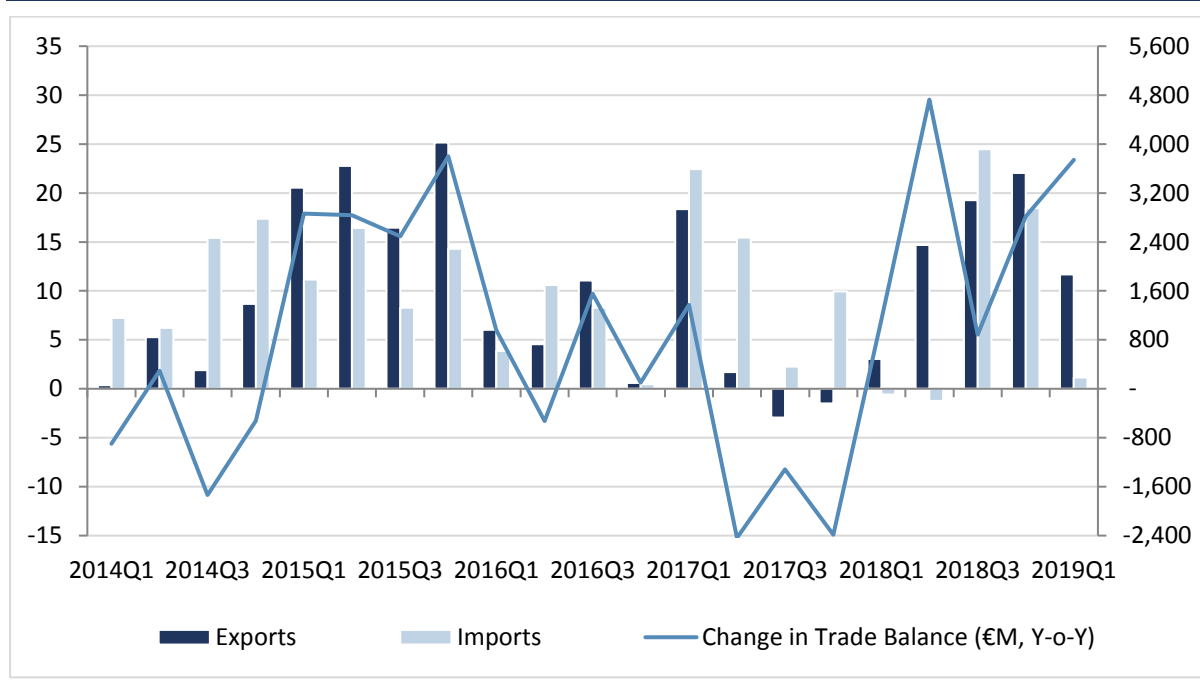
Source: Central Statistics Office.

Cross-border trade excludes the trade of ownership goods (e.g. contract manufacturing, merchanting)[7] hence the final growth rates for Quarterly National Account goods trade will differ compared to these figures. While these traded goods are owned by Irish resident firms, some of these goods may never physically cross the Irish border nor are they produced domestically. Cross-border trade therefore functions somewhat more accurately as an indicator of domestic exporter performance.[8] When examining the trade of goods, foreign-owned Irish resident firm activities such as processing and merchanting must be taken into account.

The 11.7 per cent increase in cross-border exports was largely driven by chemical and machinery products, as displayed in Table 1. Of a €4.2 billion increase in exports, chemical products contributed €2.3 billion while machinery contributed €1.2 billion. Though Irish trade is highly influenced by the pharmaceutical industry, excluding chemical products still results in export growth of 15 per cent due to significant improvements in the exports of electricity, electrical machinery

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7   'Goods for processing' is dominated by 'Contract Manufacturing', a process in which multinational companies residing in Ireland issue contracts to foreign firms to produce goods. Although these goods never enter the Irish economy, due to ownership of these goods pertaining to Irish resident firms, sales are recorded as an Irish export. 'Merchanting' consists of the buying and selling of completed goods abroad which at no stage enter or leave Ireland.

8   For further details on ownership trade, see CSO document 'Explaining Goods Exports and Imports 2012-2016'.

and transport equipment.[9] For the same period, trade in machinery and chemicals products represented 60 per cent of total imports. Machinery imports increased year-on-year by 8.8 per cent while imports of chemicals declined by 23.6 per cent. The significant decline in chemicals is mostly attributed to reduced imports of medicinal and pharmaceutical products from Germany and Italy, down 69 and 78 per cent respectively, relative to Q1 2018.

TABLE 1   JANUARY-MARCH CHANGE IN IRISH EXPORTS BY COMMODITY (€ BILLION)

	Q1 2018	Q1 2019	€Change	% Change
Cross Border Goods	**33.8**	**38.0**	**4.2**	**12**
Food and live animals	2.6	2.7	0.1	4
Beverages and tobacco	0.3	0.4	0.1	24
Crude materials, inedible, except fuels	0.5	0.5	0.0	-4
Mineral fuels, lubricants and related materials	0.2	0.5	0.3	135
Animal and vegetable oils, fats and waxes	0.0	0.0	0.0	-15
Chemicals and related products	**21.4**	**23.8**	**2.3**	**11**
Manufactured goods classified chiefly by material	0.6	0.6	0.0	2
Machinery and transport equipment	4.2	5.4	1.2	29
Miscellaneous manufactured articles	3.8	4.0	0.1	3
Other items	0.2	0.3	0.1	30
Exports less Chemical Products	**12.4**	**14.3**	**1.8**	**15**

Source: Central Statistics Office and *QEC* author calculations.

Given the vulnerability of the domestic agricultural sector to Brexit, it is important to monitor food exports closely. Figure 12 splits food trade into two major sub-components. In general, food exports have improved somewhat, largely driven by dairy products and eggs. The UK and EU were the main contributors to the 5.1 per cent growth in Irish food exports whereas the remainder of the world's demand for Irish food exports continued to decline, down by 0.8 per cent in Q1 2019 relative to the same period last year.

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[9]   Electricity is registered under 'Mineral fuels, lubricants and related materials'. With the launch of the Integrated Single Electricity Market (ISEM) in October 2018, exports and imports of electricity increased in Q1 2019, year-on-year, by 709 and 751 per cent respectively. Though these gross flows are large, when combined they contribute towards a mild trade deficit in net exports of electricity.

FIGURE 12   ANNUAL GROWTH RATE (%) OF CROSS-BORDER FOOD EXPORTS
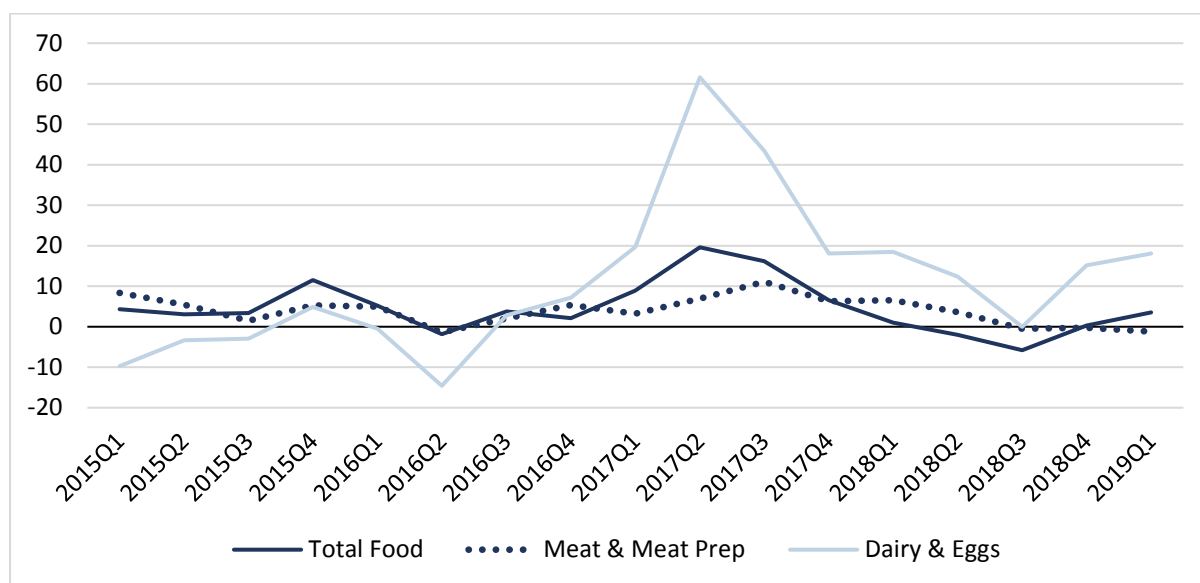
Source: Central Statistics Office.

Services

In 2018, service exports increased annually by 10 per cent. Computer services accounted for half of total service exports for the year, up from a share of 43 per cent in 2017. It is worth noting that exports of computer services have been experiencing consecutive quarters of double digit growth since mid-2014. As highlighted in Figure 13, business services have recently been exhibiting similar improvements. As stated by the Central Statistics Office (CSO) in their recent data release, this is mainly observed through greater advertising and inter-affiliate management charges.

FIGURE 13   EXPORTS OF SERVICES BY COMPONENT (€MILLION)
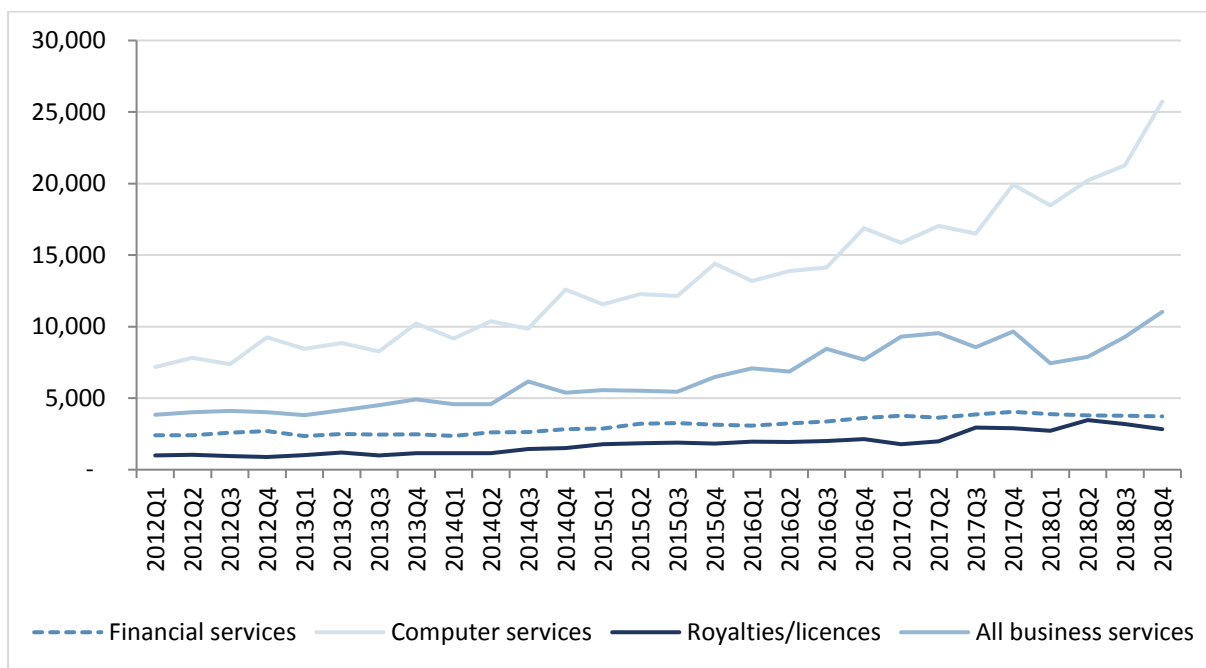
Source: Central Statistics Office.

Imports of services increased annually by 4 per cent. Royalties & licences and business services accounted for 78 per cent of service imports both in 2017 and 2018. As a component of 'business services', imports of research and development services experienced the largest annual increase in Q4 2018, rising annually by 120 per cent.

FIGURE 14   IMPORTS OF SERVICES BY COMPONENT (€MILLION)
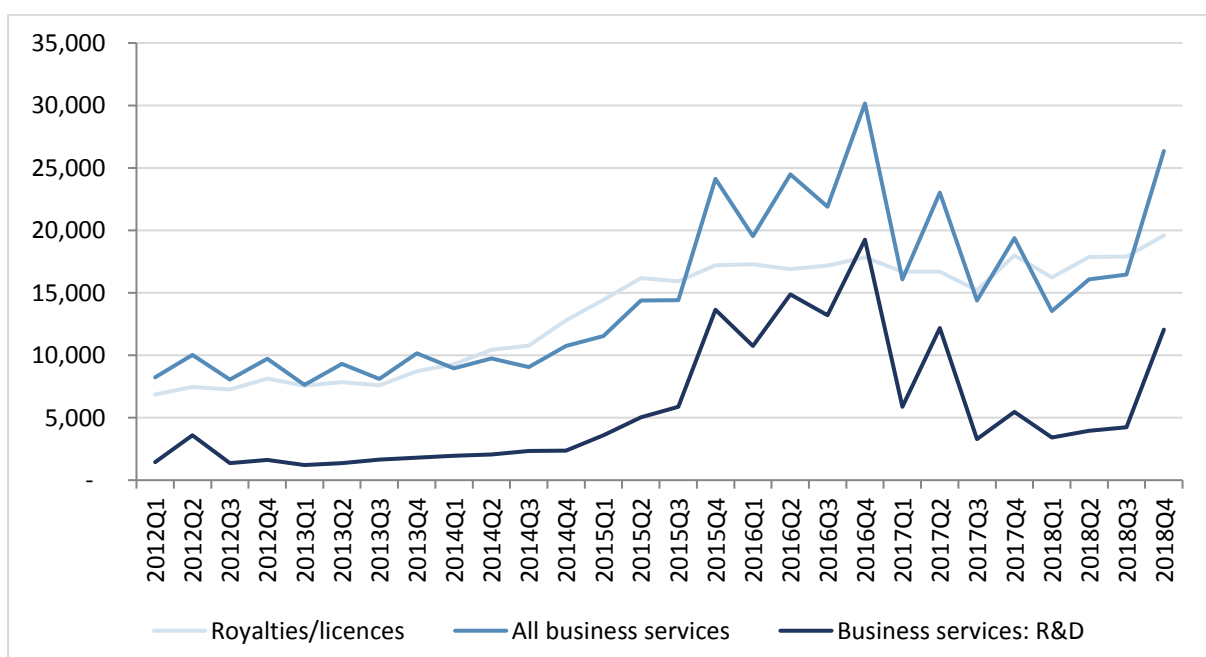
Source: Central Statistics Office.

Current Account

Similarly to the previous year, the low trade balance for services in 2018 resulted in a significant current account surplus of €29 billion (12 per cent of gross national product). As seen in Figure 15, this surplus could have been far larger, roughly 15 per cent of GNP, had recent developments in service trade stayed on course. A sudden increase in R&D related imports led to the relatively low current account contribution of €178 million in Q4 2018.

FIGURE 15   CURRENT ACCOUNT BALANCE (€MILLION)
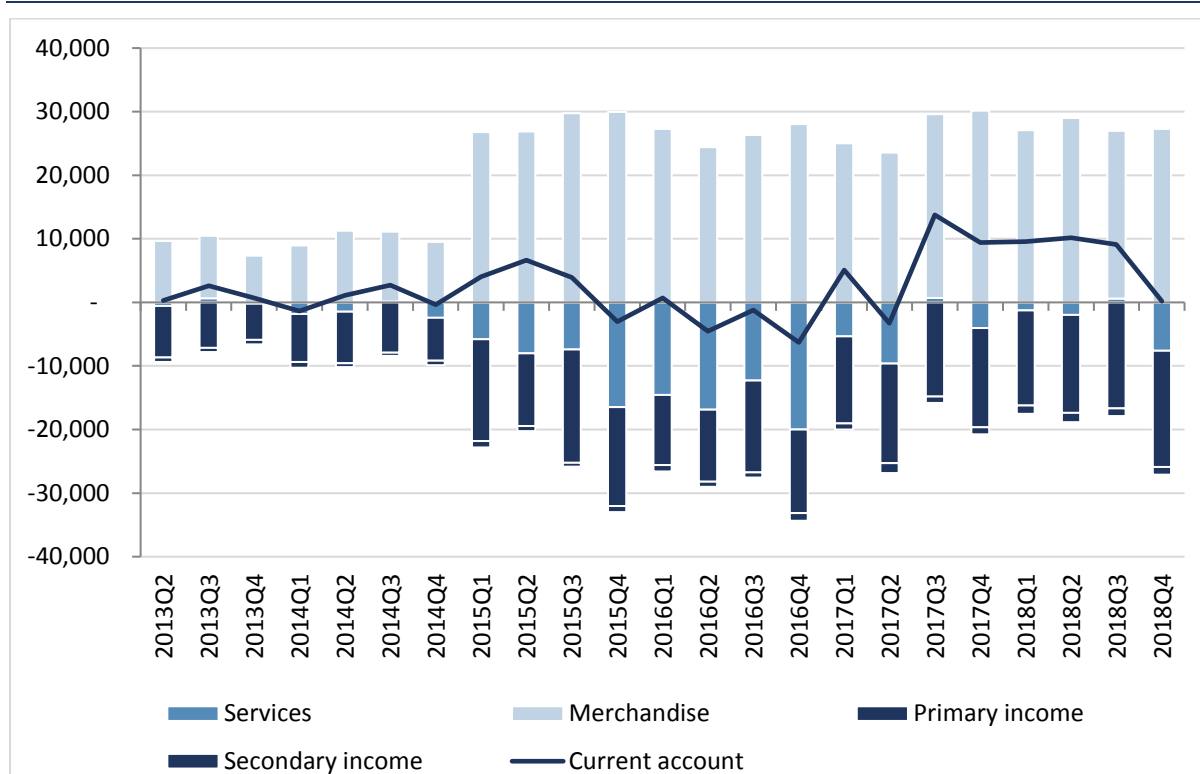
Source: Central Statistics Office.

Given the influence that a small number of particularly large multinational firms have had on the current account from 2015 onwards, the Central Statistics Office proceeded to release a modified measure of the current account balance, with the aim of excluding transactions that were not reflective of the underlying conditions of the domestic economy and its relationship with the wider global markets. These adjustments include the exclusion of trade in R&D related intellectual property services and imports of aircraft related to leasing. Furthermore, to address distortions to primary income outflows, the modified balance also excludes the contribution of depreciation on R&D service imports and trade in IP, depreciation attributed to aircraft leasing and redomiciled income.

While these various changes reduce the current account balance, it is still positive from 2014 onward. From Figure 16 it can be seen that depreciation and service trade related to R&D activities has had the most distortionary impact on the current account balance, while aircraft leasing has played a relatively minor role since 2015. As seen in the figure, the *Commentary* forecasts a current account surplus of €29 billion in 2018.

FIGURE 16 MODIFIED CURRENT ACCOUNT BALANCE (€MILLION)
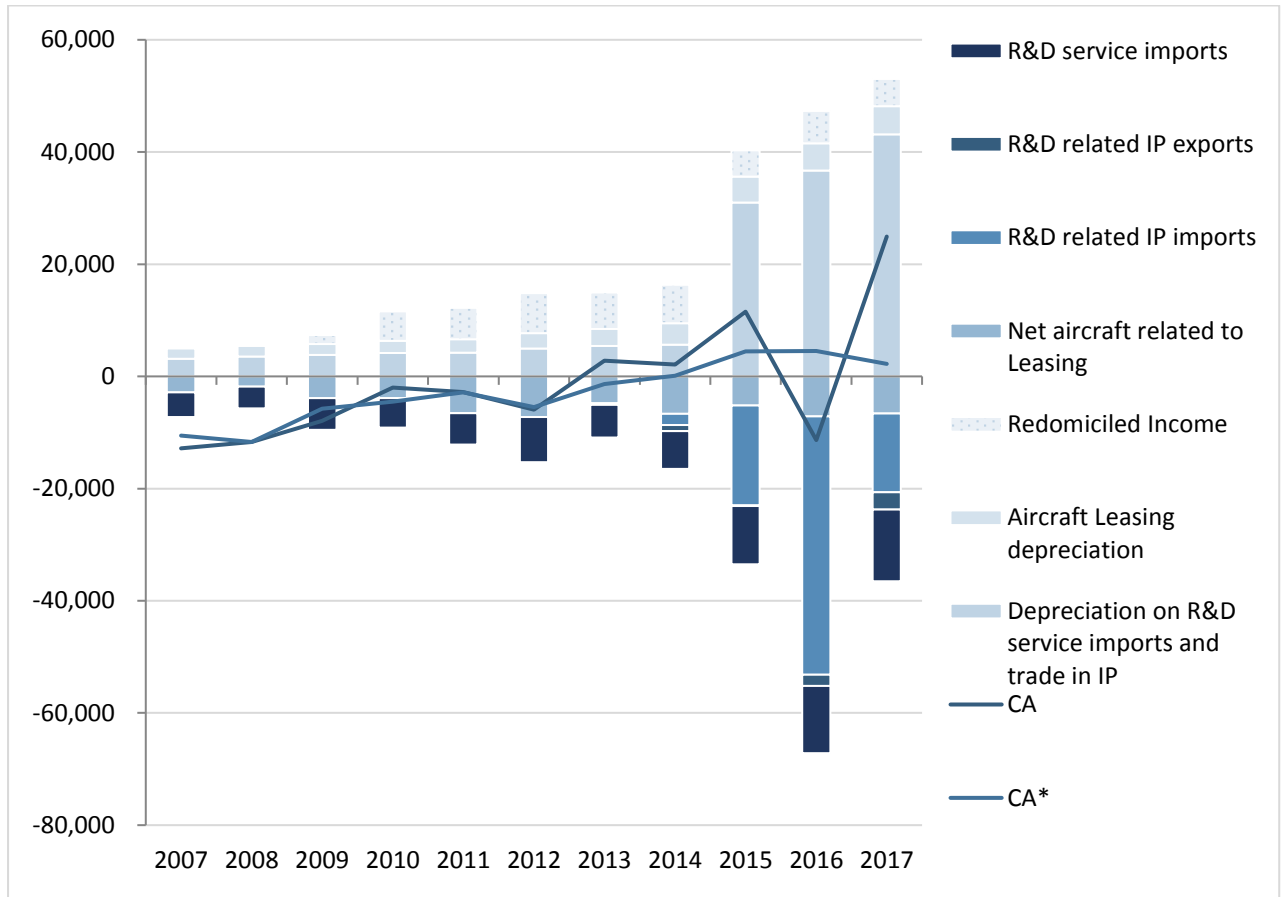
Source: Central Statistics Office.

Due to the volatile nature of ownership trade in goods as well as services, forecasts in the *Commentary* continue to be based on trends in trade patterns linked to underlying Irish economic activity. Given the persistent signs of slowdowns in bilateral trade flows across major economies and recent data on Irish trade performance in the initial quarter of 2019, underlying growth forecasts have been moderated slightly. We expect export growth of 4.2 per cent and 4.3 per cent in 2019 and 2020 respectively. Imports are expected to increase by 6.0 per cent in 2019 and 5.9 per cent the following year. The year-end current account is expected to reach €17.9 billion (6.8 per cent of GNP) in 2019 before falling somewhat to €14 billion (5.1 per cent of GNP) in 2020.

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 and the outlook for inflation. This is 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.

In Figure 17 the actual and forecast performance of the Irish economy is placed within a European context – the actual growth rate of the domestic economy in 2015 of 25 per cent is replaced by an estimated growth rate of 5.5 per cent.[10] From 2014 onwards, the significant relative performance of the Irish economy is apparent. According to the most recent forecasts, this performance looks set to continue over the next two years.

FIGURE 17   ACTUAL (2011-2018) AND FORECAST (2019-2020) ANNUAL GDP GROWTH RATES (%)
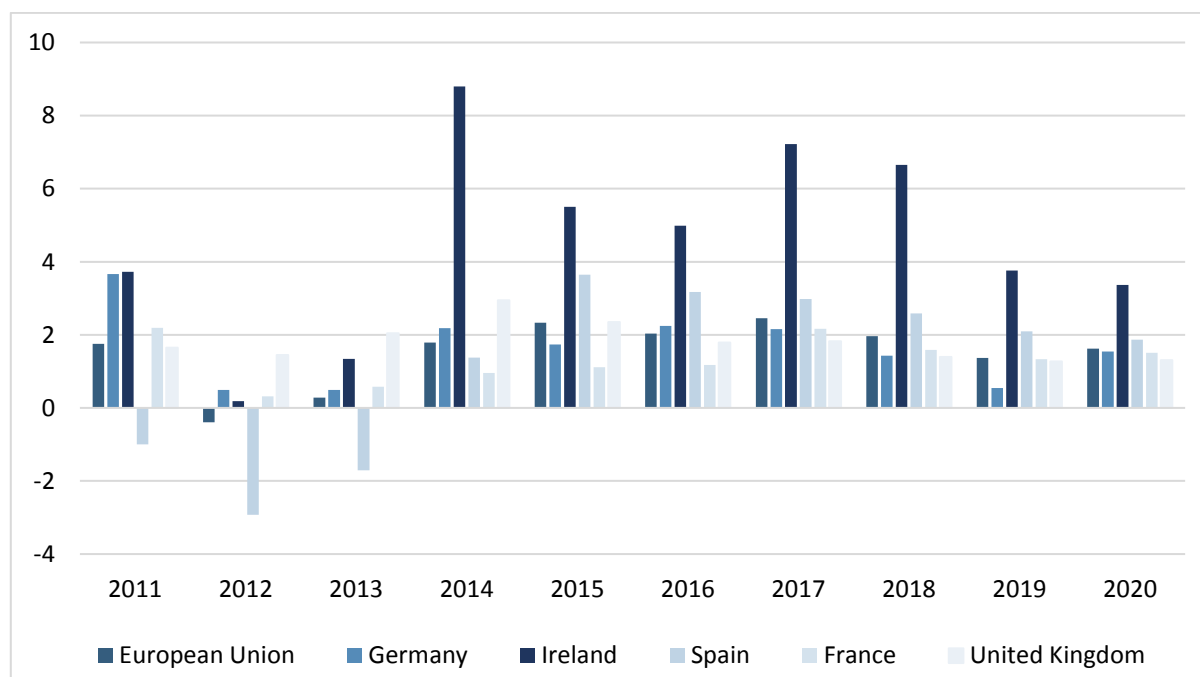
*Source:*   St Louis Fed Database, from Chicago Board Options Exchange.

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[10]   Most commentators accept that the official 25 per cent growth rate in 2015 did not accurately reflect the rate of underlying growth in the Irish economy for that year. Following calculations in the Autumn 2016 *Quarterly Economic Commentary* (*QEC*), we estimate the rate of GDP growth at 5.5 per cent for 2015.

MONETARY AND FINANCIAL AND INFLATION OUTLOOK

Household Credit and Mortgage Market

Due to the potential financial instability risks that can emerge from high levels of credit in the economy, the growth rates of household lending must be monitored closely. Figure 18 presents the growth rates of credit to households from Irish resident credit institutions.[11] The data are split by loans for house purchase and other personal loans (auto finance, credit cards, student loans etc.). The annual growth rate of mortgage lending was 1.4 per cent in Q4 2018 which was a slight increase on the 1 per cent growth rate in Q3 2018. There was also an expansion in the growth rate of non-mortgage credit, up to 2.7 per cent in Q4 2018. While the growth rates in lending for house purchase and other personal credit were positive in each quarter of 2018, they remain significantly below their pre-crisis peak level.

FIGURE 18   GROWTH RATES OF CREDIT TO HOUSEHOLDS (%)
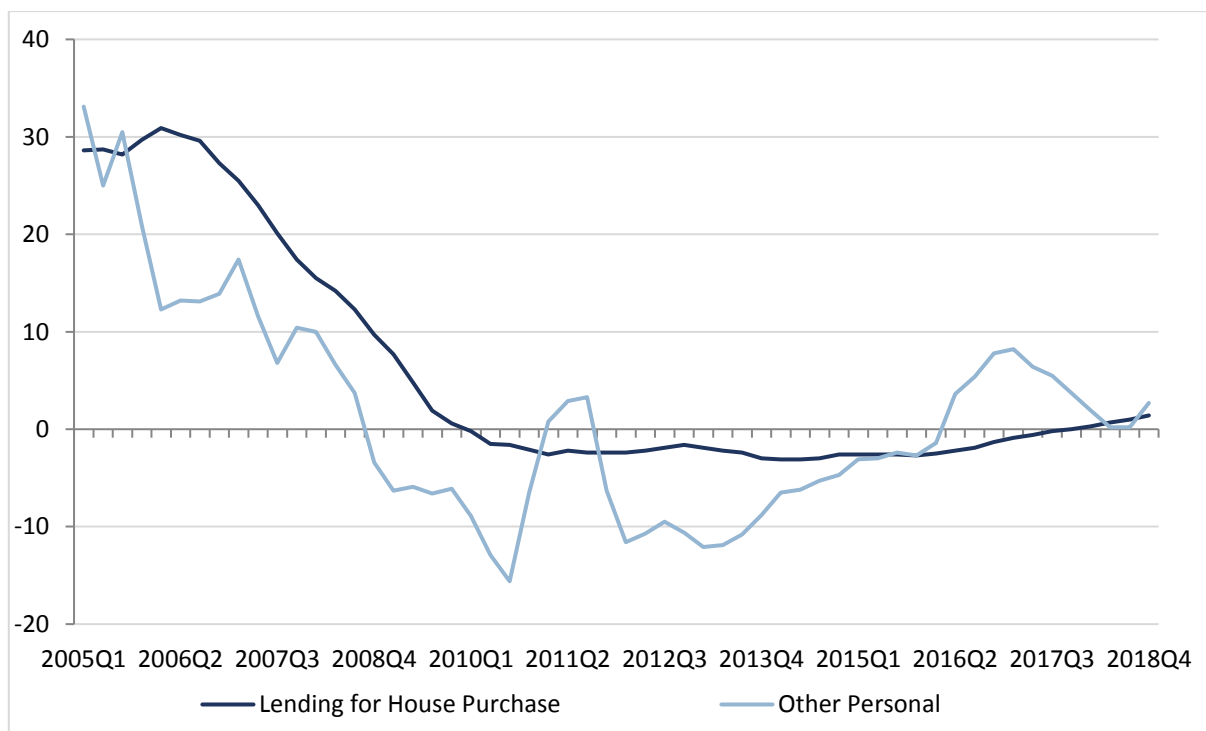
Source: Central Bank of Ireland, Credit, Money and Banking Statistics.
*Notes:*   Data are taken from Central Bank of Ireland data release A.18, Growth rates series codes 777 and 1,252.

Looking at new mortgage lending, in Q1 2019 the total volume of drawdowns increased by 8.9 per cent annually while the total value of drawdowns increased by 10.6 per cent. These are the lowest rates of new mortgage growth in both

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[11]   See CBI, Credit, Money and Banking Statistics: Private Household Credit and Deposits A.18 for details.

volume and value terms since Q1 2016 when annual growth rates were negative. It is likely that the deceleration in the growth rate of new mortgages is related to affordability issues in the housing market with fewer people able to access the higher levels of credit required due to the persistent increase in house prices. However, it should be noted that despite the deceleration in growth rates the total amount of new mortgage drawdowns in Q1 2019 was still at its highest level in the first quarter of any year since 2009.

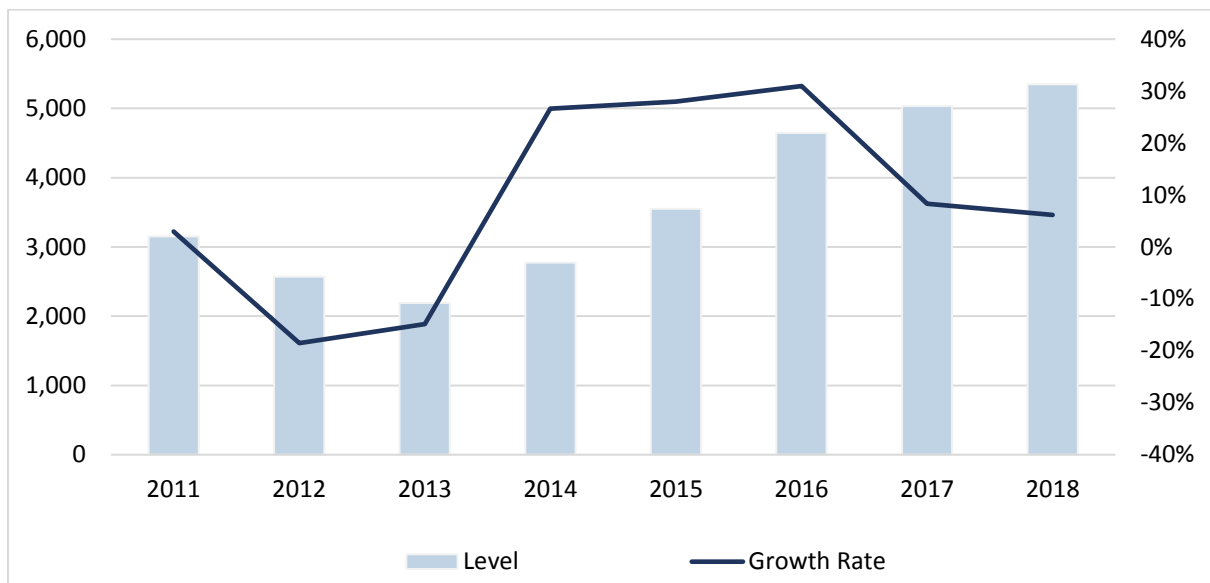**FIGURE 19   TOTAL NEW MORTGAGE LENDING (%)**
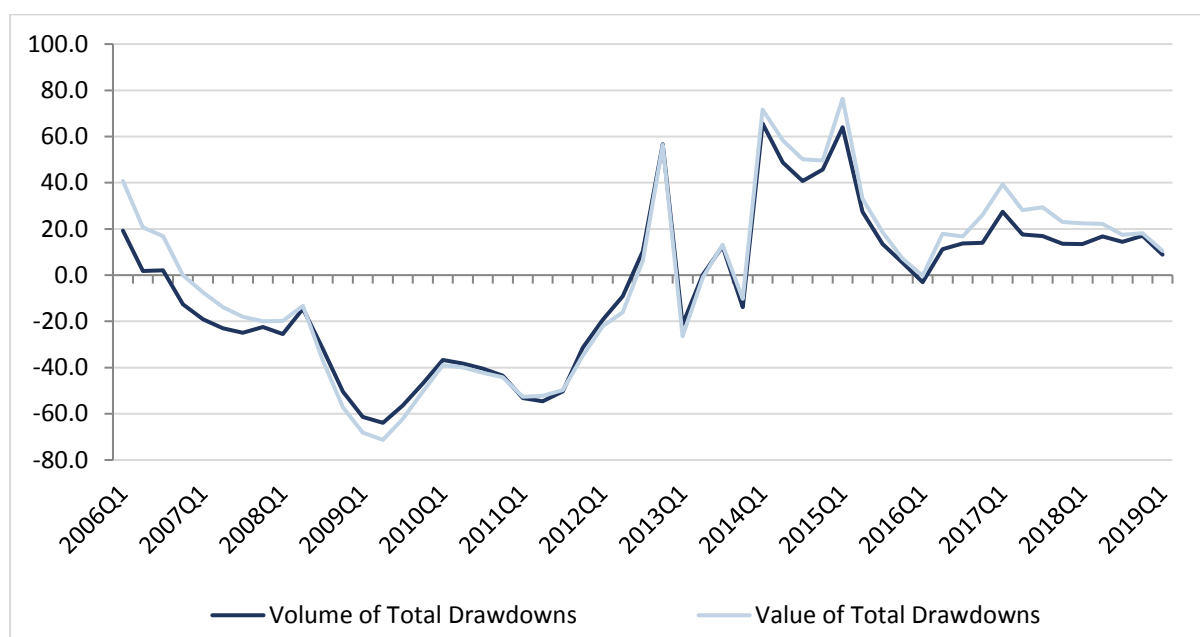
Source: Banking and Payments Federation Ireland.

Trends in SME Credit Market

The allocation of credit to SMEs provides a gauge of both the willingness of credit providers to take on risk and the views of indigenous businesses to the suitability of market conditions for future investment. Figure 20 presents new lending to SMEs over the period 2011 to 2018. From 2013 onwards it can be seen that the volume of new lending to SMEs has been increasing annually. However, the rate of growth has declined in 2017 and 2018 and now stands at just over 6 per cent which is the lowest rate of growth in SME lending since 2013. The slowdown in the rate of lending may be related to uncertainty among domestic businesses with regards to the outcome of Brexit as well as the reduced growth outlook across Europe. However, these data only include lending by the traditional banking sector. If it is the case that SMEs are using increasing amounts of non-bank financing, the overall financing level may be higher than documented in the official statistics.

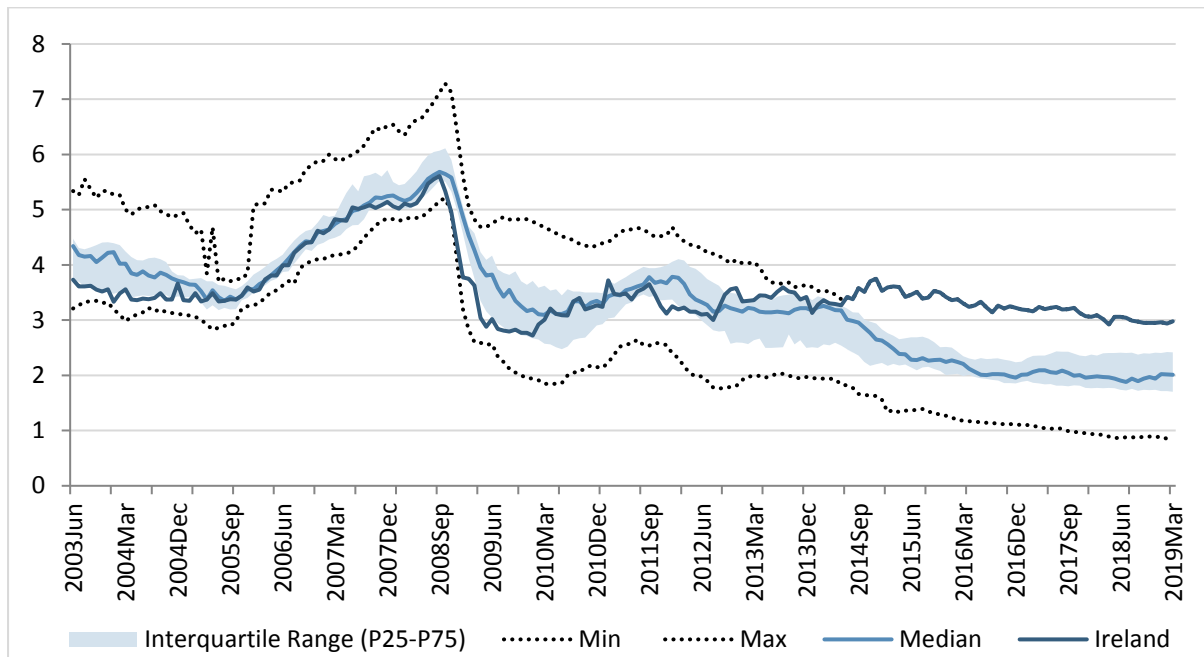**FIGURE 20   NEW LENDING TO SMES – TOTAL PER ANNUM**

Examining SME lending by sector (Figure 21), there were significant increases in lending to both the construction and business services sector in 2018. However, in areas such as manufacturing and wholesale and retail there was a fall in new lending relative to the previous year. Wholesale and retail firms may be tempering investment due to declining consumer sentiment which is reflective of the growing uncertainty around Brexit. Investment may also be curtailed due to the growth of e-commerce, with consumers switching away from traditional retail and purchasing more goods online.

FIGURE 21   NEW LENDING TO SMES – BY SECTOR PER ANNUM (€ MILLION)
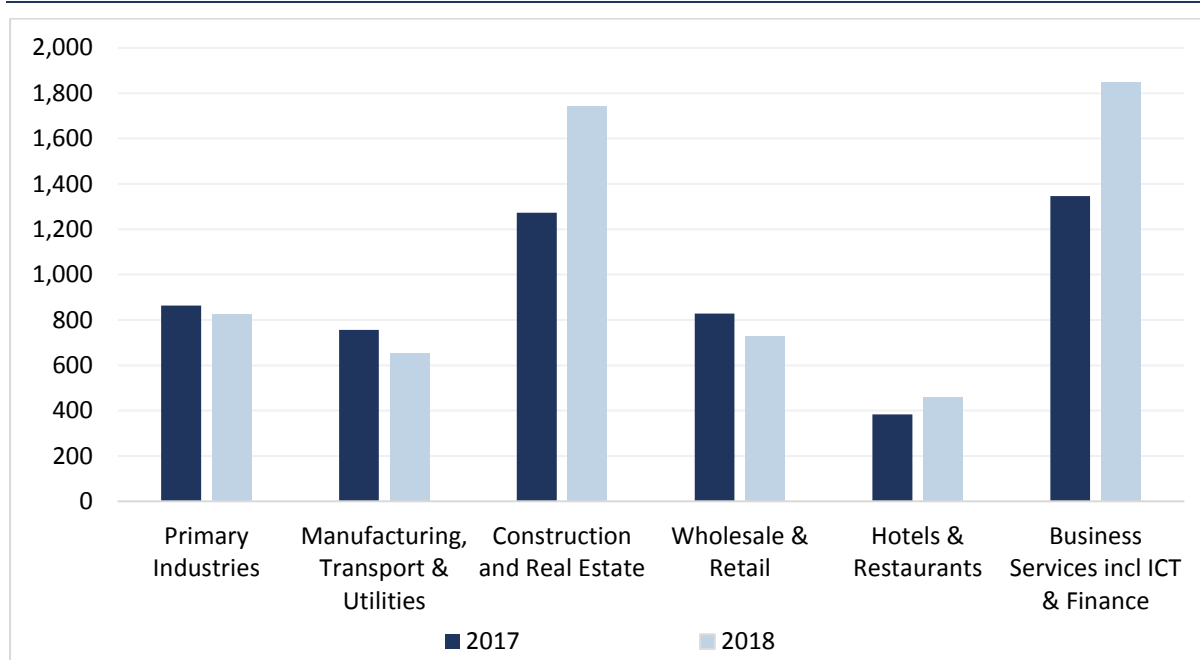
Source: Central Bank of Ireland, SME Credit Series, Table A.14.1.

Interest Rates and the Cost of Finance

Since 2014, the interest rate on mortgages in Ireland has been falling steadily and as of March 2019 it stood at 2.98 per cent. Nevertheless, the borrowing rate on Irish loans remains the highest in the Euro Area, as has been the case since Q3 2014. As of March 2019, interest rates on mortgages were nearly 100 basis points higher than the Euro Area average. Given the affordability issues in the Irish housing market, the comparatively high borrowing rates exacerbate the challenges faced by Irish homeowners.

FIGURE 22   INTEREST RATES ON NEW HOUSE PURCHASE LOANS TO HOUSEHOLDS – EUROPEAN COMPARISON

Like interest rates on mortgages, rates on corporate loans in Ireland are also higher than the Eurozone average. Figure 23 presents the interest rates on new business loans for Non-Financial Corporations in Ireland as well as the mean rate for the Eurozone. Two series are shown: 1) covering all loans and 2) covering loans worth less than €250,000, the latter of which is used as a proxy for loans to SMEs. While the interest rate on all corporate loans in Ireland was 3.03 per cent in March 2019, the average rate in the Euro Area was just 1.64 per cent. The difference is even starker for small loans with the rate in Ireland 5.33 per cent compared to 2.25 per cent in the Eurozone.

There are a number of factors in the Irish credit market that may be contributing to these interest rate differentials. One such factor which has been cited by the Central Bank[12] among others is the lack of competition among retail banks. In the aftermath of the financial crisis a number of banks collapsed, increasing the concentration of retail banks in the Irish market. This has reduced the level of competition in the banking sector. More broadly, differences in firm behaviour, risk appetites and national regulation, particularly with regard to repossessions,

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[12]   Nevin, Ciarán (2018). 'Irish retail bank profitability 2003-2018', *Financial Stability Notes*, Vol. 2018, No. 10, Central Bank of Ireland.

are amongst the main reasons for the difference in interest rates between the Irish and European markets.

**FIGURE 23   INTEREST RATES ON NEW CORPORATE LOANS – EUROPEAN COMPARISON**
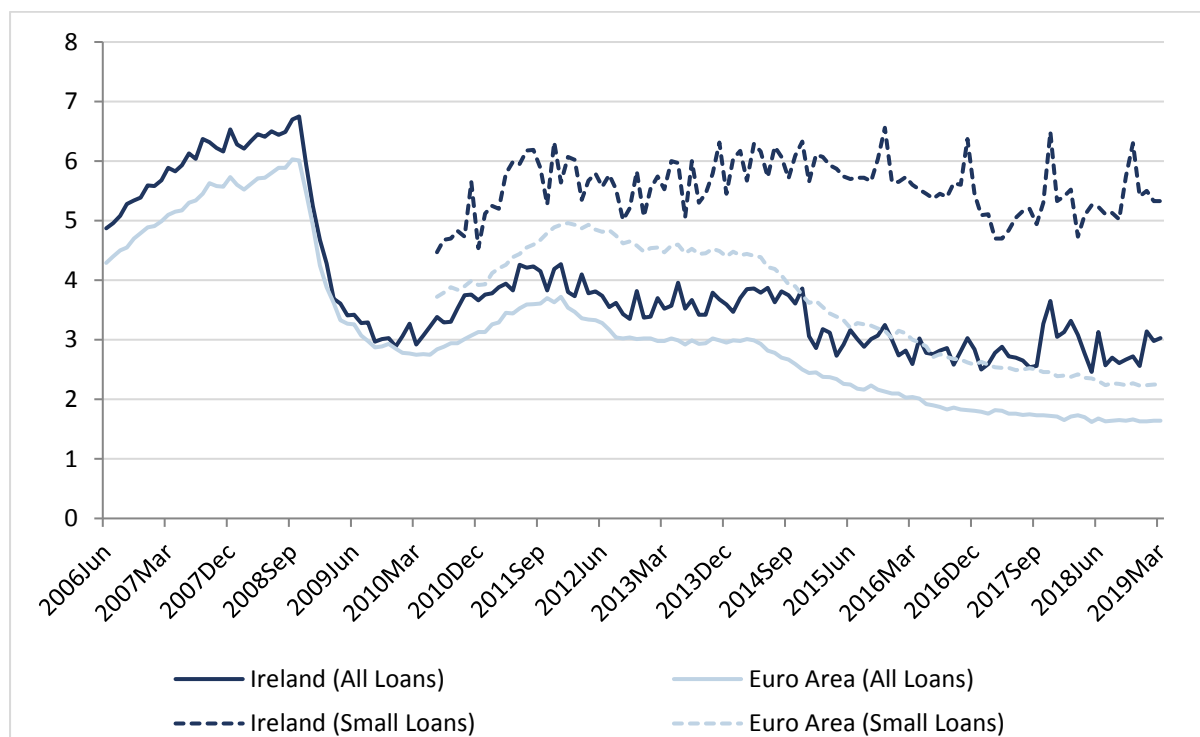
Sources: ECB MFI data. Small loans refer to loans worth less than €250,000.

Inflation Outlook

Figure 24 presents the inflation rate in Ireland using CPI, the CPI excluding energy and unprocessed foods (core inflation), and HICP. All three measures of price growth have increased considerably throughout 2019. In May 2019, the 12-month inflation rate was 1.0 per cent for CPI and HICP. With energy prices rising by 5 per cent, core inflation remains below headline CPI at 0.6 per cent. Other sectors in which there was an annual increase in prices were restaurants and   hotels (+ 3.2 per cent), alcohol and tobacco (+ 2.7 per cent), and education costs (+ 1.7 per cent). Elsewhere, sectors which experienced deflation over the 12-month period were furnishings, household equipment and routine household maintenance (-3.9 per cent), communications (-6.1 per cent), clothing and footwear (-1.3 per cent) and food and non-alcoholic beverages (-0.2 per cent).

FIGURE 24   ANNUAL GROWTH IN INFLATION (%)
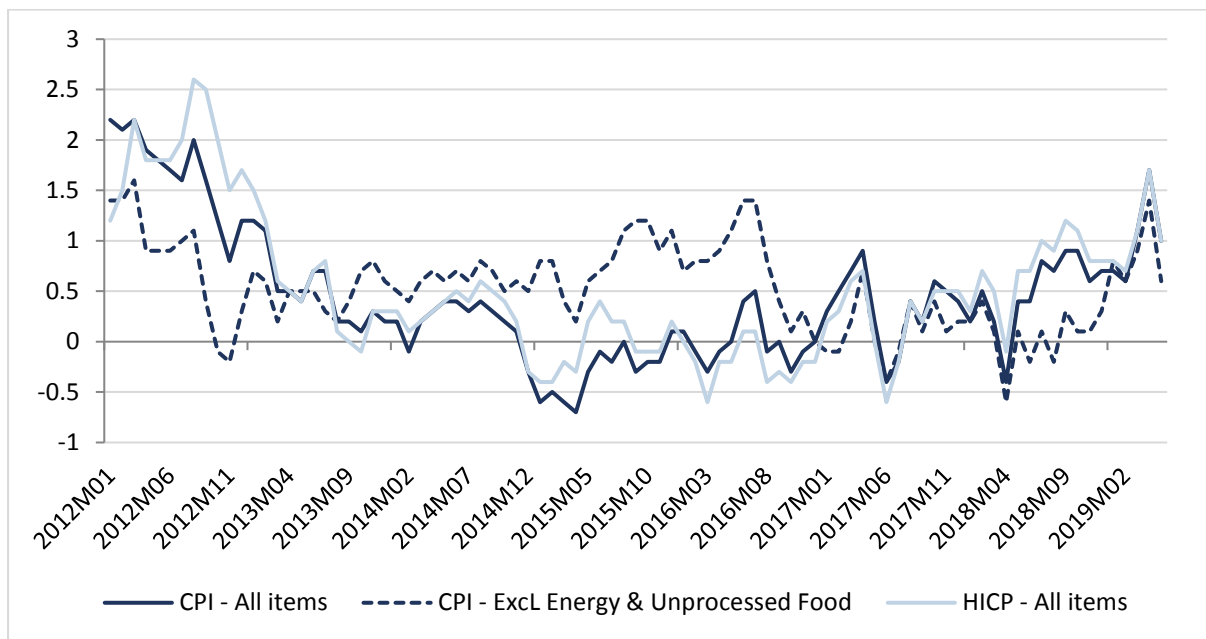
Source: Central Statistics Office.

Figure 25 highlights a noticeable difference in the price trends between goods and services. While the annual price growth of services reached 1.2 per cent in May, the prices of goods fell by 0.2 per cent over the same period. Though the rate of deflation for goods has been slowing since the start of the year, negative or low price growth for goods has been persistent since 2013.

FIGURE 25   DECOMPOSITION OF ANNUAL (%) CPI GROWTH INTO GOODS AND SERVICES GROWTH
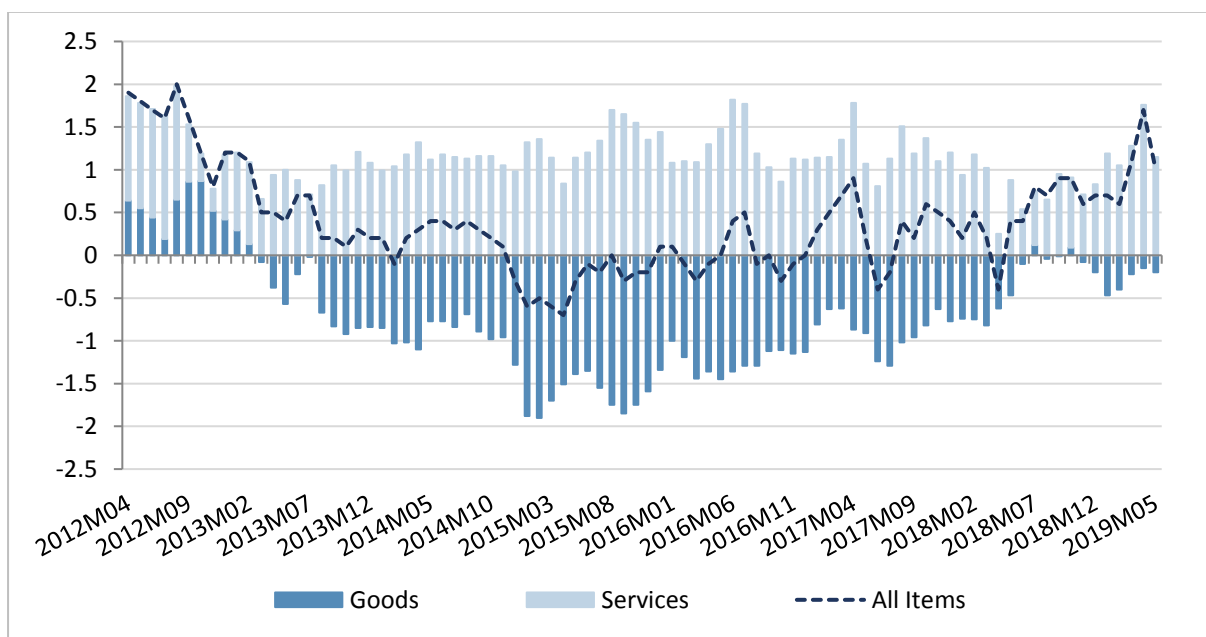
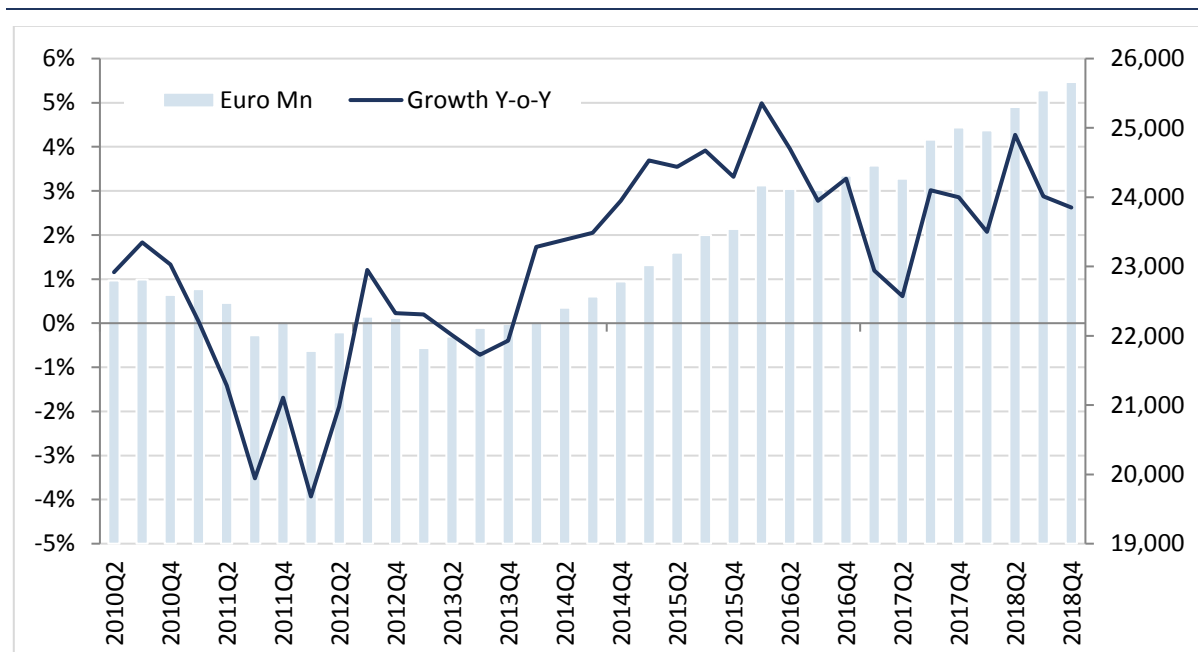*Source:*   Central Statistics Office.

In light of the *Commentary*'s forecast for strong domestic demand and further tightening in the labour market, price growth is expected to accelerate over the next two years. Consumer prices are expected to increase by 1.4 per cent in 2019, rising to 1.7 per cent in 2020.

DEMAND

Household sector consumption

According to the latest quarterly National Accounts, personal consumption expenditure increased by 2.6 per cent year-on-year in Q4 2018. The continued strong growth in household spending has likely been driven by lower unemployment rates and increasing disposable incomes. However, despite this, the past two quarters have shown a moderation in the rate of growth. Given the international uncertainties around Brexit, tariff and trade policy, it would not be surprising if households were lowering consumption levels to build up savings buffers in case adverse scenarios materialise. Nevertheless, the fast pace of domestic economic expansion, coupled with the tightness in the labour market may outweigh or offset these factors as household resources increase. Understanding which of these factors will dominate is critical to charting the path for consumption over the coming period.

FIGURE 26   QUARTERLY PERSONAL CONSUMPTION ON GOODS AND SERVICES – CONSTANT MARKET PRICES AND SEASONALLY-ADJUSTED

Source: Central Statistics Office.

To get an insight into what is driving household spending patterns we draw on detailed retail sales data. Retail sales is an important input into understanding

household behaviour as it measures actual spending and is available in a timely manner. Table 2 presents the annual growth in retail sales volume for select items for the three months to April 2019. Across all sectors, retail sales are up on the same three months in the previous year. Overall retail business increased by 4.5 per cent or 6.3 per cent when sales of motor vehicles were excluded. Sales of furniture and lighting goods were considerable, up 12.4 per cent, which is likely due to the strong growth in housing market activity. Since the last *Commentary*, which considered data up to end 2018, there has been a pick-up in retail sales with the annualised growth rates accelerating. This is likely due to the strong improvement in the labour market (in terms of employment and wage growth) observed during this period.

TABLE 2   GROWTH IN SELECT RETAIL SALES (VOLUME) ITEMS (THREE MONTHS TO APRIL 2019)

Retail Business – NACE Rev. 2	Volume of Sales Annual % change
Motor Trades	0.9
Non-specialised stores (excluding department stores)	5.1
Department stores	1.7
Clothing, Footwear and Textiles	9.2
Furniture and lighting	15.2
All retail businesses	4.5
All retail businesses, excluding motor trades	6.3

Source: Central Statistics Office.

The overall trends in retail sales are displayed in Figure 27. This chart presents a three-month rolling average of annual growth of total retail sales, sales excluding the motor trade, and sales for household equipment. Retail sales (both including and excluding motor sales) continue to perform strongly. The growth in household equipment sales remains well above the average of all retail sales, with the three-month rolling rate up 17.9 per cent in April 2019. As previously noted, this is likely driven by the continued increase in housing market activity. Given the uncertainties facing consumers in the Irish economy, in particular with Brexit, it may have been expected that retail sales growth would have moderated through late 2018 and into 2019. While this does appear to have happened up to February 2019, the March and April updates suggest a pick-up in retail sales and a further acceleration in the growth rate. This may be driven by improvements in the labour market outweighing any concerns due to uncertainty or some pent up demand being released with the announcement of the delay in Brexit.

FIGURE 27   ANNUAL GROWTH (%) IN RETAIL SALES INDEX VOLUME ADJUSTED (BASE 2005=100), THREE-MONTH ROLLING AVERAGE
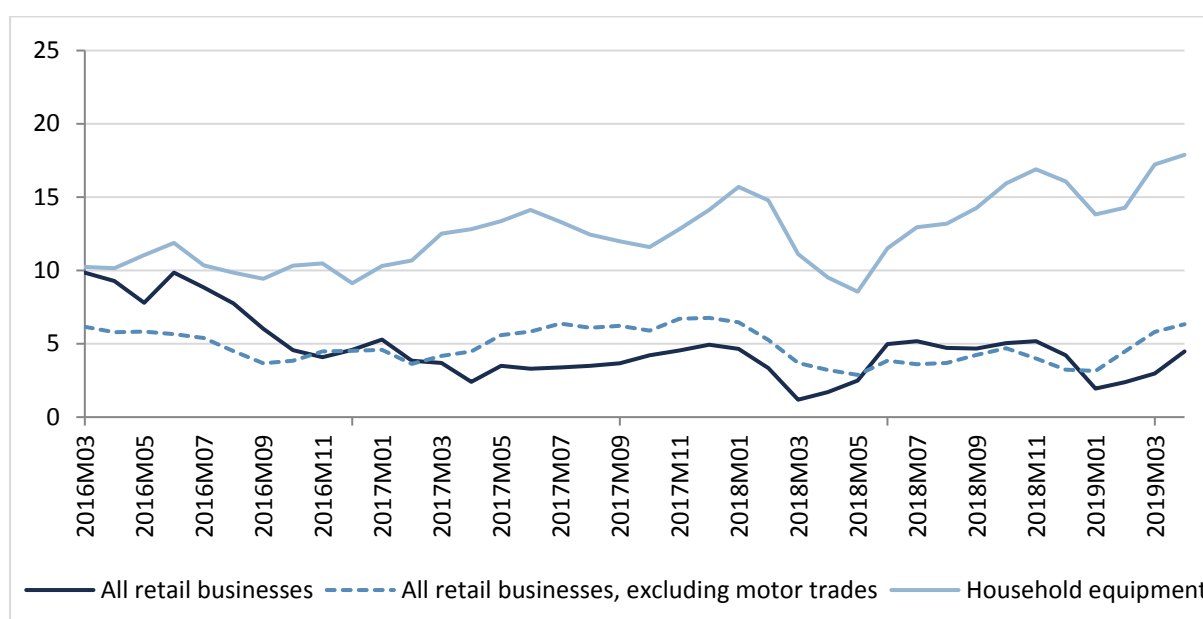
Source: Central Statistics Office.

Another important indicator which provides insight into household spending is consumer sentiment. Figure 28 presents an index developed using the European Commission data on consumer sentiment. The figure presents data for Ireland, the UK and the rest of the EU to provide context.

FIGURE 28   CONSUMER SENTIMENT INDICATORS – IRELAND, UK AND REST OF EU
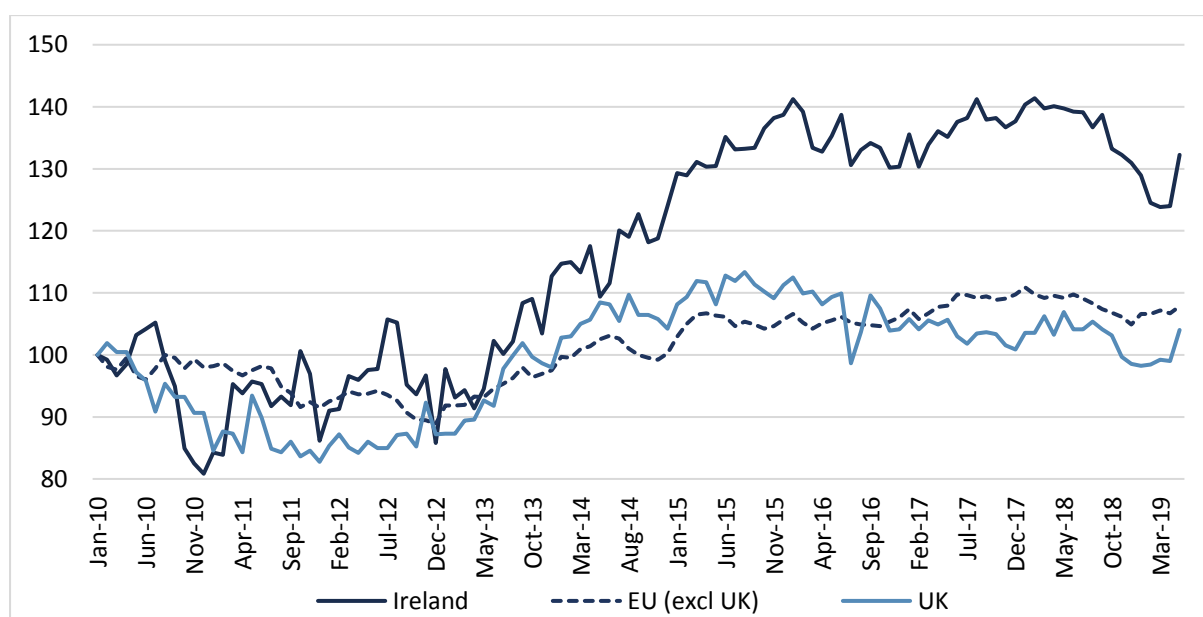

Source: European Commission data and ESRI calculation.
Note: The positive/negative balances from the EU confidence series are transformed by adding 100. We then set the base to 100 in January 2010 with growth relative to this point i.e. ((Yt/YJan2010) -1)*100.

While consumer sentiment grew much more strongly in Ireland than elsewhere in the period 2014-2017, it is clear that mid- to late-2018 consumer sentiment has been falling. This suggests that Irish consumers became more fearful as the Brexit deadline drew to a close without a deal. A similar pattern is also evident in the UK. The most recent data point for May 2019 provides some respite with a pick-up in sentiment occurring in Ireland, the UK and EU. This may be driven by the postponement of the Brexit deadline to October 2019 giving time for negotiations to continue.

FIGURE 29   SCATTER PLOT OF RETAIL SALES AND CONSUMER SENTIMENT
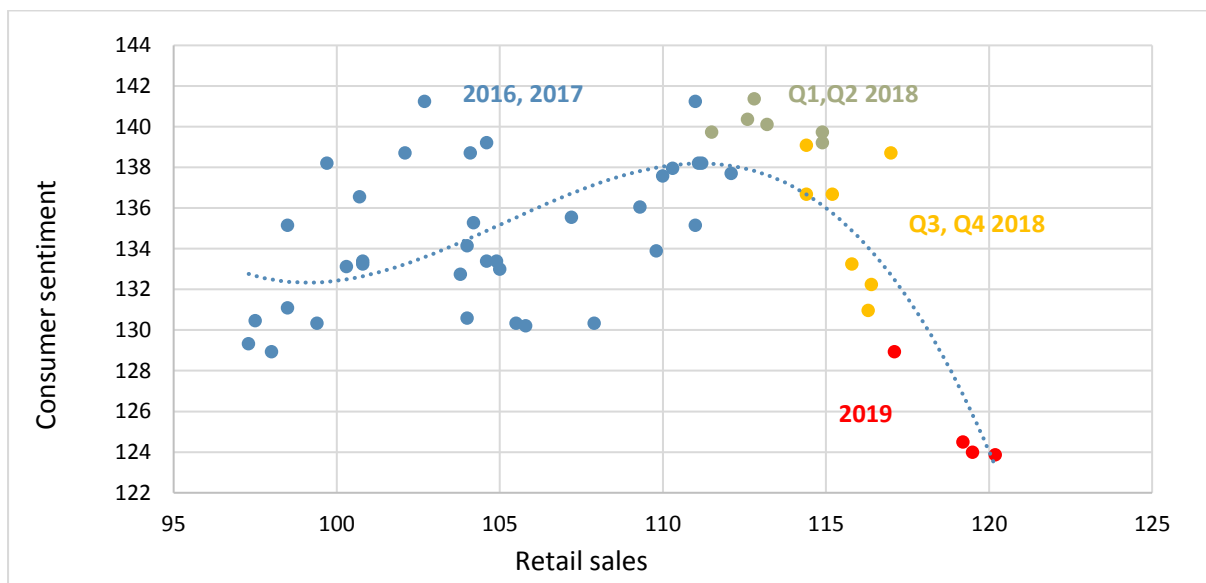
Source: ESRI analysis.
Note: Trendline is a cubic polynomial.

The fact that retail sales are continuing to rise into 2019 despite the moderation in consumer sentiment makes charting the path for consumption more difficult. Both of these indicators normally move in tandem (See Figure 29). However this relationship appears to have broken down coming into late 2018, as displayed in Figure 29 where the past nine months have shown a negative correlation between sentiment and retail sales. Box 1 by McQuinn provides evidence to suggest that actual consumer sentiment levels has departed from that level suggested by economic fundamentals such as unemployment and inflation. Part of this can be explained by looking at the subcomponents of consumer sentiment in Figure 30. It can be seen that households have become much more pessimistic regarding their views on the broader economy but are more positive about their own finances and spending plans. This likely explains why we see a continued pick-up in retail sales despite a moderation in consumer sentiment.

FIGURE 30   RELATIVE TRENDS IN CONSUMER SENTIMENT SUB-INDICES
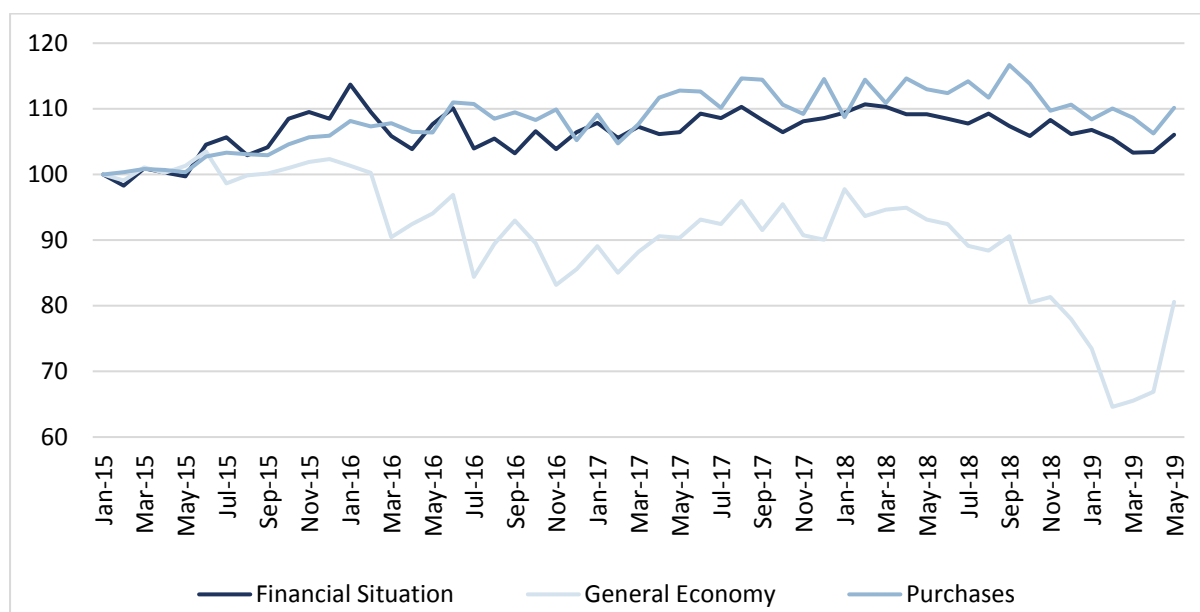
Source: European Commission data and ESRI calculation.
Note: The positive/negative balances from the EU confidence series are transformed by adding 100. We then set the base to 100 in January 2010 with growth relative to this point i.e. ((Yt/YJan2010) -1)*100.

Looking forward, and considering both factors, we expect household consumption to continue growing positively over the next two years. Given the expected increase in employment and the continued increase in earnings, this should support higher consumer spending. The current data suggest these factors are outweighing any decline in consumer sentiment driven by the uncertain outlook. In 2019 we expect consumption expenditure to grow by 2.5 per cent and at a slightly slower pace of 2.3 per cent in 2020.

BOX 1   MODELLING IRISH CONSUMER SENTIMENT – THE POTENTIAL IMPACT OF BREXIT

There is general agreement that Brexit constitutes one of the greatest challenges to the Irish economy over the short to medium term with a range of studies highlighting the adverse impact of the UK's departure from the European Union (EU) on headline Irish economic variables. However, has Brexit already had a negative impact ex ante on Irish economic performance? From October 2018 onwards Irish consumer sentiment as captured by the Consumer Sentiment Index estimated by the ESRI and KBC Bank has shown a sharp downturn. This is despite the fact that most key Irish economic variables such as labour market data and taxation receipts have shown robust growth over the period. However, since this period there has been a significant increase in the amount of media attention devoted to Brexit with political developments in the UK particularly receiving heightened levels of coverage in Ireland. Therefore, in this box, we attempt to see if there is evidence to suggest that Brexit is adversely impacting Irish consumer sentiment. Figure A plots Irish consumer sentiment as per the KBC/ESRI index. From this, the deterioration in sentiment since Q4 2018 can be observed.

To gauge the potential impact of Brexit on consumer sentiment, we specify and estimate a model of Irish consumer sentiment. If, using standard determinants of consumer sentiment, the model is unable to explain recent trends in consumer sentiment, this could provide *a priori* evidence that Brexit maybe impacting Irish consumer attitudes.

In general, there is a relative dearth of such models, however, one exception is that specified in Lovell and Tien (2000). In modelling US consumer sentiment, Lovell and Tien (2000) specifically assess the value of an Economic Discomfort Index (EDI) as devised by the noted economist Arthur Okun. The index consists of the following.

$$\text{EDI} = |\dot{p}_t| + u_t \qquad\qquad (1)$$

where $|\dot{p}_t|$ is the absolute rate of inflation and u_t is the unemployment rate. The *Wall Street Journal* (1971) summarised the index in the following way.

> *The higher this index, the greater the discomfort – we're less pained by inflation if the job market is jumping, and less sensitive to others' unemployment if a placed price level is widely enjoyed* ....

Based on their model, Lovell and Tien (2000) state that, in a US context, the Economic Discomfort Index provides a reasonable first approximation in summarising the impact of adverse economic conditions on the consumer.

Therefore, we now apply the index in assessing Irish consumer sentiment. The following model is specified and estimated:

$$\log(CPI_t) = \alpha_0 + \alpha_1 \log(EDI_t) \qquad\qquad (2)$$

CPI is the Irish Consumer Sentiment Index.

The model is run on monthly data over the period January 1998 to February 2019. The regression results are summarised in Table A. Over the period in question, the EDI variable is significant and has the correctly hypothesised sign.

In Figure B, the residuals between the actual and fitted values from (2) models are plotted. It can be clearly observed that from 2018 onwards the model does a relatively poor job of estimating Irish consumer sentiment. Based on the EDI and its components, Irish consumer sentiment should have continued to trend upwards from October 2018, however, instead it has declined sharply. This suggests that some other variable or factor is influencing Irish consumer sentiment from this time. This provides evidence *a priori* to suggest that Brexit has had an adverse impact on Irish consumer sentiment.

A number of studies point to the close relationship between consumer sentiment and consumption. Carroll, Fuhrer and Wilcox (1994) and Ludvigson (2004) find that after controlling for economic fundamentals – measured by labour income growth, stock prices and short-term interest rates – sentiment contains some small but statistically significant independent information about future consumption growth. Using Australian data, Gillitzer and Prasad (2016) argue that changes in consumer sentiment have a direct effect on consumption. Therefore, if Brexit has had an adverse impact on consumer sentiment, it has already had a materially negative impact on the Irish economy via lower rates of consumption than would otherwise be the case.

TABLE A   **REGRESSION ESTIMATE RESULTS**

Dependent Variable	$\log(CPI_t)$	
	Coefficient	T-Stat
$\log(EDI_t)$	-0.615	-14.42
	$R^2 = 0.452$	

Source: *QEC* Authors' Analysis.

FIGURE A   **IRISH CONSUMER SENTIMENT**
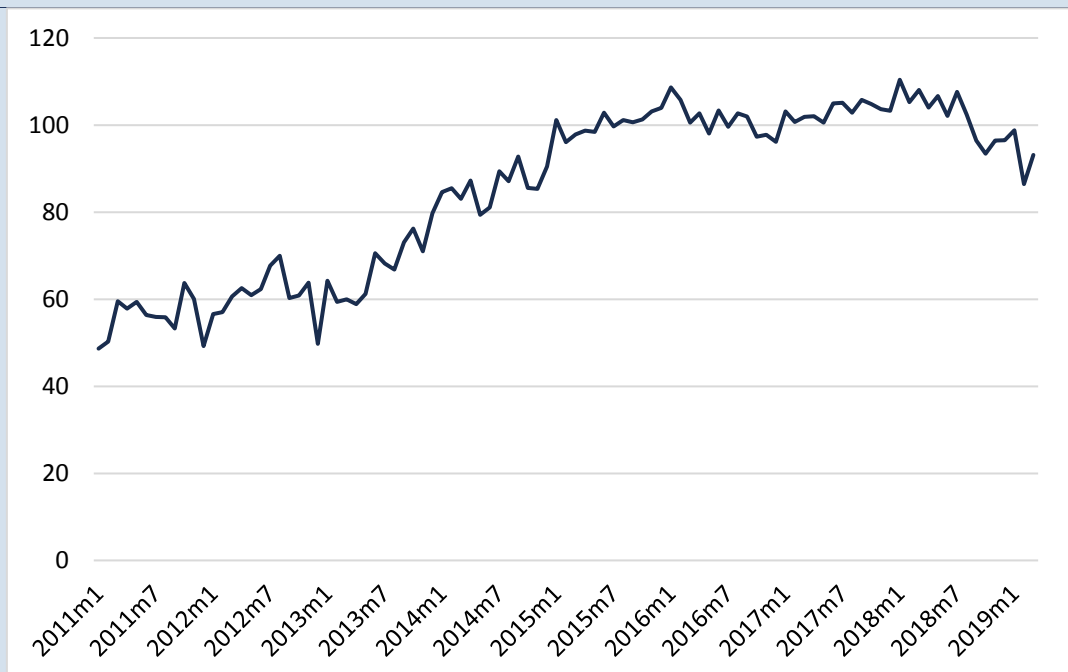
Source: KBC Bank/ESRI Consumer Sentiment Index.

FIGURE B   MODEL OF IRISH CONSUMER SENTIMENT: RESIDUAL VALUES
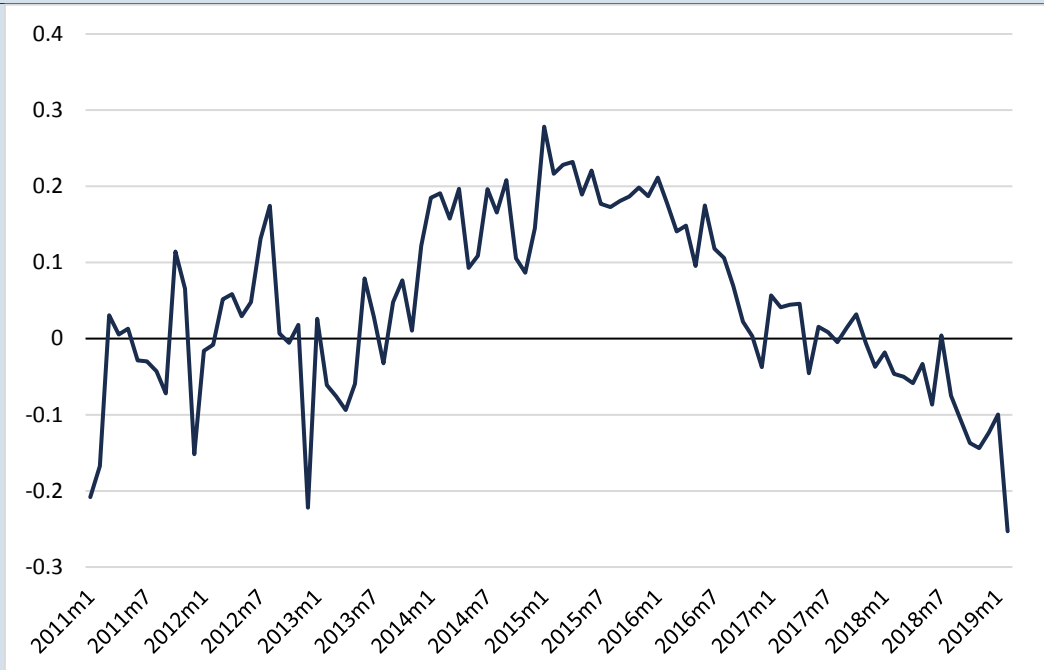
References:

Carroll C.D., J.C. Fuhrer and D.W. Wilcox (1994). 'Does consumer sentiment forecast household spending? If so, why?', *The American Economic Review*, 84(5), pp. 1397-1408.

Gillitzer C. and N. Prasad (2016). 'The effect of consumer sentiment on consumption', Reserve Bank of Australia Research Discussion Paper, RDP 2016-10.

Lovell M.C. and P. Tien (2000). 'Economic discomfort and consumer sentiment', *Eastern Economic Journal*, Vol. 26, No. 1, Winter 2000, pp. 1-11.

Ludvigson S.C. (2004). 'Consumer confidence and consumer spending', *The Journal of Economic Perspectives*, 18(2), pp. 29-50.

This Box was prepared by Kieran McQuinn.

Property market developments

Property price growth has continued to decelerate into 2019, following the trend which began in mid-2018. The rate of growth is currently at its lowest rate since late 2013. Figure 31 plots the year-on-year changes in residential property prices by property type.

FIGURE 31   ANNUAL RESIDENTIAL PROPERTY PRICE GROWTH (%) BY DWELLING
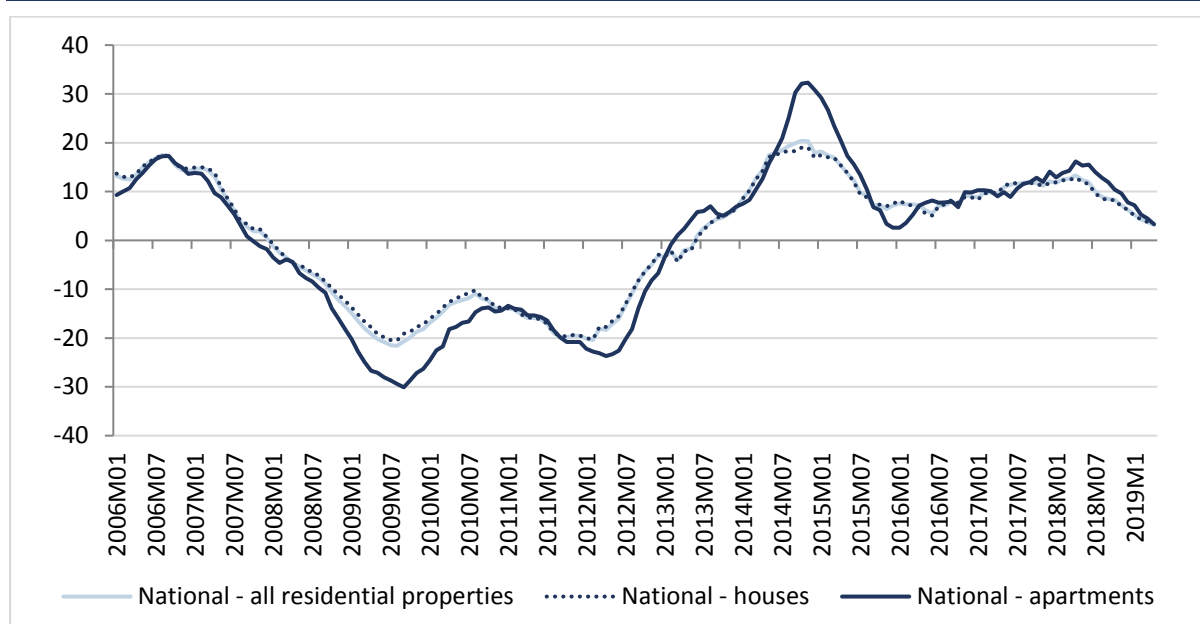
Source: Central Statistics Office.

Since April 2018 annual property price growth has fallen month-on-month and, as of April 2019, the growth rate was just 3.1 per cent. This is a considerable decline from the growth rate seen in the same period the previous year. There is a range of factors which could potentially be contributing to these trends. One possible factor is the increased level of housing completions. However, a major potential contributory factor is the increasing extent to which borrowers are limited under the macroprudential rules on loan-to-income and loan-to-value. These measures are designed to ensure prudent borrowing levels are maintained in the residential sector. Across different types of dwelling, the divergence in growth rates between house prices and apartments has again narrowed into 2019.

Property price developments for Dublin and the rest of Ireland are presented in Figure 32. The deceleration of property prices is most prevalent in Dublin where year-on-year property price growth fell to 0.5 per cent in April 2019, the lowest growth rate in the capital since 2013. On a more granular basis, prices were unchanged on an annualised basis for Dublin houses, with prices actually falling in three of the four local authority areas (Fingal, Dún Laoghaire-Rathdown and Dublin City) in April 2019 relative to April 2018. These figures are presented in Table 3.

TABLE 3   PERCENTAGE CHANGE OVER 12 MONTHS FOR RESIDENTIAL PROPERTY PRICE INDEX (%) BY TYPE OF RESIDENTIAL PROPERTY AND MONTH

	2018 M12	2019 M01	2019 M02	2019 M03	2019 M04
Dublin – all residential properties	3.8	2.7	1.4	0.9	0.5
Dublin – houses	4.1	2.8	1.3	0.5	0
Dublin – apartments	3.4	2.6	2.1	2.1	2.2
Dublin City – houses	4.0	3.1	1.7	0.4	-0.3
Dún Laoghaire-Rathdown – houses	5.1	3.6	1.5	0.3	-1.5
Fingal – houses	3.4	2.2	1.2	0.3	-0.4
South Dublin – houses	4.5	3.4	3.2	3.5	4.0

Source: Central Statistics Office.

Given the marked deceleration in property price growth, down by over ten percentage points since April 2018, and the fact that prices are falling in three Dublin areas for house dwellings, it would not be surprising if Dublin overall experiences a reversal in property prices in the near term. Given the higher level of house prices in Dublin and the surrounding area, it is likely the Central Bank rules are binding most in these areas and this is contributing to the more marked decline in the growth rate observed in the capital area. Furthermore, housing supply has been concentrated in the Dublin area which may be helping to moderate prices.

Property price growth in the rest of the country fell at a slower pace over the second half of 2018 and this has continued into 2019. As of April 2019, the year-on-year growth was 5.6 per cent, down eight percentage points since April 2018.

FIGURE 32   ANNUAL RESIDENTIAL PROPERTY PRICE GROWTH (%) BY REGION
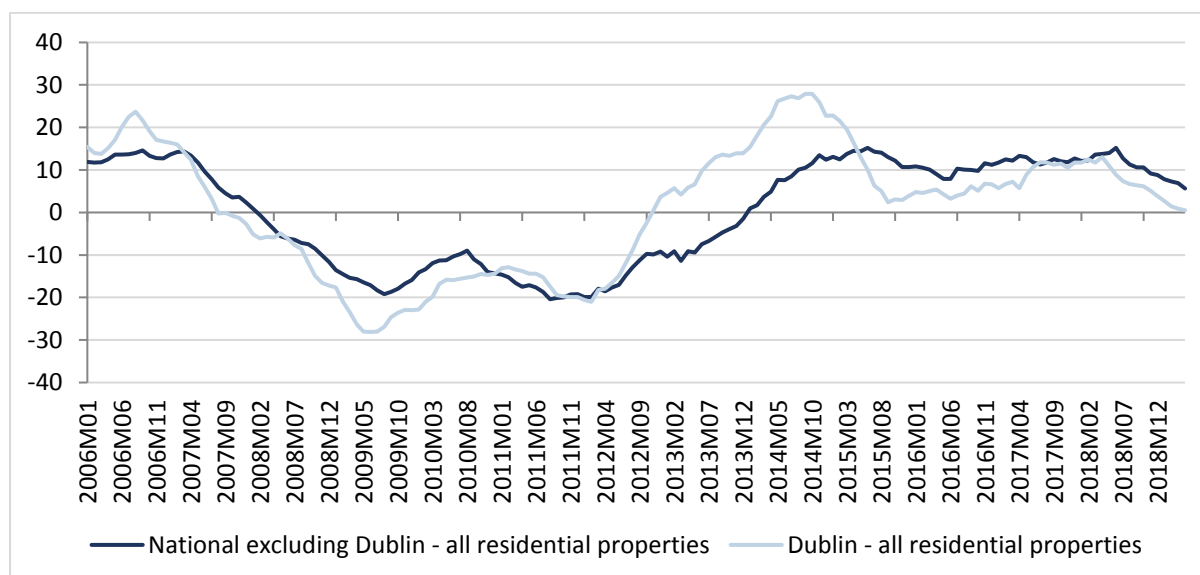
Source: Central Statistics Office.

While property price growth has clearly moderated, rent levels continue to rise across the country. In Q4 2018, the National Rent Index grew by just under 7 per cent relative to the same period in the previous year. As well as the national index, the ESRI/RTB Rental Index also produces indicators at a regional level, namely for Dublin, the Greater Dublin Area (GDA) and outside of the GDA. The indices are presented in Figure 33. Annual rent rates in Dublin grew by 7.8 per cent in Q4 2018, a higher rate than the other regional areas. Rents in the GDA and outside the GDA both grew at around 5.5 per cent. Increases in the rent level across the country are expected to continue as the level of housing supply fails to meet the country's structural demand.

FIGURE 33   RTB RENT INDEX – NATIONAL, DUBLIN, GDA (EXCL. DUBLIN) AND OUTSIDE GDA Q3 2007=100
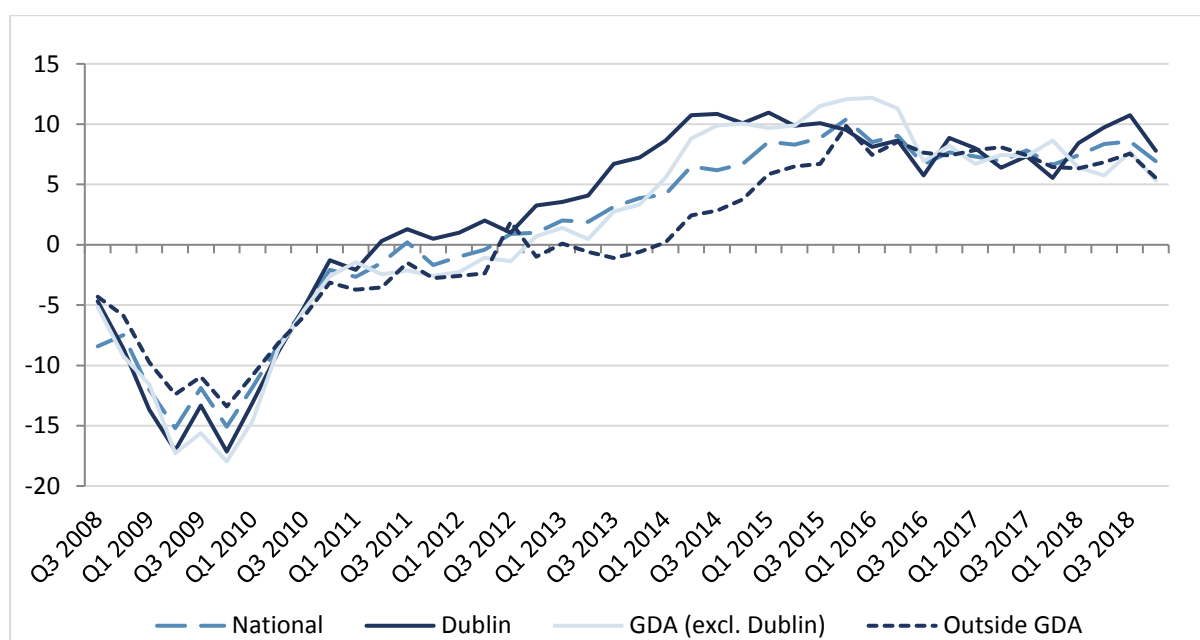
Source: Residential Tenancies Board (RTB).

SUPPLY

Investment

Strong investment growth in Ireland over the past number of years has been a hallmark of the economic recovery. Total Gross Fixed Capital Formation has grown sharply with significant contributions from construction activity and multinational capital investment (even excluding investment in aircraft related to leasing and intangible assets from research and development activities). However, in recent quarters there has been a downward trend in investment growth, as displayed in Figure 34. While there are a number of potential factors behind this, it is likely that the current level of global uncertainty due to both

Brexit and international trade relations, are having a particularly adverse impact on the investment decisions of Irish firms.

FIGURE 34   GROSS FIXED CAPITAL FORMATION GROWTH, YEAR-ON-YEAR (%)
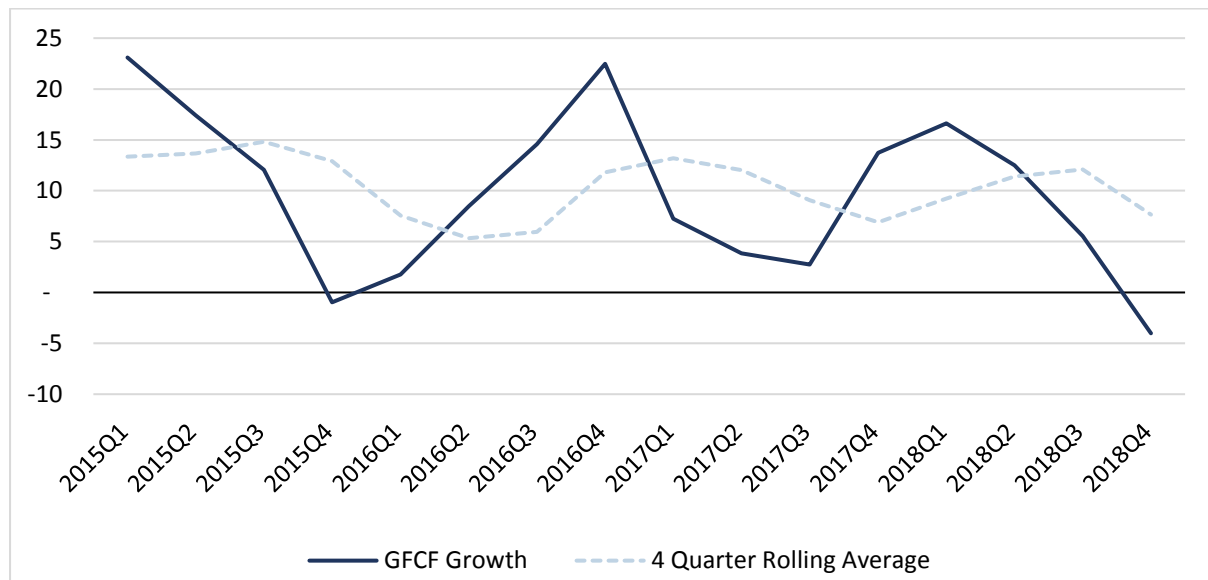
Source: Central Statistics Office and *QEC* Authors' analysis.

To provide further insight into the factors determining the slowdown in investment growth in Ireland, we split overall investment into its subcomponents and plot the trend in these series. Figure 35 presents trends in intangibles, buildings and construction, and machinery and equipment investment on a four-quarter rolling average basis. While a slowdown in intangibles is evident, more notable for the underlying economy is a slowing trend in construction and machinery and equipment investment.

FIGURE 35   GROSS FIXED CAPITAL FORMATION GROWTH BY ASSET TYPE, YEAR-ON-YEAR (%)
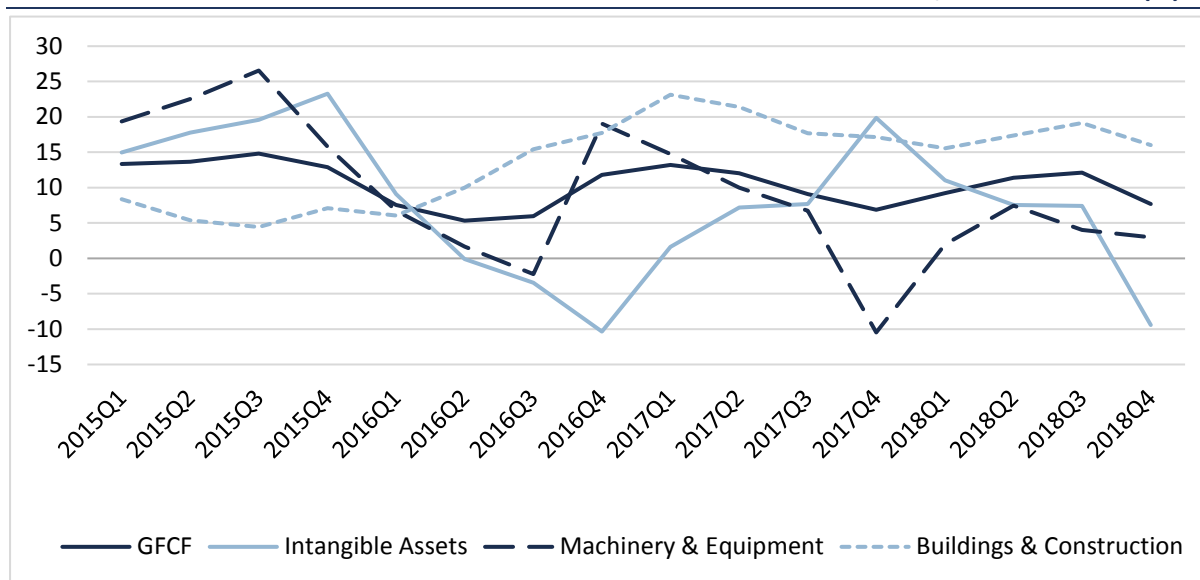
Source: ESRI analysis of Central Statistics Office data.

In terms of the machinery and equipment, as this investment is dominated by multinationals it is likely to be considerably affected by global factors and global uncertainty. Box 2 examines the association between global uncertainty and Irish investment, noting that this relationship differs between asset classes and is strongest in the machinery and equipment category. The heightened sensitivity of Irish investment aggregates to global developments again reinforces the sensitivity of domestic economic activity to international trends. Indeed, the Box demonstrates that Irish investment is more sensitive to global, rather than Irish, uncertainty.

BOX 2   GLOBAL UNCERTAINTY AND THE IMPACT ON IRISH AGGREGATE INVESTMENT

It is well established that economic uncertainty has a negative effect on business investment. If political or economic risks rise, this increases the risk premium required by a firm and makes forecasting cash flow from fixed investment more difficult, especially given capital investment is often irreversible in nature. As a result, companies often postpone, forego or delay investment in periods of economic, financial or political instability. From an academic standpoint, there is a long literature which explores the link between uncertainty and investment with estimates of the causal effect coming through as unambiguously negative. Furthermore, recent research has found a negative relationship between policy uncertainty and capital spending with differences evident across companies and asset types (Gulen and Ion, 2016).

For a small open economy like Ireland, it is likely both domestic and international uncertainty play varying roles depending on whether the firm is domestic facing or internationalised. Indeed, from a macroeconomic perspective, the impact of

multinationals on our capital investment statistics means that it is likely fluctuations in aggregate Irish investment may be more sensitive to global variables than their domestic counterparts.

At present, there are some major sources of uncertainty in the Irish and global economies, the most important of these being Brexit and the ongoing trade policy dispute between the United States and China. This can be demonstrated by drawing on the US Economic Policy Uncertainty Index which is produced by Baker et al. (2016). The economic policy uncertainty indicator is calculated by counting the usage of key phrases from media reports to create a metric measuring the degree of suggested uncertainty. These data show a gradual pick-up in uncertainty through 2018 and into 2019. If that is contrasted with the same index for Ireland produced by Zalla (2017) using the same methodology, it can be seen that this index increased considerably since Brexit and has remained high despite a slight downturn in the most recent period.

FIGURE C   ECONOMIC POLICY UNCERTAINTY – BASED ON MEDIA MENTIONS OF KEY PHRASES
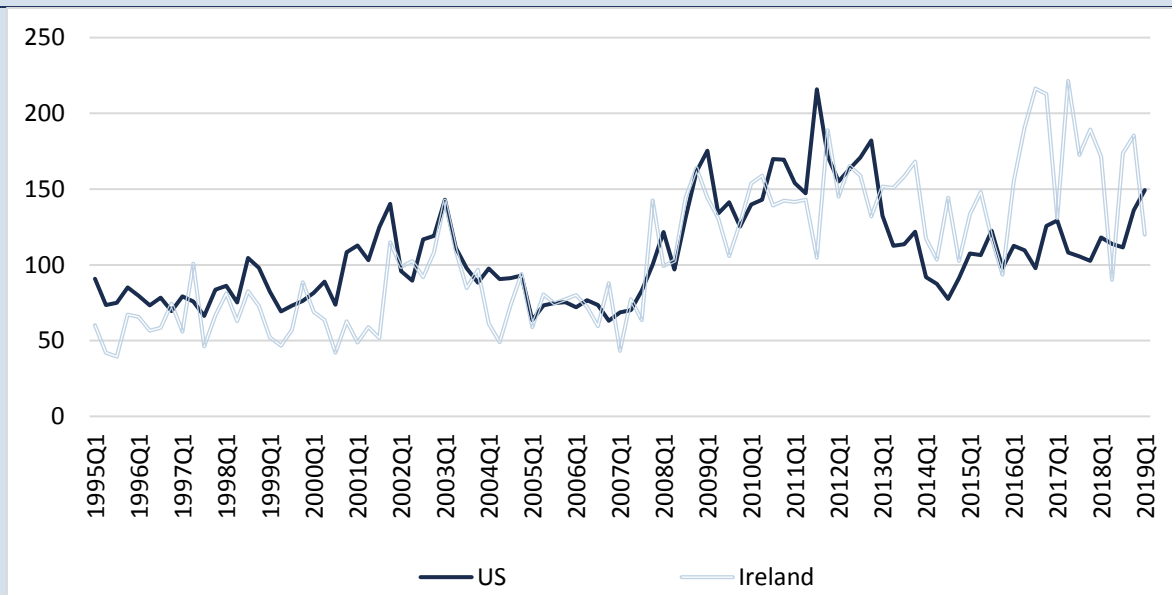
Sources: Baker et al. (2016).

For the purposes of this Box, our objective is to explore whether Irish investment aggregates are more or less sensitive to Irish or international uncertainty (US). This, in turn, will help identify which factors are more useful as leading indicators of how trends in domestic investment are evolving. This can be useful for short-term commentators on the Irish economy when trying to react to increases in uncertainty before National Account data are available.

To explore this in more detail, we take each of the constant price investment series from the CSO (modified versions), and estimate simple accelerator models of the type used in the ESRI macroeconomic model COSMO which link investment to output growth, the cost of capital and other factors in an error correction framework. This takes the following specification:

$$\Delta lnI_t = \beta_1 \Delta lnI_{t-1} + \beta_2 \Delta lnGDP_{t-1} + \beta_3 \Delta lnr_{t-1} + \sigma(lnI_{t-1} - \varphi lnGDP_{t-1} - vlnr_{t-1})$$

The first part of this equation provides the short-term dynamics while the second part is the long-run equation. This is estimated with dynamic OLS. We augment the model by first adding the measure of Irish economic policy uncertainty from Figure C and secondly the measure of US policy uncertainty above to see how sensitive Irish investment aggregates are to each of these factors.

The sample runs from Q1 1996 to Q4 2018. We estimate the model on four investment series: overall Gross Fixed Capital Formation; construction investment; machinery and equipment investment; and intangibles. Table B presents the coefficients from the long-run and the short-run equations. For brevity, we present only the coefficients on the policy uncertainty indices.

TABLE B   MODELS INCLUDING US AND IRISH ECONOMIC POLICY UNCERTAINTY

Long-Run Equations				
	Overall	Construction	M&E	Intangibles
$\ln(EPU(US)_t)$	-0.406***	-0.408***	-0.502***	-0.156+
	(0.054)	(0.063)	(0.113)	(0.081)
$\ln(EPU(IE)_t)$	-0.201*	-0.163	-0.304***	-0.127
	(0.081)	(0.107)	(0.076)	(0.060)
Short-Run Equations				
$\Delta\ln(EPU(US)_{t-1})$	-0.271***	-0.170**	-0.482***	-0.091
	(0.047)	(0.055)	(0.080)	(0.090)
$\Delta\ln(EPU(IE)_{t-1})$	-0.026	0.010	-0.107	-0.021
	(0.030)	(0.033)	(0.067)	(0.069)
Observations	91	91	91	91

Source: *QEC* Authors' Analysis.
Note: US and Irish models ran separately, + p < 0:10, * p < 0:05, *** p < 0:01, *** p < 0:001.

It is clear that US economic policy uncertainty has a significant and negative impact on Irish macroeconomic investment in both the short term and the long term. The long-term coefficient would suggest that a one percentage point increase in uncertainty lowers investment by -0.4 percentage points. This holds for all investment types but it is noteworthy that machinery and equipment investment is most sensitive to US uncertainty. This may be a factor in the short-term slowdown in Irish investment that we have seen in this asset type recently. Intangibles are less affected and this may be due to the fact that intangibles are not irreversible in terms of their investment nature. In terms of the short-term effects, changes in policy uncertainty slow the growth rate of investment in the short term and this is strongest for machinery and equipment assets.

In contrast, the impact of Irish economic policy uncertainty is much more muted with the overall long-term effect half the size in magnitude (-0.201). It is also lower across all asset types. We do not find any short-term correlation between the investment series and domestic policy uncertainty.

In conclusion, this short box highlights the sensitivity of Irish investment to international uncertainty and how this is a critical indicator in understanding the path of investment over time. It also highlights the differing sensitivity across asset classes which is also important. Aggregate investment, due to the strong influence of international companies, is less sensitive to domestic policy uncertainty.

References:

Baker, S., N. Bloom and S. Davis (2016). 'Measuring Economic Policy Uncertainty', *The Quarterly Journal of Economics*, Vol. 131(4), pp. 1593-1636.

Gulen, H. and M. Ion (2016). 'Editor's Choice Policy Uncertainty and Corporate Investment', *Review of Financial Studies*, Vol. 29(3), pp. 523-564.

Zalla, R. (2017). 'Economic Policy Uncertainty in Ireland', *Atlantic Economic Journal*, Vol. 45(2), pp. 269-271.

This Box was prepared by Conor O'Toole.

Construction outlook

Construction sector investment has grown strongly in recent years with growth rates of over 20 per cent per annum through 2016 and into 2017. However, more recently the growth rate has moderated, as noted above. Notwithstanding, the recent slowdown, such rapid rates of growth are high in an international context. To provide more insight as to the comparative dynamics of domestic capital formation in construction, Figure 36 presents the growth rate of Irish construction investment as compared to selected other European economies and the aggregate for the European Union as a whole. Irish construction investment is growing much more rapidly than any other country. It is also noteworthy that the Irish figures are historically much more volatile than in other countries.

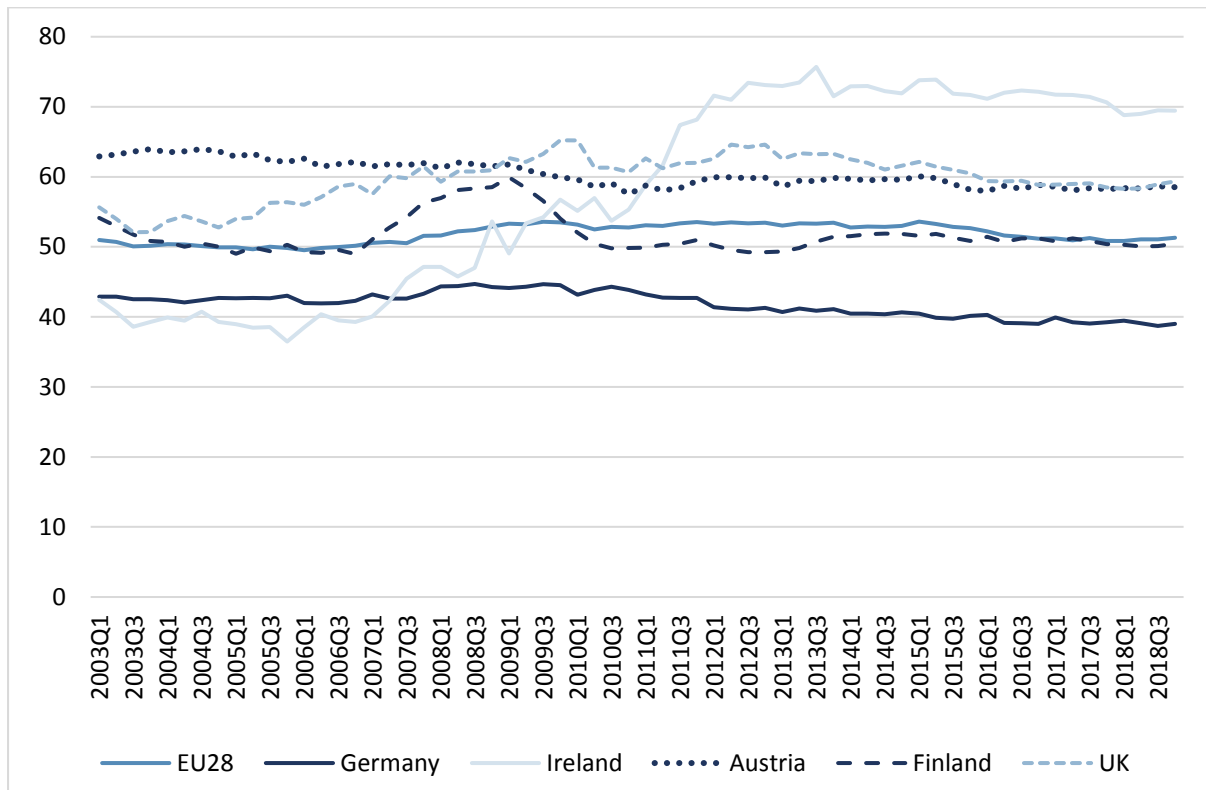**FIGURE 36   ANNUAL GROWTH RATE IN GROSS TOTAL CONSTRUCTION INVESTMENT – EUROPEAN COMPARISON (%)**
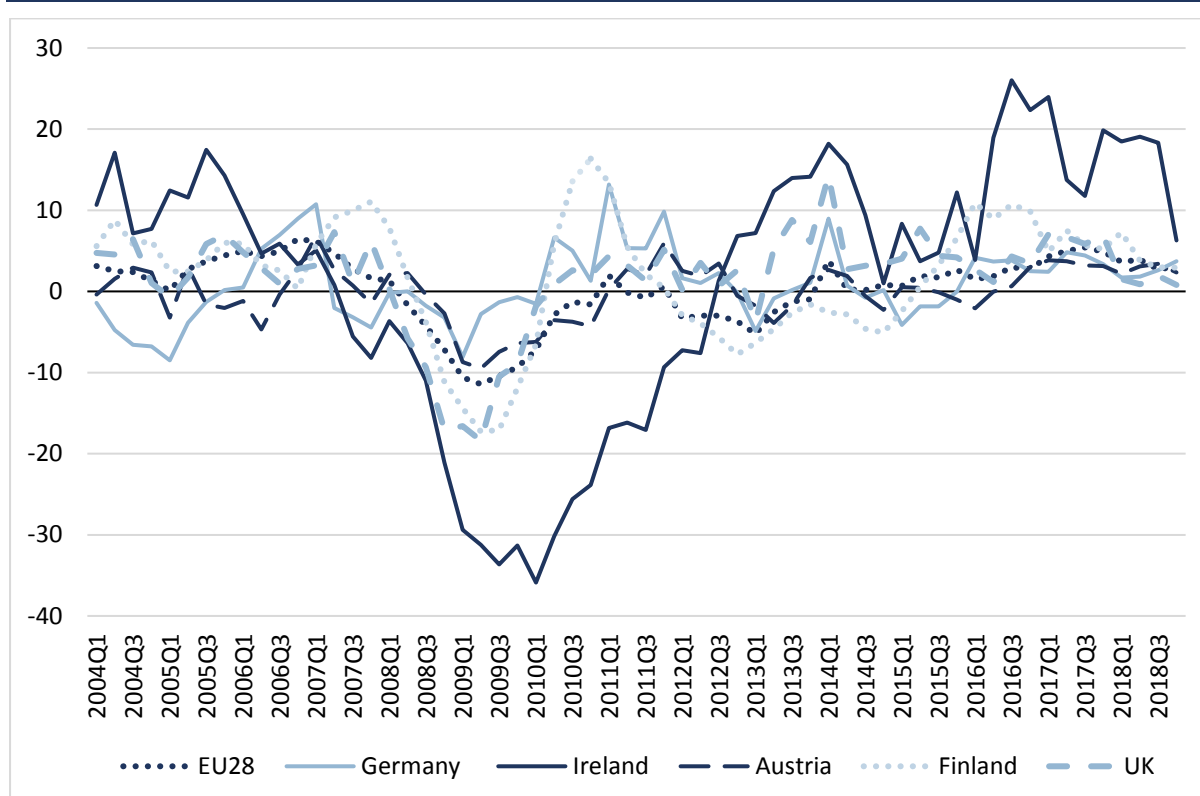
Source: Eurostat and ESRI analysis. Data are chain linked volumes € million (2010) seasonally adjusted and calendar adjusted.

In previous Commentaries, we have noted that the composition of Irish construction investment has changed since before the financial crisis with a much greater share of non-residential investment activity. This can be demonstrated in Figure 37 which shows the share of non-residential dwelling investment went from under 40 per cent of the total Irish investment level to just under 70 per cent at present. Across Europe, Ireland now has the highest share of investment accounted for by non-residential construction which mainly captures commercial real estate investment. Such a heightened contribution of this source of investment to the aggregate poses risks to Ireland if such investment is internationally financed and could suffer a quick reversal in prices and activity if global market conditions deteriorate. As most of the commercial real estate in Ireland is financed by international equity capital (Kennedy, 2017),[13] the domestic banking stability risks are lessened. However they are not eliminated, as a reversal in prices and activity would affect market liquidity which would inevitably have a knock on effect for the domestic economy.

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[13]   Kennedy, G. (2017). Property Market Overview', Presentation to Central Bank of Ireland Property Market Roundtable, slides at: https://www.centralbank.ie/docs/default-source/tns/events/171002-property-market-presentation.pdf?sfvrsn=2

FIGURE 37 SHARE OF OTHER CONSTRUCTION INVESTMENT TO TOTAL CONSTRUCTION – EUROPEAN COMPARISON (%)

Source: Eurostat and ESRI analysis. Data are chain linked volumes € million (2010) seasonally adjusted and calendar adjusted.

Given this heightened non-residential activity, we explore whether the observed slowdown is occurring in the commercial or residential investment activity. The annual growth rate of these two asset types is presented in Figure 38. We also present comparable growth rates for the European Union for context. It is noteworthy that the drop in the growth in construction activity is consistent for both dwellings and non-dwellings investment. The growth in dwellings investment in the EU has also slowed recently.

FIGURE 38   ANNUAL GROWTH RATE IN DWELLINGS VERSUS OTHER CONSTRUCTION INVESTMENT – EUROPEAN COMPARISON (%)
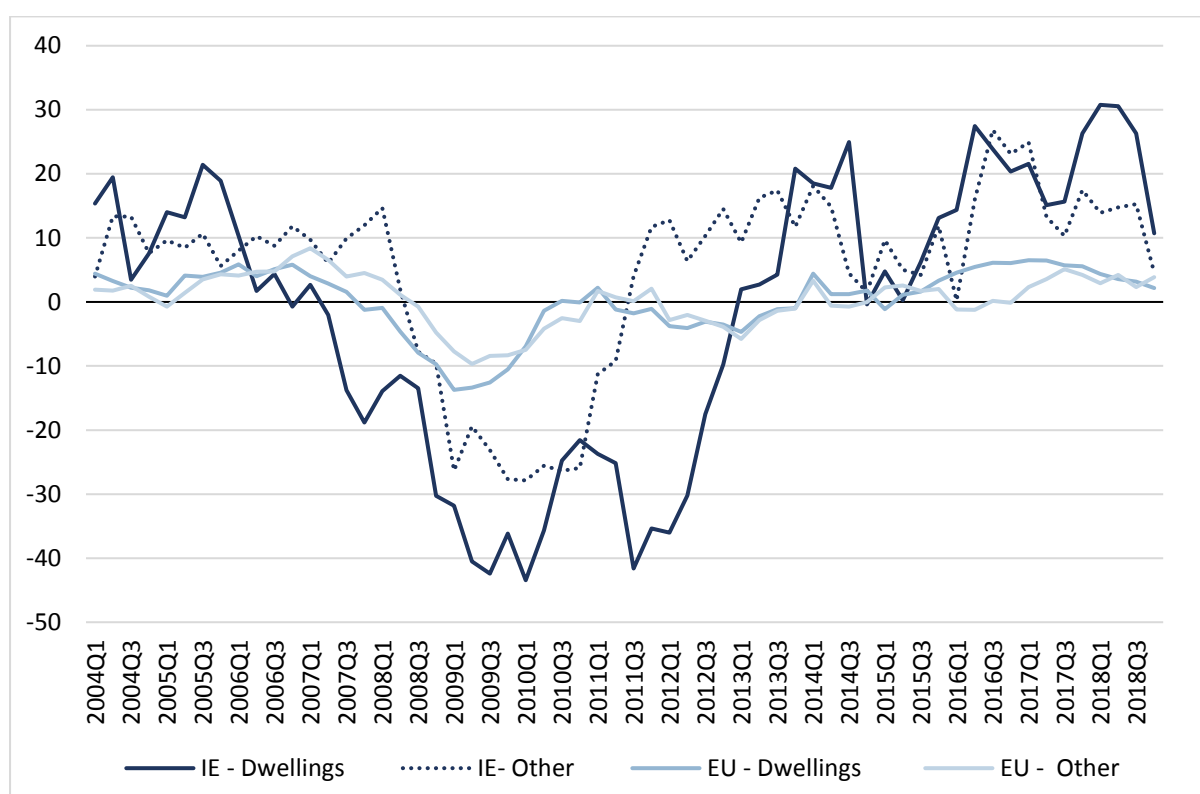
Source: Eurostat and ESRI analysis. Data are chain linked volumes € million (2010) seasonally adjusted and calendar adjusted.

Despite the slowdown in the growth rate in aggregate terms discussed above, we continue to expect that construction activity will increase, particularly as the completion of new residential units expands. Given the strong increase in housing completions from 14,400 in 2017 to 18,000 in 2018, we expect continued growth in 2019 and 2020. Both the increased private sector output and the expanded commitment by Government to increase the capital spend in housing (particularly related to the delivery of social and affordable units) in Budget 2019 are likely to be key factors in output increasing in the sector. Consequently, we forecast 23,500 units in 2019 increasing to 29,000 units in 2020 (Figure 39).

FIGURE 39   ANNUAL HOUSING COMPLETIONS (2019-2020 FORECASTS) – TO 2018 ACTUAL
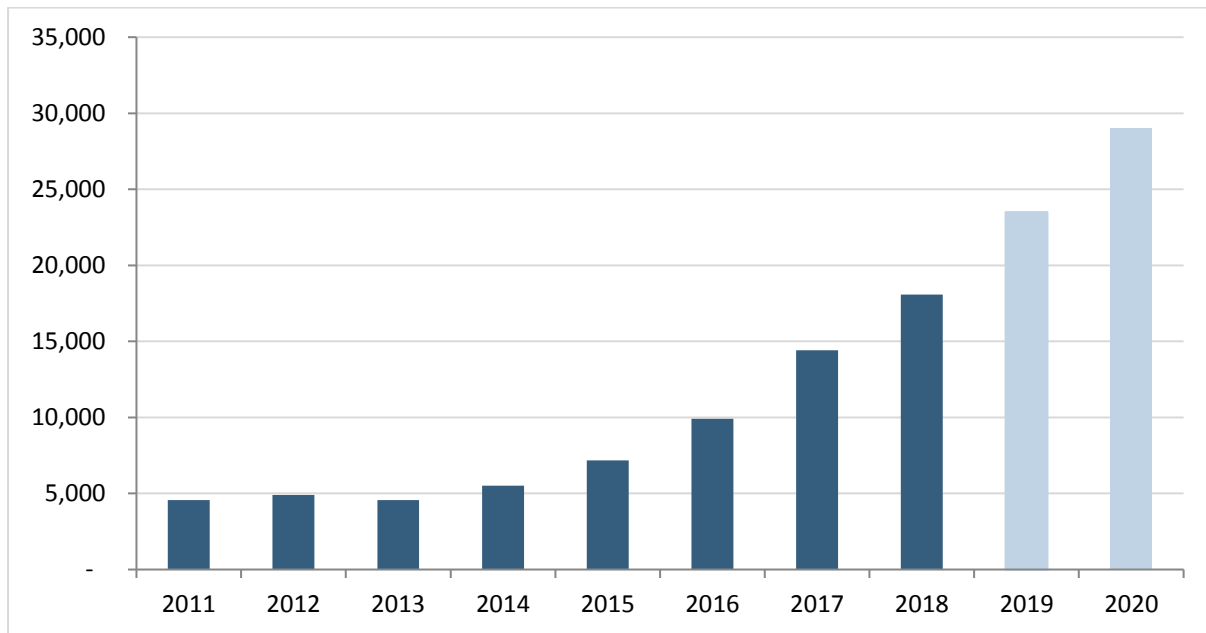
Source: Central Statistics Office and *QEC* forecasts.

Forecasts

As global risk factors and the Brexit negotiations continue to weigh on business planning, we have moderated our investment outlook for 2019 and 2020. However, strong construction activity and increased public investment are likely to be key drivers of domestic capital formation, despite the recent noted slowdown. Overall, we expect annual average growth in investment of 7.1 per cent in 2019 and 7.6 per cent in 2020. This is a minor downward revision relative to our previous *Commentary* and, if global conditions continue to deteriorate and a hard Brexit materialises, we would expect to revise our forecasts further downward as 2019 progresses.

LABOUR MARKET

Following a year of declines in the unemployment rate and record high levels of employment, there were no signs of a slowdown in the labour market in Q1 2019. Indeed, improvements in the labour market have accelerated in 2019 with unemployment falling to levels not seen since the years before the financial crisis. However, the strength of the labour market is likely to bring its own challenges for the Irish economy. As the economy approaches full employment, wage growth is likely to accelerate, posing a threat to the competiveness of Irish firms. Inflation pressures will also increase due to the greater levels of disposable income among consumers.

Unemployment

While the Live Register is not a precise measure of unemployment,[14] as it includes part-time and some seasonal and casual workers, it is one of the most up-to-date and detailed labour market measures. As of April 2019 there were 194,700 people on the Live Register which was 33,600 (14.7 per cent) fewer than the same period the previous year. As can be seen from Figure 40, there was a fall in the total number of people under the age of 25 on the Live Register, declining by 4,400 or 17.7 per cent over the year.

FIGURE 40   NUMBERS ON THE LIVE REGISTER ('000) BY AGE: OCTOBER 2006 TO OCTOBER 2018
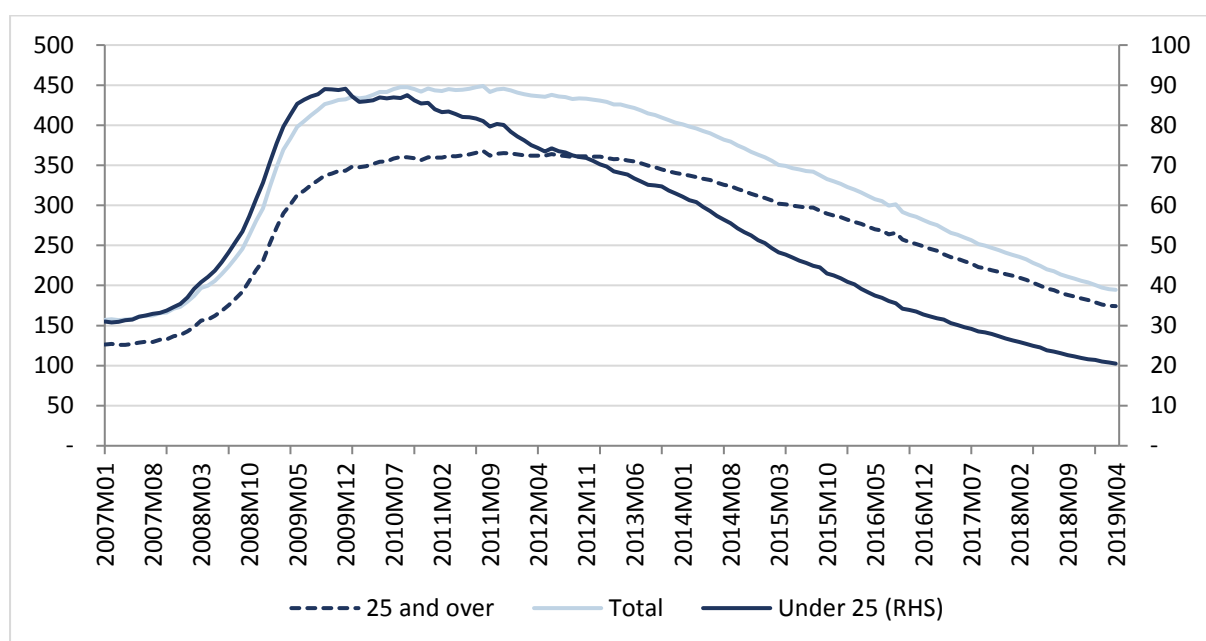
Source: Central Statistics Office.

As well as displaying the fall in the number of people out of work, data from the Live Register also indicate there has been a decrease in the *duration of time* people have been out of work. Long-term unemployment is defined as being out of work for a period of greater than 12 months and its negative consequences for individuals and society have been well documented.[15] The longer a person is unemployed, the more difficult they are likely to find it to return to the workforce as a result of deskilling, reduced motivation and apprehension from employers about hiring someone who has been out of work for a sustained period of time.

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[14]   The Live Register provides a monthly series of the numbers of people registered for Jobseekers Benefit, Jobseekers Allowance or other statutory entitlements at the Irish Department of Social Protection.

[15]   Abraham, Catharine G., Kristin Sandusky, John Haltiwanger and James R. Spletzer (2016). 'The Consequences of Long Term Unemployment: Evidence from Matched Employer-Employee Data,' Working Papers 16-40, Center for Economic Studies, US Census Bureau.
O'Connell, P.J., S. McGuinness and Elish Kelly (2010). 'A Statistical Profiling Model of Long-Term Unemployment Risk in Ireland'. Economic and Social Research Institute (ESRI), Papers.

Figure 41 shows the share of registrations by duration in April 2014 and five years later in April 2019. Over this time there was a 7 per cent reduction in those who were registered for a period of greater than a year i.e. classified as long-term unemployed. Coupled with the overall decline in the number of people on the Live Register, the number of people in long-term unemployment fell by 103,000 down to 75,000 over this period. There was also a 4 per cent decrease in the proportion of people in very long-term unemployment (on the register for three years or more) over this period, down to 42,000.

FIGURE 41   PROPORTION OF PEOPLE ON THE LIVE REGISTER (%) BY DURATION
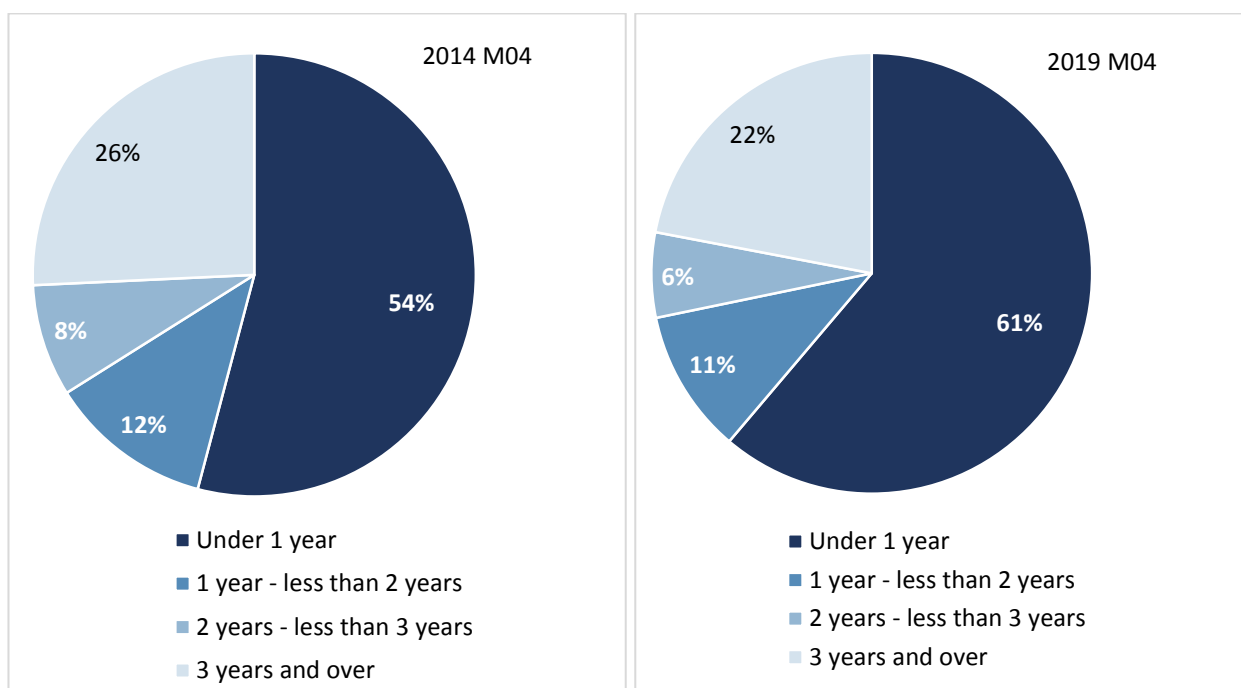
Sources: Live Register, Central Statistics Office.

Q1 2019 has seen a sharp decline in the rate of unemployment, falling below 5 per cent for the first time since August 2007. This marks a significant milestone in the turnaround of the Irish labour market where just over seven years previous the unemployment rate peaked at around 16 per cent. As of May 2019 the seasonally-adjusted unemployment rate was 4.4 per cent which is the lowest it has been since January 2005. Despite the slowdown in growth in the Eurozone and the uncertainty which has persisted around Brexit, the labour market has continued to expand and is now approaching a level which can be considered full employment.

FIGURE 42   SEASONALLY-ADJUSTED UNEMPLOYMENT RATE BY MONTH (%)
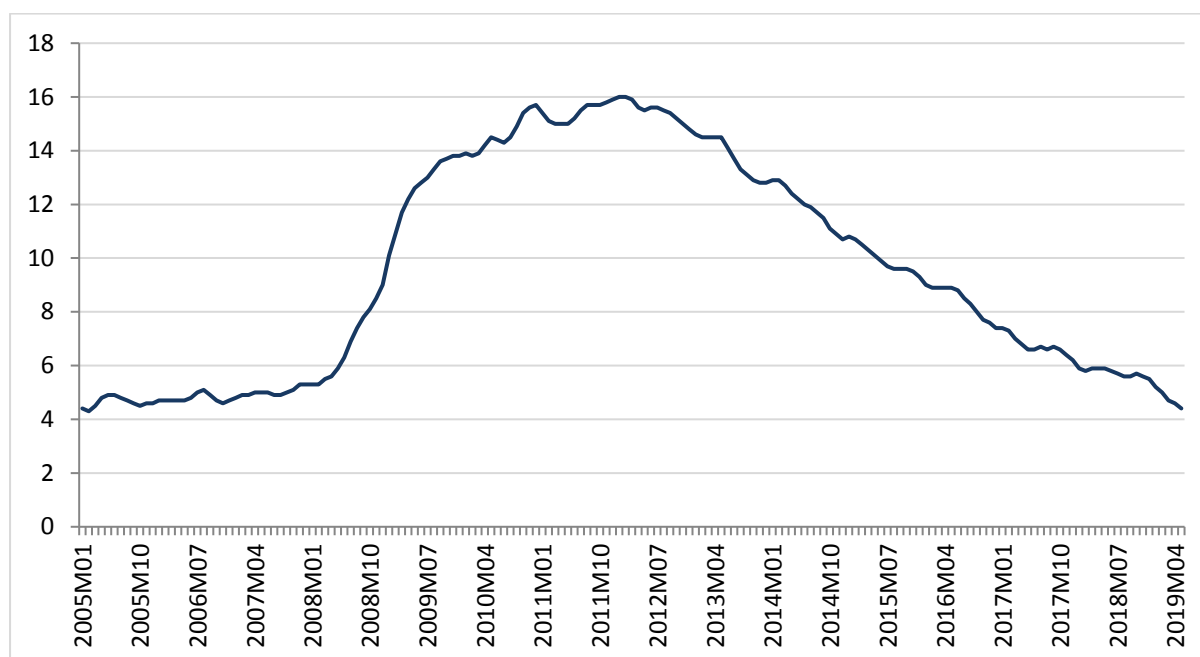
Source: Labour Force Survey, Central Statistics Office.

A labour market approaching full employment has a number of implications for the Irish economy with regard to competitiveness and increasing price levels. Figure 43 shows a scatter plot of core inflation and unemployment in Ireland with monthly data points from January 1998 to April 2014. A clear inverse relationship akin to the short-run Philips Curve emerges where, as unemployment falls, there is an increase in the rate of inflation. The quadratic trend line in Figure 43 highlights the non-linear relationship between the two variables. Of particular relevance to the current labour market situation is that as the unemployment rate approaches 4 per cent there has historically been a steep incline in inflation in the range of 5 to 6 per cent. Given that the current unemployment rate is at 4.4 per cent and trending sharply downwards, this relationship suggests we are likely to see increasing upward pressure on price levels through 2019.

FIGURE 43   RELATIONSHIP BETWEEN UNEMPLOYMENT AND CORE INFLATION (JAN 1998 TO APR 2019)
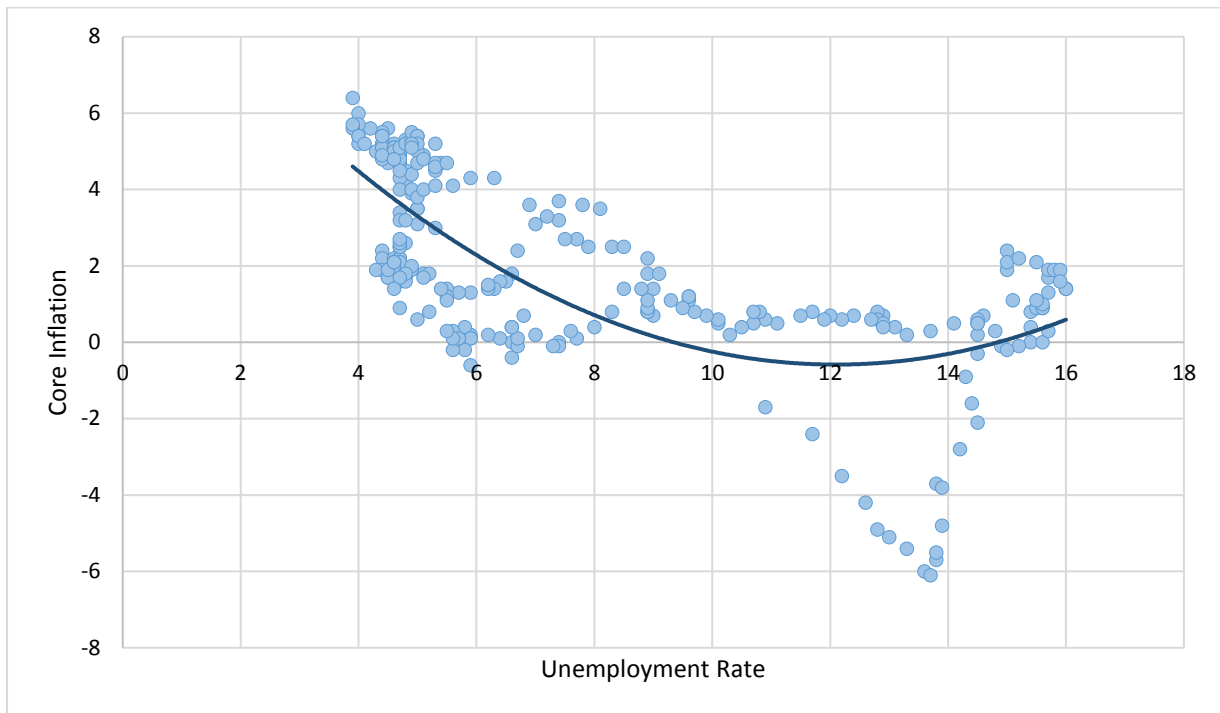
Source: Central Statistics Office.

Employment

Following a year in which Irish employment levels reached record highs, there were no signs of a slowdown in job creation over Q1 2019. On a seasonally-adjusted basis, there were 81,200 additional jobs added to the Irish economy in Q1 2019 compared to the same period the previous year, representing an increase of 3.7 per cent. This brings the total number of people in employment up to 2,301,900. The number of people working full time increased by 3.5 per cent up to 1,828,900 while part-time employment increased by 4.1 per cent to 473,000. The number of people who are part-time *underemployed*, which is a measure of those who are currently working part time but would like more hours, fell by 6 per cent. This suggests that there are an increasing number of people moving from part-time to full-time work in the Irish labour force. Over the same period the labour force participation rate for those aged 15-64 increased slightly to 72.8 per cent.

FIGURE 44   SEASONALLY-ADJUSTED EMPLOYMENT, FULL TIME AND PART TIME ('000)
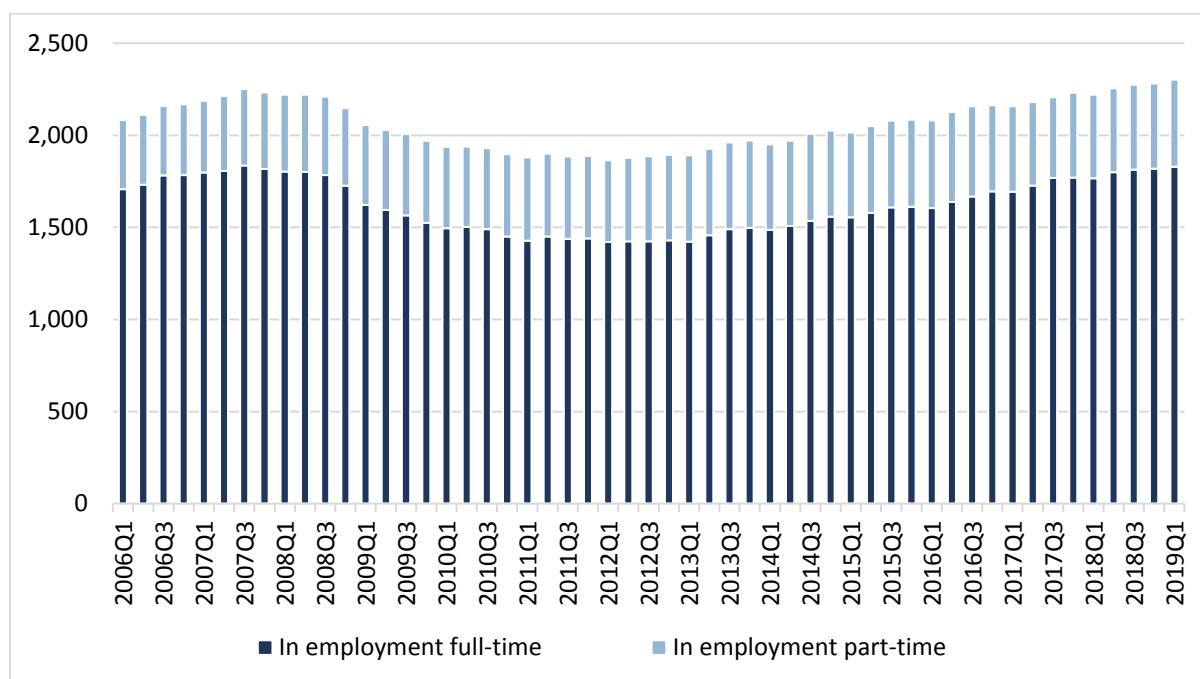
Sources: Labour Force Survey, Central Statistics Office

Figure 45 breaks down the seasonally-adjusted level of employment by sector for the first quarter of 2014, 2018 and 2019. The construction sector has had by far the largest growth in employment, increasing by 66.1 per cent over the last five years. This is due to both the low base level of employment in the sector following the housing collapse and the subsequent rapid recovery in the property market in recent years. There have also been significant increases in employment in the admin and support services sector (+40.1 per cent), the transportation and storage sector (+24.4 per cent) and the accommodation and food service sector (23.6 per cent). The only sector in which there has been a fall in employment has been in agriculture (including forestry and fishing) where employment fell by 6.3 per cent compared to 2014 and 8.6 per cent compared to 2018. In light of the tightening labour market, it is notable that the biggest sectoral growth is concentrated in domestic non-traded sectors. If these areas divert considerable resources away from the traded sector, and prices and wages in these sectors continue to rise, this is highly likely to lead to an erosion in competitiveness and a further challenge to firms' in traded sectors.

FIGURE 45   ANNUAL GROWTH SEASONALLY-ADJUSTED EMPLOYMENT BY SECTOR ('000)
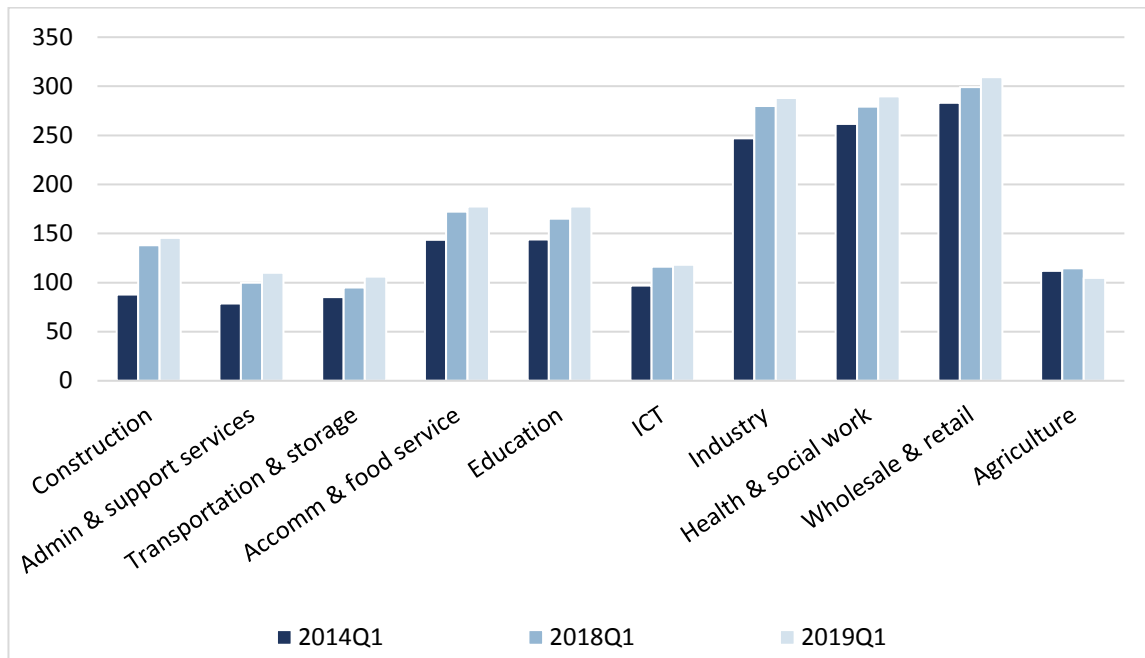
Sources: Labour Force Survey, Central Statistics Office.

Table 4 presents employment rates by gender and education for Q1 2014 and Q1 2019. The strengthening of the labour market over this period is reflected in the increase in the overall employment rate of 7.3 per cent. While employment rates for both men and women have increased over the period, the gender gap has remained unchanged at about 10 percentage points. The gender gap is most pronounced among those with lower levels of education and converges for those with higher levels of education. In terms of educational attainment, the group which has seen the smallest improvement in employment rates over this period has been those with an education level of lower secondary or below. This is especially concerning given the already low rate of employment among this group in 2014. Indeed, in Ireland the rate of employment among those with lower levels of education consistently falls below the average rate in both the EU and OECD.[16]

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[16]   The rate of employment for 20-64 year olds with educational attainment of lower secondary or below was 51.5 per cent in Ireland in 2018 compared to 56.1 per cent in the EU.
   The rate of employment for 25-64 year olds with educational attainment of lower secondary or below was 50.85 per cent in Ireland in 2017 compared to 57.4 per cent in the OECD.

TABLE 4   EMPLOYMENT RATES BY GENDER AND EDUCATION (AGE 15-64) (%)

Gender	Education	Q1 2014 %	Q1 2019 %
Both sexes	**All Education levels**	62.0	69.3
	Lower secondary or below	38.8	42.4
	Upper secondary and post-secondary non-tertiary	61.5	70.2
	Tertiary	80.0	85.2
Male	**All Education levels**	67.0	74.3
	Lower secondary or below	48.3	50.7
	Upper secondary and post-secondary non-tertiary	68.0	77.7
	Tertiary	84.7	89.9
Female	**All Education levels**	57.1	64.3
	Lower secondary or below	27.0	32.0
	Upper secondary and post-secondary non-tertiary	54.8	62.4
	Tertiary	76.3	81.4

Sources: Labour Force Survey, Central Statistics Office.

Earnings

Seasonally-adjusted Average Hourly Earnings increased by 2.23 per cent in Q1 2019 compared to the same period the previous year. The average earnings per hour now stands at €23.38 while the average earnings per week is €761.63. In terms of sectors the largest increases were observed in transportation and storage up by €1.68 per hour (+7.8 per cent), arts and entertainment up by €1.30 per hour (+7.3 per cent) and mining and quarrying up by €1.66 per hour (+7.2 per cent). Other notable increases occurred in wholesale and retail (+4 per cent), information and communication (+3.9 per cent) and administrative and support services (+3 per cent). In a number of sectors there was a fall in the seasonally-adjusted Average Hourly Earnings over this period, most notably in the area of professional, scientific and technical activities where Average Hourly Earnings fell by €0.20 (-0.7 per cent).

FIGURE 46 TRENDS IN AVERAGE EARNINGS PER WEEK AND PER HOUR (€), SEASONALLY ADJUSTED
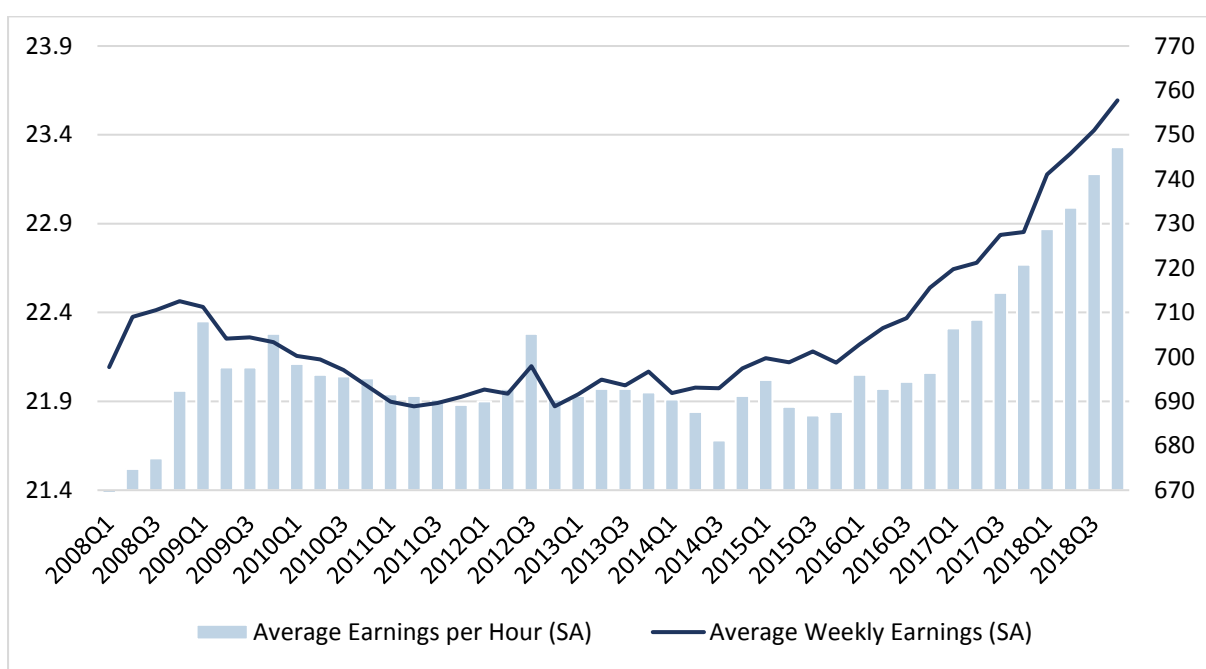
Figure 47 shows labour costs in Ireland compared to the Eurozone average before, during and after the financial crisis. In the post-crisis period there was a clear sizeable decrease in the relative cost of labour in Ireland. While in 2008 labour costs were 15.1 per cent greater than the Eurozone average, in 2012 they were just 5.3 per cent greater.

A large part of the story of the recovery in the Irish economy post-financial crisis has been export-led growth.[17] As labour costs are one of the key factors which impact on the competiveness of domestic firms in international markets, it is likely that the large fall in labour costs over this time had a significant bearing on the turnaround in fortunes for the Irish economy. While labour costs have remained relatively low in recent years, a slight increase was observed in 2018 compared to the previous year. As the labour market continues to tighten, it is likely that labour costs will continue to rise which may impact the competiveness of Irish businesses in the international market.

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[17]   McQuinn K. and P. Varthalitis (2019). 'How openness to trade rescued the Irish economy', in Campos, N., P. De Grauwe and Ji Yuemei (Eds), *Structural Reforms and Economic Growth in Europe* (forthcoming), Cambridge University Press.

FIGURE 47   IRISH LABOUR COSTS AS A PERCENTAGE OF AVERAGE LABOUR COSTS IN THE EUROZONE (%)
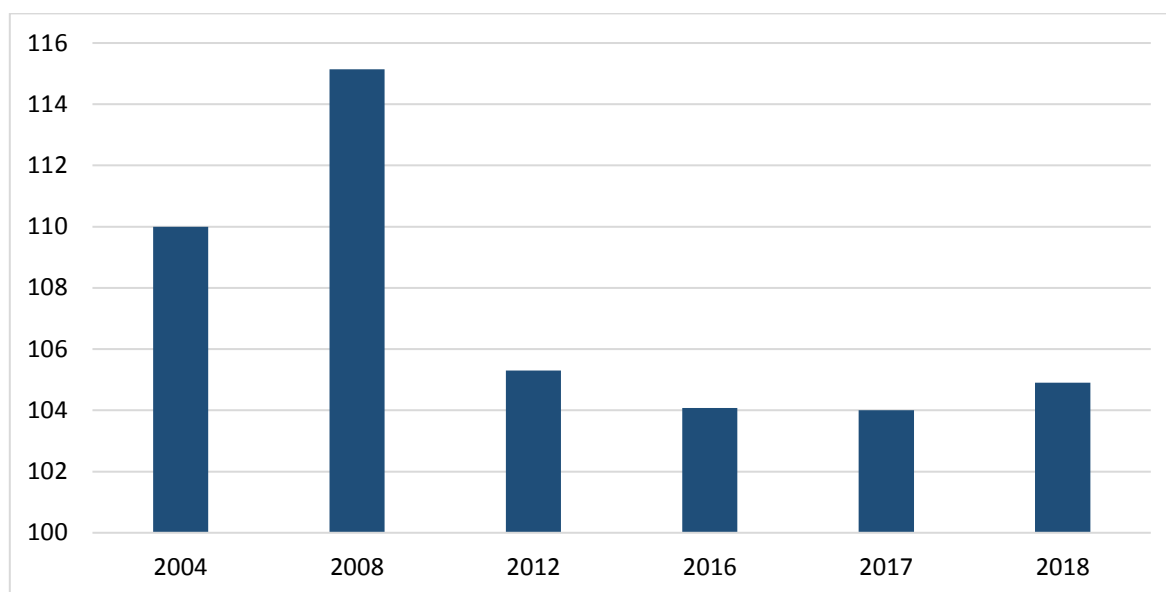
Source: Eurostat.

Labour market forecasts

Continued strong growth in the Irish economy should see the labour market improve further with the unemployment rate expected to average 4.5 per cent in 2019. As the labour market reaches full employment we expect the unemployment rate to fall at an increasingly slower pace and to average 4.1 per cent in 2020. Employment levels are expected to average 2.32 million in 2019 and 2.38 million in 2020. Due to the tightening labour market we expect nominal earnings to increase by 4.4 per cent in 2019 and by 4.6 per cent in 2020. These growth rates are likely to stoke inflationary pressures and may lead to a deterioration in competiveness, in particular if the unemployment rate drops near 4 per cent.

PUBLIC FINANCES

For the first four months of 2019, Exchequer receipts have increased by 3.5 per cent on an annual basis. This is comparable to the similar figures for 2017 and 2018 (3.7 and 3.6 per cent respectively). All tax headings with the exception of corporation tax registered robust growth in 2019, with excise duty and capital gains tax, in particular, experiencing significant growth. Figure 48 illustrates the annual changes in taxation returns for the last four years for the main tax categories as well as the overall total amount.

FIGURE 48   ANNUAL CHANGES IN MAJOR TAX SUB-COMPONENTS: JANUARY TO APRIL (%)
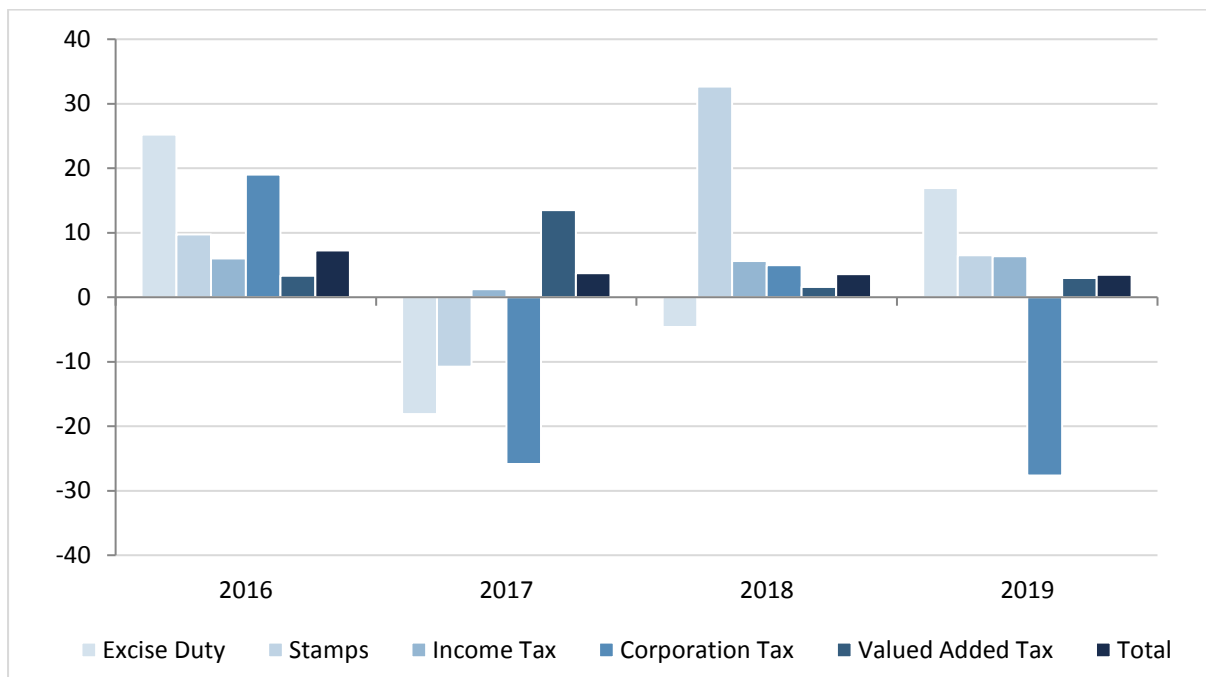
Source: Department of Finance.

While it is too early in the year to read too much into the significant decline in corporation tax receipts (28 per cent), it is worth bearing in mind that receipts from corporation tax experienced a significant increase in 2018 of 24 per cent. As noted in the previous *Commentary*, the particularly high levels of these receipts gives rise to the possibility of windfall tax receipts. If a significant element of taxation receipts are windfall in nature, this raises questions about the sustainability over the medium term of this source of revenue.

Pay-related social insurance (PRSI) has seen an increase of over 5 per cent in 2019; this suggests the underlying economy is continuing to perform strongly as these receipts are closely related to developments in the labour market. In terms of gross voted expenditure, Table 5 shows that for the year to date, both current and capital expenditure are progressing in accordance with 'profile' or Government forecasts at the start of the year.

TABLE 5   CAPITAL AND CURRENT GROSS VOTED EXPENDITURE (€BILLION) – ACTUAL AND PROFILE (JANUARY TO APRIL)

	Actual	Profile	% Difference
Current	18.82	18.97	0.8
Capital	1.42	1.42	0.1
Total	20.25	20.39	0.7

Source: Department of Finance.

Despite the strong increases in taxation receipts, we still believe that the General Government Balance will be back in deficit both in 2019 and 2020. This is mainly because the achievement of a mild surplus in 2018 was due in part to the exceptionally strong nature of corporation tax receipts in that year. With more modest increases in corporation tax forecast for 2019 and 2020, an overall deficit is now likely to occur. Given the strong growth forecasts for the Irish economy overall, the likelihood of government deficits over the next two years is a particular concern. Running a mild surplus in budgetary terms at this stage would help to take some demand-side pressures out of the economy while also enabling the provision of financial buffers when the economic cycle changes.

Figure 49 presents the debt-to-GDP and GNI* ratios associated with our fiscal forecasts. From this it can be seen that debt-to-GDP is expected to fall to less than 60 per cent in 2020, while debt-to-GNI* is expected to fall to just under 96 per cent for the same year. The high level of debt-to-GNI* highlights the continued vulnerability of the Irish sovereign from an indebtedness perspective. It also re-emphasises the need for prudent fiscal policies which allow a reduction in indebtedness over time. A sustained reduction in debt over time provides buffers to borrow in future when downturns arise.

FIGURE 49   DEBT-TO-GDP AND GNI*RATIOS (%)
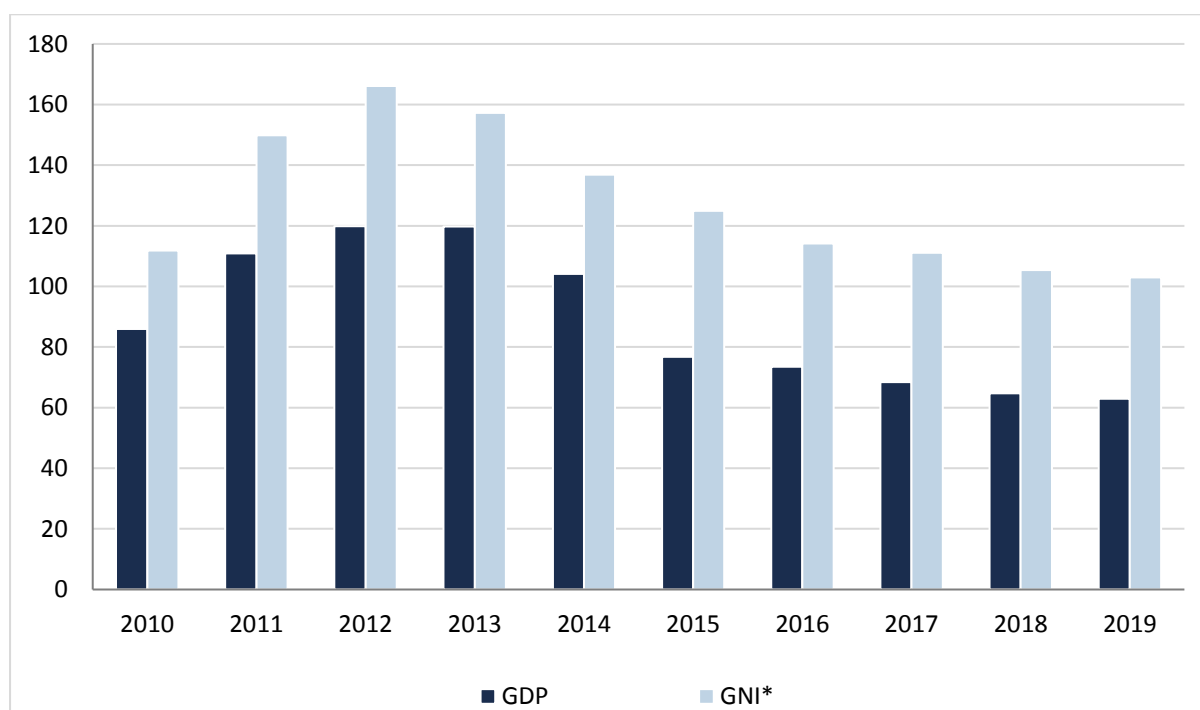
Source: *QEC* calculations.

General Assessment

Notwithstanding the observed slowdown in international macroeconomic conditions, the Irish economy continues to experience robust economic growth in 2019. Taxation receipts and labour market data both indicate that the economy is performing well with growth likely to be 4 per cent in the present year. The unemployment rate has fallen below 5 per cent for the first time since 2007 and we expect it will continue to drop into 2020. As with previous Commentaries, all forecasts are subject to the assumption that the United Kingdom remains in the European Union.

Heightened uncertainty, however, is still very much a feature of present economic conditions with the KBC Bank/ESRI Consumer Sentiment Index, for example, registering a significant downturn in households' expectations since November 2018. Inevitably, much of this uncertainty is due to the ongoing issue of Brexit and the potential nature of the UK's exit from the European Union. While a wide variety of studies such as Bergin et al. (2019) have quantified the cost to the Irish economy over the medium term of different Brexit scenarios, it is increasingly clear that Brexit has already had an adverse impact on Irish economic activity in advance of the UK's actual departure particularly via the subcomponent of consumer expectations. McQuinn, in a box to the *Commentary*, examines the potential impact of Brexit on Irish consumer sentiment. Evidence in the box suggests that the typical determinants of consumer sentiment (unemployment and inflation) are unable to explain the sharp downturn in Irish sentiment observed over the past 8/9 months. Therefore, *a priori*, the increased attention devoted to Brexit and the significant uncertainty surrounding the outcome appears to have had a materially negative impact on Irish consumer sentiment. Given the observed relationship between sentiment and actual economic decisions, this suggests that the growth performance of the Irish economy has already been adversely impacted by Brexit.

Uncertainty from international sources is also highly relevant in terms of investment decisions made domestically. In another box to the *Commentary* O'Toole examines the impact of US policy uncertainty on investment decisions taken in the Irish economy. The box shows that Irish investment at a macroeconomic level, in particular machinery and equipment assets, is more highly correlated with international economic uncertainty rather than domestic developments. This is unsurprising given the highly globalised nature of the Irish economy and the impact of multinationals on aggregate investment trends. The results underscore the importance of international events for the domestic economy. It also further reinforces the risks of an economic downturn domestically if the international economy deteriorates.

The continued improvement in key domestic labour market variables has resulted in a sustained increase in both nominal and real wage growth in the Irish economy. Average Hourly Earnings were estimated to have grown by over 4 per cent in 2018 with similar or potentially higher rates of growth expected in 2019 and 2020. Despite recent acceleration in the rate of inflation, price increases remain considerably below the growth rate in earnings. A continuation of this trend will see further increases in real wage growth which we expect to be just under 3 per cent over the coming years. While the increase in wages should reflect increases in underlying productivity in the Irish labour force, it is also a key indicator of potential overheating in the economy. Given that the labour market is currently at full employment, and there is evidence of increasing price levels, fiscal policy will have to be particularly disciplined in ensuring that competitiveness in the domestic economy is maintained. As noted in McQuinn and Varthalitis (2019), the restoration in competitiveness after the international financial downturn in 2007/2008 was one of the key reasons for the rebalancing of the Irish economy away from the disproportionate influence of the construction (non-tradable) sector and back to the more productive tradable sector.[18] Achieving a balance between growth emanating from domestic activity and that from foreign trade is essential for the sustainable evolution of the economy.

Given the expected increase in capital expenditure over the short to medium term, it may be advisable to run an explicitly counter-cyclical fiscal policy and instigate a mildly contractionary budget. Taxation increases in the area of carbon taxes or residential property taxes could be used to reduce some of the demand-side pressures which are now evident in the domestic economy. These measures would also avoid the distortionary effects for employment of any changes in taxes on labour.

The need for fiscal vigilance in that regard is reinforced by the recent cost over-runs in the case of certain high profile capital projects. Over the medium term the Irish State is facing increasing budgetary pressures in areas such as healthcare provision (see Wren et al., 2017[19] for details), while the National Development Plan (NDP) has outlined an ambitious capital investment programme over the period 2018 and 2027. It is clear that the Government is to increase its scale of expenditure considerably over the decade ahead, therefore, vigilance is required over both the short and medium term to ensure that value for money is achieved where significant outlays of taxpayers' money is concerned. Specifically, when it

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[18]   McQuinn, K. and P. Varthalitis (2019). 'How openness to trade rescued the Irish economy'.
[19]   Wren M.A., C. Keegan, B. Walsh, A. Bergin, J. Eighan, A. Brick, S. Connolly, D. Watson and J. Banks (2017). *Projections of demand for healthcare in Ireland, 2015-2030*, first report from the Hippocrates model. ESRI Research series No. 67.

comes to large infrastructural projects, it is evident that improvements in the processes overseeing such projects are required such that the initial estimates of certain projects should more accurately predict final costs.

From a general governance perspective, it is also somewhat disquieting that there is such a significant difference in opinion between the views of the Department of Public Expenditure and the Government on the National Broadband plan. The forecasted sums of public money involved are substantial in nature. The Celtic Tiger saw a number of projects where public money was not utilised in an efficient or prudent manner; it is imperative that the mistakes of that particular period are not repeated going forward.

Part of the general strategy for broadening the tax base in the coming years should be a sustained increase in carbon taxes. The benefit of such a policy is to both widen the tax base but also assist climate policy. However, some of the difficulty in implementing these measures is the degree to which lower income households are affected by such a policy. In a paper to this *Commentary*, Tovar Reaños and Lynch (2019) examine the impact of increased carbon taxation on both carbon emissions and household income and equality. Microdata from the Household Budget Survey (HBS) are used to estimate the effects of carbon taxation on both energy- and non-energy-related commodities expenditure. This research also considers the impact of recycling the carbon revenue back to households, using both a flat allocation and a targeted allocation. The results demonstrate that carbon taxes are an effective means of reducing emissions. For example, a 30 per cent increase in carbon taxes could result in a 3.3 per cent reduction in carbon emissions; emissions would reduce by over 8 per cent if taxes were increased by €80. Additionally, the research indicates that carbon taxes, when coupled with appropriate revenue recycling, has the capacity to reduce income inequality. Therefore, carbon taxation can help policymakers achieve a variety of objectives if implemented in a precise and imaginative manner.

DETAILED FORECAST TABLES

FORECAST TABLE A1   EXPORTS OF GOODS AND SERVICES

	2017	% change in 2018		2018	% change in 2019		2019	% change in 2020		2020
	€ bn	Value	Volume	€ bn	Value	Volume	€ bn	Value	Volume	€ bn
Merchandise	192.9	8.0	11.9	208.2	4.6	3.3	217.9	4.7	3.2	228.3
Tourism	5.0	5.3	3.9	5.2	3.2	3.2	5.4	3.2	3.2	5.6
Other Services	154.7	10.1	5.3	170.3	7.2	6.1	182.5	7.2	5.9	195.6
Exports of Goods and Services	352.6	8.9	8.9	383.8	5.7	4.2	405.8	5.8	4.3	429.4
FISM Adjustment	0.0			0.0			-0.7			-0.5
Adjusted Exports	352.6	8.9	8.9	383.8	5.6	4.2	405.2	5.8	4.3	428.8

FORECAST TABLE A2   INVESTMENT

	2017	% change in 2018		2018	% change in 2019		2019	% change in 2020		2020
	€ bn	Value	Volume	€ bn	Value	Volume	€ bn	Value	Volume	€ bn
Housing	5.4	35.0	24.4	7.3	28.8	24.8	9.4	22.9	19.6	11.6
Other Building	14.3	19.5	12.3	17.1	17.1	11.0	20.0	15.7	10	23.1
Transfer Costs	1.2	36.7	24.5	1.6	13.4	8	1.8	11.3	7	2.0
Building and Construction	21.8	24.3	15.9	27.1	20	17.8	32.5	14.5	12.9	38.3
Machinery and Equipment	47.2	10.8	7.3	52.4	5.3	3.3	55.2	7.2	4.9	59.1
Total Investment	69.0	15.1	9.8	79.4	10.3	7.1	87.7	11.1	7.6	97.4

FORECAST TABLE A3   PERSONAL INCOME

	2017	% change in 2018		2018	% change in 2019		2019	% change in 2020		2020
	€ bn	%	€ bn	€ bn	%	€ bn	€ bn	%	€ bn	€ bn
Agriculture	0.7	3.3	0.0	0.7	1.4	0.0	0.7	1.2	0.0	0.7
Non-Agricultural	85.7	7.1	6.1	91.8	8.1	7.4	99.2	6.9	6.9	106.1
Rental Income	10.0	7.6	0.8	10.8	7.4	0.8	11.6	7.2	0.8	12.4
Other Income	15.7	3.4	0.5	16.3	7.1	1.2	17.4	2.2	0.4	17.8
Total Income Received	112.1	6.6	7.4	119.5	7.9	9.4	128.9	6.3	8.1	137.1
Current Transfers	8.6	-2.8	-0.2	8.4	-9.3	-0.8	7.6	-8.5	-0.6	6.9
Gross Personal Income	120.7	5.9	7.2	127.9	6.7	8.6	136.5	5.5	7.5	144.0
Taxes on Income and Wealth	-22.2	6.1	-1.4	-23.5	4.1	-1.0	-24.5	5.0	-1.2	-25.7
Personal Disposable Income	98.6	5.9	5.8	104.4	7.3	7.6	112.0	5.6	6.3	118.3
Consumption	93.8	4.7	4.4	98.3	4.1	4.1	102.3	4.2	4.3	106.7
Personal Savings	11.4	13.8	1.6	13.0	29.1	3.8	16.8	12.4	2.1	18.9
Savings Ratio	11.2			11.9			14.3			15.2
Average Personal Tax Rate	0.18			0.18			0.18			0.18

FORECAST TABLE A4   IMPORTS OF GOODS AND SERVICES

	2017	% change in 2018		2018	% change in 2019		2019	% change in 2020		2020
	€ bn	Value	Volume	€ bn	Value	Volume	€ bn	Value	Volume	€ bn
Merchandise	85.2	15.6	14.4	98.5	9.7	8.2	108.1	8.9	7.0	117.8
Tourism	5.8	8.8	7.8	6.3	6.4	4.8	6.7	6.2	4.4	7.1
Other Services	172.2	4.2	3.2	179.5	6.9	5.5	191.8	6.9	5.3	205.0
Imports of Goods and Services	263.3	8.0	7.0	284.4	7.8	6.0	306.7	7.6	5.9	329.9
FISM Adjustment	0.0			0.0			-0.7			-0.8
Adjusted Imports	263.3	8.0	7.0	284.4	7.6	6.0	305.9	7.6	5.9	329.1

FORECAST TABLE A5   BALANCE OF PAYMENTS

	2017	2018	2019	2020
	€ bn	€ bn	€ bn	€ bn
Exports of Goods and Services	352.6	383.8	405.2	428.7
Imports of Goods and Services	263.3	284.4	305.9	329.1
Net Factor Payments	-59.8	-65.4	-75.6	-79.4
Net Transfers	-4.6	-5.1	-5.6	-6.1
Balance on Current Account	24.9	29.0	17.9	14.0
As a % of GNP	10.7	11.5	6.8	5.1

FORECAST TABLE A6   EMPLOYMENT AND UNEMPLOYMENT, ANNUAL AVERAGE

	2017	2018	2019	2020
	'000	'000	'000	'000
Agriculture	110.4	107.4	104.9	105.0
Industry	412.1	423.2	435.2	446.7
Of which: Construction	128.7	143.3	146.3	150.1
Services	1,664.4	1,719.4	1,777.2	1,823.2
Total at Work	2,194.6	2,249.9	2,324.2	2,374.7
Unemployed	157.7	145.2	110.4	101.9
Labour Force	2,352.2	2,395.1	2,434.6	2,476.6
Unemployment Rate, %	6.7	5.7	4.5	4.1

Special Article

CARBON TAXATION IN IRELAND. DISTRIBUTIONAL EFFECTS OF REVENUE RECYCLING POLICIES[1]

Miguel Angel Tovar Reaños* and Muireann Lynch

ABSTRACT

We calculate the impact of an increase in carbon taxation on carbon emissions and on income inequality. Carbon emissions reduce by 3.94 per cent for a carbon tax increase of €30 per tonne, and 10.24 per cent for an increase of €80 per tonne. Carbon taxation is found to be regressive, with poorer households spending a greater proportion of their income on the tax than more affluent households. However, returning the carbon tax revenues to households reverses this regressive effect, and the net policy effect is progressive. A 'carbon cheque' that distributes the revenues equally to every household leads small changes in income inequality, while a targeted mechanism that directs more of the revenues towards less affluent households is more progressive, and actually reduces income inequality. The targeted mechanism resembles recycling the revenues through the tax and welfare system, and thus has lower administrative costs than a 'carbon cheque'.

INTRODUCTION

Carbon pricing or taxation has been endorsed by many as an important tool in combatting climate change by reducing carbon emissions in the most cost-effective manner, while inducing minimal distortions in other markets (Nordhaus, 1993). The general principle of carbon taxation as an appropriate mechanism to reduce carbon emissions enjoys broad support amongst economists.[2]

However, significant public concerns over carbon taxation remain. Energy affordability is an important consideration for citizens, as is the extent to which carbon taxes impact on income inequality (Kolstad et al., 2014). Because poorer households spend a greater share of their income on energy, carbon taxes can impact on both energy affordability and income inequality. The impact of carbon taxation on rural households is also of concern. Finally, the ability of carbon

taxation to bring about a decrease in emissions, particularly if households are unable to readily switch to alternative fuels, is sometimes questioned (Patt and Lilliestam, 2018; Vasilakou, 2010).

At least some of these concerns can be addressed by appropriate recycling of the revenue raised by carbon taxation. If the revenue is returned to households, either directly or via the tax and welfare systems, concerns over energy affordability can be addressed. Assuming the revenue received by each household is at least as great as the household expenditure on carbon tax, there is no net effect on energy affordability. Furthermore, appropriate targeting of the recycled revenues can leave income inequality unchanged, or even reduced. Klenert et al. (2018) provide a thorough review of the range of the various revenue recycling mechanisms that can be employed by policymakers.

The choice of recycling mechanism is very important because a poorly designed instrument could exacerbate rather than attenuate an increase in income inequality caused by the tax itself (see Williams, 2016). The cost of implementing the policy itself should also be taken into consideration. For example, the administrative cost of recycling revenue through a direct transfer is likely to be higher than that of changing taxation and social welfare payment rates and thresholds. This higher administration cost reduces the total amount of revenue available for distribution amongst households.

In Ireland, carbon is seen as a core element of the transition to a sustainable economy (DCCAE, 2017) and a carbon tax was introduced in 2010, which applies to the non-ETS (Emissions Trading Scheme) sector only. There is broad political agreement that this tax should be increased (Committee on Climate Action, 2019). New research on the implications of increased carbon taxes for emissions, affordability and inequality is therefore warranted and is the focus of this research.

Research on carbon taxation in Ireland has been carried out since as early as 1992 (FitzGerald and McCoy, 1992). Several of the studies take a macroeconomic perspective and model the economy as a whole. As a result, these can calculate the impact of carbon taxation on various sectors of the economy as well as on households (Bergin et al., 2004; Wissema and Dellink, 2007; Conefrey et al., 2013). They can also calculate the changes in behaviour induced by carbon taxation and the resulting reduction in emissions. However, these models cannot take account of individual household characteristics and behaviour, and do not consider how different categories of household are affected by carbon taxation, which requires the use of microdata. Research on carbon taxation that does rely on Irish microdata includes Scott and Eakins, 2004 and Callan et al., 2009. Carbon

taxes are found by each of the above papers to be regressive, but this literature also finds that the regressive effects can be reversed if the revenue raised from the tax is recycled appropriately back to households. However these models are unable to account for behavioural changes as a result of the tax, and instead assume that household carbon emissions continue unabated after the tax is introduced. While this may be a plausible short-run assumption, it is unlikely to apply in the long run.

This research represents a significant advance on the state of the art by examining the impact of increased carbon taxation on both carbon emissions and household income and equality. Carbon taxation mainly affects household expenditure on energy-related commodities like fuel and transport, as these goods become more expensive. However, carbon taxation also affects expenditure on non-energy-related commodities by shifting the share of the household budget that is spent on each type of commodity. In order to estimate the effects of carbon taxation on expenditure on both energy- and non-energy-related commodities, we use microdata from the Household Budget Survey of Ireland (HBS). This research also considers the impact of recycling the carbon revenue back to households, using both a flat allocation and a targeted allocation.

Our results show that carbon taxes are an effective means of reducing both CO_2 emissions and income inequality when the tax revenue is properly allocated and targeted to protect vulnerable households.

METHODOLOGY AND DATA

2.1   Demand system estimation

We employ the Exact Affine Stone Index demand system (EASI, see Lewbel and Pendakur, 2009) to model household behaviour. A demand system is a method of determining how consumer behaviour responds to changes in prices. Consumption decisions are represented as a system of equations which depend on prices, consumption budgets, and observed as well as unobserved household characteristics. Unlike previous models of household demand, the EASI allows for a flexible representation of the relationship between household expenditure on a particular commodity and the household's total disposable income. Demand systems have been used to study households' energy use and carbon emissions (Creedy and Sleeman, 2006; Pashardes et al., 2014; Tovar Reaños and Wolfing, 2018), but, to our knowledge, this study which employs the EASI demand system to examine the distributional implications of carbon taxation, taking revenue recycling into account, is unique in the literature. It is also the first study to apply

the EASI to Irish data. The outputs of the model can be used to estimate a household expenditure function, which represents the quantities of each commodity consumed by a household, given that the household faces a budget restriction. Changes in the price of one commodity, for example increasing energy prices due to a carbon tax, means households will choose a different bundle of commodities in response: in other words, their expenditure on all commodities will change, not just energy-related commodities. We quantify the cost to households from carbon taxation, by determining the adjustment in household income needed to accept a different commodity bundle.[3] This cost will in turn change income distribution and consequently income inequality. We used Atkinson's inequality index to measure these changes in income inequality (see Tovar Reaños and Wolfing, 2018).[4]

To apply the model, data on household expenditure on different commodities, commodity prices and other socioeconomic variables are needed. Using the Household Budget Survey (HBS) from the Central Statistical Office (CSO), we use the following waves from the HBS to estimate our demand system; 2015-2016, 2009, 2004, 1999 and 1994. We group consumption goods into six categories: food, housing, heating and lighting, transport, education and leisure, and other goods and services.[5] A similar approach has been used in Tovar Reaños and Wolfing (2018) and by Bohringer et al. (2017). The grouping largely follows the Classification of Individual Consumption According to Purpose (COICOP). As in Baker et al. (1989) we do not include purchase of vehicles and big appliances such as washing machines, dryers, etc. as part of the commodity bundles. Instead, dummy variables for ownership of these commodities are included in the analysis. Energy is comprised of expenditure on electricity, natural gas, liquid fuels and solid fuels. Transport expenditure comprises petrol and/or diesel, vehicular maintenance, insurance and public transport. Because carbon taxes affect the prices of both heating and fuels for private transportation,[6] we can estimate the changes in income distribution for both groups.

A potential caveat is that the parameters for transportation include both public and private transport. However, once we compared our results with a model that only includes private transport, our results are slightly higher, and the general

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[3]   After estimating an expenditure function we are able to estimate Hicks' equivalent variation.
[4]   We follow King (1983) to estimate equivalent income and inequality.
[5]   This aggregation maximises the use of the data because it considerably reduces the number of households reporting zero expenditure in any given category.
[6]   While expenditure on electricity is included in the HBS dataset and in our model, carbon taxes do not apply to electricity consumption because electricity generation is covered by the European Union's Emissions Trading Scheme (ETS). Therefore a change in carbon tax changes the prices of heating and transportation fuels, but not of electricity.

conclusion found in this report holds.[7] Full details of the model can be found in Tovar Reaños and Lynch, 2019.

## 2.2   Energy consumption with no carbon taxation increase

Figure 1 shows that low income households spend the largest share of their budget on residential energy. The consumption in this sector comprises electricity and fuels for heating. Similar patterns are found for the expenditure on private transportation as shown in Figure 2. This shows that higher energy prices (via a carbon tax or otherwise) will potentially harm low income households disproportionally. This tallies with results from previous research.

FIGURE 1   BUDGET SHARE OF EXPENDITURE ON HEATING AND LIGHTING USED IN THE RESIDENTIAL SECTOR ACROSS EXPENDITURE QUARTILES
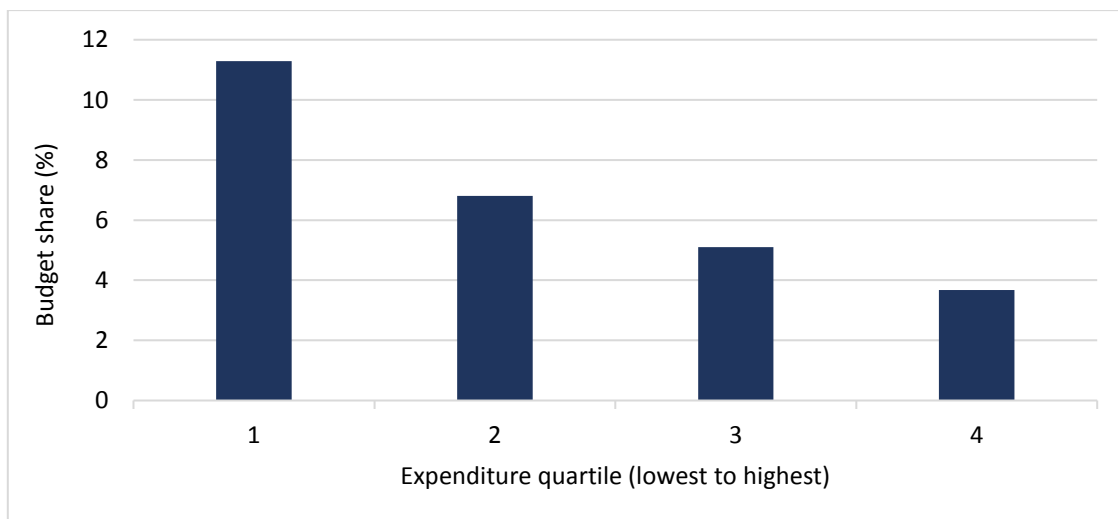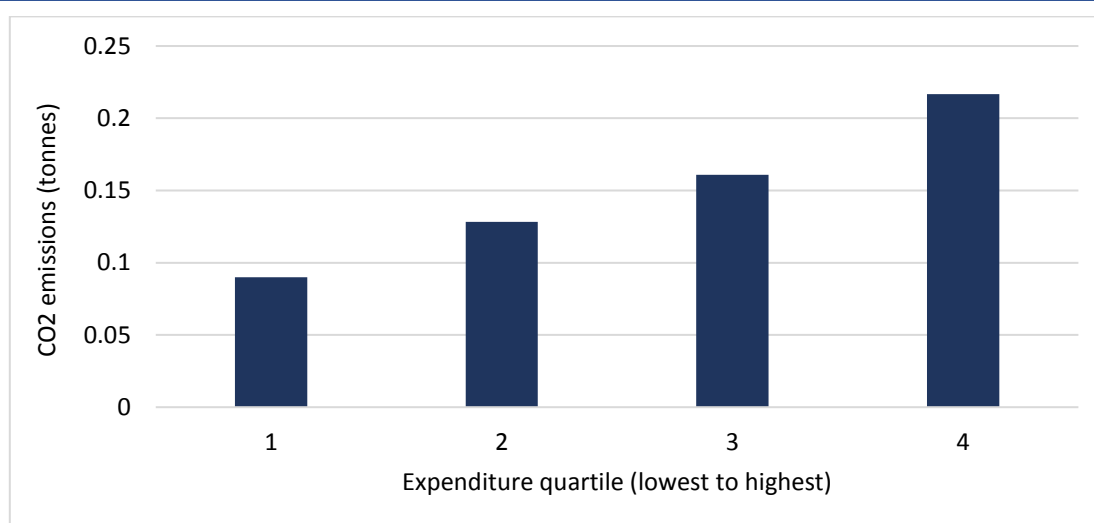

Source: Own estimation based on the HBS.

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[7]   We use a Heckman correction to estimate a demand system for only vehicle owners as in West and Williams (2007). For full details of this estimation see Tovar et al., 2019.

FIGURE 2 BUDGET SHARE OF EXPENDITURE ON DIESEL AND PETROL USED IN PRIVATE TRANSPORTATION ACROSS EXPENDITURE QUARTILES
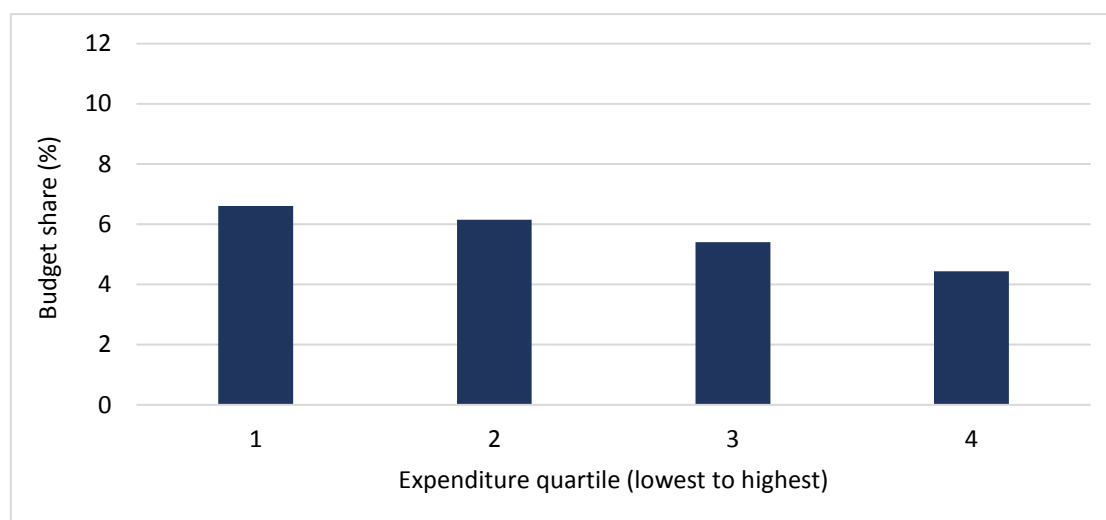
Source: Own estimation based on the HBS.

FIGURE 3 CARBON EMISSIONS BY INCOME QUARTILE (TONNES)

Source: Own estimation based on the HBS.

Figure 3 shows the carbon emissions per household. More affluent households have higher emissions. This calls for the implementation of a progressive policy instrument where carbon taxes increase with income.

MICROSIMULATION

Having determined the expenditure of each income quartile on fuels and transportation, we now determine the impact of a change in carbon taxation on behaviour. This is the major contribution of this piece of research. For this exercise, we use only the 2015-2016 wave of the HBS because it has the most recent data. In addition, we use emission factors and prices of energy

commodities provided by the Sustainable Energy Authority of Ireland (SEAI).[8] As in Callan et al. (2009), we only consider direct emissions.

It is important to note here that the model is a partial equilibrium model, and consequently it is not able to estimate changes in labour supply or in the supply of commodities purchased by households as a result of carbon taxes. This will be the focus of future research.

SCENARIOS

We analyse two carbon tax scenarios, where we consider an additional carbon tax of €30 and €80 per tonne respectively. When combined with the existing carbon tax of €20 per tonne, total carbon taxes come to €50 and €100 per tonne. In the baseline scenario, households pay the current carbon tax (i.e. €20 per tonne).

Furthermore, we analyse two mechanisms for recycling the additional carbon tax revenue; a flat allocation and a targeted allocation. The flat allocation scenario resembles the green cheque, which has been advocated by some policymakers; an equal cash transfer is given to every household, the sum total of which is equal to the total carbon tax revenue. Under the targeted scenario, the revenue is distributed amongst households in inverse proportion to the households' share of aggregate income, according to the following equations:

$$\frac{\sum_{h}^{H} X_h}{X_h} = r_h$$

$$Share\ X_h = \frac{r_h}{\sum_{h} r_h}$$

where X_h is each household's total expenditure and $Share\ X_h$ calculates the share of the total carbon tax revenues that accrue to each household h. The first equation calculates the inverse of each household's share of aggregate expenditure, and the second equation normalises this in order to ensure that the sum of all the shares to adds to one.

This allocation mechanism is designed to resemble social welfare transfers, which broadly accrue to households in inverse proportion to income (with some exceptions).

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[8]   Emission factors can be found at www.seai.ie/resources/publications/Energy-Emissions-2017-Final.pdf

RESULTS[9]

5.1 Initial incidence

5.1.1 Household level

Table 1 displays how the cost of increasing the carbon tax by an additional €30 per tonne falls on the household types with the largest incidence across the income quartiles as a proportion of total expenditure. Every household bears some cost, but the cost is greatest for the poorest households. Comparing the first and fourth quartiles indicates that poorer households (1st quartile) suffer disproportionately more from carbon taxes. In addition, single households with children are the most affected by this policy.

It should be noted here that this table includes no assumption on how the revenues from carbon taxes are utilised. In essence, the table shows the cost of increasing the carbon tax but assumes that the revenue raised from so doing exits the economy entirely. We relax this assumption further on. Note that our metric measures the cost of the policy as the extra income that the household would require, were they to choose their original bundle of commodities, but at the new set of energy prices.

TABLE 1   HICK'S EQUIVALENT VARIATION RELATIVE TO HOUSEHOLD INCOME

|	1st_quartile	2nd_quartile	3rd_quartile	4th_quartile
Single_no_children	-0.83	-0.41***	-0.34***	-0.23***
Single_+65	-0.94	-0.58	-0.41	-0.16***
Single_with_children	-1.01***	-0.67***	-0.45	-0.37
All_households	-0.88	-0.59	-0.48	-0.39

Source: Authors' own estimation.
Notes: Statistically significant with respect to the sample mean in each quartile *p<0.10, **p<0.05, ***p<0.01.

The following graph shows how the tax burden is distributed across different expenditure quartiles. In addition, the graph is broken down by rural and urban households.[10] One can see that rural households are disproportionally more affected, particularly rural households in the lowest income quartile.

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[9]   Own-price, cross-price and expenditure elasticities can be found in Tovar et al., 2019.
[10]   Rural and urban households are defined by the CSO regarding population size and proximity with aggregated town areas (see www.cso.ie/en/releasesandpublications/ep/p-cp1hii/cp1hii/bgn).

FIGURE 4   DISTRIBUTIONAL EFFECTS OF CARBON TAX FOR URBAN AND RURAL HOUSEHOLDS
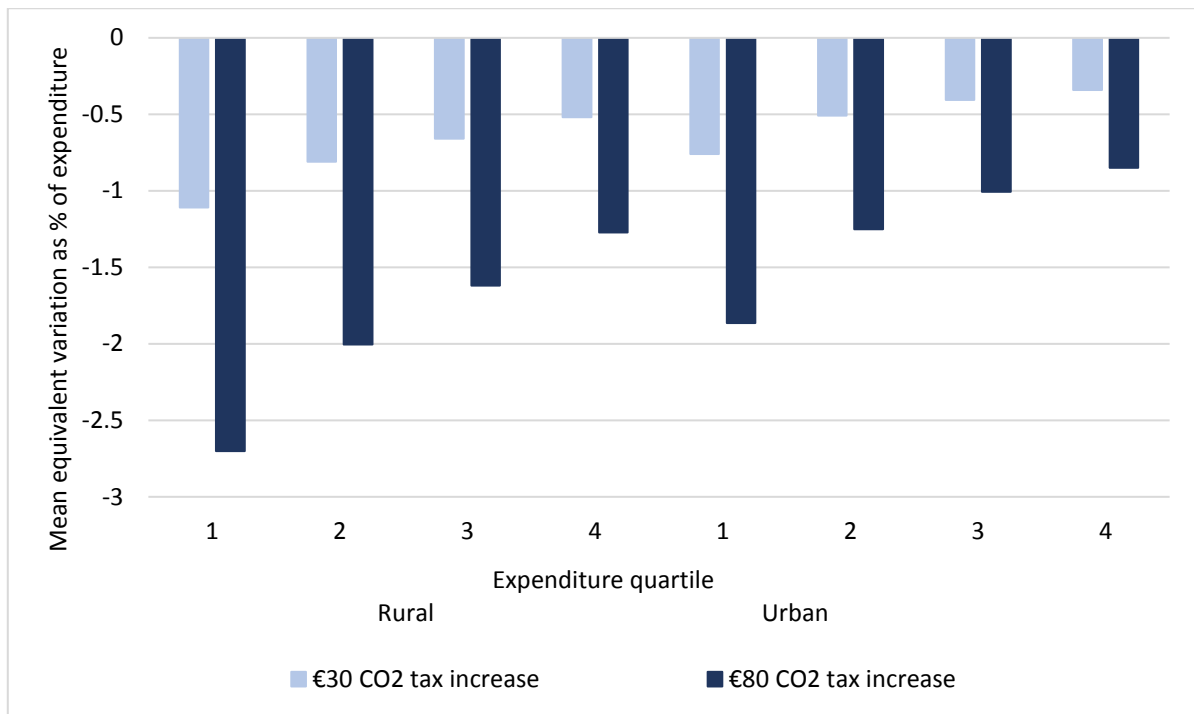
Source: Authors' own estimation.

Table 2 shows the average cost per week of carbon taxation on different household types in monetary terms. Households living in older dwellings and low skilled workers have larger costs. Callan et al. (2009) used a different approach and estimated an average cost per week of more than €4 for an additional carbon tax of €20 per tonne. Our results are at the lower bound of this estimate, which is inevitable as our model includes the behavioural effects of carbon taxation. We can simulate the extent to which households will reduce their carbon consumption as a result of the tax, thereby reducing the tax that they pay (as well as reducing total emissions).

TABLE 2   CARBON TAX COST (€/WEEK). OWN ESTIMATED HICK'S EQUIVALENT VARIATION

	Tax_+30	Tax_+80
Dwelling_1980	-3.037***	-7.467 ***
Low_skill	-3.126 ***	-7.726 ***
All_households	-2.772	-6.841

Source: Authors' own estimation.
Notes: Values have been equalised to consider household size. Statistically significant with respect to the sample mean in each quartile. *p<0.10, **p<0.05, **p<0.01.

5.1.2 *Aggregated level*

The cost of the policy faced by households estimated in the previous section will also have distributional effects at aggregate level. Table 3 shows the changes in

income inequality, total expenditure per capita and CO_2 emissions as a result of the carbon tax. In the absence of revenue recycling, income inequality, as measured by the Atkinson index, increases. This is due to the regressive nature of carbon taxation. In addition, after paying for the carbon tax, the total expenditure of households declines by between 0.46 per cent and 1.14 per cent. A tax increase of €30 and €80 per tonne decreases CO_2 emissions by 3.94 per cent and 10.24 per cent respectively, due to the behavioural changes made by households in response to the tax.

**TABLE 3   CHANGES IN INEQUALITY, EXPENDITURE AND EMISSIONS IN %**

Tax	Inequality %	Expenditure %	Emissions %
+€30	0.40	-0.46	-3.94
+€80	1.04	-1.14	-10.24

Source: Authors' own estimation.

5.2   Revenue recycling

We now consider the effects of recycling carbon tax revenue to households. Figure 5 shows how the cost of an additional €80 per tonne changes when the flat and targeted allocations described above are used. A flat allocation, while equal in monetary terms for each household, is larger in comparison to total expenditure for poorer households than for richer households. For this reason, the flat allocation compensates poorer households more than richer households as a proportion of expenditure. However, a more targeted measure benefits the poorest households far more than the flat measure. The targeted measure is therefore more progressive, which is appropriate given that higher income households emit higher levels of carbon.

FIGURE 5   DISTRIBUTIONAL EFFECTS OF DIFFERENT REVENUE RECYCLING MECHANISM
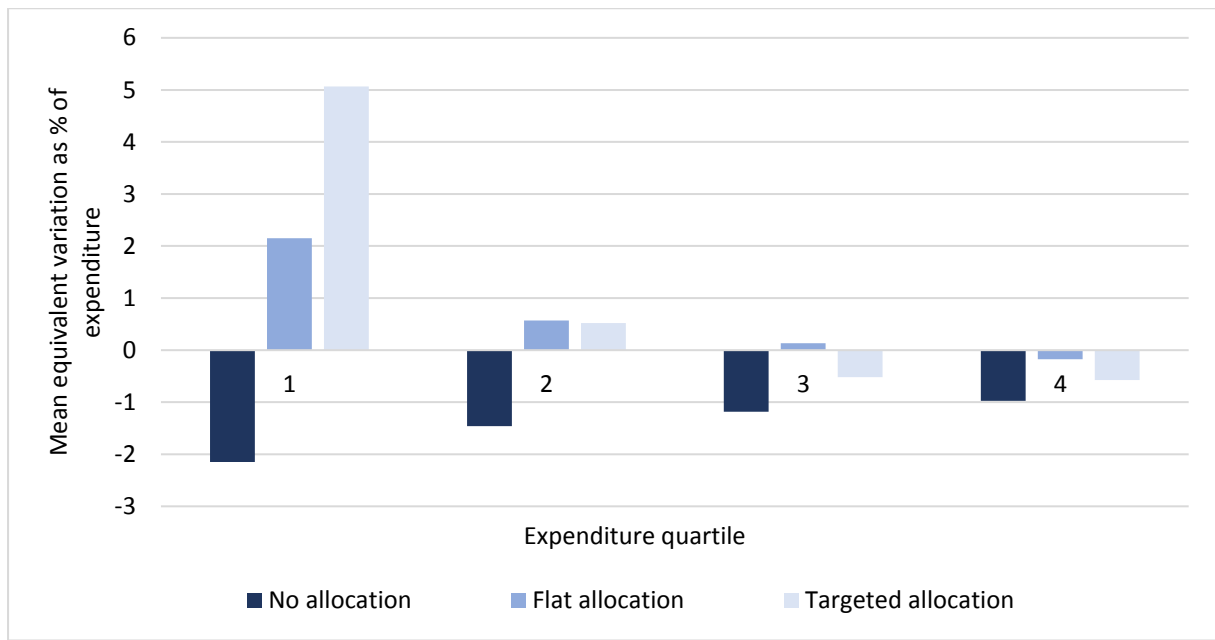
Source: Authors' own estimation.

Administrative costs are not included in this analysis, but it should be noted here that the administrative cost of the targeted scenario is likely to be lower than that of the flat allocation. This is due to the fact that the flat allocation would most likely have to be achieved by implementing a new mechanism in which a cash payment is delivered to each household, and there is currently no national register of households in the State. In contrast, the targeted mechanism proposal is along the lines of that proposed in Callan et al. (2009), in which the revenues are recycled through the existing tax and welfare system. It is unlikely that the targeted mechanism proposed here could be replicated with 100 per cent accuracy via the existing tax and social welfare mechanisms, but the general principle of a targeted mechanism being preferable to a flat allocation has been established.

In order to evaluate the general effects of the policies, Table 4 shows the effects of the tax increase and revenue recycling on inequality and expenditure. A flat allocation can reduce inequality and increase the average expenditure available for households. Recycling mechanisms can thus not only reverse the regressive effects of carbon taxation, but can actually reduce rather than increase income inequality. The targeted mechanism has even larger effects, potentially doubling the benefits obtained by the flat allocation mechanism.

The degree to which recycling mechanisms can reduce income inequality increases as carbon taxation increases. This is because higher carbon taxes yield

higher revenues, and so if appropriate recycling mechanisms are chosen, the reductions in inequality are greater.

TABLE 4   CHANGES IN INEQUALITY, EXPENDITURE: DISTRIBUTIONAL EFFECTS OF TWO RE-ALLOCATION MECHANISMS

Flat allocation		
Carbon tax	Inequality %	Expenditure %
+€30	-0.46	0.16
+€80	-1.05	0.41
Targeted allocation		
Carbon tax	Inequality %	Expenditure %
+€30	-1.23	0.16
+€80	-2.78	0.41

Source: Authors' own estimation.

CONCLUSION

This work examined the impact of increased carbon taxation in Ireland, and quantified the impact of same on carbon emissions using Irish microlevel data for the first time. Our results find a 3.94 per cent reduction in carbon emissions if carbon taxes are increased by €30 per tonne, and an 10.24 per cent reduction in emissions if taxes are increased by €80 per tonne. The evidence suggests that carbon taxation is a valid and important part of climate policy.

Results from previous research, which find that carbon taxes are regressive, are repeated here. The impact on rural households is particularly evident. However, the fact that appropriate revenue recycling can reverse these regressive effects diminishes the validity of distributional issues as an argument against increasing carbon taxation. In fact, carbon taxation coupled with revenue recycling has the potential to be a useful tool for mitigating income inequality, independent of climate policy. In our scenario, the flat allocation mimics the carbon cheque, which has been proposed as a potential revenue recycling mechanism in Ireland. While this re-allocation mechanism can reduce inequality, our alternative scenario of the targeted mechanism can bring larger reductions in income inequality.

Our model does not estimate the overall macroeconomic cost of policy reforms because it is a partial equilibrium model. In the same line, our changes in CO_2 emissions are direct emissions and do not consider the overall changes in emissions. Further research is needed to have a macro and micro vison of the cost of the policy reform. Finally, it should be noted that our results simulate behavioural changes based on historical data, which are influenced by the

climate, energy and other policies in place at the time the data were collected. Future climate and energy policies, independent of carbon taxation, have the potential to shift behaviour even further. For example, measures such as improved public transportation or congestion charging in city centres could reduce the level of carbon taxation at which commuters move away from private motorised transportation and towards public transport and/or walking or cycling. In other words, these policies would increase the price-responsiveness of commuters to carbon taxation, resulting in even greater emission reductions for a given level of carbon taxation. The interplay between carbon taxation and other climate and energy policies should therefore be taken into consideration by policymakers.

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