Chapter 2

Endorsement and Assessment of the Macroeconomic Forecasts

2. Endorsement and Assessment of the Macroeconomic Forecasts

Key messages

- The Department of Finance's *Budget 2020* macroeconomic forecasts show a slowdown in economic activity in the short term, followed by a recovery towards long-run potential growth. While the Council assessed this forecast to be within an endorsable range, the outlook for the Irish economy remains unusually uncertain, with overheating still possible. The risk of a more adverse scenario following a disorderly Brexit has not entirely dissipated.

- The Budget forecasts were appropriately prepared on the basis of a disorderly UK exit from the EU, given the risks and potential impact. The forecasts were informed by simulations undertaken with the COSMO model of the macroeconomy. While this provides a good framework to assess the longer-term impact, the short-run scenario may not incorporate all disruptions and hence may be somewhat too benign. For example, following a disorderly Brexit, the unemployment rate is forecast to be 0.6 of a percentage point higher in 2020 relative to an orderly-deal scenario.

- Although the likelihood of a disorderly Brexit has reduced, the Council highlights that there could be considerable downside risks to the Budget's disorderly Brexit scenario due to several factors, including the labour-intensive nature of the trading relationship between the UK and Ireland. This chapter shows how economic downturns can be characterised by severe impacts on the domestic economy. Further analysis in this chapter assesses the relationship between falling consumer and business sentiment indices and relevant measures of real economic activity. However, the analysis shows that sentiment has a mixed track record as a leading indicator of future falls in economic activity.

- The forecasts for government consumption in *Budget 2020* rely on expenditure projections that are not well anchored to known pressures, including population growth and demographic changes. As a result, persistent positive forecast errors (outturns greater than forecast) have been noted in previous Council publications. There is also an inconsistency between how nominal and real spending are projected.

2.1 Introduction

The Council's endorsement exercise covered short-term macroeconomic forecasts prepared by the Department of Finance for 2019 and 2020 reflected in *Budget 2020*, based on the prudent and appropriate assumption of a disorderly UK exit from the EU. As the identification of risks to the economy requires careful and continuous analysis, the Council monitors developments in the Irish economy, and the economies of Ireland's main trading partners, on an ongoing basis.

Although the central scenario of a disorderly Brexit was not necessarily more likely than not to occur at the time of the endorsement, and its likelihood has diminished in the intervening period, the negative impacts of any form of Brexit—not only a disorderly Brexit—could be more severe than shown in *Budget 2020* forecasts. The historical experience of Ireland and comparable European countries with downturns presented in Box D provides context for a possible less-benign impact of a disorderly Brexit, and Box E considers the recent declines in consumer and business sentiment, and the possible implications for future activity. Box F at the end of this chapter briefly investigates the relative performance of the Council's Benchmark forecasts and a new methodology applying a large Bayesian vector autoregression (LBVAR) model.

2.2 Endorsement of *Budget 2020* Forecasts

The Council's most recent endorsement exercise of the Department of Finance's macroeconomic forecasts was undertaken in September 2019 (see Appendix B for the endorsement timeline details).[27] The short-term macroeconomic forecasts produced by the Department and contained in *Budget 2020* for 2019 and 2020 were judged as being within an endorseable range, taking into account the methodology and plausibility of the judgments made.

The endorsement process entails three aspects: the appropriateness of the methodology used, the pattern of recent forecast errors, and comparisons with the Council's benchmark projections and other forecasts. This section then concludes with an overview of macroeconomic risks that could contribute to divergence between the Budget's forecasts and eventual outturns.

Methodology

The Council is satisfied that the Department's approach to macroeconomic forecasting broadly conforms to that of other forecasting agencies. For the demand-side macroeconomic forecasts, the methodology continues to produce reasonably accurate short-term (in-year and year-ahead) forecasts of underlying domestic demand—that is, domestic demand excluding investments in aircraft and intangibles. This is shown in Figure 2.1 in the June 2019 *Fiscal Assessment Report* (Fiscal Council, 2019c).

However, Ireland's exports and imports are more difficult to forecast accurately, given the distortions to the data caused by multinational firms. Furthermore, the coherence of some aspects of the Department's forecasts, in particular over the medium term, could continue to be further improved. As discussed later in this chapter, the forecast of a fall in the savings ratio over 2021–2024 may not be consistent with higher precautionary savings resulting from a disorderly Brexit.

The Council has noted several issues regarding the *Budget 2020* forecasts for government net consumption. Over the medium term, the forecasts rely on

[27] The statutory function is detailed in Fiscal Council (2013) and Fiscal Council (2014a). Benchmark projections prepared by the Secretariat form a key part of the endorsement process. An important input into the preparation of the benchmark projections involves rounds of discussions with other external forecasters. The Secretariat met with the European Commission and statisticians from the CSO to gain further insights into recent data releases.

expenditure projections that are not well anchored to known spending pressures, such as a growing population and changes in the demographic profile. Furthermore, the Department forecasts growth in the government consumption deflator—which includes the effect of public sector wage growth—to turn negative for 2021–2024. This is highly implausible and appears to reflect a methodological issue arising from the use of inconsistent nominal and volume government consumption forecasts, whereby government spending volumes grow at a reasonable rate but nominal spending growth is implausibly low (1.2 per cent on average for 2021–2024).

Compared with April's *Stability Programme Update 2019* (*SPU 2019*), the Government made the decision to prepare *Budget 2020* based on assumption of a disorderly UK exit from the EU, without a withdrawal agreement. Although the Budget forecasts were finalised in September, the UK government and the EU later reached a new withdrawal agreement in mid-October. As the Budget occurred before the EU had granted a further Article 50 extension to end-January 2020 and at a time when UK policy was very uncertain, the Government's approach was prudent and appropriate given the likelihood and potential impact of a disorderly exit.[28]

Budget forecasts were formulated by first updating the *SPU 2019* figures based on no change in the assumption regarding Brexit—that is, assuming an orderly exit with a withdrawal agreement in place, including provisions for a transition period until end-2020. This scenario was then updated to reflect the output of ESRI/Department of Finance research (Bergin *et al.*, 2019), in which the impacts of a disorderly Brexit scenario were modelled using the ESRI's COSMO medium-term macroeconomic model of the Irish economy.

Bergin *et al.* (2019) include various caveats to their analysis, some of which are described in Table 2.1.[29] Overall, the Council assesses that these caveats imply a significant degree of downside risk for the estimated impact of a disorderly Brexit on the Irish economy, relative to the *Budget 2020* forecasts—if a disorderly Brexit occurs.

[28] The deal has not yet been passed in legislation and the UK general election in December could increase or decrease the likelihood that the UK parliament ratifies the new withdrawal agreement.

[29] The Department notes that the euro-sterling exchange rate is not the same as that shown in Table 2 of the *Budget 2020 Economic and Fiscal Outlook*, as the assumption of a disorderly Brexit "necessitat(es) an element of judgement when compiling the external demand assessment".

Table 2.1: Caveats to COSMO-based estimates of the potential impact of Brexit on the Irish economy

Caveat	Description
Trade	The timing and severity of changes in trade patterns may differ from the assumptions reflected in Bergin *et al.* (2019), and those reflected in *Budget 2020*, in the event of a disorderly Brexit. Non-UK trade flows could also be disrupted due to a disorderly Brexit.
Supply-chain effects	The absence of supply-chain effects from the model could mean the model underestimates the impact of a disorderly Brexit on the Irish economy.
Labour market	A disorderly Brexit could result in sharper declines in employment, as Brexit is modelled as a typical trade shock, whereas the labour intensity of UK demand is often greater than for an average trading partner. This reflects the relative importance of the UK market to Irish-owned firms involved in labour-intensive activities, such as agri-foods exports (Lawless and Morgenroth, 2019). A modest 0.6 percentage-point increase in the unemployment rate is forecast in 2020 in the event of a disorderly Brexit, compared to the deal-counterfactual scenario—this could prove too benign.
Fiscal policy	The model excludes any response to Brexit in terms of government spending. The inclusion in *Budget 2020* of "Brexit contingency" expenditure implies possible upside risk to short-term growth forecasts. Previous Council analysis (Fiscal Council, 2019c) using the Fiscal Feedbacks model that indicates a more severe negative impact of Brexit on the public finances could occur. This may result in more challenging trade-offs for the Government if large and persistent deficits occur, as a rising debt ratio implies a limited capacity for lasting fiscal support.
Potential growth	Brexit could negatively impact Ireland's potential growth rate. Estimated impacts on Ireland's output are presented as a level shock, and growth rates are not explicitly impacted over the long run. However, Brexit can also be viewed as representing a shock to long-run or trend growth rates (Fiscal Council, 2017e). This would be consistent with Irish exporters facing significant challenges in diversifying to other markets after Brexit, and the existence of a relationship between potential economic growth and an economy's openness to trade, capital and labour market flows.

Sources: Bergin et al. (2019); and Fiscal Council (2017e, 2018e).

Pattern of recent forecast errors

The Council notes a pattern of generally positive errors in forecasts of underlying domestic demand since 2013—that is, outturn growth rates have often been higher than those forecast. In Chapter 2 of the June 2019 *Fiscal Assessment Report* (Fiscal Council, 2019c), government net consumption has been identified as the one clear source of persistent positive forecast errors in underlying domestic demand. This highlights the need to use more realistic assumptions for government spending to present the most accurate forecast of future macroeconomic developments.

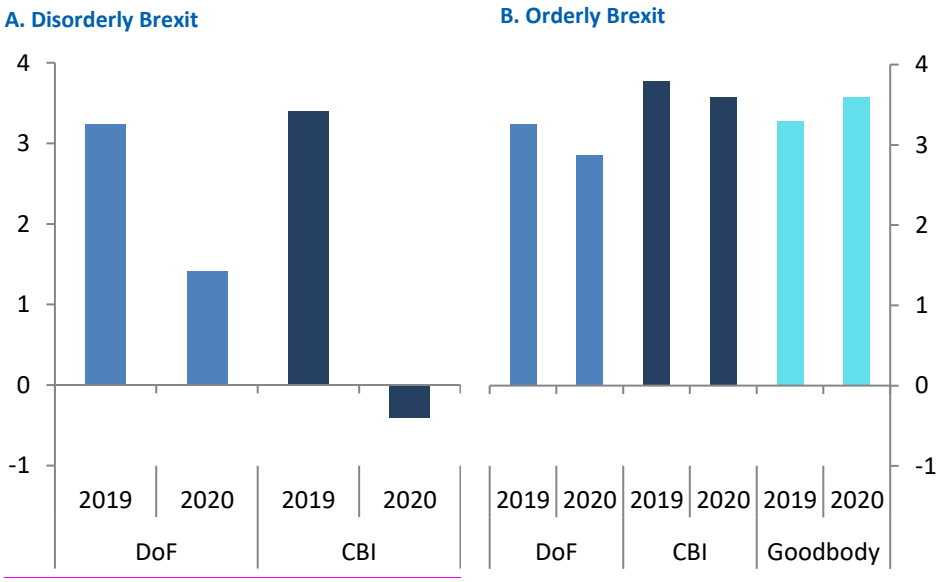
Forecasts of exports, particularly services exports, have also been lower than outturns over time, and by a considerable magnitude. For example, outturns for services exports have been 5.7 percentage points higher than in-year forecasts on average for the period 2014–2018 (12.8 per cent versus 7.1 per cent forecast), despite these forecasts taking place at Budget time in October of the forecast year. Data revisions to the quarterly national accounts explain some of this, and these components are inherently difficult to forecast given on-going structural changes.

Comparison with other projections

The Council's benchmark projections are presented in Appendix C. There are minor differences between the benchmark projections and the Department's macroeconomic forecasts. The benchmark projections anticipate a slightly slower growth rate than *Budget 2020* for 2020–2024; the average difference in underlying domestic demand growth is 0.3 of a percentage point, assuming a disorderly Brexit takes place. This difference includes broadly offsetting contributions of faster growth in personal consumption and slower growth in underlying investment.

Figure 2.1: Forecasts of underlying domestic demand

Year-on-year percentage change in volumes



Sources: Department of Finance, *Budget 2020*; Central Bank of Ireland, *Quarterly Bulletin No 4 2019*; Goodbody Stockbrokers, November 2019.

Figure 2.1 compares recent short-term forecasts for real underlying domestic demand in 2019 and 2020, for both disorderly Brexit (panel A) and orderly Brexit (panel B) scenarios. *Budget 2020* projects that a disorderly Brexit results in lower underlying domestic demand growth of 1.8 per cent. The Central Bank of Ireland

estimates a more severe impact with a decrease in growth of 4 percentage points, to −0.4 per cent.

Macroeconomic risks

The medium-term outlook for the Irish economy is unusually uncertain (see Chapter 1), with clear possibilities for both upside performance (due to overheating) and realisation of various downside risks. Besides the risk of a more adverse scenario under a disorderly Brexit, the current downside macroeconomic risks include continued escalation of protectionist measures involving the world's largest economies, the onset of a cyclical downturn in Ireland's main trading partners, and the possibility that continued easing in monetary conditions could lead to a build-up of financial vulnerabilities. Table 2.2 reviews the macroeconomic risks described by the Department in *Budget 2020*.

Table 2.2: Assessing the *Budget 2020* macroeconomic risk matrix

Likelihood (L) and Impact (M) are from *Budget 2020*, unless stated (red=high; pink=medium; grey=low)

L	M	
		Deeper global slowdown: Forecasts for global growth have been revised downward in 2019. A more protracted slowdown could negatively impact Ireland's exports, with potential implications for incomes and employment creation.
		Larger impacts of a disorderly Brexit: Although the Budget forecasts reflect a scenario involving a disorderly Brexit, such a unique shock to economic growth as Brexit is very difficult to accurately forecast, and the impacts on the Irish economy could be more severe than projected.
		Disruption to world trade: Related to the risk of a deeper global slowdown, an increased risk of protectionist trade policies may have a negative impact on worldwide trade flows. In 2019, Ireland has been impacted by tariffs as a result of a trade dispute between the EU and the US.
		Geopolitical factors: While geopolitical factors have little direct impact on Ireland, second-round effects of wider global tensions on world trade could be significant.
		Loss of competitiveness: Domestic sources of possible competitiveness losses include wage pressures and rising rents in commercial and residential properties. One possible external source of a loss in competitiveness is a shock to exchange rates.
		Inappropriate monetary policy (Fiscal Council risk): Monetary policy is set by the European Central Bank. If a disorderly Brexit is avoided, growth in Ireland is forecast to continue to outperform the euro area. This scenario could mean a looser monetary policy than would be ideal for Ireland. This could amplify the business cycle, as occurred prior to the last crisis.
		Housing supply pressures: A supply response would be expected to moderate price growth, and year-on-year price changes in Dublin began to decline in August 2019. Excess demand can be harmful for competitiveness and labour mobility, while a construction boom with output nearing potential could exacerbate the risk of overheating risk.
		Concentrated production base: The Irish production base is concentrated in a small number of sectors. As a result, sector- or firm-specific shocks could pose wider risks for the economy.
		Overheating risk: Overheating could occur in the Irish economy even without significant credit growth. A persistently strong economic growth rate when the economy is operating near its potential output means there is a risk of overheating if rapid growth rates continue.
		Inappropriate domestic policy (Fiscal Council risk): Ireland has fewer levers for managing the domestic economy. Two main domestic policy tools are fiscal policy and macroprudential policy. These may need to play an active role in preventing overheating, although they may also provide support to the economy in a downturn.

Sources: Department of Finance, *Budget 2020*; and Fiscal Council assessment.

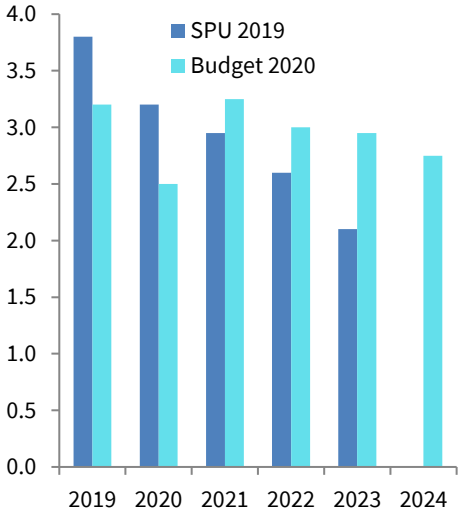
2.3 Assessment of the *Budget 2020* Macroeconomic Forecasts

Macroeconomic context

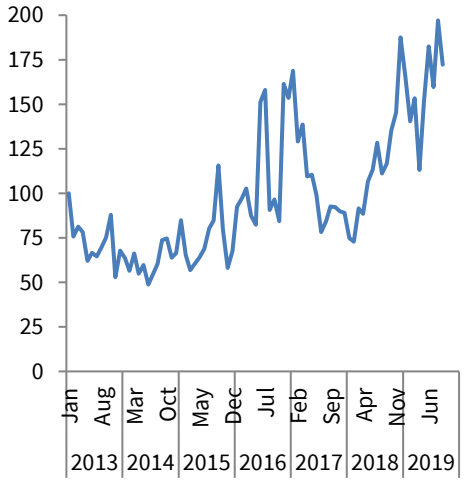
Budget 2020 forecasts incorporate an anticipated short-term weakening of demand in Ireland's main trading partners, as shown in Figure 2.2A. An increase in trading frictions and protectionist measures among the world's largest economies (US and China), in combination with the prospect of a disorderly UK exit from the EU, and uncertainty in monetary policy, are reflected in an elevated level of global economic policy uncertainty (Figure 2.2B). A slowdown in Euro Area manufacturing and services is suggested by high-frequency indicators such as purchasing managers' indices. This slowdown has also been evident in some quarterly macroeconomic data releases in recent months, although as of yet there has been no adverse impact on growth rates in employment or earnings.

Figure 2.2: World demand weaker with rising policy uncertainty

A. World demand forecasts
Year-on-year percentage change



B. Global economic policy uncertainty
January 2013 = 100



Sources: Department of Finance, *Budget 2020* Macroeconomic Outlook and Projections (Presentation to Irish Fiscal Advisory Council, slide 26); and www.policyuncertainty.com.

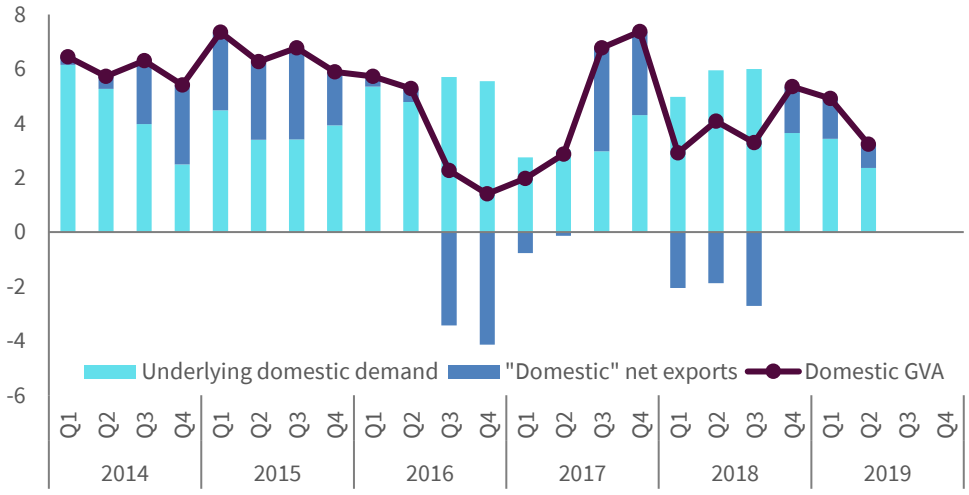
A slowdown in world demand could significantly affect the Irish economy given its strong dependence on trade—however, the current shock to global trade has so far been concentrated in activities where Ireland has lower exports exposure. Headline Irish exports increased by 10.4 per cent in 2018 and reached 201 per cent of modified gross national income, and the majority relate to sales by multinational firms whose strong performance has continued in 2019. For example, exports of computer services increased by close to one third in the first half of the year

compared with the same period in 2018, whereas pharmaceuticals exports (NACE codes 51 and 54) are 10.3 per cent higher for January–September. While many of these firms operate in industries which are less cyclically sensitive to global demand, domestic Irish exporters are generally far more exposed to such effects.

One way to estimate the contribution of net exports by domestic firms to economic growth is to subtract underlying domestic demand (excluding investments in aircraft and intangibles) from gross value added that is not dominated by multinational firms (whose turnover is over 85 per cent of a sector's total)—that is, "domestic" GVA. As shown in Figure 2.3, this highlights the part of domestic value added that is explained by underlying domestic activity and the part that is explained by "domestic" net exports. This measure of domestic net exports explains much of the variation in the growth of domestic production over recent years, including the slowdown in the second half of 2016—possibly in response to the UK voting to leave the EU—and acted as something of a drag on growth in 2018.

Figure 2.3: "Domestic" net exports have contributed less to economic growth since the Brexit vote in mid-2016

Year-on-year percentage change in volumes



Sources: CSO; and internal Fiscal Council calculations.
Note: "Domestic" net exports are estimated as the difference between non-multinational-dominated gross value added and underlying domestic demand (excluding investments in aircraft and intangibles). Council estimates of aircraft and intangibles are used for Q2 2019 as the data were not published in the Quarterly National Accounts due to confidentiality issues.

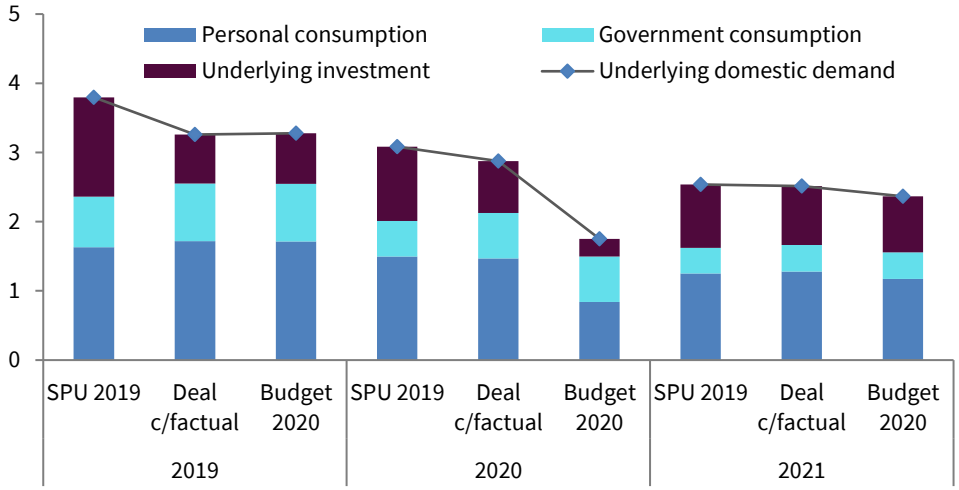
Budget 2020 short-term forecasts

In an orderly Brexit scenario, the underlying domestic demand growth projections in *Budget 2020* would have been slightly slower than in April's SPU. Figure 2.4 presents the changes to the *SPU 2019* forecasts reflected in *Budget 2020* for underlying domestic demand and its components. This shows the estimated

impacts to April's short-term outlook of updated forecasts reflecting a "deal-counterfactual" scenario, and of a disorderly Brexit.[30]

Figure 2.4: Changes to *SPU 2019* short-term forecasts for underlying domestic demand and its component contributions

Year-on-year percentage change and percentage points



Sources: Department of Finance; and internal Fiscal Council calculations.
Note: Underlying investment growth in 2021 is assumed unchanged compared to *SPU 2019*.

The impact of a disorderly Brexit is evident in a near-halving of the 2020 growth forecast for underlying domestic demand, to 1.8 per cent in *Budget 2020*. A far more modest reduction in growth as a result of a disorderly Brexit of 0.15 of a percentage point is forecast for 2021.[31]

Table 2.3 details the Budget's short-term forecasts with both orderly and disorderly Brexit scenarios included for 2020. A disorderly Brexit reduces personal consumption growth by 1 percentage point, and underlying investment growth by 2.4 percentage points, with downward revisions also for growth in employment and the labour force. Gross domestic product growth is forecast to slow to 0.7 per cent in 2020, down from 3.1 per cent in the deal-counterfactual scenario. This forecast is particularly affected by slower growth in exports of 0.9 per cent, driving a negative contribution to growth of underlying net exports. The shock is also reflected in a return to a negative estimated output gap in 2020, compared to output 0.8 per cent above potential as shown in April's SPU (see Figure 2.5).

[30] Although the "deal-counterfactual" scenario could prove to be a more likely outcome, a disorderly Brexit remains possible. Furthermore, the current deal reflects less favourable trading arrangements for Ireland than under the previous withdrawal agreement.
[31] 2021 was not included in the Council's endorsement exercise for *Budget 2020*.

Table 2.3: *Budget 2020* macroeconomic forecasts (to 2020)

Percentage change in volume, unless stated

	2018[a]	*2019*	Disorderly Brexit *2020*	Orderly Brexit *2020*
Demand				
Underlying domestic demand[b]	5.3	3.3	1.8	2.9
GDP	8.2	5.5	0.7	3.1
…of which (contributions)				
Underlying domestic demand[c] (p.p.)	*2.7*	*1.7*	*0.8*	*1.5*
Underlying net exports[c] (p.p.)	*5.5*	*3.7*	*−0.1*	*1.7*
Personal consumption	3.4	2.7	1.4	2.4
Government consumption	4.4	4.5	3.5	3.5
Investment	−21.1	50.4	−24.0	−22.4
Underlying investment[b]	13.0	3.8	1.3	3.9
Exports	10.4	10.2	0.9	4.2
Imports	–2.9	22.6	–6.5	–4.7
Underlying imports[b]	6.5	11.7	1.6	4.8
Supply				
Potential output	5.3	4.0	2.0	N/A
Output gap (% of potential output)[d]	−0.2	1.0	−0.3	N/A
Labour market				
Population	1.4	1.3	1.2	N/A
Labour force	1.8	1.8	1.4	N/A
Employment	2.9	2.4	0.8	1.7
Unemployment rate (% labour force)	5.8	5.2	5.7	5.1
Prices (year-on-year percentage change)				
HICP	0.7	0.9	1.3	1.2
Personal consumption deflator	1.8	1.7	1.7	N/A
GDP deflator	0.8	0.4	1.6	1.9
Other				
Nominal GNI*	7.3	2.9	0.2	N/A
Nominal GDP	9.1	5.9	2.4	5.2
Nominal GDP (€ billion)	324.0	343.2	351.4	364.0
Modified current account (% of GNI*)	6.6	5.2	2.4	N/A

Sources: CSO; Department of Finance; and internal Fiscal Council calculations.

Notes: [a] Denotes latest outturns from the CSO.

[b] Underlying (final) domestic demand, investment and imports exclude other transport equipment (mainly aircraft) and intangibles. For the orderly Brexit scenario in 2020, the growth rate in modified investment is used as a proxy for underlying investment.

[c] Underlying contributions to real GDP growth rates in percentage points. Underlying net exports include the effect of the change in inventories and exclude the effect of investment in aircraft and intangible assets.

[d] The output gap and potential output estimates used here are the Department's GDP-based alternative estimates.

Budget 2020 forecasts show continued growth in underlying domestic demand, despite the impact of a disorderly Brexit. However, the main risks to this outlook are

to the downside, as discussed in relation to the Department's methodology, and the caveats to the estimated impacts of a disorderly Brexit (Table 2.1).

Given the significant uncertainty surrounding the forecasts, it is important to consider the possible impacts of a less benign scenario due to a disorderly Brexit—or an orderly Brexit with less benign impacts than currently envisaged in the Budget forecasts. Box D analyses downturns in domestic economic activity in Ireland and comparable European countries over the past six decades, and finds that investment declines have been particularly severe manifestations of downturns in Ireland. Although a downturn is not forecast following a disorderly Brexit, the historical experience of downturns provides context for possible impacts on the domestic economy and labour market if a less benign scenario were to materialise.

With the decline in 2019 of high-frequency consumer and business sentiment indicators for Ireland, it is relevant to query whether sentiment can provide advance warning of a forthcoming slowdown in the economy. The analysis in Box E suggests that the relationship between sentiment indicators and real economic activity has historically not been very strong, with signals often mixed. For example, in contrast to the sentiment data, other indicators of economic activity such as the quarterly national accounts and retail sales have held up quite well so far in 2019. This matches findings elsewhere: for example, Stock and Watson (2003) find that US consumer confidence declined sharply before and during the 1990 recession, yet it maintained strength well into the 2001 recession.

Box D: Characterising downturns in Ireland's domestic economy

Budget 2020 forecasts a slowdown in economic growth for Ireland in 2020. However, as discussed in this chapter, a great deal of uncertainty surrounds short-term forecasts of economic growth in a disorderly Brexit. With a view to quantifying possible downside risks to the Budget forecasts, this box considers how downturns have historically manifested in relevant indicators of economic activity, for Ireland and comparable European countries.

Methodology

Downturn episodes in Ireland and a group of small European countries are analysed using 59 years of European Commission AMECO data (in volumes) for personal consumption, investment, employment, and (HICP-deflated) compensation of employees.[32] A standardised definition of a downturn episode in final domestic demand (excluding stocks) is taken as an

[32] Latest CSO data are used for Ireland, and investments in aircraft and intangibles are excluded from Ireland's gross fixed capital formation data since 1995, due to their high import content and association with activities of multinational enterprises.

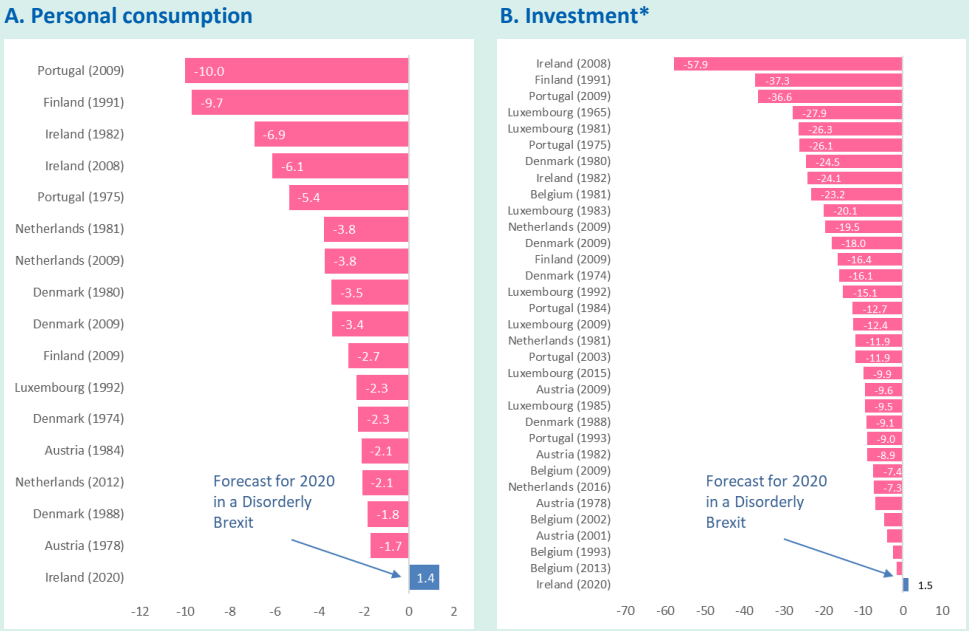
annual growth rate that is one standard deviation below the country-specific long-run average. Downturn impacts are then calculated as peak-to-trough falls in the four variables listed above for up to seven years around each downturn year—that is, from year *t-1* to *t+6* for a downturn in year *t*. This approach to assessing the impacts of downturns is very mechanical, however, and does not account for different causes of downturn episodes across countries.

What happens to personal consumption and investment in downturns?

Figure D.1 presents the performances of personal consumption and investment (gross fixed capital formation) during domestic downturns in Ireland and comparable European countries. The two panels show a typical feature of business cycles: investment is more sensitive to downturns than personal consumption, which is evident in both the relative size of the impacts and the relative number of episodes.

Figure D.1: Investment falls by more than consumption in downturns

Peak-to-trough percentage change in volume; country and first year of downturn episode



Sources: European Commission, AMECO database; CSO; and internal Fiscal Council calculations.
Notes: Downturns are defined as growth in final domestic demand (excluding stocks) one standard deviation below its long-run (1961–2018) average. Bars show peak-to-trough percentage change from years *t-1* to *t+6*, with a downturn occurring in year *t*.
*The latest CSO data are used for Ireland for 1995–2018, and underlying investment (excluding investments in aircraft and intangibles) is used instead of unadjusted gross fixed capital formation.

The most severe investment downturn in the sample took place in Ireland during the recent crisis period, when underlying investment fell 57.9 per cent between 2008 and 2012. Personal consumption in Ireland fell 6.9 per cent in 1982, which is its worst peak-to-trough decline since 1960, and later fell by 6.1 per cent during the recent crisis period (2009–2013).

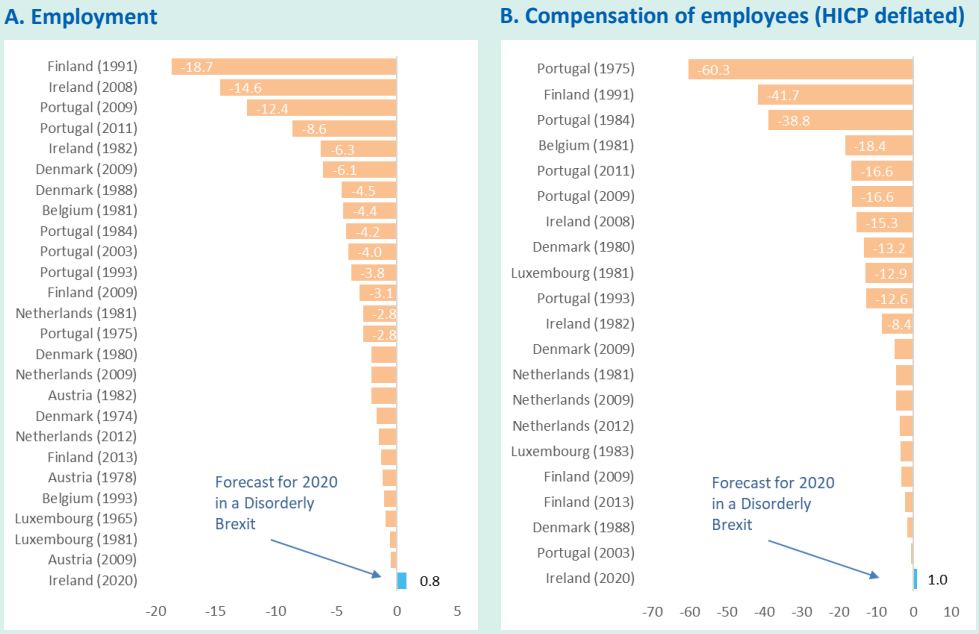
Despite the assumption of a disorderly Brexit, *Budget 2020* forecasts growth in underlying domestic demand in 2020 of 1.4 per cent. This does not meet the criteria for a "downturn" as defined in this box, as one standard deviation below the 1961–2018 average involves a fall of 0.5 per cent. However, the risk of a more adverse impact is illustrated by the range of episodes experienced in comparable European countries—based on which, the average reduction in personal consumption is 4.2 per cent, and 16.6 per cent for investment. As noted previously, this analysis does not attempt to account for differences in the causes of downturns across countries and over time, and instead mechanically compares episodes in a broader sense.

What happens to employment and employees' wages in downturns?

Figure D.2 shows corresponding labour-market impacts of downturns in Ireland and similar European countries. Ireland's largest downturns have severely impacted employment and real compensation of employees, although impacts have been worse elsewhere, for example in Finland (for employment) and Portugal (for wages). While *Budget 2020* does not forecast a downturn episode in 2020, the historical context shows an average impact across country downturn episodes of −4.5 per cent for employment and −15 per cent for real compensation of employees.

Figure D.2: Wages often fall by more than employment in downturns

Peak-to-trough percentage change in volumes, by country and first year of downturn episode



Sources: European Commission, AMECO database; CSO; and internal Fiscal Council calculations.
Notes: Downturns are defined as growth in final domestic demand (excluding stocks) one standard deviation below its long-run (1961–2018) average. Bars show peak-to-trough percentage change from years *t-1* to *t+6*, with a downturn occurring in year *t*. The latest CSO data are used for Ireland for 1999–2018.

Implications

These findings suggest that Ireland's downturns have been relatively severe, in particular for underlying investment. Although all downturn episodes are unique, the examples included in this box suggest that investment and real compensation of employees have been exposed to particularly large peak-to-trough falls of over one tenth in many cases. As such, if a disorderly Brexit causes a downturn to occur, there could be large downside risks to the Budget's forecasts for 2020.

Box E: How well do consumer and business sentiment correspond to real economic activity?

A number of surveys are used to measure consumer and firm assessments of their financial circumstances and their expectations for the general economy. Among these are the KBC consumer sentiment index, and the European Commission's indices for consumer and business sentiment (which includes sub-indices for industry and services).

Table E.1 shows the correlations between these sentiment indices and four measures of real economic activity: expenditure on personal consumption, underlying domestic demand, underlying investment, and gross domestic product. The highest correlations are between the consumer sentiment indices and underlying domestic demand, and a similarly strong relationship exists between these indices and personal consumption—the largest component of underlying domestic demand.

Table E.1: Consumer sentiment is more correlated with real economic growth than is business sentiment

Correlation coefficient: 1=perfectly correlated, –1=perfectly negatively correlated

	Consumer sentiment		Business sentiment	
	KBC	DGECFIN	DGECFIN (Industry)	DGECFIN (Services)
Personal consumption	0.80	0.81	0.52	0.61
Underlying domestic demand	0.81	0.83	0.62	0.69
Underlying investment	0.60	0.60	0.60	0.61
Gross domestic product	0.66	0.65	0.60	0.72

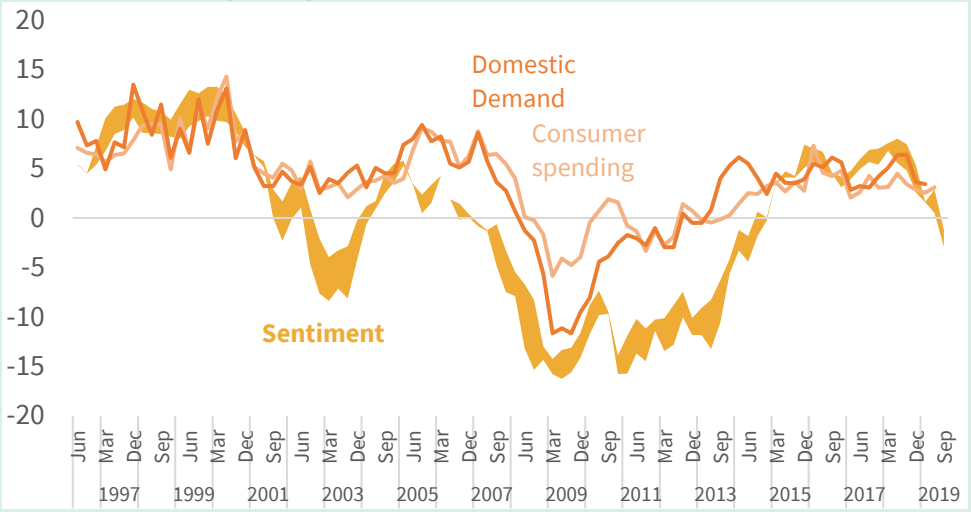
Sources: CSO; KBC Bank Ireland; European Commission; and internal Fiscal Council workings.
Note: The table shows correlations between year-on-year percentage changes for real economic activity—using quarterly data—and standardised sentiment, which is constructed by subtracting a long-run average from quarterly sentiment data, and scaling it by its long-run standard deviation.

Consumer sentiment indices

Consumer sentiment has a reasonable correlation with real activity, as shown in Figure E.1. But looking closely at the performance of sentiment indicators over time, their performance as leading indicators is relatively mixed.[33]

Figure E.1: Consumer sentiment indices are reasonably correlated with real activity, but have a mixed performance as leading indicators

Year-on-year percentage change and standardised consumer sentiment



Sources: CSO; KBC Bank Ireland; European Commission; and internal Fiscal Council workings.
Note: These data show year-on-year percentage changes for personal consumption and underlying domestic demand, using quarterly data. Standardised consumer sentiment is constructed by subtracting a long-run average from quarterly sentiment data, and scaling by its long-run standard deviation.

[33] McQuinn (2019) finds that while Irish consumer sentiment has a statistically significant relationship with economic activity, this model has performed relatively poorly since 2018.

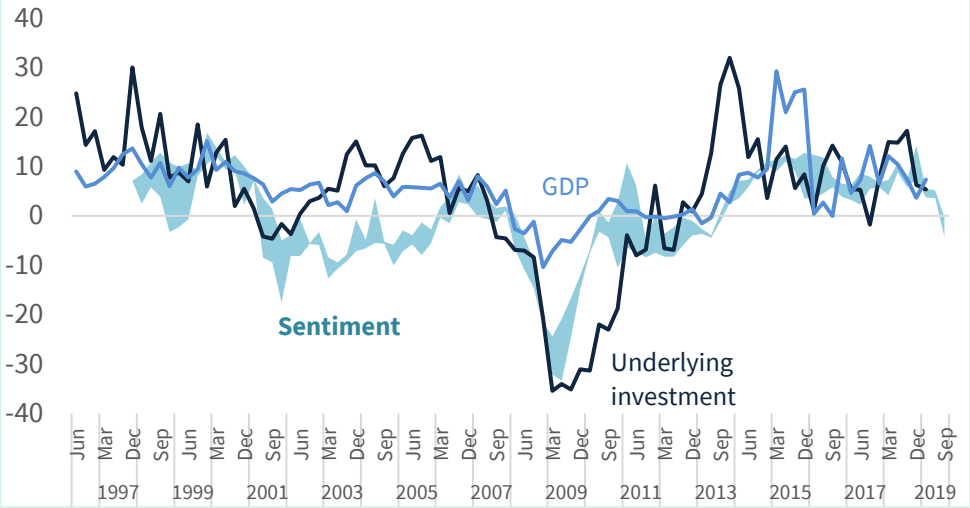
For instance, in the early 2000s around the time of the "dot-com bubble" and 9/11, the sentiment indices weakened substantially. Though real activity did moderate during this period, they held up quite well regardless of the declines in sentiment. This moderation also partly reflected the ending of a catch-up (or "convergence") period as opposed to an underlying weakening in economic conditions. By contrast, in the financial crisis period, weaknesses in consumer sentiment did appear to pre-sage contractions in real activity as far out as four to six quarters ahead.

Business sentiment indices

Business sentiment data tend to have a weaker correlation with real activity compared to consumer sentiment indicators (Figure E.2). Looking more closely at their performance as leading indicators, we can see that it is—as with consumer sentiment—quite mixed.

Figure E.2: Business sentiment indices show weaker correlation with real activity

Year-on-year percentage change and standardised consumer sentiment



Sources: CSO; European Commission; and internal Fiscal Council workings.
Note: These data show year-on-year percentage changes for personal consumption and underlying domestic demand, using quarterly data. Standardised consumer sentiment is constructed by subtracting a long-run average from quarterly sentiment data, and scaling by its long-run standard deviation.

The early 2000s again saw business sentiment indices weakening, though real activity (underlying investment and GDP) held up quite well. The contraction in investment in 2001 was short-lived relative to the ongoing weaknesses in sentiment. At the time of the financial crisis, underlying investment contracted before sentiment turned. While sentiment seemed to recover its pre-crisis levels by 2011, investment continued to contract.

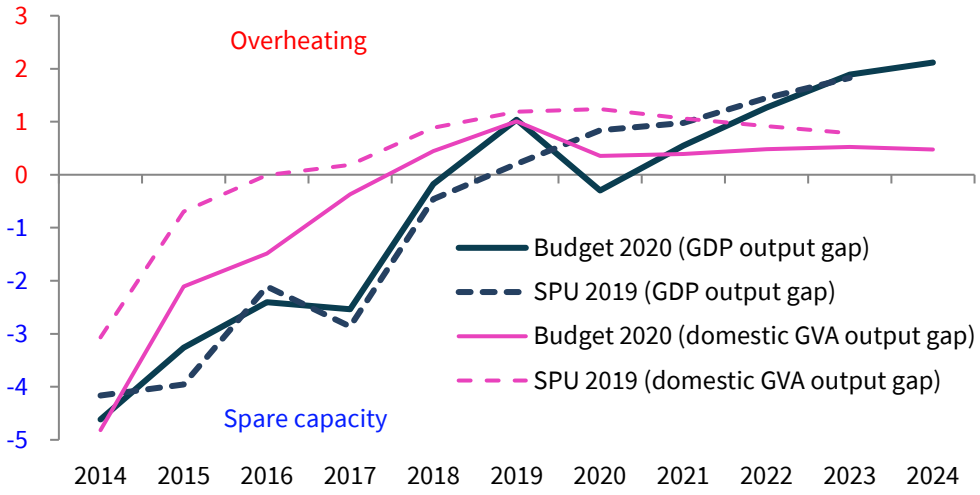
Budget 2020 medium-term forecasts

Over the medium term, underlying domestic demand forecasts in *Budget 2020* show growth of close to 2½ per cent per year for 2021–2024, while employment growth is forecast to recover gradually after falling to 0.8 per cent in 2020, towards 2 per cent by 2024. The unemployment rate is forecast to increase only modestly to 5.9 per cent in 2021 before recovering to 5½ per cent by 2024. Compared to an orderly Brexit, the unemployment rate is forecast to increase by just 0.6 of a percentage point in 2020 and 0.8 of a percentage point in 2021 as a result of a disorderly Brexit.

The impact of a disorderly Brexit is concentrated in an expected fall in underlying net exports in 2020, resulting in a slower forecast for GDP growth. The effects are largely treated as a level shock to demand, rather than as a supply shock affecting long-term growth rates. This results in a modestly negative impact on the Department's preferred output gap estimate in 2020—the most recent GDP-based and domestic GVA-based alternative estimates are shown in Figure 2.5, with *SPU 2019* figures also included for comparison. Although April's SPU forecasts were prepared assuming an orderly Brexit, it is noteworthy that compared to a prior 0.2 per cent, the most recent estimate of the output gap in 2019 has been revised up to 1 per cent—in line with current and prior estimates based on domestic GVA. The revision reflects a higher GDP outturn for 2018 in July's *National Income and Expenditure 2018*.

Figure 2.5: Alternative output gap estimates

Percentage points of potential output



Sources: Department of Finance, *SPU 2019* and *Budget 2020*.

Over the medium term, the GDP-based measure suggests that the output gap will turn positive and continue to widen over the forecast horizon to reach around 2 per cent by 2024, consistent with some overheating. However, as the Council has previously noted, the GDP-based estimates are conceptually weaker than those based on domestic GVA, given the large distortions to GDP in recent years (Fiscal Council, 2018e). Alternative estimates provided by the Department of Finance point to a smaller but still positive output gap in the coming years. Overheating is fairly likely if the economy remains on a steady course. An increasingly positive output gap may be less likely in a disorderly Brexit scenario, although growth could be unbalanced between Brexit-impacted traditional sectors and other activities.

However, the coherence of some of the trends in key economic sustainability indicators over the medium term is weaker in some areas than others. Whereas the savings ratio forecast in April's SPU was just over 12 per cent on average for 2021–2023, the profile in *Budget 2020* (based on a disorderly Brexit) shows a fall in the savings ratio of 3.6 percentage points over 2020–2024. This is despite the Budget's forecasts for slower household consumption and faster personal disposable income on average over the medium term compared to April's SPU. Furthermore, this may not be consistent with possibly higher precautionary savings under a disorderly Brexit scenario.

Imbalances

The Council's modular approach examines possible sources of economic imbalances—see Appendix D for details. The approach seeks to address the difficulty of producing a summary statistical estimate of the cyclical position of the economy, and to monitor specific economic data that may indicate the presence of potentially unsustainable positions of relevance to the public finances, or developments that display procyclical tendencies. The four modules examined are the labour market and prices, external balances, dwellings and investment, and credit conditions.

Figure 2.6 (overleaf) shows the Council's "heat map" visualisation. As the crisis years approached, the mainly red-coloured ("hot") indicators corresponded to activity that was more than one standard deviation above its central value. These indicators abruptly turned blue for much of the time since 2009, and more recently have become more neutral (yellow) as the recovery progressed. Preliminary 2019 data show an increasing number of orange and red indicators, in particular for the labour market and investment—hourly wages grew by 3.6 per cent in the first half of 2019, the fastest pace since 2008, and far faster than 0.6 per cent in the Euro Area.

The labour market and prices

Budget 2020 forecasts a relatively benign labour-market environment. Despite strong employment growth in recent years, price inflation in Ireland remains muted. The unemployment rate is forecast by the Department to return to 5½ per cent by 2024 after modest increases in 2020 and 2021 as a result of a disorderly Brexit. The Budget projects net immigration above 1 per cent of the labour force over the medium term, broadly unchanged compared to April's SPU.

Figure 2.6: Heat map for monitoring potential imbalances in the Irish economy

Within specified standard deviation bands of central values:

-2.00 -1.75 -1.50 -1.25 -1.00 -0.75 -0.50 -0.25 0.00 0.25 0.50 0.75 1.00 1.25 1.50 1.75 2.00 NA

'00 '01 '02 '03 '04 '05 '06 '07 '08 '09 '10 '11 '12 '13 '14 '15 '16 '17 '18 '19

Aggregate

Output gap

Change in output gap

Labour Market and Prices

Unemployment (% labour force)

Construction (% total employment)

Net migration (% labour force)

Inflation (HICP)

Core inflation

Personal consumption deflator

Hourly wage inflation

Real hourly wage inflation

Relative hourly wage growth (Ireland / Euro Area)

Change in unemployment (% labour force)

Change in inflation (HICP)

Change in core inflation

Change in wage inflation

External Balances

Modified current account (% GNI*)

Adjusted NIIP (% GNI*)

Change in modified current account (% GNI*)

Investment and Housing

Underlying investment (% GNI*)

Residential construction (% GNI*)

New dwelling completions (thousands)

Non-residential construction (% GNI*)

Residential property price growth

Residential price-to-income ratio

Residential price-to-rent ratio

Household savings ratio (% disposable income)

Household net lending/borrowing (% GNI*)

Change in underlying investment (% GNI*)

Change in residential construction (% GNI*)

Change in new dwelling completions

Change in non-residential construction (% GNI*)

Credit and Financial

New mortgage lending (% GNI*)

Credit to private sector Ex FI (% GNI*)

Adjusted private sector credit (% GNI*)

New SME credit (% GNI*)

Sources: CSO; Central Bank of Ireland; Department of Finance (*Budget 2019* forecasts); Department of Environment, Heritage and Local Government; ESRI/PTSB; European Commission (AMECO and CIRCABC); Residential Tenancies Board; and internal Fiscal Council calculations.

Note: 2019 data included above show year-to-date outturns, and the *Budget 2020* forecast for GNI* is used. For other calculation details, see Timoney and Casey (2018).

External balances

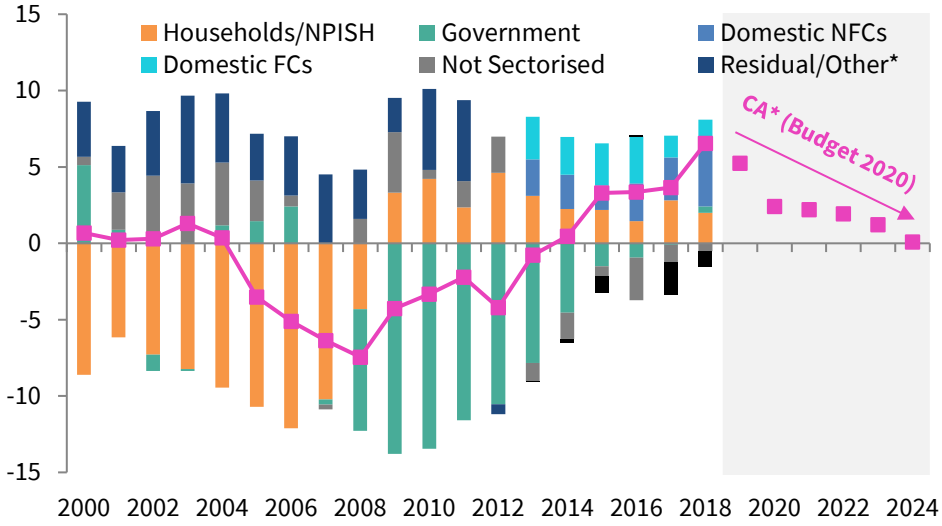
The modified current account (CA*) can be analysed based on the net financial balances of institutional economic sectors. This is approximated using the balance of gross savings less gross capital formation by households/non-profit institutions serving households (NPISH), government, domestic financial corporations and non-financial corporations (data available from 2013), non-sectorised activity, and a residual category including domestic firms prior to 2012.

Large unexpected corporation tax receipts in recent years have contributed to the current account balance over time. These receipts represent a net injection to the Irish economy, as foreign-owned multinational enterprises contribute four-fifths of receipts. These are different from conventional tax receipts on domestic incomes, which are available to the government yet have a counterpart in taxes paid out of domestic activity. It can therefore complicate assessments of the sustainability of the current economic position and should be accounted for. Underlying measures of the current account—if adjusted for the surges in corporation tax (Box B, *June 2019 Fiscal Assessment Report*) as well as the impact of multinational activities more generally—would likely show a surplus of closer to 2.3–4.3 per cent of GNI* for 2019, rather than 5.2 per cent as forecast in *Budget 2020*.

The sectoral balances of the Irish economy are shown in Figure 2.7. Factoring in gross savings and gross capital formation, the figures now suggest the domestic non-financial corporation sectoral balance improved by €2.3 billion in 2018, and all sectors of the economy (besides "Not Sectorised" and a residual category) contributed positively to the CA* surplus of close to €13 billion. The Department forecasts a sharp decrease in CA* in 2020, reflecting weaker expected net exports mainly due to the disorderly Brexit assumption, leading to an assumed reduction in the contribution of non-financial corporations to the CA* balance. Following this, the Department projects a more gradual decrease over the medium term. However, the CA* level is projected to retain a €2.7 billion surplus by 2023, whereas *SPU 2019* forecasted a deficit of €3.2 billion for the same year. This is despite the higher forecast for the household savings ratio in April's SPU. The SPU and Budget forecasts for CA* imply very different prospects for the medium-term health of the economy—if CA* remains in surplus over time, this suggests a greater degree of sustainability for economic activity than other relevant indicators, especially the positive and widening output gap.

Figure 2.7: Domestic balances were all positive in 2018

Percentage of GNI*



Sources: CSO; and internal Fiscal Council calculations.
Note: Net-financial-balance components of the modified current account are calculated as gross savings less gross capital formation of households/NPISH, government, domestic financial corporations, domestic non-financial corporations, not sectorised, and a residual category which includes domestic financial and non-financial corporations prior to 2013.

Dwellings and investment

From a low base of activity, residential construction is forecast by the Department to continue to rise over coming years. Annual housing completions, officially estimated at 17,995 for 2018, are forecast by the Department to increase to 45,000 by 2024. This would approach the upper end of estimates of the appropriate medium-term level of new-dwelling completions consistent with demand, and could prove challenging to achieve without a rapid increase in apartments completions—of which just 3,132 were completed in the four quarters to Q3 2019. While it is necessary to address the undersupply of new housing, particularly if a disorderly Brexit is avoided, there is a risk that the associated construction activity in an economy already close to full employment will create imbalances in demand and a skew towards new-dwelling construction. Residential construction is an employment-intensive activity and generates significant tax revenues, as well as typically attracting inward migration—which in turn can further increase the required supply of new dwellings. As previously highlighted in Council publications (Fiscal Council, 2019c), the level of activity in non-residential construction continues to be projected to remain above its long-run average share of GNI* over the medium term. Allowing for usual volatility, this level of activity reaches close to two standard deviations above its long-run average in the early 2020s, suggesting either that the

forecasts are overoptimistic or the risk of possible resource over-concentration in non-residential construction in the coming years.

Credit conditions

The stock of credit owed by households and enterprises (excluding financial intermediation) has been in continuous decline for over ten years, beginning in the fourth quarter of 2008. More recently, the pace of reduction in the stock of private-sector credit has slowed. Net credit flows to private-sector enterprises (excluding financial intermediation) returned to growth in 2018. For household lending, net flows of credit advanced for principal dwelling purchases have been growing since the second quarter of 2016, and have remained close to 4 per cent as of the second quarter of 2019. This growth has occurred despite the impact of macroprudential limitations on lending, which could be contributing to a recent slowdown in national residential property price growth. With new-dwelling completions forecast to increase steadily over the medium term, there is potential for rapid growth in net flows of credit for house purchases. It is essential that developments in credit are closely monitored and anticipated, to enable policymakers and regulators to take corrective actions where necessary.

Box F: Using a Large Bayesian VAR for short-run forecasting of Ireland's macroeconomy

As part of the Council's endorsement function, the Council prepares benchmark forecasts of Ireland's macroeconomy to allow for a comparison with the forecasts of the Department of Finance.[34] The Council adopts a suite of modelling approach (having multiple models), to forecast each individual macroeconomic indicator.[35] This box gives a brief summary of an additional forecasting tool the Council has developed—Large Bayesian Vector Auto-Regression (LBVAR)—for forecasting Ireland's underlying macroeconomy.

Given the large range of dynamics that can affect the economy in the short-run, modelling the macroeconomy in a system requires a large number of inputs. Often historical data availability is limited. This can give rise to a large number of parameters that need to be estimated with only a limited data set. For instance, in a Vector Auto-Regression (VAR) with P lags and N variables there are $N^2 \times P + N$ parameters that need to be estimated. Therefore, adding additional variables to a conventional VAR can significantly reduce the degrees of freedom. This can lead to in-sample overfitting and large out of sample forecast errors.

Following the work of Bańbura *et al*. (2010), LBVARs offer a solution to this problem. LBVARs apply Bayesian shrinkage to the parameters of the model, which allows for the use of large information sets to forecast the macroeconomy. LBVARs have been shown to have superior forecasting performance to that of smaller VARs, smaller Bayesian VARs, Factor-Augmented VARs and small DSGE models (Bańbura *et al*., 2010; Gupt & Kabundi, 2010).

The basic intuition behind an LBVAR is to start with a standard VAR model and take a prior belief, typically a so called "Minnesota prior", which is a belief that each equation in the model is centred around a random walk with drift:

$$Y_t = c + Y_{t-1} + u_t$$

Where Y_t is the variable of interest, c is a constant and u_t is a normally distributed error term. This is equivalent to a prior belief that the variable depends on its own lagged value (the coefficient of Y_{t-1} is equal to 1) and not on other variables (the coefficient on the lags of other variables is 0). The overall tightness of the prior distribution around this central estimate is then controlled by a hyper-parameter, λ. The idea behind an LBVAR is to increase the overall tightness of the prior distribution around the central estimates as the number of variables increases, thus reducing overfitting that occurs in larger conventional VARs and reducing the impact of omitted variable bias that smaller VARs are prone to.

Comparing the historical forecasting performance of the Large Bayesian VAR with the Council's other models

This section provides a brief analysis of the forecasting performance of the LBVAR. Forecasts from the LBVAR are compared with the forecasts produced by two models, one for employment growth, and one for personal goods consumption growth, currently in use by the Council. The LBVAR was estimated using a dataset of 47 variables from Q1 2000 to Q4 2018. Figure F.1A shows the outturn for employment growth alongside the one-year-ahead forecast of employment growth from the LBVAR and from one of the Council's benchmark models for forecasting employment.[36] Both models perform relatively similar. The average absolute forecast error for the LBVAR of 0.78 versus 0.80 for the benchmark model. The relative mean

[34] The Council's mandate includes endorsing, as it considers appropriate, the official macroeconomic forecasts of the Department of Finance that are the basis for Budgets and SPUs.

[35] See Conroy & Casey (2017) for an outline of the Council's Suite of Models approach.

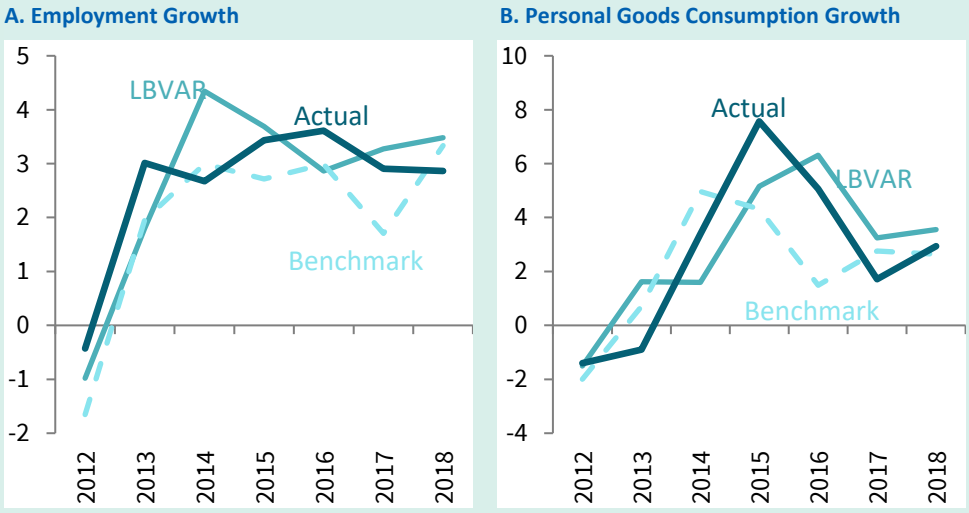
[36] The benchmark model for forecasting employment growth is an error correction model with Underlying Domestic Demand as the macro-driver.

squared forecast error is 1.08, indicating that the benchmark model performs slightly better over this time horizon.[37]

A similar exercise is carried out for personal goods consumption growth (Figure F.1B).[38] Again, both models' performance is relatively similar; however, the LBVAR outperforms the benchmark model in terms of the average absolute forecast error and the relative mean squared forecast error. The average absolute forecast error is 1.46 and 1.71 for the LBVAR and the benchmark model respectively. The relative mean squared forecast error is 0.66 over this horizon, indicating that the LBVAR has a superior forecasting performance.

Figure F.1: Comparison of LBVAR forecasts with the Council's benchmarks

Year-on-year percentage change



Sources: CSO; and Internal Fiscal Council calculations.

Note: Left Panel: Data shows the one-year ahead forecasted employment growth rate for the LBVAR and the benchmark model, as well as the actual employment growth for that year (as of the March 2019 release of the Quarterly National Accounts (QNA)). Right panel: Data show the one-year-ahead forecasted personal goods consumption growth rate for the LBVAR and the benchmark model, as well as the actual personal goods consumption growth rate for that year (as of the March 2019 release of the QNA).

What is the LBVAR currently forecasting?

Table F.1 shows the LBVAR's forecasts for 2019 and 2020 for employment growth and personal goods consumption. The LBVAR forecasts are purely model based with no judgement applied. These forecasts are shown alongside the Council's benchmark forecasts for these variables. For 2019, the LBVAR forecasts employment growth to be 2.6 per cent and personal goods consumption to be 2.7 per cent, relatively close to the benchmark forecast of 2.4 per cent and 2.5 per cent respectively. For 2020, the forecasts for employment growth are only marginally different, with the LBVAR forecasting a growth rate of 1.4 per cent, while the benchmark forecast is 1.5 per cent. There is however, a slight divergence in the forecasts for personal consumption growth for 2020, with the LBVAR forecasting growth of 2.4 per cent, while the benchmark forecast is 2.0 per cent.

[37] That is, the mean squared forecast error of the LBVAR divided by the mean squared forecast error of the benchmark model. Values below one, indicate that the LBVAR has superior forecasting performance relative to the benchmark model.

[38] The benchmark model for forecasting personal consumption growth is an error correction model with personal disposable income in the long-run equation, and both personal disposable income and household wealth in the short-run equation.

Table F.1: LBVAR statistical forecasts

Year-on-year percentage change

	2019	2020
LBVAR employment growth	2.6	1.4
Benchmark employment growth	2.4	1.5
LBVAR personal goods consumption growth	2.7	2.4
Benchmark personal goods consumption growth	2.5	2.0

Sources: CSO; and internal Fiscal Council calculations.

Note: Forecasts are based on data up to Q2 2019. Figures for the benchmark correspond to those in Appendix C relating to the orderly Brexit scenario. The benchmark figures in this table are based on the suite of models for each variable, of which the models outlined above constitute one of the models in the suite for each variable. The benchmark figures may include some element of judgement.

While the analysis above gives a brief outline of the LBVAR and its forecasting performance, a forthcoming working paper will provide a more detailed description of the model estimation and a more comprehensive analysis of its forecasting performance for a wider range of variables.