

a shock would be more sudden, with a sharp front-loading of the negative impact when the shock occurs. As noted in IFAC (2017a), COSMO estimates assume that the impact on the Irish labour market from a shock to UK output is equivalent to that of an average trading partner. Given that Irish exports to the UK may be more labour-intensive than average, this may underestimate the medium-term impact of a hard Brexit on the Irish economy.

Ascertaining the current cyclical position of the economy is difficult, and the Council uses a modular approach to help assess cyclical developments in the economy (see Appendix C). This involves assessing key sources of imbalances that can help to explain any deviation of the economy from its level of potential output, with a view to examining these “modules” in a more systematic manner. Means of incorporating this information directly into baseline estimates of potential output can then be explored, with additional indicators incorporated into output gap equations as proposed by Borio *et al* (2014).⁴⁷ For further discussion of imbalances see Section 2.4.2.

Box E: Problems with the Commonly Agreed Methodology as applied to Ireland

This box sets out some of the problems that arise from using the Commonly Agreed Methodology (CAM) for estimating potential output in Ireland. The unsuitability of the CAM has been highlighted in previous *Fiscal Assessment Reports* and has been highlighted by the Department going back as far as 2003 (Department of Finance, 2003) and by Bergin and FitzGerald (2014).

The CAM uses a production function approach, whereby potential output is driven by capital, labour and technological progress. While production function approaches are standard in the literature, there are alternative methods to estimate potential output, with univariate and multivariate filters also popular. The basic structure of the CAM production function is shown in equation (1) below.

$$Y = L^{\alpha} K^{1-\alpha} TFP \quad (1)$$

where Y = potential output; L = trend labour inputs; K = net capital stock; and TFP is Trend Factor Productivity; with the elasticities of output to labour and capital determined by α . The exponents on labour and capital (α and $1-\alpha$) represent the respective factor shares. The fact that they sum to one reflects the constant returns to scale assumption.

The specific application of the production function methodology leads to questionable estimates for Ireland. Some of these aspects are discussed below:

- (1) The natural rate of unemployment (NAWRU): Labour inputs are key to the production function approach and one of the most important aspects of this is the estimate of the NAWRU, which represents the long-run equilibrium unemployment rate consistent with keeping inflation constant.^{48,49} While structural changes in the labour market can lead to changes in the NAWRU, the NAWRU itself would be expected to be reasonably stable over time. Figure E1 below shows how CAM-based estimates of the NAWRU vary greatly from year to year and appear to track actual unemployment quite closely.

⁴⁷ See Box A, Fiscal Assessment Report, November 2015.

⁴⁸ NAWRU stands for the Non-Accelerating Wage Rate of Unemployment.

⁴⁹ Labour inputs have an output elasticity of 2/3 (corresponding to $\alpha = 2/3$ in (1) above).

As labour inputs make a substantial component of potential output, NAWRU estimates being quite close to actual unemployment rates contributes to potential output growth mirroring growth of actual output, as outlined below.

- (2) **Net Capital Stock:** The assumption under the CAM is that when at its potential, output is consistent with full use of the existing capital stock. Recent distortions to the capital stock data cause difficulties for Ireland. In recent years there have been substantial levels of investment recorded in the National Accounts in the form of investment in intangible assets. In addition, there have been large reclassifications of balance sheets (in 2015) which further boost the level of the capital stock. Such developments contribute positively to potential output estimates as measured under the CAM (this approach was adopted to help prevent distortions to estimates of the output gap in 2015), though their contribution to the labour market, to domestic incomes, and to government revenues are less relevant than are other activities. A more appropriate approach might be to use a modified capital stock that excludes some of the capital assets which do not generate income or employment for Irish residents. Prior to the crisis, large additions to the capital stock were made via the housing sector. Because of the assumption highlighted above, these increases contributed to stronger potential output growth even though these investment levels proved unproductive.
- (3) **Total Factor Productivity:** The third element of the production function is Total Factor Productivity (TFP). Historical estimates are obtained as a residual (often referred to as the Solow residual), after assuming output elasticities of labour and capital inputs of 2/3 and 1/3 respectively.⁵⁰ Naturally, if the other production function inputs (capital stock and labour) are poorly measured, then the quality of TFP estimates will also suffer as it is a residual. The TFP series is de-trended using a Kalman filter, which draws on information from a capacity utilisation series for the manufacturing sector.⁵¹ This is particularly problematic for Ireland, as the capacity utilisation series was discontinued in 2008.
- (4) **Mechanical closure:** Some applications of the CAM (not all, as this is optional) involve enforced closure of the output gap over the medium term. In effect, this approach sees the output gap closed in three equal parts from its starting position in year $t+2$ to year $t+5$ (e.g., by 2022 in the *Budget 2018* forecasts). This is an approach used by the Department of Finance in its own application of the CAM. Forecasters often assume that growth reverts to trend levels in the medium term given uncertainties about longer-horizon developments and the transient nature of demand shocks. Yet there may be good reasons to suggest that output may fall short of or even overshoot potential levels for a sustained period of time. One scenario that the Council has considered plausible over the medium-term is that persistent supply shortfalls in the residential sector could lead to a period of above-normal output that lasts beyond the very near term (IFAC, 2017b).
- (5) **Use of GDP:** While GDP is used as the standard measure of national output across the EU, this is problematic for Ireland. GDP has been considered to be a poor measure for Ireland given the unusual gap between GDP and GNP arising from a relatively high level of multinational activity and subsequent repatriation of profits. For most countries, there is little difference, but in Ireland GNP has tended to be some 85 per cent of GDP due to the outward flows of profits. In 2015, a level shift was observed, with both GDP and GNP boosted by a dramatic rise in net exports that resulted from

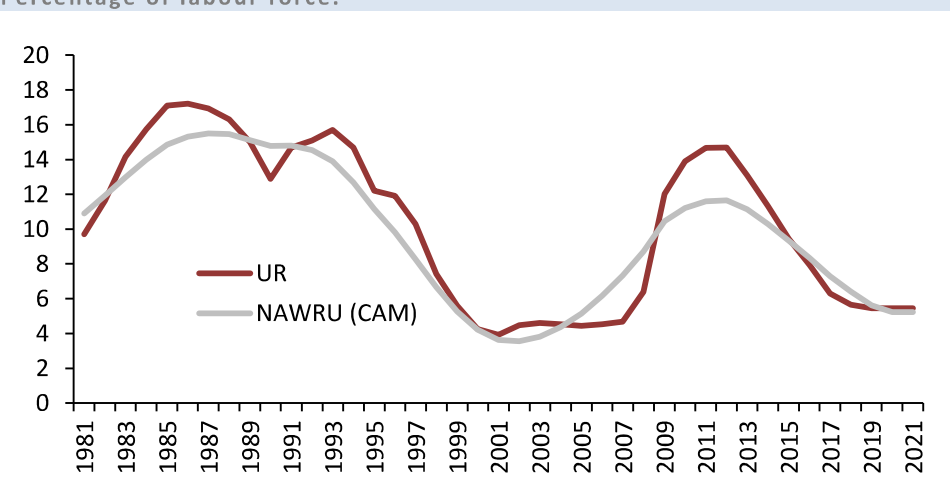
⁵⁰ Given that the labour share (as a percentage of GNI*) is currently less than 50 per cent, a 2/3 output elasticity on labour seems high.

⁵¹ Using a Kalman filter rather than a HP filter is thought to be advantageous as it is less susceptible to end-point bias.

corporate restructuring. In 2014, the adoption of new international standards for national accounting saw both measures boosted by the recognition of investment in R&D. While the former level shift was more clearly an artificial boost to measured GDP/GNP levels, the inclusion of R&D asset flows was arguably a sensible recognition of previously unrecognised activities that had some value added. However, given that R&D activities do not contribute very strongly to employment or domestic incomes, and that, in the Irish context, these activities are exceptionally large by international standards, and predominantly conducted by foreign-owned multinationals, there is a good case for disregarding them when assessing the potential output of the Irish economy. An alternative metric (which has been used for IFAC estimates of potential output) that could be more appropriate is domestic GVA. This excludes output from the multinational-dominated sectors of the economy and gives a better indication of the cyclical position of the domestic economy.

Figure E1: NAWRU and the Unemployment Rate (UR)

Percentage of labour force.



Sources: CSO and Budget 2018.

2.3.5 Forecasts of Other Agencies

Most forecasting agencies envisage strong real GDP growth in 2017, with more moderate rates of growth next year (Figure 2.8). For both this year and next year, the forecasts of the Department are lower than those of all agencies shown apart from the IMF. Interestingly, all agencies apart from the Department of Finance have significantly upgraded their forecasts for 2017 and 2018 in recent rounds (Figure 2.9).