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Sensitivity Analysis of the Department of Finance Approach to Potential Output Estimation Under the EC Methodology

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ANALYTICAL NOTE 2: SENSITIVITY ANALYSIS OF THE DEPARTMENT OF FINANCE APPROACH TO POTENTIAL OUTPUT ESTIMATION UNDER THE EC METHODOLOGY

The Department of Finance is obliged to include estimates of potential output made under the EC commonly agreed methodology in the *SPU*. This methodology is used to decompose output into trend and cyclical components, both over historical data as well as the forecast horizon. However, Department of Finance forecasts for actual variables can have a significant impact on estimated potential growth and the closure of the output gap. These may lead to significantly different estimates made by the EC within the same framework.

To derive medium-term forecasts and extend the variables that feed into the historical estimates of potential, the EC methodology uses a variety of statistical approaches. The Department's supply side forecasts for *SPU 2014* are estimated in parallel with demand side forecasts over the horizon to 2018. In practice, the forecasts for demand and labour market developments are used as an input to the harmonised model. The Department use the resultant potential output and output gap estimates to inform their view of real output over the horizon. Using input variables rather than the more mechanistic methods used by the EC can lead to significant differences for the later years of the forecast horizon. Figure N2 shows the impact of using the *SPU 2014* forecasts only to 2015 and applying the EC extension methods thereafter.

### FIGURE N2: POTENTIAL GROWTH USING *SPU 2014* FORECASTS TO 2015
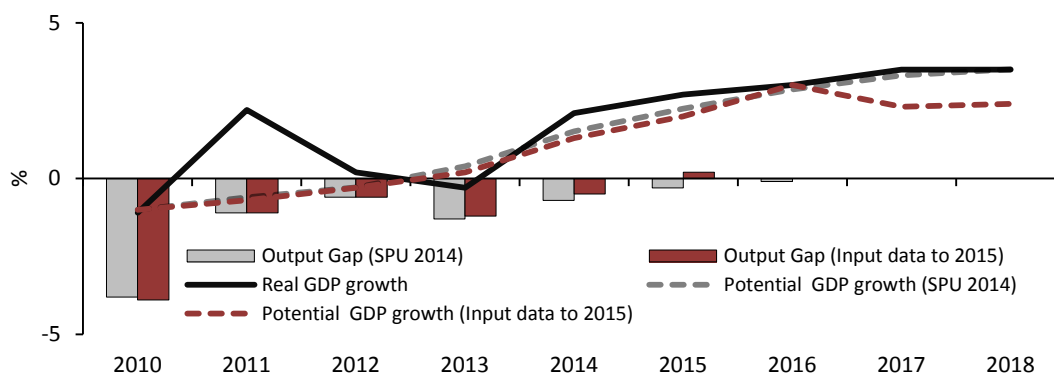
Source: SPU 2014 and internal calculations.

Applying this method produces an the estimate of potential output growth in 2018 that is almost 1 percentage point lower that the SPU 2014 estimate, mainly as a result of differences arising through the labour supply channel. This results in a positive output gap in 2015.

The main explanation for this difference is the approach to extending the estimate of the Non-Accelerating Wage Rate of Unemployment (NAWRU) beyond 2015. Figure N3 compares the NAWRU estimates using the Department's 2018 forecasts of the unemployment rate, productivity and wage and price movements with the NAWRU estimated using the EC extension method from 2015.[1, 2] This difference in approach to estimating the potential labour supply accounts for nearly all of the 2018 difference in potential growth: just over 1 percentage point. The Department's estimates are based on labour market assumptions which include a sharp fall in the unemployment rate to 2018. The EC approach to extending the NAWRU beyond the horizon of their short-term forecasts is mechanical and heavily influenced by the initial end point of their short-term forecast (in this case to 2015).

FIGURE N3: COMPARISON OF NAWRU ESTIMATES
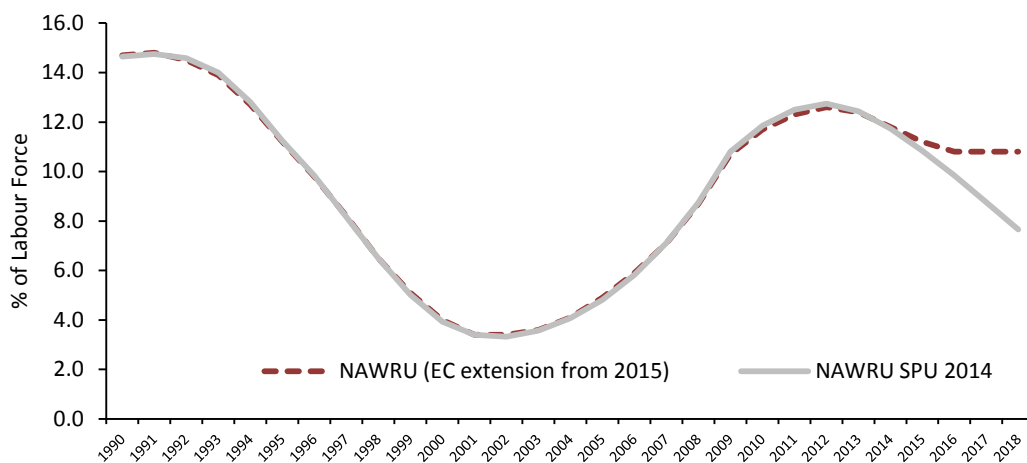
Source: SPU 2014 and internal calculations.

To estimate the contribution of capital accumulation, the EC commonly agreed methodology is based on the assumption that the maximum potential output contribution of capital is given by the full utilisation of capital stock in the economy. As such, capital is driven by the forecast of investment by the Department to 2018.[3]

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[1] The recently revised mechanism used by the EC is: $NAWRU_t = NAWRU_{t-1} + 0.5 * (NAWRU_{t-1} - NAWRU_{t-2})$ for 2016 and the NAWRU is held constant for 2017 and 2018.

[2] Both estimates use the revised methodology being referred to as 'New Keynesian' for NAWRU estimation.

[3] The Department can also make assumptions in relation to the rate of capital depreciation, which is held constant from 2013 for the *SPU 2014* estimates, in line with the EC approach. The impact of adjusting the depreciation rate from the 3.9 per cent assumed by both the EC and the Department to its long-run average of 3.7 per cent is limited, adding less than 0.1 of a percentage point to potential growth in 2018.

The other major component of potential growth is trend Total Factor Productivity (TFP). This is estimated in the EC common methodology using a Kalman filter approach, which uses actual TFP and a capacity utilisation series to obtain the results.[4] To produce the TFP input series the log of the Solow residual is calculated using a standard Cobb-Douglas production function approach and based on outturn data. This series is extended to 2018 by the Department using their actual forecasts for labour, capital and GDP growth. The impact of this extension is relatively limited adding 0.1 of a percentage point to potential growth in 2018.

ALTERNATIVE APPROACH TO TFP ESTIMATION

A significant limitation to the harmonised approach for Ireland is that the capacity utilisation input series has not been collected for Ireland since 2008. An alternative approach proposed by Clancy (2013) uses a composite index of weighted PMIs. Figure N4 compares the contribution of trend TFP to potential growth using the CUBS data and substituting the alternative composite PMI capacity utilisation. Both measures show trend TFP contributing 0.9 of a percentage point to potential output by 2018.

REVISIONS TO THE NAWRU METHODOLOGY: A NON-CENTRED 'NEW KEYNESIAN' APPROACH[5]

A change to the EC commonly agreed methodology, specifically the estimation of the NAWRU, was agreed by the Economic Policy Committee (EPC) in March 2014. This new approach is designed to lessen the impact of nominal wage rigidities on structural unemployment levels. The previous approach generated persistently high NAWRU estimates for countries with high wage rigidities and a high unemployment rate. To circumvent this, the new approach uses a proxy for real unit labour costs rather than estimating the NAWRU through the change in wage inflation. A new "non-centring" approach is also used.[6]

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[4] The specific capacity utilisation series used is the Capacity Utilisation Business Survey (CUBS). Note that this survey has not been conducted for Ireland since 2008 and consequently data is linearly extended from 2009.

[5] See also Box I.1, pg 27 of the EC's Spring 2014 Forecasts and Box 1, pg 23, *SPU 2014* for a discussion of this methodological change.

[6] This approach adjusts the results of the new model by the average difference between the old and new models, where the new model gives a higher average NAWRU than the old model. This so-called 'non-centring' approach adjusts the results of the model for Ireland by 0.43 percentage points for each year.

FIGURE N4 CONTRIBUTION OF ALTERNATIVE TFP ESTIMATES TO POTENTIAL GROWTH
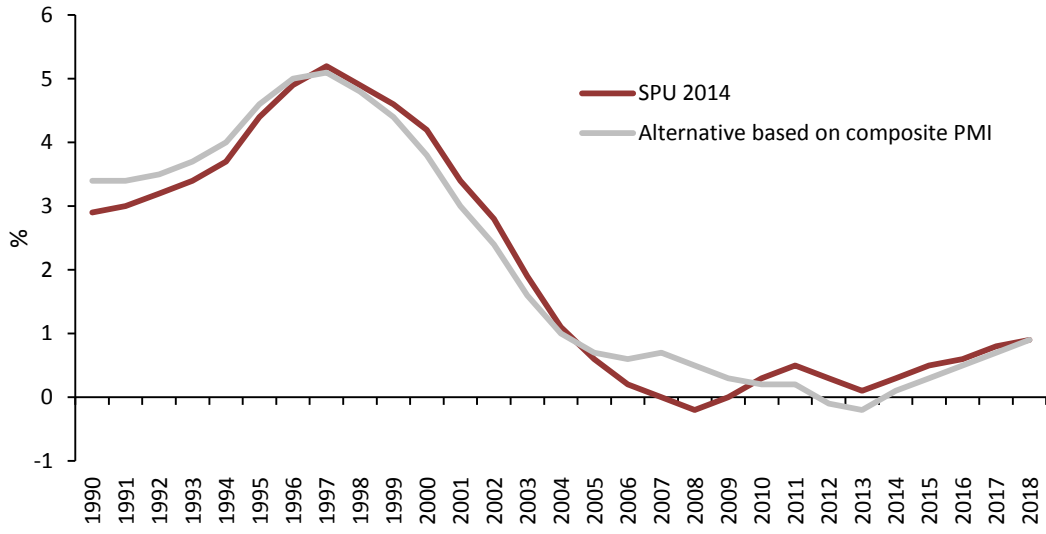
Source: SPU 2014 and internal calculations.

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