

ANALYTICAL NOTE SERIES

EU Fiscal Rules: Real-time Measurement Issues of the Output Gap

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Context

The objectives of the EU fiscal rules are vitally important for the effective management of the State's finances, particularly in Ireland due to our history of implementing pro-cyclical policies which magnify the impact of economic cycles. However, fiscal policy in real-time could be negatively impacted by some methodological shortcomings inherent in the fiscal rules.

The core building blocks of the EU fiscal rules rely on the estimation of unobservable variables in both pillars of the Preventive arm. With a specific focus on the estimation of Ireland's Output Gap (OG) using the Commonly Agreed Methodology (CAM), this note reviews the real-time accuracy of the measurement of these unobservable variables to assess whether they provide a useful guide for fiscal policy in the year decisions are taken. This is important in order to assess how the existing framework for fiscal policy could be further strengthened and to ensure the sustainable management of public expenditure.

Key Findings

The key findings from this note are:

- Estimates of Irish potential output, and in turn of the OG, tend to be revised very often and by significant magnitudes. The average annual absolute revision to the OG is almost 1 percentage point (pp.)
- OG forecasts from 2003 to 2007 indicated either zero or negative gaps, while recent forecasts correctly identify the large positive OGs during that period.
- The technical assumption of a mechanical closure of the OG is unlikely to reflect the evolution of the economic cycle for Ireland and therefore needs to be supplemented with information from other economic indicators to ensure that policy assessments are robust.
- This note illustrates that the estimates of potential output and the OG proved to be imprecise in real-time and may provide an inaccurate guide for assessing the cyclical position of the economy and the underlying fiscal position.

Irish Government Economic and Evaluation Service

This paper has been prepared by members of the Irish Government Economic and Evaluation Service. It does not necessarily reflect the policy position of the Minister for Public Expenditure and Reform or the Government.

SECTION ONE

Overview of the EU fiscal rules.

As a Member State of the European Union, Ireland is subject to the fiscal rules of the Stability and Growth Path (SGP), which is made of the Preventive and the Corrective arms. After leaving the Corrective arm of the SGP in 2015 (i.e. 3% of GDP deficit), Ireland entered the Preventive Arm in 2016. The EU fiscal rules were also put into national law with the Fiscal Responsibility Acts 2012 and 2013. The Structural Balance (SB) and the Expenditure Benchmark (EB) are the two key pillars of these rules¹. Based on these, the EU Commission assess Member States' fiscal policies and their compliance with the rules. The SB is linked to the Medium-term Budgetary Objective (MTO) which is a country specific target level for the Government budgetary position set in structural terms, that is, stripping out cyclically-driven tax revenue and expenditure, and one-offs measures from the General Government Balance (GGB). If a Member State is not at its MTO, as is currently the case for Ireland, improvements in the SB must be achieved on an annual basis until this is reached. These are set at > 0.5% of potential GDP as a benchmark, but they can vary depending on the debt level and macroeconomic conditions.

The EB is a complementary rule to the SB rule. It limits growth in public expenditure to support the achievement of the MTO. The EB addresses fiscal

policy by managing the year-on-year real growth in government expenditure, by which it limits expenditure growth to the medium-term potential growth rate of the economy. A convergence margin is also subtracted if the country is not at its MTO to secure progress towards the achievement of the MTO. Discretionary revenue measures can be used to increase expenditure above the limit set by the EB. The EB excludes some elements of expenditure that are not considered to be fully under the control of Government, such as debt interest payments, Government spending on EU programmes and cyclical unemployment expenditure. In addition, government gross fixed capital formation is averaged over a 4-year period. In assessing compliance, it has recently been agreed that one-off measures for expenditure and revenue are excluded from the calculation of the EB. The concept of fiscal space, which is widely used in Ireland in debate on fiscal policy, is derived from the calculation of the EB. Fiscal space is defined in this context as the gap between existing expenditure plans on a no-policy change basis and the projected permitted growth in expenditure and discretionary revenue reducing measures. As referred to above, discretionary revenue-raising measures can increase fiscal space.

Fiscal rules are a very important tool for fiscal policy. They have played a major role in underpinning the restoration of Ireland's public

¹ From 2016 to 2018, Ireland is also subject to a transitional debt rule which requires sufficient advancement (defined by the Minimum Linear Structural Adjustment (MLSA)) towards compliance

with the debt benchmark (60% of GDP) at the end of the transition period.

finances. If properly designed, these can mitigate the tendency to accumulate excessive deficits by Governments. They also can be utilised to promote counter-cyclical fiscal policy and stable public finances².

SECTION TWO

The building blocks of the EU fiscal rules: potential output and the output gap

The objectives of the EU fiscal rules are of particular importance and should be strongly recognised, especially in Ireland in light of the experience of large unsustainable and pro-cyclical expenditure increases and tax reductions in advance of the crisis. However, fiscal policy could be negatively impacted by some shortcomings of the current fiscal rules, particularly in relation to some elements of the methodological approach underlying the estimation of potential output and the OG.

The EU fiscal rules are based on economic variables which are not observable and must be estimated using several statistical and econometric methods. The SB is calculated by adjusting the GGB for the effects of the economic cycle and one-off measures such as bank recapitalisations³. The cyclical adjustment of the GGB is done using an estimate of the OG, the difference between

potential output and actual output, expressed as a percentage of potential output. The OG is a measure of the cyclical position of the economy, which is important not only for budgetary surveillance purposes but more generally for macro management of the economy and the State's finances. If the OG is negative there is assumed to be economic slack in the economy, while the economy is assumed to be at risk of overheating if the OG is positive.

Potential output can be defined as that "sustainable" level of output which is produced when the factors of production (capital, labour and productivity) are employed at their equilibrium levels. This output level is associated with constant inflation. As potential output is unobservable, it must be estimated using econometric approaches. The Commission estimates potential output using a Cobb Douglas production function approach: $Y^* = L^{*\alpha} K^{1-\alpha} TFP^*$. Where L^* and TFP^* are the "normal"/equilibrium/trend levels of the labour input and total factor productivity, while K is the net fixed capital stock. The output elasticity of labour is α , while $(1-\alpha)$ is the output elasticity of capital.

Given that the capital stock is assumed to be fully utilised, to estimate potential output it is essential

² Bedogni and Meaney (IGEES, 2017) show by ways of indicative counterfactual scenarios that Ireland would have followed a more counter-cyclical expenditure policy during the pre-crisis period if the EB had been in place.

³ Algebraically, $SB = (GGB/Y) - CBC - OFM$, where GGB is the General Government Balance expressed in nominal

terms; Y is nominal GDP; OFM are one-off measures (% of Y) and CBC is the cyclical budgetary component. CBC is calculated as the product of the semi-elasticity of the budget balance to the cycle (ϵ) and the output gap (OG). The value of the semi-elasticity is set at 0.53, while the OG is calculated as the difference between actual GDP (Y) and potential GDP (Y^*).

to produce estimates of two economic variables: the non-accelerating wage rate of unemployment (NAWRU) and trend TFP. The trend values of TFP (TFP*) are estimated using a bivariate Kalman filter. This is an update from the previously used univariate Hodrick-Prescott (HP) filter that extracts the unobserved cyclical component of TFP using the information contained in an index of capacity utilisation (Capacity Utilisation Business Survey (CUBS)). This approach is based on the assumption that capacity utilisation and the cyclical component of TFP are highly correlated (they tend to co-move) and therefore the capacity utilisation index possesses valuable information on the business cycle. However, for Ireland the CUBS has not been collected since 2008, and as result the series is linearly projected within the model.

On the other hand, the calculation of the labour input (trend hours worked) depends on the NAWRU⁴. The NAWRU calculation is in turn built on the macroeconomic relationship between wage inflation and unemployment gap that is predicted by the Phillips curve. This relationship indicates that when the economy is at potential, there is no output gap, economic resources are fully utilised (full employment) and sustainable non-inflationary growth is produced. This state is associated with constant wage inflation. By contrast, inflation would increase if output (unemployment) is above (below) potential and decrease if output

(unemployment) is below (above) its equilibrium level. While theoretically appealing, NAWRU estimates, particularly in the case of Ireland but not specific to it appear to be pro-cyclical as they track the actual unemployment rate quite closely. Pro-cyclical estimates of the NAWRU in turn translate into pro-cyclical figures of potential output.

SECTION THREE

Data revisions and real-time estimates of the OG

Data revisions are a standard challenge arising in macroeconomic analysis generally. This issue is compounded for Ireland given the magnitude of the revisions that have on occasion arisen. There is also potential for the uncertainty arising from this issue to be further compounded by the application of complex econometric methodologies and techniques to macroeconomic data.

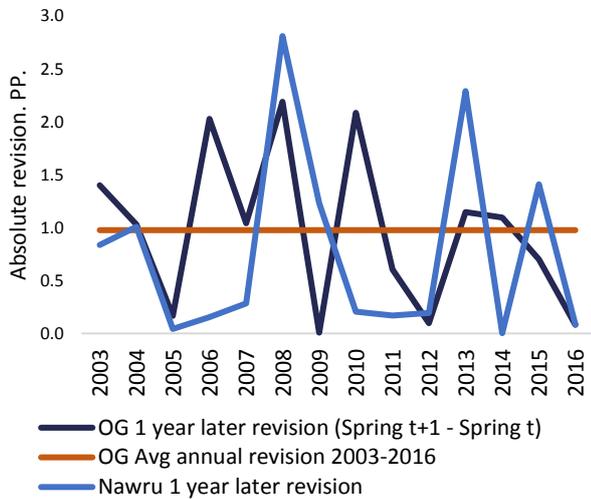
Estimates of potential output for Ireland, and in turn of the OG, tend to be revised very often and by significant magnitudes (as large as the size of the OG). Particular difficulties arise with regards to real-time estimates which are crucial in guiding the conduct of fiscal policy at the time that fiscal assessments are particularly relevant to the consideration of policy options.

⁴ The trend labour input L^* is calculated in the following way: $L^* = (WPOP * TPART * (1 - NAWRU)) * THOU$; where WPOP is the working age population (aged 15 to 74); PART are the trend participation rates (HP filtered);

NAWRU is the equilibrium level of unemployment that is consistent with stable wage inflation; THOU are the trend average hours worked (HP filtered).

Large annual revisions in Output Gap estimates

Figure 1: Output Gap and NAWRU Annual Revisions, 2003 - 2016



Source: CIRCABC website and Authors' calculations.

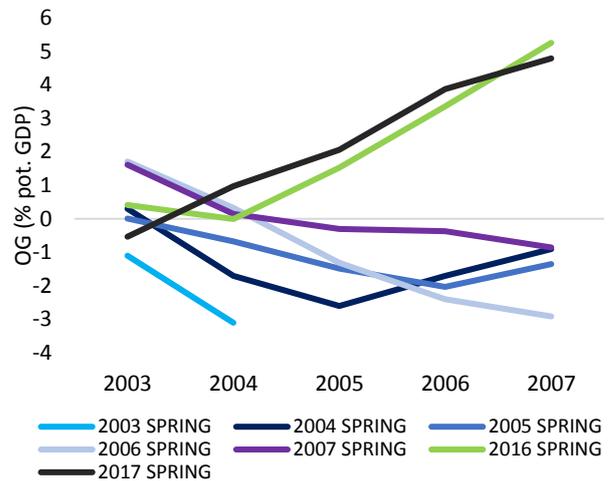
Figure 1 highlights the uncertainty of the Commission’s estimates of the Irish OG. The figure shows 1 year later absolute revisions (spring t+1 – spring t) of any given year t from 2003 to 2016. As an example, the first point from the left indicates that with the 2004 Spring forecast the 2003 OG was revised by 1.4 pp compared to its real-time estimate (of 2003 in 2003). The second point from the left indicates that with the 2005 Spring forecast the 2004 OG was revised by 1 pp compared to its real time estimate (of 2004 in 2004), and so forth. On average, every next year t+1, previous year t estimates of year t are revised by almost 1 pp (average annual absolute revision). Over 2003-2016, the root-mean square error of revisions (an additional measure of variability) is 1.2 percent of potential GDP. Revisions to OG estimates correlate

⁵ This issue is not unique to the Commission’s harmonised methodology. For example, estimates of other institutions such as the IMF and the OECD based

with revisions to NAWRU’s suggesting that these are an important driver of the variability of OG estimates. The high volatility of revisions observed at turning points such as in 2008 highlights how the current methodology struggles to detect their occurrence. Nonetheless, OG estimates feed into estimates of the SB, which in turn make it difficult to accurately assess in real-time the structural position of the public finances.

Unreliability of real-time estimates

Figure 2: Output Gap estimates for 2003-2007 over time



Source: CIRCABC website

An analysis of the Commission’s estimates of the Irish OG, which is shown in Figure 2, draws attention to the difficulties in correctly identifying in real-time the cyclical position of the Irish economy. For example, at the time when the economy was experiencing overheating (from 2000 to 2007), OG estimates did not provide useful policy guidance.⁵ Each round of spring forecast

on alternative methodologies also showed a broadly closed OG during the boom years.

produced over the period 2003-2007 indicated that the OG was either zero or negative. Conversely, the two latest rounds of forecast (2016-2017) correctly identify the positive OGs which occurred during that period. Furthermore, when the economy was in a recession (from 2008 to 2014) real-time estimates were more pessimistic than current estimates for this period. For example, according to the 2009 spring forecast, the OG in 2009 was -7.2%, therefore a very negative output gap. However, the same figure was revised to -5.7% in 2011 and eventually to -4.3% in the 2017 spring forecast.

Assessments of the cyclical position of the Irish economy in the near future

Work has been undertaken at EU level over time to improve and enhance the Commission methodology. However, better estimates of the OG arising from this process need to be complemented by other measures and indicators in order to accurately assess the cyclical position of the economy. For example, housing market indicators and growth rates of the construction sector could indicate that there could be some risk

of overheating of the economy in the near future. However, the latest 2017 EU Autumn forecast project that a positive OG is now closing as the Irish economy is cooling down and returning to its potential level. Against the backdrop of the very substantial increase in public capital investment announced in Budget 2018, it is very important to seek to ensure that the likely cyclical position of the economy is more accurately assessed given, for example, that empirical studies find that public investment shows the highest short-term fiscal multiplier.⁶

In addition it is important to note that different bodies make different judgments as to the cyclical position of the economy. This is evident, for example, from Figure 3, which displays the OG estimates for the period 2016-2018 produced by the OECD, IMF and the European Commission (EC)⁷.

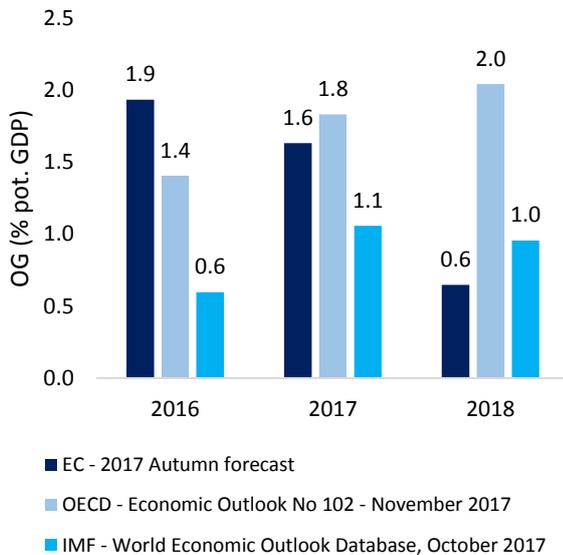
⁶ For a review of the recent literature on fiscal multipliers see Batini N., Eyraud L., Forni L., and Weber A. (2014) "Fiscal Multipliers: Size, Determinants, and Use in Macroeconomic Projections," IMF Technical Notes and Manuals, Fiscal Affairs Department, Washington: International Monetary Fund.

⁷ In the same way as the EC, the OECD also relies on a production function (PF) approach. However, the method used by the OECD differs substantially with regard to the concept of structural unemployment that is employed. For the OECD, this relates to the NAIRU (non-accelerating inflation rate of unemployment) which is the equilibrium level of unemployment that is

consistent with stable price inflation equal to the official targets of monetary authorities. Furthermore, human capital is introduced as a third factor of production. On the other hand, the IMF adopts a wide range of different methods such as the PF method and statistical multivariate filters that depend on the specific country under consideration. For more information on the IMF's approaches see Alichu A., Bizimana O., Domit S., Fernandez Corugedo E., Laxton D., Tanyeri K., Wang H., and Fan Zhang F. "Multivariate Filter Estimation of Potential Output for the Euro Area and the United States", IMF working paper, WP/15/253.

Heterogeneity of estimates

Figure 3: range of OG estimates for 2016-2018



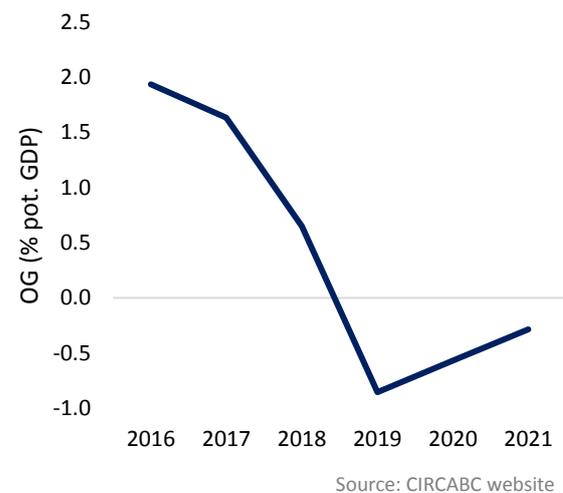
The OECD estimated a positive OG in 2016 (1.4%), which is forecast to increase in 2018 (2%), suggesting a further acceleration of the economy. IMF estimates indicate that while the economy was already close to potential in 2016 (0.6%), the OG is estimated to become larger in both 2017 (1.1%) and 2018 (1%). Conversely, Commission's estimates predict convergence with GDP expected to get close to its potential in 2018 (0.6%). Domestically, the Irish Fiscal Advisory Council (IFAC) stated in its June 2017 Fiscal Assessment Report that "a more plausible path for the output gap would be that it is closed or slightly negative this year (2017), with potential overheating arising in future years should recent strong demand growth persist"⁸. These considerations were remarked on in IFAC's November 2017 report, which highlighted the odd profile of the CAM-

based OG closing from a positive position (i.e. as if the economy were cooling down).

From this analysis it is clear that the use of different methodologies produces different estimates for the OG. While it is the case that estimates are model-based, it is also worth noting the extent to which the different assessments produced by the different forecasting bodies differ from each other which highlights the challenge involved in assessing the cyclical position of the economy and consequently the underlying fiscal position on a real-time basis.

Mechanical Closure

Figure 4: Estimated Output Gap 2016-2021



Returning to the Commission's approach, a final important assumption that is made is related to the mechanical closure of the OG by 2021 (see Figure 4). This assumption is informed by standard macroeconomic principles according to which an economy is expected to return to its equilibrium over the medium-term. In this regard, the

⁸ Irish Fiscal Advisory Council (2017). Fiscal Assessment Report, June 2017. Dublin: Irish Fiscal Advisory Council

empirical literature finds that the average length of a business cycle is 8-10 years. However, this approach will provide an incorrect prediction of the evolution of the economic cycle if Ireland's current cycle differs from what is assumed. The application of a "one-size-fits-all" approach in which the economy is assumed to return to its potential output level, which does not take into account country specific factors, therefore creates a potential risk that unsustainable macroeconomic and fiscal trends will not be identified on a timely basis.

It is important to note that the Commission's methodology to estimate the OG has been agreed by Member States and continuous effort is put into place by working groups on an ongoing basis to improve it⁹. Moreover, the production function approach is based on mainstream macroeconomic theory and similar formulations are also used by the OECD and IMF to produce OG estimates. Nonetheless, as highlighted in this note and remarked on by IFAC in its June 2017 assessment report, it is also important to carry out further research on alternative set of indicators other than the OG which can help better identify the cyclical position of the Irish economy¹⁰. If possible, these indicators should be simple, transparent and more

linked to observable variables. As an example, composite indicators generated by aggregating information on job vacancy rates, business sentiment and consumer confidence can complement OG estimates and allow for a better understanding of the degree of spare capacity in an economy and overheating risks.

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⁹ For example, it is currently being assessed how to include country specific amendments to the Commonly Agreed Methodology to take account of country specificities. Furthermore, given the measurement problems affecting the structural balance, the Commission announced that its compliance assessment would give prominence to the expenditure benchmark.

¹⁰ In response to IFAC, the Department of Finance has committed to produce alternative estimates of the cyclical position of the Irish economy. The Department of Finance had previously acknowledged the issues around the reliability of output gap estimates. In the 2016 Stability Programme Update, the Department also published an overview of its alternative approach based on the Borio methodology.