Potential output estimates and estimates of the cyclical position of the economy are important inputs to the design of sustainable fiscal and macroeconomic policies. In the past, however, estimates of these for Ireland have been problematic. The EC methodology, which underpins the fiscal rules, has come in for particular criticism related to the real-time estimates of potential output it produces. This Box outlines the work that the Council has engaged in to progress toward more appropriate measures for assessing the fiscal stance as well as to help in assessing medium-term forecasts produced by the Department of Finance.

ACCOUNTING FOR OTHER IMBALANCES

For the purposes of fiscal sustainability, estimates of economic potential should strive to account for imbalances in the economy that have a significant bearing on government revenue and expenditure. A number of these are overlooked by the EC methodology and incorporating them may help to overcome a key failing of the methodology during the bubble period, when severe credit and housing imbalances contributed to an unsustainable revenue base, yet were not highlighted by estimates under the EC methodology. Various imbalances such as those related to Ireland's balance of payments position have been cited as important factors (Bergin and FitzGerald, 2014).

FIGURE B.1: COMPARISON OF OUTPUT GAP ESTIMATES

Sources: CSO; internal IFAC calculations.
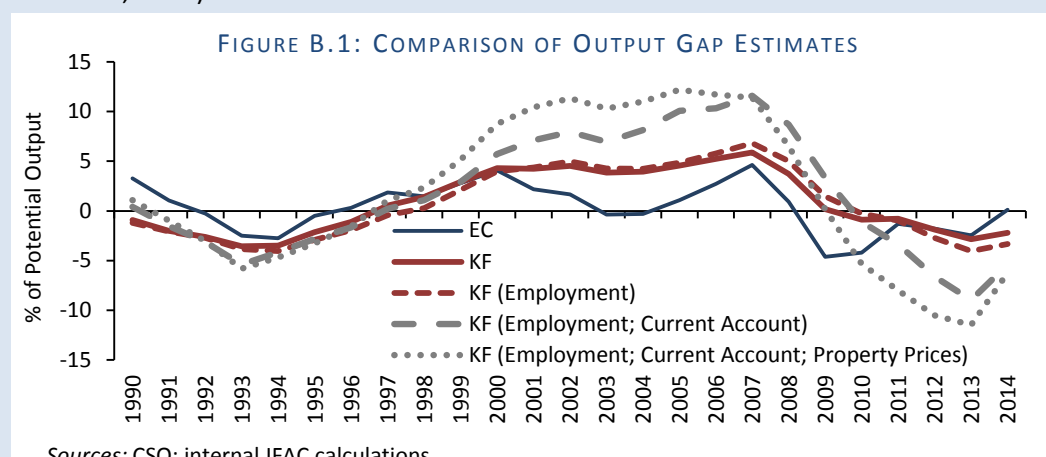
One approach that seeks to resolve this issue is to use multivariate filters that incorporate other variables, which signal such imbalances. A common approach in the literature is to augment a multivariate Kalman filter with structural economic relationships. These incorporate additional data intended to better inform or guide the filtering process. Most approaches in recent literature combine earlier strands of research that focus on the Philips Curve, for example. Using this model, one can produce what might be considered a basic potential output estimate to which

additional information can be incorporated such as financial, trade, credit and housing imbalances. There have been some criticisms of this approach.[1]

Figure B.1 compares the use of the various Kalman filter estimates to the EC Harmonised Method. Various indicators of potential imbalances are added to a basic KF (with drift) in order to better inform the degree of slack that exists in the economy. These additional indicators are incorporated through the output gap equations as proposed by Borio *et al.* (2014). The estimated overheating in the economy pre-crisis is more significant when using the various multivariate filters as compared to the EU approach; with a deeper dip below potential during the crisis and post-crisis period also evident. However, growth above potential begins in the late 1990s, which is slightly earlier than would be expected a priori, (e.g., Honohan, 2009). Additional issues arise in that the magnitude of some of the output gaps estimated under the various KF approaches appear unusually large; some of the indicators of imbalances, when included over the full estimation period, appear statistically insignificant; issues of instability with respect to parameter estimation can arise; and, finally, structural breaks in trend growth rates may not be adequately addressed.
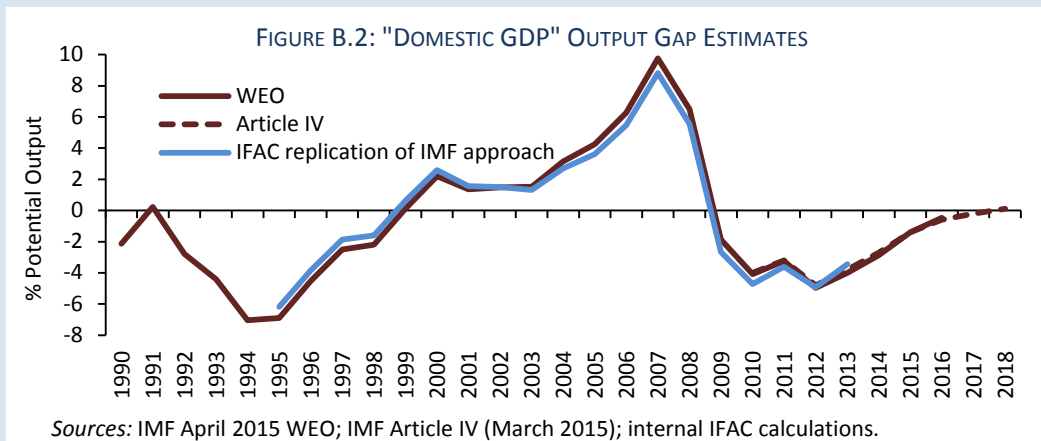
FOCUSING ON DOMESTIC SECTORS

For the purposes of fiscal sustainability, focusing on activity outside of the volatile multinational-dominated sectors may also be of more relevance. The multinational sector in Ireland has relatively little fiscal impact compared to more domestic-oriented sectors, while their impact on employment is also relatively low.[2] For these reasons, the IMF (2015a and 2015b) have adopted an alternative approach as a guide for the medium term that involves filtering real GDP excluding the multinational-dominated sectors as measured by the CSO. This approach yields a measure of trend growth that might be labelled "domestic GDP". The corresponding output gap estimates (Figure B.2) show a relatively intuitive excess emerging in the 2000s, magnified in the pre-crisis period, and followed by a sharp swing into negative territory before gradually recovering in the post-crisis period.

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[1] Borio *et al.* (2014) criticise the imposition of economic theory on Kalman filter estimates as the resulting output gaps are highly sensitive to the model specification. These can also perform poorly in real time and are arguably more opaque than other methods. They suggest the adoption of a more 'parsimonious approach' that involves incorporating additional, observable economic data directly in the output gap equation as an explanatory variable rather than imposing economic relationships to direct the filter.

[2] Recent analysis by the IMF (2015b) also suggests that changes in GVA of these sectors do not have a statistically significant impact on revenues.

FIGURE B.2: "DOMESTIC GDP" OUTPUT GAP ESTIMATES

Sources: IMF April 2015 WEO; IMF Article IV (March 2015); internal IFAC calculations.

While an approach that emphasises domestic sectors has obvious advantages, there are drawbacks. For instance, the common problem of end-point bias can result in an overweighting of the most recent outturns when estimating trend growth rates under some statistical filters. Moreover, the use of a univariate filter could lead to a failure to pick up on other critical imbalances that matter for public finances, such as a housing bubble, for example. Estimates of the multinational-dominated sectors' GVA are also produced with a longer lag relative to headline GDP figures. Finally, as noted previously, filtering methods in general may fail to capture large structural changes in trend growth.

AREAS FOR DEVELOPMENT

The issues outlined above give a sense of the challenges facing policymakers when determining sustainable fiscal policies on the basis of medium-term macroeconomic activity. The Council views progress on multivariate filter approaches as part of the toolkit for developing alternative estimates of potential output. In addition to statistical filters, further work is planned that would develop analyses in a number of key areas pertaining to the imbalances that matter most for the public finances. The work being undertaken as part of the Central Bank of Ireland/ESRI Macro Modelling Project could also shed light on important questions around Ireland's medium-term growth potential.