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Towards a more comprehensive assessment of fiscal space

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ABSTRACT

The prolonged sluggishness in the world economy since the global financial crisis has led to growing calls for a reorientation of macroeconomic policies toward more supportive fiscal measures. Such calls inevitably invite the question of how much fiscal space governments actually have. This paper provides a systematic review of the most popular definitions and measures of fiscal space. It examines the evolution of fiscal space measures and discusses the pros and cons of each measure. It then outlines several key factors that could help to further strengthen existing approaches and allow a more comprehensive assessment of fiscal space. By illustrating how different measures paint considerably different pictures of an economy's fiscal space, the paper underscores the need to use a dashboard of indicators.

JEL Classification: C82, E62, H60, H63

Keywords: Fiscal space; quantitative measures of fiscal space; debt sustainability

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Towards a more comprehensive assessment of fiscal space

1 Introduction

Amid concerns that the world economy remains stuck in a low-growth equilibrium, calls for a more supportive role of fiscal policy have become more frequent in recent years. Several major international organizations, including the United Nations, the International Monetary Fund and the Organization for Economic Co-operation and Development, have advocated a reorientation of macroeconomic policies, urging countries to use available fiscal space to boost demand and support potential growth.[1] The case for more supportive fiscal policy rests on three main arguments: First, the extraordinarily accommodative monetary policies implemented by major central banks in the aftermath of the global financial crisis have not been able to ensure a return to robust and balanced global growth. While monetary authorities have not completely run out of ammunition, the room for further easing in developed economies is limited. At the same time, there is growing evidence that unconventional monetary policy measures, such as quantitative easing and negative interest rates, have only modest potential to bolster aggregate demand, while carrying costs and downside risks for the global economy. Second, fiscal multipliers appear to be particularly large in the current circumstances of monetary accommodation, very low interest rates and subdued aggregate demand. Several recent studies have documented that expansionary fiscal policy – and in particular increases in government spending – can have unusually positive effects when policy rates are at or close to the zero-lower bound (e.g., Abiad and others, 2015; Christiano and others, 2011). And third, government spending plays a central role in driving progress towards the Sustainable Development Goals (SDGs). Public investment in education, health, environmental management and infrastructure can help raise output, crowd in private investment and reduce unemployment, thus supporting growth and development today and in the future.

The call for a more supportive role of fiscal policy inevitably invites the question of how much room for manoeuvre governments actually have. The global financial crisis and the ensuing Great Recession have resulted in high levels of public debt, particularly in developed economies (see Figure 1). The current low oil prices, in turn, exert strong pressures on the fiscal balances of oil-dependent economies. Therefore, analyses of fiscal space are vital in evaluating which countries have room to implement a more expansive fiscal policy. Moreover, empirical evidence suggests the size of fiscal multipliers depends on the extent of fiscal space (World Bank, 2015). In the case of limited fiscal space, expansionary fiscal policy is more likely to crowd out private investment and household consumption through its impact on interest rates and future tax rates. In order to contribute to this debate, this paper seeks to explore the following questions related to fiscal space:

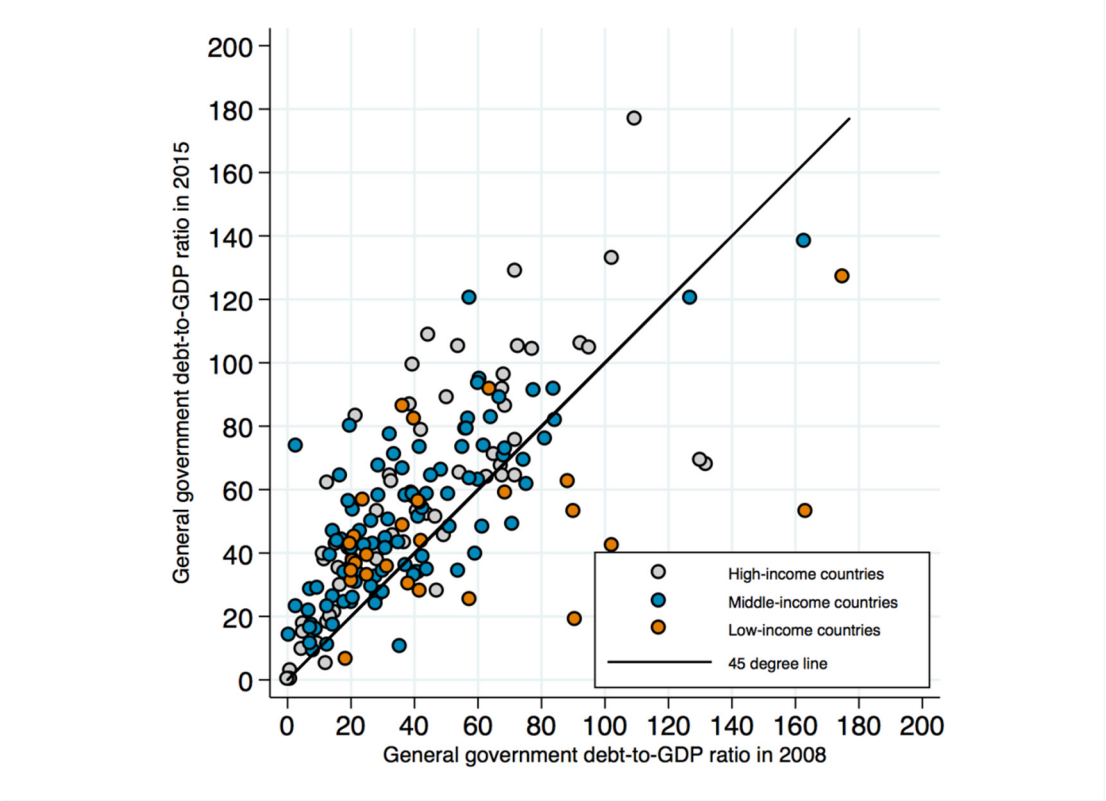
- What is fiscal space and how is it typically measured?
- What are the shortcomings of the conventional approaches to quantitatively assess fiscal space?
- How can current approaches be strengthened to provide a more comprehensive picture of fiscal space?

1 The United Nations *World Economic Situation and Prospects 2017* report stated that *"many economies depend excessively on monetary policy alone to support their objectives. Although it played an important role in the aftermath of the global crisis and remains an important policy tool, a much broader approach is needed, incorporating a more effective use of fiscal policy, as well as moving beyond policies of demand management to include structural reforms."*

In launching the OECD Going for Growth 2016 report, OECD Secretary-General Angel Gurría stated that *"today's exceptionally low interest rates improve governments' fiscal space, affording a unique opportunity to make investments in infrastructure that will boost demand, stoke growth and actually improve public finances."* The IMF also noted in its Global Prospects and Policy Challenges report – prepared for the G-20 Finance Ministers and Central Bank Governors' Meeting in February 2016 – that in order *"to avoid over-reliance on monetary policy, near-term fiscal policy should support the recovery where appropriate and provided there is fiscal space, focusing on investment."*

Figure 1

Gross general government debt-to-GDP ratio, 2008 versus 2015



Note: Countries with gross general government debt-to-GDP ratio over 200 in either year are excluded from this chart.
Sources: Authors' elaboration, based on data from IMF World Economic Outlook October 2016 and World Bank World Development Indicators.

By addressing these questions, the paper aims to provide a systematic review of the existing definitions and quantitative measures of fiscal space.[2] The rest of the paper is organized as follows. Section 2 presents and discusses alternative definitions of fiscal spaces. Section 3 examines the evolution of fiscal space measures, showing that recent measures represent a step in the right direction. Section 4 then discusses several key factors that could help to further strengthen existing approaches and allow a more comprehensive assessment of fiscal space. By demonstrating how different fiscal space measures can provide significantly different pictures of a country's fiscal space, the paper warns against relying on any single measure alone. Section 5 summarizes the main findings and advocates the use of a dashboard of measures that provides a more comprehensive quantitative evaluation of fiscal space.

2 IMF (2012) and IMF (2016a) both have a one-page summary of existing fiscal space measures. To the knowledge of the authors, these are the only attempts in the literature to provide a review of fiscal space measures.

2 What is fiscal space?

While reference to fiscal space is recurrent in the on-going macroeconomic policy discussions, a clear consensus on its definition and measurement is lacking. The most widely used definition provided by Heller (2005) describes fiscal space as the "availability of budgetary room that allows a government to provide resources for a desired purpose without any prejudice to the sustainability of a government's financial position." In this case, the notion of fiscal space is closely linked to the concept of fiscal sustainability, which in turn is related to the capacity of a government to finance its operations, to service its debt obligations, and to ensure its solvency. Heller underscores that determination of fiscal space is country-specific and requires in-depth assessment of a country's domestic macroeconomic conditions, initial fiscal position, revenue and expenditure structure, debt structure, and external economic environment, among other factors.

Other definitions of fiscal space focus more strongly on countries' potential to expand their financing capacity. Roy, and others (2009), for example, interpret fiscal space as "the financing that is available to a government as a result of concrete policy actions for enhancing resource mobilization, and the reforms necessary to secure the enabling governance, institutional and economic environment for these policy actions to be effective, for a specified set of development objectives". This definition alludes to the various channels through which fiscal space can be enhanced. Governments can increase their financing capacity by raising revenues, by making expenditures more efficient or by increasing external and internal borrowing.

Alternatively, fiscal space could also be examined from the perspective of the relationship between debt and growth, which has been discussed extensively in the literature. Many studies have identified a negative long-run relationship between rising debt-to-GDP and economic growth. Some key channels explored in the literature include the relationship between higher public debt and higher borrowing costs, which in turn hamper investment and growth; the distortionary impact of expectations of higher future taxes on consumption and investment decisions; the association of higher debt with higher inflation, as governments could seek to use the latter to lower the ratio of the former to nominal GDP; and greater uncertainty regarding economic prospects as debt levels rise, as higher debt is typically associated with more volatile growth, partly reflecting the more limited scope for fiscal policy to buttress the economy during downturns. A number of studies have identified debt-to-GDP thresholds (often around 90 per cent) beyond which an increase in debt would begin to have a negative impact on GDP growth. (Woo and Kumar, 2015; Cecchetti and others, 2011; Baum and others, 2013).[3] On the empirical side, there are, however, major concerns over the studies' high sensitivity to country coverage and modelling specification (Égert, 2015). Several recent studies have rejected the idea of a simple, universally applicable threshold, underscoring instead the importance of the debt trajectory (Pescatori and others, 2014; Chudik and others, 2017). Specifically, it is shown that countries with high but declining public debt appear to grow as fast as countries with lower debt.

3 How is fiscal space typically measured?

While there is no single definition of fiscal space, most empirical studies in the literature rely on the concept of debt sustainability. The following debt dynamics equation is at the centre of any debt sustainability assessment:

$$\Delta d_t = \left(\frac{r_t - g_t}{1+g_t}\right) \cdot d_{t-1} - pb_t + sf_t \qquad (1)$$

3 These studies mainly focus on euro area and OECD countries. Looking also at emerging economies, results of Woo and Kumar (2015) suggest that the negative effect of initial debt on growth tends to be bigger in emerging economies than in advanced economies.

where d denotes the public debt-to-GDP ratio, r denotes the real interest rate, g denotes real output growth, pb denotes the primary balance as a share of nominal GDP and sf the stock-flow adjustment as a share of nominal GDP.[4] The equation reflects the accounting relationship between changes in public debt-to-GDP ratio and three main factors: (1) the primary balance; (2) the interest rate-growth differential; and (3) the stock-flow adjustment.

3.1 Conventional fiscal space measures

In practice, conventional fiscal space indicators involve comparing the current level of public debt or fiscal deficit to a benchmark level that is expected to be associated with debt sustainability. For example, an often-used used indicator is the *debt sustainability gap*, i.e. the difference between a country's current debt level and its estimated sustainable debt level (Zandi and others, 2011; Ostry and others, 2010):

$$debt\ sustainability\ gap = d^* - d_t \tag{2}$$

with d^* denoting the benchmark sustainable debt-to-GDP ratio, which will be discussed below.

A related indicator is the *primary balance sustainability gap*, which is defined as the difference between the current primary balance and a debt-stabilizing primary balance pb^*.

$$primary\ balance\ sustainability\ gap = pb^* - pb_t \tag{3}$$

The debt-stabilizing primary balance can be derived from equation (1) by assuming that stock-flow adjustments and changes in the debt-to-GDP ratio are zero:

$$\boldsymbol{pb^*} = \left(\frac{\tilde{r}-\tilde{g}}{1+\tilde{g}}\right) \times \boldsymbol{d^*} \tag{4}$$

with $\tilde{r}$ and $\tilde{g}$ denoting the country-specific long-run real interest rate and the long-run growth rate, respectively.

3.2 Estimating the benchmark sustainable debt-to-GDP ratio

The key variable in the aforementioned fiscal space measures is the benchmark sustainable debt-to-GDP ratio, i.e. d^* in equation (2) and equation (4). There are several approaches to estimating the sustainable debt-to-GDP ratio. We will now examine four of the most common practices:

1. Median or mean debt-to-GDP ratio of a defined group of countries;
2. Signal-approach, which indicates the level of debt-to-GDP ratio that best predicts the occurrence of a debt stress event;
3. Sum of present discounted value of all future projected primary balances;
4. Ability-to-pay model of sovereign default.

4 Examples of stock-flow adjustment include issuance/redemption of debt, acquisition/sale of financial assets, and appreciation/depreciation of foreign-currency debt, etc.

(1) One of the more basic approaches to estimate sustainable debt levels is to use the median or mean debt-to-GDP ratio of a defined group of countries, e.g. regional groups or income groups.[5] This approach is straightforward and less data-demanding than other approaches. However, there is a lack of a clear rationale behind using the group's median debt-to-GDP ratio as a country's benchmark sustainable debt level. The implicit assumption of this approach is that countries with public debt ratios that fall around the median or mean are on a sustainable debt path. The estimates are highly sensitive to the selection of countries in the group and the approach is completely backward-looking as it does not incorporate projections of countries' fiscal positions. It also runs contrary to the general consensus that sustainable debt levels should vary by country as they depend on country-specific factors.

(2) A second approach is the signal approach introduced by Kaminsky, and others (1998), which can be used to derive the levels of debt-to-GDP ratio and other fiscal indicators that best predict the occurrence of a debt stress event. Under this approach, the estimated debt-to-GDP ratio threshold is one that maximizes the signal-to-noise ratio, which is defined as the ratio of the percentage of correctly classified crises in all crisis observations to the percentage of falsely classified crises in all non-crisis observations:

$$signal\text{-}to\text{-}noise\ ratio(d^*) = \frac{TP(d^*)/N_C}{FP(d^*)/N_{NC}} \tag{5}$$

with TP(d*) denoting the total number of correctly classified crises (i.e. true positive events) using the debt-to-GDP ratio threshold d* over the sample period, FP(d*) denoting the total number of falsely classified crises (i.e. false positive events) using the same threshold d*, N_C denoting the total number of crisis observations and N_{NC} denoting the total number of non-crisis observations.

In the standard practice described in IMF (2013), sample-specific thresholds (e.g. emerging markets and advanced economies) for multiple debt-related indicators – rather than just the debt-to-GDP ratio – are being estimated, making use of observations of actual debt crises and levels of the indicators around the time debt crises occurred. Countries that did not experience any debt crises are left out from the estimation in the procedures adopted by the IMF (even though this is not required from a technical perspective).

The signal approach is similar to the group mean/median approach in that it produces no country-specific estimates of sustainable debt thresholds and the sample-specific estimates are sensitive to the selection of countries.[6] It is also completely backward looking. Nevertheless, it is a more sophisticated approach as the estimation of the threshold is based on debt levels that are associated with actual occurrences of debt crises.

(3) A third approach is the classic approach of calculating the present discounted value of all future projected primary balances of a country, popularized by Buiter (1985) and Blanchard, and others (1990). Debt levels below that level would be considered sustainable from the perspective of period t.

$$d_t^* \leq \sum_{i=1}^{\infty} \left[\left(\frac{1}{1+r}\right)^i E_t(pb_{t+i}) \right] \tag{6}$$

5 For an example in which this approach is used to estimate sustainable debt levels, see World Bank (2015). Another example is the 60 per cent threshold that the Treaty on European Union (formerly known as the Treaty of Maastricht) set as the limit on EU countries regarding their gross government debt-to-GDP ratio. The threshold was set at 60 per cent because it was the average ratio in the European Union at the time of the treaty negotiation (De Grauwe, 2016).

6 IMF (2013) mitigates the issue by excluding outliers from the estimation. Specifically, country-specific observations above 2 standard deviations and below 1.5 standard deviations from the sample average are excluded.

Equation (6) is generally referred to as the intertemporal government budget constraint (IGBC).[7] It implies that the government will earn sufficient net revenue in the future to fully service its existing debt.

A simplified version of this classic approach is to look at a deterministic version of the IGBC, where the focus is to evaluate the long-run, steady-state government budget constraint (IMF, 2013). In this steady-state setting, the sustainable debt level is defined as:

$$d^* = \frac{(1+\tilde{g})\widetilde{pb}}{\tilde{r}-\tilde{g}} \approx \frac{\widetilde{pb}}{\tilde{r}-\tilde{g}} \tag{7}$$

Equation (7) is essentially a rearrangement of equation (4). The key here is to determine the maximum sustainable level of the primary balance and an appropriate level for $\tilde{r} - \tilde{g}$, which will differ across countries. IMF (2013) emphasizes that the assessment should be a forward-looking exercise. The identification of $\tilde{r}$ and $\tilde{g}$ would therefore have to take into account the secular decline in interest rates as well as the subdued outlook for global growth.

This IGBC approach is a significant improvement from the first two approaches as it allows estimation of country-specific sustainable debt levels and incorporates information from fiscal position projections. However, the need for reliable and accurate forecasts of primary balances poses challenges. Forecasts of fiscal variables are typically subject to a huge margin of uncertainty, as they are predicated on both macroeconomic projections and assumptions on policy decision-making many years into the future.[8] These challenges are amplified for resource-rich, developing regions that tend to have more volatile fiscal balance track records (see Figure 2). Insufficient consideration of uncertainty could risk overstating a country's sustainable debt level. For example, it is possible that a country suffers a sufficiently long period of exceptionally large primary deficits – relative to its long-run, steady-state primary balance level. This could eventually make creditors sceptical of the government's ability to generate enough future revenue to pay off its existing debt even if actual debt remains below the country's estimated sustainable debt level. The looming concern could then result in higher borrowing costs and render the government incapable of rolling over its debt. In this case, the debt level that eventually triggers government insolvency would be below the initially identified sustainable debt level, which was derived based on a higher, projected level of primary balances using equation (7). In summary, a large and prolonged deviation of the primary balance from its long-run steady-state level could cause governments to become insolvent at a lower debt level than in the case where there is minimal fiscal uncertainty and no large-scale deviation of fiscal variables from their long-term steady state levels.[9]

Another limitation of the classical approach is that the IGBC imposes relatively mild restrictions on the paths of primary fiscal balances and public debts that are consistent with a country being solvent. As pointed out by Bohn (2007), the IGBC always holds as long as debt or both government revenues and government spending (including interest payments) are integrated of any finite order.[10] Furthermore, it can be shown that for a

7 It can be shown that the IGBC holds if and only if the no-Ponzi game condition is satisfied, i.e. the government cannot service its debt exclusively by rolling over debt forever. The mathematical presentation of the condition is as follows: $\lim_{i\to\infty}\left(\frac{1}{1+r}\right)^i E_t(d_{t+i}) = 0$.

8 The number of years for which the primary balance needs to be forecasted is theoretically infinite. However, given that the weight attached to a particular year's primary balance approaches zero as the year gets further away from the present, only primary balances of the first decade or so matter. The number of years to be considered depends on the value of the discount factor.

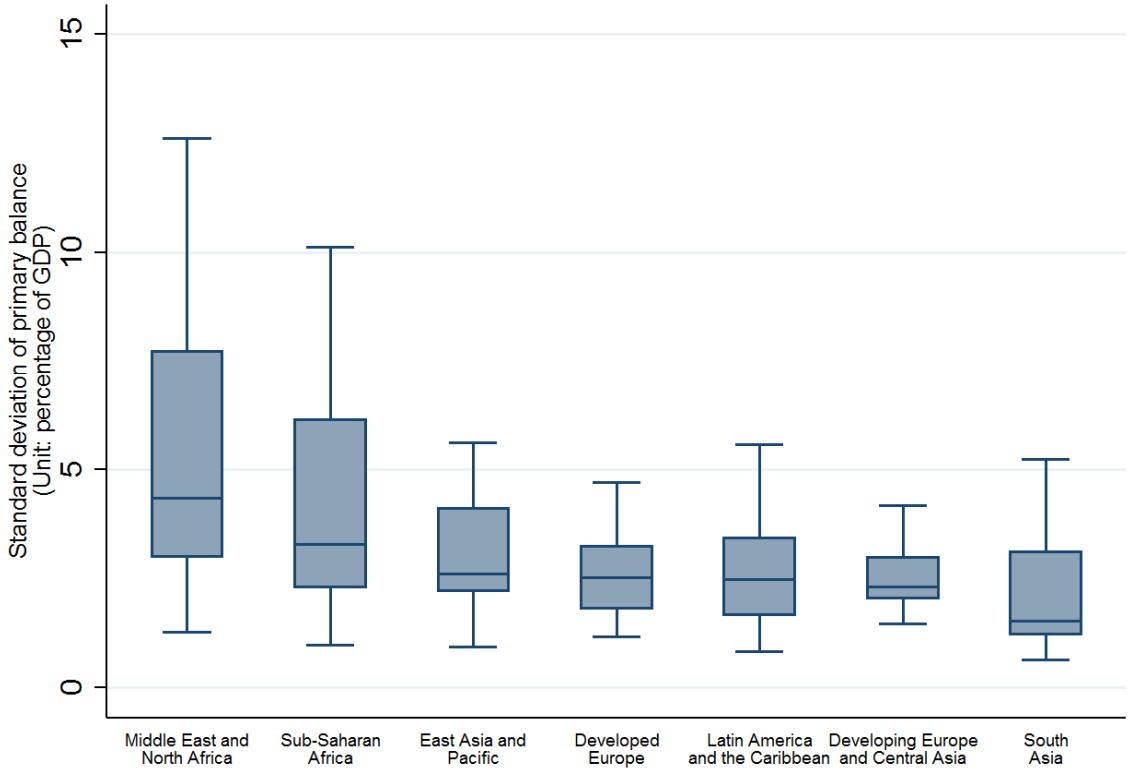
9 For more discussions, please refer to Mendoza and Oviedo (2009).

10 The intuition behind is that on the left-hand side of the no-Ponzi game condition presented in Footnote 7, the discount factor is growing exponentially in *i*, whereas debt follows a polynomial growth path at most at *k*th-order if it is a *k*th-order integrated variable. Given that exponential growth always dominates polynomial growth of any order, the discount factor in the no-Ponzi game condition will dominate the *i*-period-ahead expected debt levels as *i* approaches infinity, driving the left hand side of the no-Ponzi game condition to zero. This result shows that specific stationarity and co-integration conditions that are commonly used in standard tests for fiscal solvency are sufficient, but not necessary.

given initial debt level, there are multiple dynamic paths of the primary balance that satisfy the IGBC as long as the government adjusts its primary balance positively to the changes in debt levels (Bohn, 1998, 2008). In the extreme case, the IGBC can still hold even as debt levels approach infinity. This increase of debt levels without bound should be seen as effectively unsustainable as government bond purchasers will eventually become concerned about the government's ability and willingness to repay its debt and, consequently, limit their bond purchases.

Figure 2

Primary balance volatility, by region, 1995-2015



Note: Primary balance volatility of an economy during 1995-2015 is measured by the standard deviation of its annual primary balance (as a share of GDP) during that period. The horizontal line in the box denotes the median among economies in the region, with the top of the box denoting the 75th percentile and the bottom of the box denoting the 25th percentile. The ends of the whiskers denote the highest (lowest) observations within 1.5 interquartile range of the third (first) quartile.

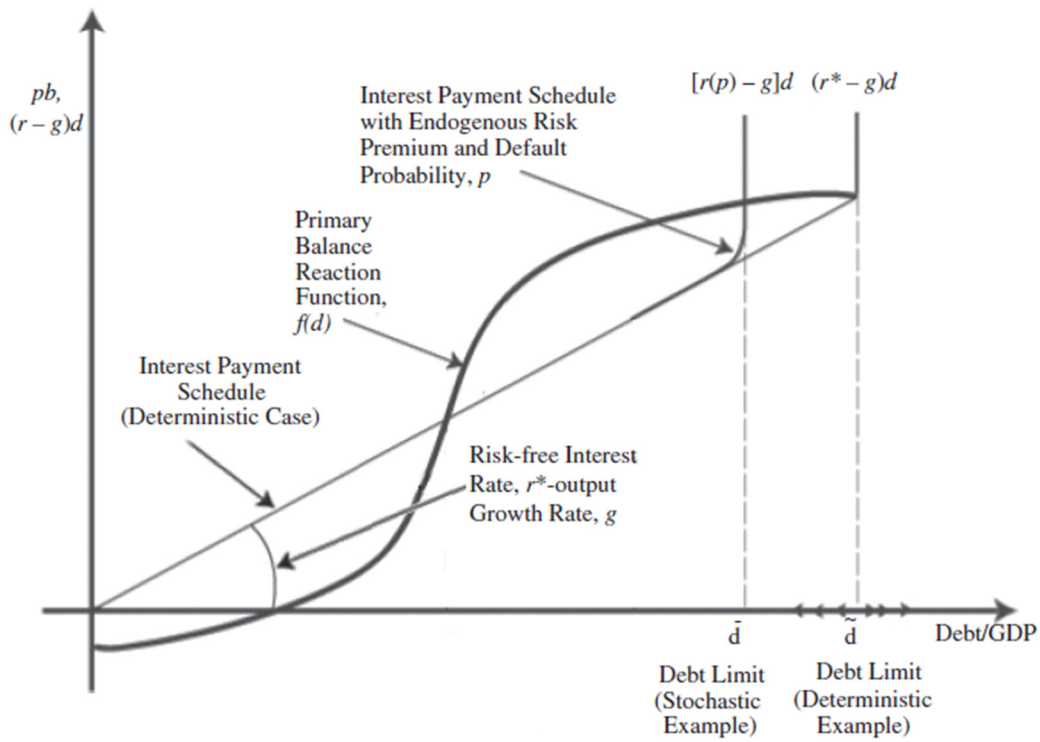
Source: Authors' calculations, based on data from IMF World Economic Outlook October 2016.

The IGBC approach also fails to consider the endogenous relationship between debt levels and interest rates. In practice, the interest rate in equation (7) typically takes on a constant steady-state value and is a not a function of the public debt level. However, as discussed earlier, government borrowing costs could start to rise as public debt accumulates, reflecting the higher risk premium that the market places over the risk-free rate that governments enjoy when public debt levels are low.

(4) A fourth approach makes use of an ability-to-pay model of sovereign default, first formally introduced by Ostry, and others (2010). It defines sustainable debt levels as levels beyond which primary balance adjustment would be insufficient to offset growing debt service. The model has gained some traction in recent years and has been employed in policy circles and the private sector (e.g. Nerlich and Reuter, 2015; Zandi and others, 2011). This approach addresses some of the shortcomings of the previous approaches, for example, by imposing a stricter sustainability criterion, i.e. ruling out an ever-increasing debt-to-GDP ratio (which is possible under the IGBC approach), and allowing for an endogenous relationship between debt levels and interest rates. The ability-to-pay model features a non-linear response function of the primary balance to public debt levels, as well as an effective interest payment schedule that depends on public debt levels (figure 3). Parameters of the fiscal response function are estimated through panel estimation and are the same across all countries. The effective interest payment schedule is a function of the country-specific historical average of market interest rates. The stochastic version of the model also allows for unanticipated fiscal shocks to the primary balance, which affect the probability of default and drive the risk premium that is charged on top of risk-free interest rates, i.e. r* in Figure 3.[11] Within this model framework, a sustainable debt ceiling is defined as the debt level above which the primary balance adjustment cannot keep up with the rising effective interest payment and the debt dynamics become explosive, i.e. $\bar{d}$ (for the stochastic case) and $\tilde{d}$ (for the deterministic case) in Figure 3.

Figure 3

Determination of sustainable debt ceiling using the ability-to-pay model of sovereign debt



Source: Adapted from Ghosh, and others (2013)

11 In the deterministic version, governments face the same risk-free interest rate regardless of the debt levels.

For each country, the level of the primary balance reaction function is determined by country-specific factors, which typically include trade openness, inflation, current and future age dependency, commodity prices, political instability, presence of fiscal rules, and international influence on fiscal behaviour (such as the existence of an IMF-supported programme). For any given interest payment schedule, a favourable factor would shift up the primary balance reaction and results in a higher debt limit as the government can reach a higher maximum primary balance to cover interest payment.

A major limitation of this approach is that historical data is used to estimate the fiscal response function at the empirical implementation stage. Therefore, like other measures, this approach also suffers from the fact that fiscal policy is ultimately a decision made by current authorities, and past behavioural responses may not necessarily be a guide to future policy choices. Another estimation issue is that the extent of primary balance adjustment in response to changes in debt levels, i.e. the shape of the fiscal response function (but not the levels of the function), is assumed to be the same across all countries.[12] This calls for careful selection of countries that share similar fiscal characteristics when conducting the estimation step. Finally, it can also be shown that a small change to the parameters of the fiscal response function – specifically parameters on the responsiveness of the primary balance to changes in debt levels – could alter the estimated debt limits significantly, highlighting concerns about the robustness of the obtained estimates (BIS, 2016).[13]

3.3 An alternative fiscal space measure

Aizenman and Jinjarak (2010) introduced an alternative fiscal space measure called "de facto fiscal space". The authors argue that the ratio of the public debt level to the "de facto tax base", or the number of tax years a government needs to repay its debt, provides a good indicator of how tight a country's budgetary room is.[14] This measure differs categorically from other fiscal measures in that it does not involve estimation of the maximum debt level. Instead, it requires estimation of the de facto tax base, which is the realized tax collection average across multiple years. Analysing cross-country data, it can be shown that de facto fiscal space prior to the global financial crisis has a positive cross-country correlation with the size of fiscal stimulus (as a share of GDP) during 2009-2010, after controlling for other relevant factors. However, since the measure is a function of accumulated debt and realized tax collection, it is backward-looking by design.[15] More importantly, it provides little information about the available room for future fiscal intervention, given the lack of benchmark levels for reference.

12 This assumption is embedded in panel estimation techniques, typically used when estimating the ability-to-pay model of sovereign debt. Technically speaking, it means the fiscal response functions of different countries share the same slope and curvature and differ only in levels due to differences in country-specific characteristics.

13 In an illustrative exercise, BIS (2016) shows that increasing the estimated responsiveness parameter of the fiscal response function by one standard deviation could increase the fiscal debt limit (as a percentage of GDP) of the United States by 100 percentage points.

14 Alternatively, de facto fiscal space could also be defined as the inverse of the number of tax years a government needs to repay its debt.

15 One could mitigate this shortcoming by using forecasted future tax collection instead of realized tax collection.

4 How can fiscal space assessments be further strengthened?

As fiscal issues are receiving greater attention in international policy debates, cross-country assessments of fiscal space have become more prevalent. As illustrated in the previous section, the methodology to conduct such assessments has undergone significant refinements. New approaches incorporate country-specific factors, model uncertainty and allow for endogenous interactions between debt levels, primary balances and interest rates. Despite these advances, there are still doubts about the ability of existing fiscal space measures to serve as a basis for cross-country comparisons, which in turn can guide policy formulation. In an attempt to further improve fiscal space assessments, we now discuss four additional factors that should be taken into account: (a) the "sovereign-currency" issue; (b) the effectiveness of fiscal policy in boosting growth; (c) the prospects for fiscal space expansion; and (d) a dashboard of fiscal space measures.

4.1 The "sovereign-currency" issue

The ability of a country to issue debt in its own currency needs to be taken into consideration when assessing its fiscal space. A country that has this ability can, in principle, service its debt by simply printing more money. This makes sovereign default unlikely. The reduced likelihood of default in turn reduces sovereign borrowing costs. For example, market confidence in the government's ability to steer clear from default can largely explain Japan's ability to maintain very high public debt levels over a long period of time, while still enjoying low interest rates. However, the advantage of issuing local currency-denominated debt can be hampered by a fixed exchange rate regime. With open capital markets, maintaining a fixed exchange rate constrains a country's ability to print money as it would exert downward pressure on the currency's value. In the end, a debt-laden government would have to abandon its fixed exchange rate regime, or risk defaulting on its sovereign debt.

In the case of a flexible exchange rate regime, a country that issues its debt in its own currency faces significantly lower risks of default, although default cannot be completely ruled out. Fitch (2013) documents several defaults on local-currency debt during the period 1994-2013, including the case of Jamaica (2010 and 2013), which operated a managed float at the time. Although the capacity to "inflate away" debt exists, a sovereign may refrain from doing so due to the significant economic, social and political costs of high inflation.

In either a flexible or fixed exchange rate regime, an unrestrained increase in public debt may eventually raise doubts among lenders regarding a government's ability and – perhaps more importantly – willingness to service its debt. This would result in a spike in borrowing costs. The "sovereign-currency" argument in general is less relevant in developing countries since many of them have significant levels of foreign currency-denominated debt.

4.2 Effectiveness of fiscal policy in boosting growth

Fiscal space assessments could also be strengthened by considering the effectiveness of fiscal policy in boosting output growth. Since discussions on fiscal space are ultimately motivated by the objective to support growth, fiscal policy effectiveness – measured by the size of the fiscal multiplier – adds an important dimension to any fiscal space assessment.

To illustrate the importance of assessing fiscal space jointly with fiscal policy effectiveness, consider the case of two countries with similar fiscal space – when assessed using existing measures – but vastly different fiscal multipliers: In effective terms, the country with the smaller fiscal multiplier has less room to support output growth through fiscal intervention before breaching its sustainable debt level. This point can be best illustrated when considering the extreme case of a country that has a negative fiscal multiplier: in this case, it

is clearly counterproductive to introduce discretionary fiscal interventions even if all existing fiscal space measures suggest there is ample "fiscal space". Indeed, there is no effective fiscal space for this country since no amount of fiscal support would boost near-term output.

Given that considerable cross-country differences in fiscal multipliers exist, including this measure into international comparisons of fiscal space is likely to yield contrasting results – a point that will be illustrated later in this section. Differences in fiscal multipliers across countries can be attributed to a range of factors, including the country's exchange rate regime, trade openness of the economy, and its stage of development (Ilzetzki and others, 2013).[16] Countries with a fixed exchange rate tend to have larger fiscal multipliers; the same can be said of relatively closed economies and developed economies (see Figure 4). The expectation formation of households, wage setters and financial markets also plays a role since it determines the magnitude of the Ricardian equivalence effect (Barrell and others, 2012).[17]

Furthermore, the size of a country's fiscal multiplier could vary depending on the business cycle. In other words, fiscal space assessment during economic upturns and downturns would provide different results, even if all other country-specific factors were held constant. The size of fiscal multipliers tends to be countercyclical, i.e. larger during recessions than otherwise.[18] Moreover, as discussed earlier, the fiscal spending multiplier is larger when the interest rate's zero lower bound (nearly) binds (Abiad and others, 2015; Christiano and others, 2011).[19]

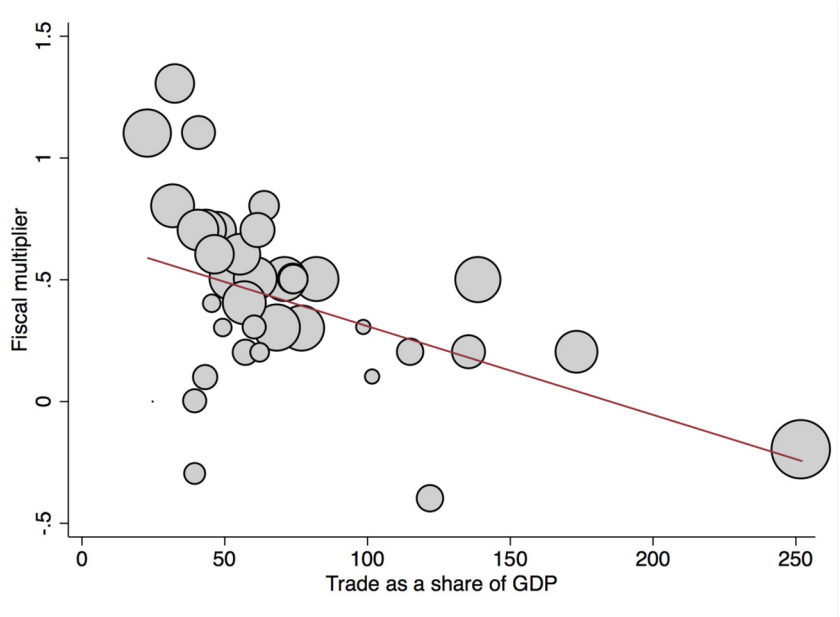
16 Fiscal multipliers tend to be larger in a fixed exchange rate regime than in a flexible exchange rate regime, as the monetary authority in the former regime would expand money supply to accommodate the rise in output and interest rate, in order to offset currency appreciation pressures. On the other hand, in the latter regime, the currency would be expected to appreciate, leading to reduced net exports that partially offset the rise in government spending. In the case of a very open economy, the rise in aggregate demand resulting from increased fiscal spending would partly result in higher imports, rather than increases in domestic production. The fiscal multiplier would therefore be smaller than in a relatively closed economy, where channels for such leakage are smaller. Empirical evidence also suggests that fiscal multipliers are smaller in emerging economies than in developed economies. Possible explanations include emerging economies' lower effectiveness in allocating fiscal resources to productive projects, as well as credibility issues – especially in relation to debt concerns – that can prompt an adverse interest rate response.

17 For example, if households are myopic and do not expect future taxes to rise in response to an increase in government spending today, the Ricardian equivalence effect would not materialize. The fiscal multiplier would then be larger than in the case where households are forward-looking.

18 This is likely due to the existence of spare capacity during recessions – which means there is minimal crowding-out of private spending by government spending – and the creation of positive wealth effects for liquidity-constrained households even after taking into account the rise of future tax liabilities, i.e. the Ricardian equivalence effect (Canzoneri and others, 2016).

19 The intuition behind is that, in the case where monetary policy is governed by some form of Taylor Rule, expansionary fiscal spending exerts upward pressure on output and expected inflation, which would typically lead the monetary authority to raise nominal interest rates. However, when the nominal interest rate is stuck at the zero-lower bound, a rise in expected inflation would drive down the real interest rate and encourage private consumption and investment.

Figure 4
Short-term fiscal multiplier, trade openness, and economic development



Note: Equation for the fitted line is y=0.67***-0.0036***x. Size of circles denotes relative size of GDP per capita (PPP-adjusted, current international $). The sample includes 22 high-income countries and 15 non-high-income countries, where data on short-term fiscal multiplier estimates are available. Trade and GDP per capita data are from 2014 and fiscal multiplier estimates are from various years.

Source: Authors' calculations, based on trade and GDP per capita data from World Bank World Development Indicators, and estimates of short-term fiscal multipliers from Barrel, and others (2012) and the literature survey table of Batini, and others (2014). Estimates from the first paper, covering the OECD economies, are based on simulations using the National Institute Global Econometric Model (NiGEM). The literature survey table from the second paper covers developing economies, with data retrieved from different time periods.

4.3 Prospects for fiscal space expansion

From a forward-looking perspective, a third factor that should be considered is a country's potential to expand fiscal space. A country's fiscal space is not static and its trajectory is determined not only by the government's spending behaviour, but also by the development of its revenue space, and – in the case of the debt-to-GDP-based fiscal space measures – the evolution of GDP. Current discussions on how governments can make use of fiscal space to engage in supportive fiscal policy have focused on how much fiscal space still remains for fiscal manoeuvre, without fully recognizing the possibility of expanding fiscal space going forward.

There are essentially two scenarios in which supportive fiscal policy – either in the form of rising government spending or tax cuts – does not necessarily have to be associated with shrinking fiscal space: (1) an expansion of the government revenue base; and (2) when economic output growth outpaces increases in public debt levels.

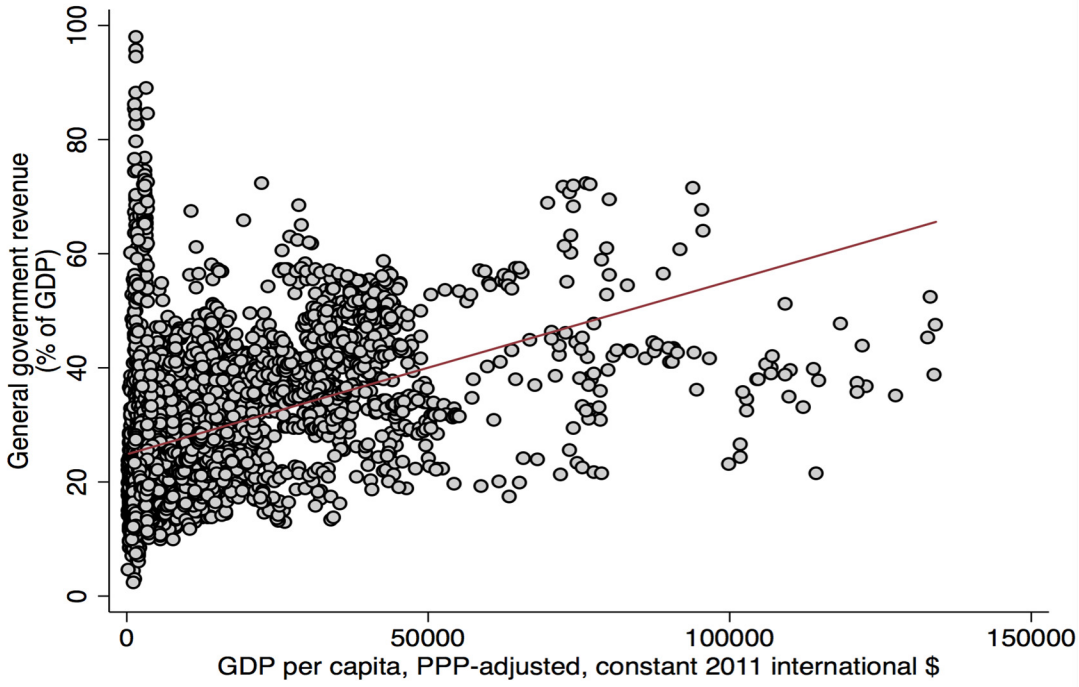
Expanding the revenue base is particularly pertinent for developing countries where government revenue as a share of GDP is relatively low. These countries have considerable room to increase government revenues by expanding the tax base, reforming the tax system, and strengthening tax collection efforts. Empirical data

shows a significant, positive correlation between tax revenue as a share of GDP and GDP per capita (see Figure 5).[20]

In the case of debt-to-GDP-based fiscal space measures, changes in fiscal space depend on the relative changes in debt levels and GDP. As long as GDP grows faster than debt levels, an economy would see a reduction in the debt-to-GDP ratio, thus enhancing fiscal space. This perspective once again links the assessment of fiscal space – this time its future trajectory – to the fiscal multiplier. The larger the fiscal multiplier, the higher is the probability that a country sees an increase, rather than a decrease, in fiscal space in response to a fiscal expansion.[21]

Figure 5

General government revenue and GDP per capita, 1990-2014



Note: Equation for the fitted line is y=24.97***+0.0003***x. The sample includes 181 countries, with annual observations from 1990 to 2014. Some low-income, commodity dependent countries saw very high general government revenue relative to the size of the economy in some years due to exceptionally high commodity prices. Observations with general government revenue greater than 100 per cent of GDP are excluded.

Sources: Authors' calculations, based on data from IMF World Economic Outlook October 2016 and World Bank World Development Indicators.

20 However, it is worth stressing that economic development does not automatically translate into a higher share of formal economic activities. Concerted efforts from the government are needed to increase formality, linking the government revenue base more closely to economic growth.

21 For some public investment projects, it is difficult to assess long-term returns given that development benefits are often hard to measure. This creates challenges for countries to assess the full impact of such investments on future fiscal space. Further research would be needed to formulate approaches that can more accurately quantify the development benefits resulting from public investment projects and help to estimate the implications for fiscal space.

4.4 Using a dashboard of fiscal space measures

A fourth factor to consider is the use of a dashboard of fiscal space measures. Previous discussions have shown that each fiscal space measure has its strengths and limitations. The measures also vary in terms of the aspects of fiscal sustainability they focus on. We now provide an explicit comparison of several fiscal space measures for a group of 27 economies. The objective here is to illustrate the different results one obtains when using these measures, rather than to provide a comprehensive assessment of the actual fiscal space in the economies.

Cross-sectional data show that different measures paint considerably different pictures of fiscal space. Figure 6 shows the fiscal space of the sampled 27 economies based on four different measures (for more details regarding how each fiscal space measure is calculated, please see Appendix A). In all panels, the economies are ranked in the order of the gross general government debt-to-GDP ratio, which ranges from 0.07 per cent in Hong Kong Special Administrative Region of China (Hong Kong SAR) on the left of the panel to 243 per cent in Japan on the right.

The following four measures have been used: (1) the group-median-debt-approach fiscal space, i.e. how far each economy's gross general government debt-to-GDP ratio is away from the group median;[22] (2) the ability-to-pay-model fiscal space; (3) the effective ability-to-pay-model fiscal space, i.e. the ability-to-pay-model fiscal space scaled by country-specific fiscal multiplier; and (4) the de facto fiscal space, here defined as the inverse of average tax years required to repay outstanding public debt. The panels show that different fiscal space measures provide different rankings of economies.

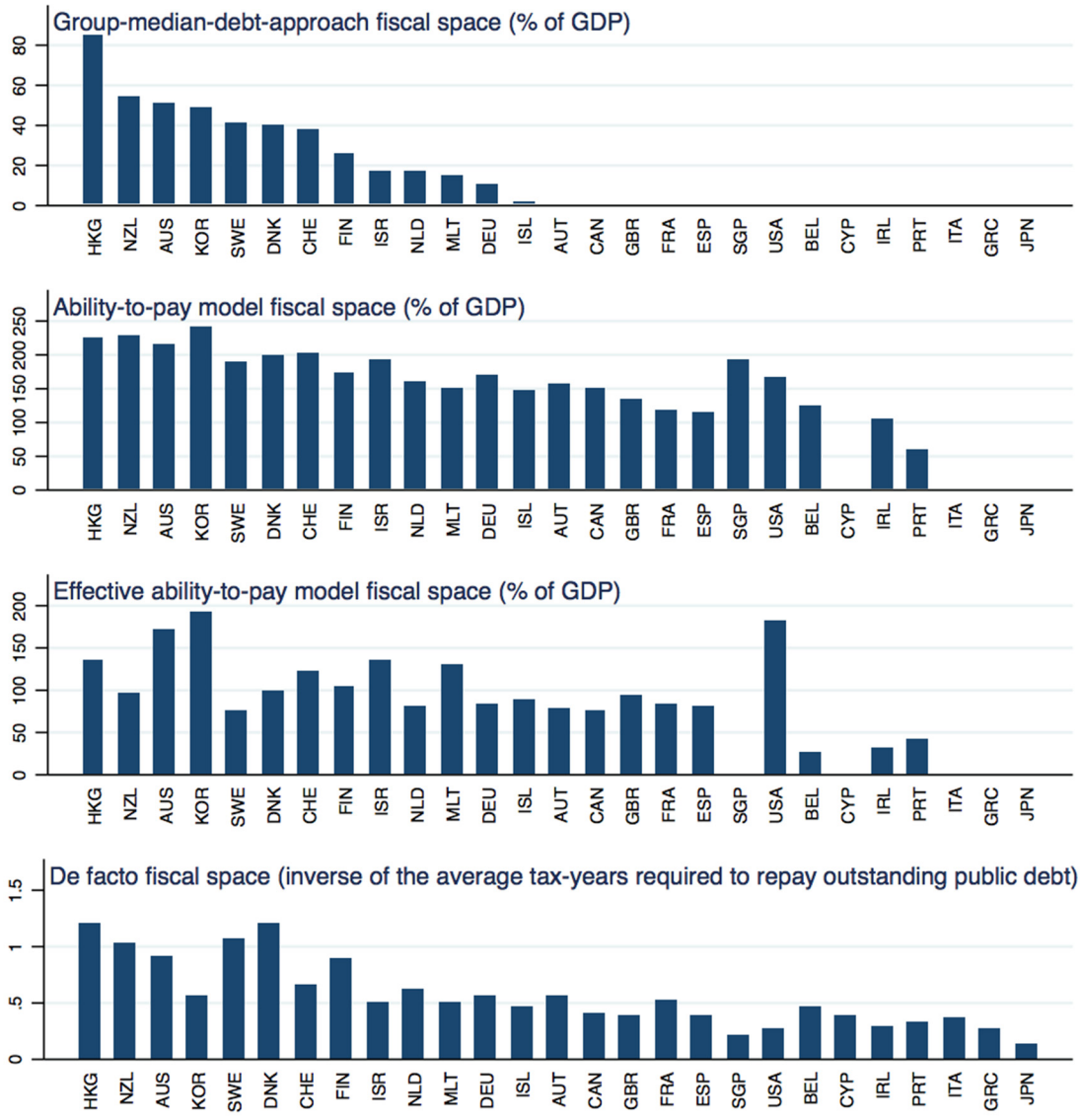
In general, economies that have the largest fiscal space evaluated using a particular measure also tend to have the largest space when evaluated by other measures, e.g. Hong Kong SAR, New Zealand, Australia and Republic of Korea. The same holds for those with the smallest fiscal space, e.g. Japan, Greece, Italy and Portugal. For some economies in the middle of the pack, however, the size of fiscal space – relative to other economies – varies significantly with the measure used.

The second panel clearly shows that countries with higher public debt-to-GDP ratios do not always have smaller ability-to-pay-model fiscal space. Notably, Singapore and the United States of America have larger fiscal space than many economies with a lower public debt-to-GDP ratio. This can partly be attributed to their relatively sanguine economic outlook and institutional stability. Moving a step forward and taking fiscal policy effectiveness into account, one can see that there are further changes to the fiscal space landscape. Singapore and the United States again stand out, but for essentially opposite reasons. On one hand, the United States now has one of the largest fiscal spaces among all selected economies, reflecting the relatively high effectiveness of its fiscal policy in supporting growth. On the other hand, despite its high ability-to-pay-model fiscal space, Singapore effectively has zero fiscal space after accounting for its negative fiscal multiplier.[23] The panel depicting de facto fiscal space also shows a different picture as it takes into account the capacity of the government to collect revenue. Nordic countries tend to perform well when evaluated using this measure given their large government revenue base.

22 For any economy with a ratio higher than the group median, its value is set to zero, indicating the lack of fiscal space.

23 It should be noted that there are both negative and positive estimates for Singapore's fiscal multiplier. The negative fiscal multiplier estimate used here comes from the literature survey table of Batini, and others (2014). Since Singapore is a small open economy with considerable possibilities of leakage to imports, all fiscal multiplier estimates are relatively low.

Figure 6
Selected fiscal space measures, 2014



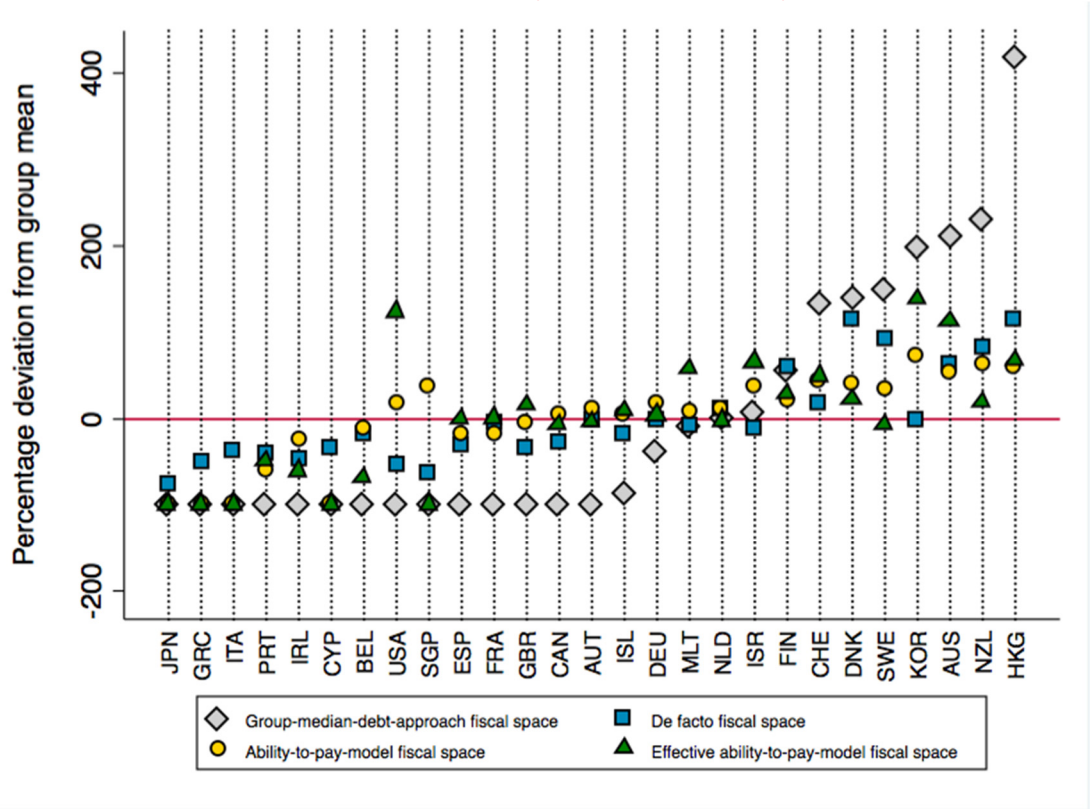
Note: For the first panel on deviation from group median debt-to-GDP ratio, the value associated with an economy with public debt-to-GDP ratio above the group median is set to zero. For the fourth panel on de facto fiscal space, the value of Hong Kong SAR is set to the second highest de facto fiscal space value among the sample economies, i.e. Denmark's 1.197. Due to its very low general government debt levels, the actual de facto fiscal space value of Hong Kong SAR is exceptionally high at 292.05.

Sources: Authors' calculations, based on data from IMF World Economic Outlook, Moody's Analytics, and multiple studies on estimating fiscal multipliers.

Figure 7 is a summary chart reiterating how estimates of fiscal space could differ, depending on the fiscal space measures that are being employed. For each of the four fiscal space measures discussed above, the chart shows each country's percentage deviation from the group mean (of the 27 selected economies). It is evident that, for several countries, not only the relative distance from the group mean (i.e. the extent of percentage deviation) changes with the fiscal space measures, but so does the ordinal position in the group. The latter observation is particularly true for countries in the middle of the distribution.

Figure 7

Selected fiscal space measures – percentage deviation from group mean, 2014



Sources: Authors' calculations, based on data from IMF World Economic Outlook, Moody's Analytics, and multiple studies on estimating fiscal multipliers.

Note: Similar to the adjustment made in Figure 6, for the purpose of calculating percentage deviation from group mean, the value of Hong Kong SAR's de facto fiscal space is set to the second highest value among the sample economies, i.e. Denmark's 1.197.

5 Summary and concluding remarks

In this paper, we reviewed a range of fiscal space measures and explored the advantages and disadvantages of each measure. The various measures not only have different data requirements, but also stress different aspects of the concept of fiscal space. Reliance on any single measure in assessing fiscal space would likely lead to an incomplete and potentially biased assessment of fiscal resources that are available to a government. Therefore, a comprehensive approach to assess fiscal space should be based on a dashboard of indicators, including the existing fiscal space measures, some modified versions of these measures, and other key variables that capture additional aspects. In this light, one should consider the following points when conducting a comprehensive fiscal space assessment:

- First, comparing a country's public debt levels with the mean/median of a country grouping can only be the first step of fiscal space assessment. Each country has its own maximum sustainable debt level that varies based on domestic and international factors. Even as a first step, the group mean/median approach requires very careful selection of reference countries – ones that are similar in development, income levels and macroeconomic policy configurations. A large deviation from the group mean/median should prompt a more serious examination of a country's room for fiscal manoeuvre. The signal approach that estimates a sample-specific public debt threshold is a clear improvement from the group mean/median approach as it makes use of data on levels of debt and other fiscal indicators associated with previous occurrences of debt crises. However, this approach remains sensitive to country selection and is also entirely backward-looking.
- Second, a comprehensive assessment of fiscal space should involve determining the country-specific maximum sustainable debt level. Determination of such a benchmark depends on a range of factors such as debt structure (currency denomination, maturity, domestic or international creditors, and contingent liabilities), economic outlook, current and future age dependency, institutional stability, among others. The room between the country-specific maximum sustainable debt level and the current debt level provides a more accurate indicator of a country's fiscal space, which varies across time and across country.
- Third, among approaches that produce country-specific estimates of fiscal space, the classical approach of discounting future primary balances emphasizes projections of fiscal and macroeconomic variables. This approach appears to be useful for countries with limited volatility in both sets of variables. However, it is a less suitable measure for countries that display large fluctuations in fiscal and macroeconomic variables (such as resource-rich, developing economies).
- Fourth, the ability-to-pay model emphasizes the track record of a government's fiscal adjustment in response to changes in public debt levels. It adds a behavioural dimension to the fiscal space assessment, concerning both the government's fiscal response to debt levels and the market's reaction to debt levels (in terms of interest rates that are demanded). This model-based approach allows a quantitative assessment of the impact of specific factors on fiscal space. However, it is less forward-looking than the classical approach and is shown to produce fiscal space estimates that could be highly sensitive to changes in parameters of the underlying model.
- Fifth, the effectiveness of fiscal space in boosting economic growth should be considered when assessing fiscal space. In particular, the possibility that a country has a very low or even negative fiscal multiplier makes a strong case for linking fiscal space assessment to fiscal policy effectiveness.
- Sixth, fiscal space is not static and the assessment of fiscal space should attempt to incorporate dynamic effects on revenues and GDP associated with fiscal interventions. This is important for assessing future fiscal space trajectories. Countries that adopt government spending programs of similar scales (relative to the overall size of the economy) and similar tax cut schedules, but are at different development stages and/or have different fiscal multipliers, could see their fiscal space trajectories diverge going forward.
- Seventh, uncertainty is inherent in fiscal space measures. All approaches reviewed in this paper are based on one or more of the following assumptions: (1) an accurate prediction of the future trajectory of fiscal and macroeconomic variables; (2) future fiscal and market behaviours more or less in line with past behaviours; and (3) some level of homogeneity of fiscal behaviours among countries classified in the same category. Since none of these conditions can be completely fulfilled, fiscal space cannot be exactly determined. Even a dashboard of fiscal space measures needs to be complemented by careful judgement that considers such uncertainty as well as factors not sufficiently captured by the quantitative measures.

The analyses carried out in this paper complements recent efforts of other multilateral institutions, notably the IMF and the World Bank, in assessing fiscal space, which is closely linked to their debt sustainability analysis. A recent IMF Staff Paper (2016a) discusses a set of initial factors that one should consider when assessing fiscal space. The paper proposes a four-stage approach in its assessment: (1) clarify cyclical and external macroeconomic conditions and gaps; (2) consider different fiscal space indicators in hierarchical progression; (3) explore the dynamic trajectory of fiscal space through conducting simulation exercises on discretionary fiscal policy; and (4) apply judgment to arrive at the final assessment of fiscal space. While discussions in various parts of this paper are linked to all four stages of the proposed fiscal space assessment framework, our analyses of different fiscal space measures mainly inform the second stage of the process. Indeed, in its conclusion, IMF (2016a) identified the selection of appropriate benchmarks for assessing fiscal indicators as a key area that requires more work. Our systematic review of the pros and cons of fiscal space measures – most of them involve determining benchmarks for sustainable debt levels – and how they can be jointly used to provide a comprehensive quantitative assessment is a step in that direction.

Appendix A

Estimation of selected fiscal space measures

This appendix provides details on how the four fiscal space measures shown in Figure 6 are being estimated for the sampled economies. The four measures are: (1) group-median-debt-approach fiscal space; (2) ability-to-pay-model fiscal space; (3) effective ability-to-pay model fiscal space; and (4) de facto fiscal space.

(1) Group-median-debt-approach fiscal space of economy i:

$$group - median - debt - approach\ fiscal\ space_i = \begin{cases} d_{group\ median} - d_i & , if\ d_{group\ median} - d_i \geq 0 \\ 0 & , if\ d_{group\ median} - d_i < 0 \end{cases}$$

$d_{group\ median}$ denotes the median gross general government debt-to-GDP ratio of the 27 sampled economies and d_i denotes the gross general government debt-to-GDP ratio of economy i.

All data is obtained from IMF's World Economic Outlook database.

(2) Ability-to-pay model fiscal space of economy i:

$$ability - to - pay\ model\ fiscal\ space_i = \begin{cases} d_{atpm,i} - d_i & , if\ d_{atpm,i} - d_i \geq 0 \\ 0 & , if\ d_{atpm,i} - d_i < 0 \end{cases}$$

$d_{atpm,i}$ denotes the sustainable debt-to-GDP ratio of economy i estimated using the ability-to-pay model and d_i denotes the gross general government debt-to-GDP ratio of economy i.

Estimated ability-to-pay model fiscal space of all economies are obtained directly from Moody's Analytics' Data and Tools section on fiscal space: https://www.economy.com/dismal/tools/global-fiscal-space-tracker.

(3) Effective ability-to-pay model fiscal space of economy i:

$$effective - ability - to - pay\ model\ fiscal\ space_i = \begin{cases} \dfrac{d_{atpm,i} - d_i}{1/fm_i} & , if\ d_{atpm,i} - d_i \geq 0\ andand\ fm_i > 0\ and \\ 0 & , if\ d_{atpm,i} - d_i < 0\ or\ fm_i \leq 0 \end{cases}$$

$d_{atpm,i}$ denotes the sustainable debt-to-GDP ratio of economy i estimated using the ability-to-pay model, d_i denotes the gross general government debt-to-GDP ratio of economy i, and fm_i denotes the short-term fiscal multiplier of economy i.

Estimated fiscal multipliers are obtained from Barrel, and others (2012) and a literature survey table from Batini, and others (2014). The time coverage of data used for estimation and the estimation technique employed vary from economy to economy. The estimates used are intended to be indicative and are not strictly comparable.

Effective fiscal space can be used to roughly gauge the maximum short-term output growth that a government can achieve while still maintaining fiscal sustainability. There are however caveats. First, this approach does not fully capture the impact of fiscal intervention on the evolution of debt dynamics.[24] Second, impacts of fiscal stimulus typically dissipate as time goes by, especially if the stimulus is immediately withdrawn. A longer-term assessment would therefore require looking at both short-term and long-term fiscal multipliers. Nevertheless, the proposed form of effective fiscal space provides an entry point for fiscal space to be assessed in view of the potential impact of its utilization. It could also provide a more reasonable basis for cross-country comparisons of fiscal space.

(4) De facto fiscal space of economy i, from the perspective of year t:

$$De\ facto\ fiscal\ space_{it} = \frac{1}{D_{it} \Big/ \left(\left(\sum_{y=t-5}^{y=t-1} tr_{iy} \right) / 5 \right)}$$

D_{it} denotes the gross general government debt level of economy i at year t and tr_{iy} denotes general government tax revenue level of economy i at year y.

Data on the gross general government debt level and general government tax revenue level are obtained from IMF's World Economic Outlook database.

24 Capturing the full linkages between fiscal intervention, public debt accumulation, interest rate changes, and output growth can be better done through a general equilibrium model, but we will leave it to future research work to explore this issue.

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