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# Benefits and Costs of Debt

## The Dose Makes the Poison

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## Abstract

Government debt has risen substantially in emerging market and developing economies (EMDEs) since the global financial crisis. The current environment of low global interest rates and weak growth may appear to mitigate concerns about elevated debt levels. Considering currently subdued investment, additional government borrowing might also appear to be an attractive option for financing growth-enhancing initiatives such as investment in human and physical capital. However, history suggests caution. Despite low interest rates, debt was on a rising trajectory in half of EMDEs in 2018. In addition, the cost of rolling over debt can increase sharply during periods of financial stress and result in financial crises; elevated debt levels can limit the ability of governments to provide fiscal stimulus during downturns; and high debt can weigh on investment and long-term growth. Hence, EMDEs need to strike a careful balance between taking advantage of low interest rates and avoiding the potentially adverse consequences of excessive debt accumulation.


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# Benefits and Costs of Debt: The Dose Makes the Poison

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*"[In the United States], if the future is like the past, this implies that debt rollovers, that is the issuance of debt without a later increase in taxes, may well be feasible. Put bluntly, public debt may have no fiscal cost."*

*Olivier Blanchard (2019)*

*"Public debt is not a free lunch in an economy close to full employment. But when investment demand tends to fall short of saving, […], there is a risk of chronic underemployment – and a stronger argument for deficit spending."*

*Barry Eichengreen (2019)*

*"[S]aying that a country would be better off with lower debt is not the same as saying that it would be better off lowering its debt. The risks associated with high debt levels are small relative to the harm cutting deficits would do."*

*Jason Furman and Lawrence H. Summers (2019)*

*"We're in a world where interest rates tend to be low even in good times. […]. In that kind of world, having persistent deficits can actually be a positive thing."*

*Paul Krugman (2019)*

*"[T]he notion that additional debt is a free lunch is foolish. High debt levels make it more difficult for governments to respond aggressively to shocks."*

*Kenneth Rogoff (2019a)*

*"If policymakers do not address the fiscal imbalance now, it will only become a harder problem in the future, due both to the growing size of the deficit and debt and the increased economic costs and political difficulty of enacting spending cuts or tax increases in less favorable times."*

*Alan J. Auerbach, William G. Gale, and Aaron Krupkin (2019)*

*"Acknowledging uncertainties, the evidence still suggests that large increases in the debt ratio could lead to much higher taxes, lower future incomes and intergenerational inequity."*

*Michael J. Boskin (2020)*

*"The large deficit will crowd out important federal programs, including needed infrastructure investment, as well as private investment needed for economic growth. Debt Service will account for a rising share of spending, and the high debt will likely increase interest rates […], leading to an economically perilous debt spiral."*

*John B. Taylor (2020)*

## 1. Introduction

Government debt has risen sharply in advanced economies, reaching levels not seen in the past six decades, and, in emerging market and developing economies (EMDEs), has reversed reductions prior to the global financial crisis to return to levels of the early 2000s (Kose et al. 2020). The current environment of low interest rates, combined with subpar growth performance, have led to an intense debate about benefits and costs associated with debt as the quotes in the previous page show. This debate has mainly focused on advanced economies.

Against this background, this paper examines the merits of additional debt accumulation in EMDEs. Specifically, it addresses three questions: First, what are the benefits of debt accumulation? Second, what are the costs associated with debt accumulation? Third, what is the optimal level of debt?

The paper reports three main findings. First, debt accumulation offers both benefits and costs. The benefits depend heavily on how productively the debt is used, the cyclical position of the economy, and the extent of financial market development. The costs of debt include interest payments, the possibility of debt distress, constraints that debt may impose on policy space and effectiveness, and the possible crowding out of private sector investment. Second, debt sustainability has deteriorated in EMDEs since the global financial crisis. Debt was on a rising trajectory about half of the time over 1990-2018, and fiscal positions in around 50 percent of EMDEs were on a debt-increasing trajectory in 2018. Third, there is no generally applicable optimal level of debt, either for advanced economies or for EMDEs. Optimal levels of debt depend on country characteristics, financial market conditions, the behavior of governments and private agents, and the multiple functions of debt.

There is an extensive literature that emphasizes the benefits of additional debt given current favorable borrowing conditions. Some studies argue that countries, especially those that issue reserve currencies, could take advantage of low interest rates to borrow more to finance priority expenditure. For example, Blanchard (2019) argues that, in the United States, interest rates on government bonds have been lower than nominal growth most of the time over the past several decades.[1]

In contrast, some studies caution that high debt comes with substantial costs. For example, Rogoff (2019a,b) argues that high debt restricts policymakers' ability to respond to adverse shocks, increasing the likelihood of a long-term growth slowdown. In countries

[1] Blanchard (2019) documents that the current environment, with interest rates below growth, is not unusual in the United States although, as acknowledged in Blanchard and Ubide (2019), the current trajectory of deficits and debt in the United States presents challenges. Furman and Summers (2019) similarly argue that a greater policy concern for the U.S. government is investment in human and physical capital than fiscal deficits and debt build-up. Krugman (2019) notes that debt accumulation is less of a concern in countries that borrow in their local currency. Rachel and Summers (2019), echoed by Eichengreen (2019), point to high and rising fiscal deficits and debt levels as a means to achieve full employment and raise inflation. Blanchard and Tashiro (2019) argue that primary deficits, spent on measures to raise birth rates, could be the best tool to sustain growth in Japan.

with high debt, investor concerns in the event of an adverse shock could raise borrowing cost. Economic and budget projections in the United States suggest, according to Auerbach, Gale, and Krupkin (2019), Henderson (2019), and Riedl (2019), rising interest cost on government debt.[2]

The contribution of this paper to the literature is two-fold. First, it discusses benefits and costs of debt in the context of EMDEs. The earlier literature mainly presents this benefit-cost discussion in the context of advanced economies, or more specifically, the United States. Declines in interest rates have been observed not only in advanced economies but also in EMDEs. As noted above, many EMDEs have borrowed heavily, especially since the global financial crisis. The tradeoffs EMDEs face are even starker, in light of their history of severe debt crises and their more pressing current spending needs to achieve development goals and improve living standards.

The second contribution is that, in examining debt sustainability, this paper goes beyond the discussion of interest rate-growth differentials. It uses a metric of sustainability gaps that depend on fiscal balances, long-term interest rates as well as output growth (Kose et al. 2017). Debt is not sustainable—despite interest rates below output growth—if new debt accumulation is rapid, i.e. primary deficits are large. This echoes the study of Wyplosz (2019) who finds that, when interest rates fall below output growth, debt falls in only one-half of his sample of OECD countries.

The paper is structured as follows. Section 2 overviews the evolution of debt in EMDEs since 2000. Benefits of debt are discussed in Section 3. Section 4 reviews costs associated with debt. Section 5 presents a brief review of the literature on the optimal level of debt. Section 6 concludes.

## 2. Evolution of EMDE debt since 2000

Prior to the global financial crisis, rapid growth helped narrow fiscal deficits and reduce government debt ratios, especially in EMDEs (Figure 1.A and 1.B; Kose et al. 2017). In addition to robust growth, debt relief under the Multilateral Debt Relief Initiative and Heavily Indebted Poor Countries (HIPC) Initiative contributed to the decline in debt in low-income countries (LICs) and lower middle-income countries. Fiscal deficits that reached 3 percent of GDP in EMDEs, on average, in 2001 turned into fiscal surpluses amounting to 0.7 percent of GDP, on average, by 2007. Over the same period, EMDE government debt fell by 12 percentage points of GDP to 36 percent of GDP. In LICs, government debt declined by 59 percentage points to 41 percent of GDP from 2001 to 2007.

[2] Adverse consequences of high and rising debt are also discussed by CRFB (2019), using data for the United States. The study argues that high and rising debt weighs on income growth, limits the scope for fiscal policy, raises interest rates, raise the fiscal burden for future generations, and increases the risk of crises. Alcidi and Gros (2019) show that countries with high debt pay a risk premium. Additional debt accumulation increases a risk premium and raise the cost of the entire stock of debt. This could lead to a feedback loop between high debt levels and high risk premia, resulting in explosive debt dynamics. Boskin (2020) presents a detailed critique of Blanchard (2019). He analyzes fiscal projections in the United States and concludes that substantial increases in debt levels could lead to higher taxes and lower future incomes.

Since the global financial crisis, EMDE fiscal positions have weakened. In part, this reflected sharp growth slowdowns that pushed government debt up by an average of 15 percentage points of GDP to 51 percent of GDP by 2018. This deterioration was broad-based—by 2018, government debt was higher than in 2007 in more than 70 percent of EMDEs (Figure 1.C). In LICs, government debt rose by 4 percentage points of GDP, to 45 percent of GDP in 2018 after falling to a trough of 31 percent of GDP in 2012. The share of EMDEs and LICs with fiscal deficits also increased by 20 and 7 percentage points, respectively, to 76 and 79 percent in 2018 (Figure 1.D).

The post-crisis fiscal deterioration was particularly pronounced in commodity-exporting EMDEs, which account for almost two-thirds of EMDEs. During 2011-16, almost all commodity prices collapsed. Oil prices fell by two-thirds, industrial metals prices by one-half and agricultural prices by one-third amid slowing commodity demand growth and ample supply (World Bank 2015, 2018b). The commodity price slide caused sharp growth slowdowns and losses in government revenues in commodity-exporting EMDEs. As a result, fiscal deficits of these EMDEs widened by 5 percentage points of GDP between 2010 and 2016 to 6 percent of GDP. Despite some improvements since then, they have not yet returned to balance. Although mostly from low levels, government debt in commodity-exporting EMDEs has risen by 15 percentage points of GDP since 2010, to 46 percent of GDP in 2018. In commodity-importing EMDEs, government debt increased more moderately (by 10 percentage points of GDP) to 53 percent of GDP in 2018 amid generally robust growth in those economies.

Since the crisis, the financing of debt has shifted towards higher-risk sources in many EMDEs, including debt held by nonresidents, issued on non-concessional terms, or at shorter maturity (Figure 1.E and 1.F). Debt held by nonresidents and denominated in foreign currency accounted for about 50 percent of government debt in the median EMDE in 2018, making these countries more vulnerable to a deterioration in global investor sentiment and exchange rate risk. As a result, sovereign ratings have been downgraded for many EMDEs, and 40 percent of LICs are now classified as at high risk of debt distress (World Bank 2019). The composition of this LIC debt has become increasingly non-concessional as they have accessed capital markets and borrowed from non-Paris Club creditors (World Bank 2018a, 2019).

Whereas, in most advanced economies, the private sector has deleveraged since the global financial crisis, private sector debt has risen in EMDEs in tandem with mounting government debt. As a result, total debt—consisting of government and private debt—in EMDEs has risen to a record high of almost 170 percent of GDP in 2018, from 96 percent of GDP in 2007 (Borensztein and Ye 2018; World Bank 2018b). Even excluding China, where corporate debt has soared post-crisis, other EMDEs' total debt has risen to a near-record 108 percent of GDP in 2018, from 82 percent of GDP in 2007. Total debt in LICs also increased from 53 percent of GDP in 2007 to 65 percent of GDP in 2018. Private debt accounted for more than one-half of total debt in EMDEs excluding China in 2018 and one-third in LICs.

## 3. Benefits of debt

Additional debt accumulation by EMDEs may be needed to invest in growth-enhancing projects (e.g., infrastructure, health, and education), and to protect vulnerable groups. During periods of weak growth, it may also be appropriate to borrow in order to employ expansionary fiscal policy to stimulate activity. Moreover, government debt could act as a safe asset when borrowing conditions of investors are tightened.

### 3.1. Promoting long-term growth

Government investment in physical and human capital can provide an important foundation for stronger growth over the long term. There are two major reasons additional debt is needed in EMDEs for achieving long-term development goals.

First, sustained robust growth is the foundation of long-term poverty reduction (Dollar, Kleineberg, and Kraay 2013). The expected slowdown in potential growth—the rate of growth an economy can sustain at full employment and capacity—therefore lends urgency to the need for additional investment (World Bank 2018c). In EMDEs, in particular, potential growth is expected to slow by 0.5 percentage point to 4.3 percent during 2018-27, well below the longer-term average of 5.4 percent over 1998-2017. Investment can raise potential growth directly and indirectly. The direct channel is capital accumulation, which lifts labor productivity and potential output. Indirectly, investment can raise total factor productivity because of technological improvements embedded in investment.[3]

Second, EMDEs have large investment needs to meet development goals and improve living standards. Several studies estimate the cost of investment needed to achieve the Sustainable Development Goals (SDGs). Rozenberg and Fay (2019) find that low- and middle-income countries face aggregate investment needs of 1.5 to 2.7 trillion dollars per year—equivalent to 4.5 to 8.2 percent of GDP—between 2015 and 2030 to meet infrastructure-related SDGs. Their cost estimates depend on policy choices, highlighting the importance of spending efficiency (i.e., the quality of spending) in achieving such goals. Infrastructure investment can have particularly large growth benefits if it connects isolated communities with input and output markets, allows companies to realize economies of scale by increasing market size, and increases competitive pressures (Égert, Kozluk, and Sutherland 2009; Calderón and Servén 2010).[4]

[3] For example, using a panel of OECD countries, Fourier (2016) shows that a 1-percentage-point increase in the share of public investment in expenditure is associated with an increase in long-term output by 5 percent. The study emphasizes that public investment is more growth-enhancing in areas with large externalities, such as health and research and development. To the extent that debt-financed investment spending stems the slowdown in potential growth, it helps preserve the revenues required to service this debt (Fatas et al. 2019).

[4] Gaspar et al. (2019) show that additional spending of about 1.3 trillion dollars in 2030 is required to meet the SDGs related to infrastructure in low-income developing economies and emerging market economies, and another 1.3 trillion dollars for the SDGs related to health and education. Similarly, UNCTAD (2014) discusses additional spending needs of 1.6 to 2.5 trillion dollars per year between 2015 and 2030 to achieve the goals related to economic infrastructure (i.e., power, transport, telecommunications, and water and sanitation). The additional annual investment needed to meet health-related SDGs in low- and middle-income countries is estimated at about 370 billion dollars (Stenberg et al. 2017).

These estimates of global investment needs build on a significant body of work on investment needs at the regional level. In some regions and countries, the investment needed to meet infrastructure-related goals exceeds the estimates at the global level.[5] For example, Africa's infrastructure needs have been estimated at around 93 billion dollars per year (Foster and Briceño-Garmendia 2010) or at 130 to 170 billion dollars (African Development Bank 2018). In Latin America and the Caribbean between 2008 and 2013, investment in infrastructure averaged 2.7 percent of GDP a year, lower than the 4-5 percent of GDP average estimate of infrastructure investment needs (Fay et al. 2017).

### 3.2. Stabilizing short-term macroeconomic fluctuations

Temporary debt accumulation also plays an important role to stabilize short-term macroeconomic fluctuations. During recessions, borrowing for government spending or tax cuts can provide the necessary fiscal stimulus to support activity (World Bank 2015; Yared 2019). However, how much such government borrowing works depends on fiscal multipliers—the output effects of additional government spending or tax cuts (Huidrom et al. 2016, 2019; Ramey 2019).

A number of studies estimate fiscal multipliers and find that multipliers vary widely, depending on circumstances. They show that multipliers range from a 1.1-dollar output decline to a 3.8-dollar output increase for every dollar of additional government spending or reduced revenues. The results depend on the cyclical position of the economy, country characteristics, including the coherence of fiscal frameworks, and the fiscal instrument employed. Specifically, fiscal multipliers are larger in recessions than in expansions, in advanced economies than in EMDEs, during crises than during non-crisis periods, and in flexible exchange rate regimes than in fixed exchange rate regimes (Kraay 2012, 2014). Several studies estimate peak fiscal multipliers during recessions in the range 3- to 4-dollar output increases (Auerbach and Gorodnichenko 2013; Bachmann and Sims 2012; Candelon and Lieb 2013). Output effects also tend to be larger for expenditure increases than tax cuts, and larger when accompanied by more accommodative monetary policy (Leeper, Traum, and Walker 2017).

In EMDEs, lack of fiscal space has often constrained fiscal policy during recessions, but there is some evidence that fiscal policy has become less procyclical during the 2000s (Frankel, Vegh, and Vuletin 2013; Vegh, Lederman, and Bennett 2017). The correlation between cyclical swings in output and government consumption, for example, has turned from positive (procyclical) before the global financial crisis to negative (countercyclical) after the crisis. In advanced economies, proactive fiscal policy has gained in importance in the past decade, at least potentially, as monetary policy interest rates have approached or breached the zero lower bound (Battistini, Callegari, and Zavalloni 2019).

[5] These estimates are based on a variety of costing exercises that are often not directly comparable (Vorisek and Yu forthcoming). They use different country samples and time periods; differ in their definitions of the targets to be achieved with investment (e.g., SDGs or other policy goals) and inclusion of maintenance costs; and do not always attempt to estimate optimal plans for meeting future investment needs in light of the historical, and possibly constrained, relationship between infrastructure, income level, population, and urbanization (Fay et al. 2017).

### 3.3. Providing safe assets

Sovereign debt constitutes a safe asset for investors, as an alternative to private debt whose issuers may default (Azzimonti and Yared 2019). When risk aversion rises, demand for safe assets increases while borrowing constraints on private borrowers tighten. In these circumstances, an accumulation of government debt, if redistributed to private household or corporates, can ease financing constraints (Yared 2019). As the safe asset that benchmarks private borrowing cost and can be used for collateral, government debt can therefore play an important role in financial deepening (Hauner 2009; World Bank and IMF 2001). The availability of government debt instruments is also the pre-requisite for monetary policy operations that rely on repurchase agreements of safe assets (Kumhof and Tanner 2005).

## 4. Costs associated with debt

The most basic cost of public debt is the servicing cost—the interest to be paid to creditors—which may be compared with the rate of return on the spending financed by debt to provide the simplest guide to whether public borrowing is worthwhile. An important argument against heavy borrowing, which may outweigh the benefits of borrowing in some countries, is that rollover costs—the costs of refinancing when debt matures—can increase sharply during periods of financial stress and even trigger a financial crisis. High debt can also limit the feasible size and effectiveness of fiscal stimulus during downturns. Finally, high debt can constrain growth over the long term by crowding out productivity-enhancing private investment.

### 4.1. Deteriorating debt sustainability

During the post-crisis period, the cost of government borrowing has been historically low, for both advanced economies and EMDEs (Figure 2.A and 2.B). Looking ahead, demographic shifts and slowing productivity growth are expected to contribute to a further secular decline in both real interest rates in advanced economies, continuing this multi-year trend (Holston, Laubach, and Williams 2017). However, an increase in borrowing cost, for example because of a decline in global savings rates, could test the sustainability of high debt in some countries (Henderson 2019; Rogoff 2019a,b).

The recent discussion on debt has focused on the differential between interest rates and nominal GDP growth. If interest rates (the cost of capital) are below nominal output growth (the presumed rate of return on capital), then the real burden of the debt declines over time because the rate of return on debt-financed investment is more than sufficient to service the debt. However, the interest rate-growth differential has to be weighed against the accumulation of new debt—the primary fiscal deficit. If, every year, primary deficits add more to the debt than is repaid on past debt (even if high rates of return are more than sufficient to service the debt), then the debt stock will be on a rising trajectory. When looking at sustainability of debt, it should take into account the tendency for borrowing costs to rise as debt rises, in some cases abruptly (Gruber and Kamin 2012; Mauro and Zhou 2019).

The sustainability of government debt, while considering both interest rate-growth differentials and fiscal balances, can be captured by sustainability gaps. The sustainability gaps are measures that compare a country's fiscal balance with the balance that stabilizes government debt at a target level under different assumptions of output growth and long-term interest rates (Buckle and Cruickshank 2013; Escolano 2010; Ley 2009). For example, the debt burden generated by sustained fiscal deficits would be easier to service if interest rates are lower and growth is stronger. The sustainability gap indicator provides a simple snapshot of the adjustments that may be needed to reach debt targets under different macroeconomic conditions. As shown in Kose et al. (2017), the primary balance sustainability gap (*pbsusgap*) can be calculated with the following equation:

$$pbsusgap_{c,t} = p_{c,t} - \left( \frac{i_{c,t} - \gamma_{c,t}}{1+\gamma_{c,t}} \right) d^*,$$

where $p$ is the primary balance (in percent of GDP) in country $c$ in year $t$, $i$ is the nominal long-term bond yield (with a 10-year or close maturity) in local currency, $\gamma$ is nominal GDP growth in local currency, and $d^*$ refers to the target debt ratio (in percent of GDP)—this is what is defined as the sustainability gap under *current conditions* (see Kose et al. 2017).

The target debt ratio, $d^*$, is defined as being equal to the historical median value in an economy's peer group (advanced economies or EMDEs). Implicitly, compared with benchmarking against each economy's own historical median, this approach implies more favorable debt target in economies with debt below the peer-group median and less favorable debt target in economies with debt above the peer-group median. The target (and median) debt ratios for advanced economies and EMDEs are, respectively, 53 percent of GDP and 45 percent of GDP.

These results highlight the importance of sustainability gaps in discussing debt sustainability. During 1990-2018, the interest rate-growth differential has been negative in just over half (58 percent) of country-year pairs (52 percent of country-year pairs among 34 advanced economies and 61 percent of country-year pairs among 83 EMDEs) (Figure 3.A). However, even in about one-quarter of these instances, the differential has not been large enough to offset the increase in debt from primary balances and maintain the government debt ratio on a stable or declining path. As a result, during 1990-2018, primary balances, long-term interest rates and nominal GDP growth have been such that debt has been on a steadily rising trajectory about half of the time—in 44 percent of country-year pairs among 34 advanced economies and 50 percent of country-year pairs among 83 EMDEs (Figure 3.B).

Debt sustainability has deteriorated since the global financial crisis both in advanced economies and in EDMEs (Aizenman et al. 2019). In advanced economies, debt-reducing fiscal positions (i.e., positive sustainability gaps) in 2007 turned into debt-increasing fiscal positions (i.e., negative sustainability gaps) from 2008 (Figure 3.C). Since then, sustainability has been improved and, in 2017, returned to debt-reducing positions. Still, it was below the level seen prior to the crisis.

In EMDEs, debt-reducing positions in 2007 turned into debt-increasing positions in 2015. In commodity-exporting EMDEs, this deterioration partly reflected the sharp growth slowdown that accompanied the steep post-crisis slide in commodity prices. However, recoveries in commodity prices and activity helped improve debt sustainability in these economies and, by 2018, fiscal positions in commodity exporters became debt-reducing. In commodity-importing EMDEs, fiscal positions have remained weak as a result of fiscal stimulus implemented during the global financial crisis, chronic primary deficits, and, in some EMDEs, anemic post-crisis, leading debt-increasing fiscal positions in 2018.

As aggregate sustainability gaps have improved in advanced economies, fiscal positions in most countries in this group set government debt on clearly declining trajectories by 2018. Sustainability gaps were negative in around 9 percent of advanced economies (Figure 3.D). In EMDEs, share of countries where fiscal positions were on rising trajectories (i.e., negative sustainability gaps) was around 50 percent in 2018. Negative sustainability gaps were observed in roughly 58 percent of commodity-exporting EMDEs and in about 39 percent of commodity-importing EMDEs in 2018. In principle, temporary negative sustainability gaps that are quickly reversed would be of limited concerns. However, in EMDEs, especially in commodity importers, sustainability gaps have worsened steadily since 2011.

### 4.2. Increasing vulnerability to financial crises

A growing debt-to-GDP ratio could erode investor confidence, requiring the government to pay a rising risk premium on its debt. These pressures could culminate in a debt crisis if investors fear that the accumulation of government debt is no longer sustainable (Blanchard 2019; Henderson 2019; Rogoff 2019a,b). Rapid debt accumulation can also lead to a currency crisis if investor concerns about the ability to repay foreign-currency-denominated debt induce a speculative attack on a fixed or pegged currency (Krugman 1979; Obstfeld and Rogoff 1986), or a banking crisis if private sector balance sheet vulnerabilities trigger banking panics (Chang and Velasco 2000; Krugman 1999).

While the increase in private debt in EMDEs partly reflects financial deepening that is associated with growth acceleration, elevated private debt represents a fiscal risk. Past experience illustrates that private sector debt may shift onto government balance sheets during financial crises, such as banking crises, as governments provide support to private institutions and guarantee their liabilities in difficulty (Figure 4.A; Kose, Ohnsorge, and Sugawara 2018; World Bank 2017a). For example, government debt rose by more than 30 percentage points of GDP in Indonesia and Thailand during the Asian crisis in the late 1990s. Some of advanced economies experienced a hike in government debt during banking crises in their economies, including Ireland and Latvia in 2008.

Indeed, many episodes of debt distress were accompanied by currency or banking crises (Claessens and Kose 2014). During 1970s, a relatively small number of crises were materialized, while the most recent four decades have seen more episodes (Figure 4.B). Although currency and banking crises were dominant during 1990s, the frequency of debt crises during other periods is relatively high. Some types of crises are more frequently observed than others. There are 151 banking crises, 245 currency crises, and 76 debt crises

during the period of 1970-2018, though it should be noted that several countries experienced multiple crises of the same type.[6]

For reserve currency-issuing advanced economies, like the United States, it is often argued that such a spike in risk premia is unlikely, since these countries are often viewed as safe havens during periods of market turbulence (Furman and Summers 2019; Krugman 2014). Indeed, government debt in some advanced economies has reached very high levels with interest rates remaining low. The extreme case is Japan, where the 10-year government bond yield has been below 0.1 percent for most of the time since mid-2015 even while gross government debt has exceeded 230 percent of GDP.

For EMDEs, however, this risk is more acute. During episodes of financial stress, EMDE borrowing costs tend to rise sharply, and higher debt servicing costs can cause debt ratios and debt dynamics to deteriorate and rollover risk to rise (Arellano and Ramanarayanan 2012; Figure 5.A to 5.D). A recent example is Argentina, where five-year U.S. dollar-denominated sovereign bond yields more than doubled during 2018 to a peak of higher than 11 percent in early September. Indeed, every decade since the 1970s has witnessed debt crises in EMDEs, often combined with banking or currency crises (Kose and Terrones 2015; Laeven and Valencia 2018).

Financial crises tend to result in large economic costs with large effects on economic activity (Dooley and Frankel 2003; Edwards and Frankel 2002). Many recessions follow from financial crises, and financial crises often tend to make these recessions worse than a "normal" business cycle recession (Claessens, Kose, and Terrones 2009, 2012). The average duration of a recession associated with a financial crisis is some six quarters, two more than a normal recession. There is also typically a larger output decline in recessions associated with crises than in other recessions. And the cumulative loss of a recession associated with a crisis (computed using lost output relative to the pre-crisis peak) is also much larger than that of a recession without a crisis.

The real impact of a crisis on output can be computed using various approaches. For a large cross-section of countries and a long period, Claessens, Kose, and Terrones (2012) use the traditional business cycle methodology to identify recessions. Overall losses can also be estimated by adding up the differences between trend growth and actual growth for a number of years following the crisis or until the time when annual output growth returns to its trend. On this basis, Claessens and Kose (2014) estimate that the cumulative cost of banking crises is, on average, about 23 percent of GDP during the first four years. Regardless of the methodology, losses do vary across countries. Overall losses tend to be larger in EMDEs, but the large losses in recent crises in advanced economies (e.g., both Iceland's and Ireland's output losses exceeded 100 percent) paint a different picture. The median output loss for advanced economies is now about 33 percent, which exceeds that of EMDEs at 26 percent.

[6] The various types of crises can also overlap. Currency crises frequently tend to overlap with banking crises, the so-called twin crises (Kaminsky and Reinhart 1999). In addition, debt crises can overlap with currency and balance of payments crises. For further discussions, see Claessens and Kose (2014).

Similar to financial crises, some of the sharpest deteriorations in fiscal positions have been among energy exporters. Energy-exporting EMDEs rely heavily on fiscal revenues from the resource sector, and the subsequent plunge in oil prices has forced some of them into severe fiscal adjustment and reserve losses (Danforth, Medas, and Salins 2016). Fiscal positions deteriorate sharply during oil price plunges in energy-exporting EMDEs but are subsequently rebounded as a result of a pro-cyclical fiscal tightening. Within two years after the oil price plunge, fiscal positions and debt dynamics are restored close to their pre-plunge levels (World Bank 2017a).

### 4.3. Constraining government action during downturns

High debt constrains governments' ability to respond to downturns with countercyclical fiscal policy (Obstfeld 2013; Reinhart and Rogoff 2010; Romer and Romer 2018). This was the case during the global financial crisis: fiscal stimulus during 2008-09 was considerably smaller in countries with high debt than in those with low government debt (Figure 6.A; World Bank 2015). Moreover, weak fiscal positions tend to be associated with deeper and longer recessions, a situation that can be worsened if the private sector also falls into distress and its debt migrates to government balance sheets.

Not only the size but the effectiveness of fiscal policy could be constrained when governments face high debt levels. High government debt tends to render expansionary fiscal policy less effective (Adam and Bevan 2005). In theory, high government debt can reduce the size of fiscal multipliers through two channels.

First, there is a Ricardian channel. When a government with a weak fiscal position implements fiscal stimulus, households expect tax increases sooner than in an economy with a strong fiscal position (Blanchard 1990a,b; Sutherland 1997). The perceived negative wealth effect leads households to cut consumption and save more, thereby weakening the impact of the stimulus on output. Thus, the net effect of fiscal policy on output—the size of the fiscal multiplier—may be smaller in an economy with a weaker fiscal position. Some studies discuss the Ricardian channel and show that the effect of government spending shocks on private consumption depends on government debt (Perotti 1999; Giavazzi and Pagano 1990, 1995).

The second channel is an investor sentiment channel. Countries with high sovereign debt are more likely to have to pay a risk premium to borrow (Alcidi and Gros 2019). When debt is higher, fiscal stimulus can increase creditors' concerns about sovereign credit risk, raising sovereign bond yields and, hence, borrowing costs across the whole economy (Corsetti et al. 2013). Higher risk premia, especially during times of sovereign financial stress, have been shown to feed into lower corporate borrowing (Bocola 2016). This, in turn, will crowd out private investment and consumption, reducing the fiscal multiplier.

Empirical evidence suggests that high government debt tends to render fiscal policy less effective and, therefore, fiscal multipliers are smaller when government debt is higher (Figure 6.B). Auerbach and Gorodnichenko (2012, 2013), Ilzetzki, Mendoza, and Vegh (2013), and Nickel and Tudyka (2014) estimate multipliers that depend on the fiscal position and find that weaker fiscal positions are associated with smaller fiscal multipliers.

By employing an interacted panel vector autoregression model, Huidrom et al. (2019) examine the effects of fiscal shocks not only on private consumption and CDS spreads (as a measure of risk premia) but also on output. The study finds that the relevance of Ricardian and investor sentiment considerations (i.e., private consumption and borrowing cost effects) as the two channels for a government's fiscal position to matter for fiscal multipliers (i.e., output effects). Similarly, evidence points to less effective monetary policy in the presence of high debt because of poorly anchored inflation expectations in high-debt countries (Kose et al. 2019).

### 4.4. Slowing investment and growth

With higher debt typically comes higher debt service. Spending on higher debt service needs to be financed through some combination of increased borrowing, increased taxes, and reduced government spending. Spending cuts may even include spending on critical government functions such as social safety nets or growth-enhancing public investment (Figure 6.C and 6.D; Debrun and Kinda 2016; Obstfeld 2013; Reinhart and Rogoff 2010). Separately, high and rising government debt may raise long-term interest rates and yield spreads.[7]

High debt could also create uncertainty about macroeconomic and policy prospects and weigh on growth (Lo and Rogoff 2015). It includes risks that the government may need to resort to distortionary taxation to rein in debt and deficits (IMF 2018; Kumar and Woo 2010). Higher interest rates and uncertainty would tend to crowd out productivity-enhancing private investment and weigh on output growth. By using data on U.S. stock returns, Croce et al. (2018) find that an increase in the cost of capital for innovation-intensive firms results in declines in productivity and economic growth. As a result, a rise in government debt is associated with a decline in corporate investment and R&D. Crowding-out of private investment due to high public debt is also shown in Huang, Pagano, and Panizza (2017), with data for China, and Panizza, Huang, Varghese (2018), with firm- and industry-level data across 69 countries. They find that the negative relationship between public debt and private investment reflected tightening credit constraints.

## 5. Debt: How much is too much?

Weighing these benefits and costs of debt, the literature has attempted to identify how much debt is "too much"—a threshold level of debt below which it is sustainable or not harmful to growth. A rich theoretical literature has focused on the interactions between governments, monetary authorities and private agents in response to numerous shocks. The empirical literature has estimated a wide range of threshold values that appear to be tipping points for adverse effects of debt.

[7] For details about the links between government debt and interest rates, see Ardagna, Caselli, and Lane (2007); Codogno, Favero, and Missale (2003); Laubach (2009); Rubin, Orszag, and Sinai (2004).

## 5.1. Theoretical considerations

### 5.1.1. Government debt

Government debt differs from private debt in the more limited ability of creditors to enforce debt service (Weidemaier and Gelpern 2014). Theoretical frameworks often model government debt as the outcome of the government maximizing the social welfare of domestic agents, including the beneficiaries of government spending, taxpayers, and debtholders, subject to an intertemporal budget constraint that captures debt sustainability. The literature has taken two paths, one which takes the government's willingness to honor its debt as given, and the other modelling the government's willingness to service debt as a strategic decision.

Assuming a government's willingness to service debt, the optimal level of debt depends on the nature of adverse shocks and the responses of economic agents to "unsustainable debt dynamics" (Guimaraes 2011). Early models, still widely used by policymakers, assess debt sustainability using the accounting identity of the intertemporal budget constraint, as defined in Blanchard (1990b), for scenario analysis. Debt sustainability can deteriorate rapidly in the presence of adverse shocks. Models that incorporate stochastic shocks to growth, revenues, expenditures or borrowing cost offer a range of possible debt paths (Bohn 1998; Ghosh et al. 2013; Mendoza and Oviedo 2006, 2009). Debt sustainability also depends on the response of governments, monetary authorities, and private agents, captured in general equilibrium models (D'Erasmo, Mendoza, and Zhang 2016).

Several models allow government debt to serve additional functions by introducing incomplete markets, spillovers from public investment, or interactions with monetary policy. In models with incomplete markets, government debt is a financial instrument that provides liquidity to the private sector and helps households smooth consumption.[8] If public investment offers spillovers that raise private productivity, the optimal level of debt is higher (Chatterjee, Gibson, and Rioja 2017). Finally, the optimal stock of government debt can also depend on interactions between fiscal and monetary policy (Leeper and Leith 2016), between lenders' and borrowers' financial health (Kashyap and Lorenzoni 2019), and income inequality.[9]

Another strand of the literature models a government's strategic decision to default on external debt (D'Erasmo and Mendoza 2019). In contrast with corporate debt, creditors to sovereigns typically have few mechanisms to enforce debt obligations, although over time some mechanisms have evolved to strengthen enforcement (Panizza, Sturzenegger, and Zettelmeyer 2009). Creditors can, however, retaliate against defaulting governments by excluding them from financial markets for future access to credit (Eaton and Gersovitz 1981), imposing sanctions (Bulow and Rogoff 1989), or demanding default on other

[8] For these models, see Aiyagari and McGrattan (1998); Canzoneri, Cumby, and Diba (2016); Floden (2001); Harding and Klein (2019); Peterman and Sager (2018); and Röhrs and Winter (2017).

[9] For these interactions in different model environments, see Andreasen, Sandleris, and Van der Ghote (2019); Dovis, Golosov, and Shourideh (2016); and Jeon and Kabukcuoglu (2018).

creditors.[10] Default risk also introduces monetary frictions that can discourage debt accumulation (Arellano, Bai, and Mihalache 2019). Thus, a government's decision to default is modeled as a tradeoff between short-term savings on debt service and longer-term costs, including output losses and loss of market access as a result of default.

### 5.1.2. Private debt

A large literature has examined the optimal capital structure of corporate borrowers starting with Modigliani and Miller (1958) who showed that in the absence of frictions the choice between debt and equity finance is irrelevant to firm value (see Claessens and Kose 2018 for a survey). Subsequent studies introduced frictions that helped identify an optimal composition for capital structure including the share of debt finance. Broadly speaking, the tradeoffs that determine the optimal level of corporate debt can be grouped into three strands. [11]

First, more advantageous tax treatment of debt than equity can tilt decisions about optimal capital structure toward debt (DeAngelo and Masulis 1980). However, any tax advantage of debt has to be weighed against the cost of potential debt distress, including the cost of renegotiating debt contracts and suffering production disruptions, the cost of bankruptcy, and the economy-wide cost of weaker competition from risk-averse highly leveraged firms.[12]

Second, when equity investors do not have complete information, they cannot distinguish between issuance of overvalued equity and equity issuance to finance growth and profit opportunities. To offset the cost of this information asymmetry, firm management that maximizes existing shareholder value can develop a pecking order of financing options, starting with internal finance, followed by debt and eventually equity (Myers 1984; Myers and Majluf 1984).

Third, views on what constitutes an optimal capital structure may differ between firm management and shareholders, especially in an environment of incomplete outside information. The chosen capital structure will then depend on the design of compensation for firm management (Ross 1977; Dybvig and Zender 1991). Debt can serve as a disciplining device to reduce how much a management with the objective of expanding operations may wish to invest in projects with negative net present value (Stulz 1990).

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[10] For these models, see Aguiar et al. (2016); Catao, Fostel, and Kapur (2009); Catao and Kapur (2006); Cole and Kehoe (1998); and Sandleris (2008). Some of these models also consider multiple equilibria because of self-reinforcing cycles: in one equilibrium, insolvency or illiquidity results in default, while in another equilibrium, the government manages to roll over its debt (Calvo 1988; Cole and Kehoe 2000; Mendoza and Yue 2012). The decision to default also depends on the availability of financial assistance (Corsetti, Erce, and Uy 2019).

[11] For reviews of these, see Myers (2001, 2003). Some studies also look at the composition of debt, e.g., share of foreign-currency denominated debt at the firm level (Eren and Malamud 2019; Kalemli-Ozcan, Liu and Shim 2019; Salomao and Varela 2019).

[12] See Jensen and Meckling (1976); Leland and Toft (1996); and Myers (1977) for discussions of tax advantage; see Bradley, Jarrell, and Kim (1984); Kim (1982); Leland (1994); and Titman (1984) for discussions of the costs associated with bankruptcy. See Chevalier (1995) for discussion of the cost of less vigorous competition from risk-averse highly leveraged firms.

### 5.2. Empirical considerations

The empirical literature has looked for tipping points at which debt triggers financial crises or becomes otherwise economically costly. One strand of the literature has estimated sustainable levels of debt in advanced economies if fiscal deficits remain consistent with past performance or if movements in sovereign bond yields are consistent with the past. Other studies have identified debt thresholds above which the likelihood of a financial crisis increases. A third strand of the literature has explored the debt levels above which debt burdens become detrimental to long-term growth.

The first strand of the literature has estimated the sustainable levels of government and private debt that do not culminate in debt distress.[13] Using data for 23 advanced economies, debt limits for governments borrowing at the risk-free rate have been estimated at 150-250 percent of GDP depending on country characteristics (Ghosh et al. 2013).[14] Advanced economies with government debt above 80 percent of GDP and persistent current account deficits have been shown to be vulnerable to sudden fiscal deteriorations (Greenlaw et al. 2013). Prudent debt management can help ensure a sustainable fiscal position that provides insurance against macroeconomic shocks (Missale 2012). For private sector debt, studies have focused on the link between financial system credit to the private sector, as a proxy for private debt, and non-performing loans. A typical credit boom has been estimated to more than double non-performing loans (Mendoza and Terrones 2008).

The second strand of the literature has identified government or private debt, especially external debt, among several early warning indicators of financial crises. Government debt thresholds have been defined relative to government revenues (Manasse and Roubini 2009) or exports (Kraay and Nehru 2006) and as depending on the magnitude of other early warning indicators. "Safe" levels of external debt in EMDEs have been shown to be low and to depend heavily on a country's record of macroeconomic management (Reinhart, Rogoff, and Savastano 2003).[15] Correlates of private debt or private debt accumulation—credit-to-GDP ratios or their change over time—have also been identified as early warning indicators.[16]

The third strand of the literature has estimated the debt levels above which debt burdens became detrimental to investment and long-term output growth. One study found that growth has tended to be lower in both advanced economies and EMDEs with government debt above 90 percent of GDP (Reinhart and Rogoff 2010), while another found, for 18 OECD countries, a threshold of 85 percent of GDP (Cecchetti, Mohanty, and Zampolli 2011). The thresholds for adverse short-term output effects may be lower, at 67 percent

[13] See Debrun et al. (2019) for a survey on the practical aspects of debt sustainability assessments.
[14] One commonly used "golden rule" is that borrowing should match growth-enhancing investment (Ostry, Ghosh, and Espinoza 2015).
[15] A separate literature examines the incentives of borrowers to accept or reject debt restructuring ("hold-out problem"; Fang, Schumacher, and Trebesch 2019).
[16] For discussions of these topics, see Claessens, Kose, and Terrones (2009, 2012), Dell'Ariccia et al. (2016); Eichengreen and Arteta (2002); Gourinchas and Obstfeld (2012); Rodrik and Velasco (2002); and Schularick and Taylor (2012).

of GDP for advanced economies (Baum, Checherita-Westphal, and Rother 2013). However, some studies find no such threshold effects between debt and growth outcomes (Chudik et al. 2017; Panizza and Presbitero 2014; Pescatori, Sandri, and Simon 2014).

In EMDEs, the impact of external debt on per capita growth has been estimated to be negative at debt levels above 35-40 percent of GDP (Patillo, Poirson, and Ricci 2002). In low-income countries, the threshold has been shown to be even lower, at 20-25 percent of GDP (Clements, Bhattacharya, and Nguyen 2003).

For the private sector, high corporate leverage has been associated with weaker investment, since the benefits of productive investment for owners are diluted by obligations to creditors.[17] However, while some of these studies find a more negative association between leverage and investment for higher levels of debt, none provides estimates of specific thresholds of corporate leverage beyond which it detracts from investment. Higher household debt has been associated with lower output growth (Kim and Zhang 2019).

In a nutshell, the empirical evidence suggests that the optimal level of debt depends on a wide range of trade-offs and borrower characteristics (Ostry, Ghosh, and Espinoza 2015). This in part reflects a broader theoretical challenge in the literature. A basic insight from theory is that an increase in government debt tends to increase output in the short run, but to reduce it in the long-run (Elmendorf and Mankiw 1999). Debt-financed fiscal expansion can be beneficial in the short-run to limit economic downturns and smooth macroeconomic fluctuations; and borrowing can be beneficial also in the long-run, when used to finance investments that yield a higher rate of return than the cost of debt. However, elevated debt levels can lead to sustainability challenges, increase vulnerability to crises, erode the size and effectiveness of fiscal expansion, and weigh on investment and growth.

### 5.3. Political economy considerations

When weighing benefits against costs of debt, "political-economy" forces may tilt the scale towards underestimating the cost of borrowing while overestimating its benefits. There are two strands of literature in analyzing the interactions between political-economy forces and debt accumulation. First, disagreements over spending priorities or short-lived government tenures may cause incentives to expand government spending envelopes, financed by debt.[18] Second, voters do not have complete information about election candidates. This may create incentives to generate short-lived, debt-fueled growth spurts before elections (Dubois 2016; Nordhaus 1975). Especially ahead of elections, the absence of full information may create incentives that encourage political incumbents to employ debt-financed fiscal stimulus to improve short-term growth prospects.[19]

[17] For details of these arguments, see Borensztein and Ye (2018); Chen and Lu (2016); Das and Tulin (2017); IMF (2018); Kalemli-Ozcan, Laeven, and Moreno (2018); and Magud and Sosa (2015).
[18] For details about this argument, see Aguiar and Amador (2011, 2013); Alesina and Tabellini (1990); and Drazen (2001).
[19] Aidt, Veiga, and Veiga (2011), Rogoff and Sibert (1988), and Shi and Svensson (2006) discuss these issues.

As a result, government expenditures, public debt, and deficits have tended to increase statistically significantly, albeit modestly, around elections (Brender and Drazen 2005; Klomp and De Haan 2011; Philips 2016). Such political cycles in budget pressures tend to be stronger in countries with weaker fiscal transparency, without balanced-budget requirements and with compromised governance.[20]

## 6. Conclusion

EMDE governments need to put in place mechanisms and institutions that help them strike a careful balance between taking advantage of the present low interest rate environment and avoiding the risks posed by excessive debt accumulation. For countries with sound fiscal positions and with frameworks that help ensure long-term sustainability, if the cyclical position is appropriate, the balance may tip toward debt-financed spending to boost growth prospects. But for those countries with constrained fiscal positions, alternative policies still exist to expand the fiscal resources available to finance growth-friendly policies.

These alternatives include better spending and tax policies, in an improved institutional environment. Spending can be shifted toward areas that lay the foundation of future growth, including education and health spending as well as climate-smart investment to strengthen economic resilience. Government revenue bases can be broadened by removing special exemptions and strengthening tax administration (Gaspar, Ralyea, and Ture 2019; IMF 2019; World Bank 2017b). Business climates and institutions can be strengthened to support vibrant private sector growth that can yield productivity gains and expand the revenue base.

Greater debt transparency and better debt management can mitigate some of the costs associated with debt buildups and some of the political-economy pressures for debt increases (Kose et al. 2020). The buildup in LIC debt has not been accompanied by necessary increases in the quality of debt management. Better debt management and transparency can help reduce borrowing costs, enhance debt sustainability, and dampen fiscal risks. For example, a sound debt management system would keep short-term and foreign currency exposures to prudent levels. Greater transparency—as well as institutional constraints on fiscal policy, including robust fiscal rules, and better governance—can mitigate some of the political-economy forces that are biased towards debt increases. Over time, improved debt management and transparency would help foster macroeconomic stability.

The literature on debt has extensively documented the potential benefits and costs of debt accumulation. It has also concluded there is no generally applicable optimal level of debt but it depends on a wide range of factors. Regardless of the desired level of debt, prudent debt management requires ensuring that debt is contracted on terms that preserve macroeconomic and financial resilience—preferably at longer maturities, at fixed (and

[20] For discussions of political budget cycles, see Alt and Lassen (2006 a,b); Alt and Rose (2007); Cioffi, Messina, and Tommasino (2012); Klomp and De Haan (2011); Shi and Svensson (2006); and Streb, Lema, and Torrens (2009).

favorable) interest rates, are denominated in local currency and transparently disclosed. A debt composition that is less vulnerable to market disruptions reduces the likelihood that a decline in market sentiment, sharp depreciations, or interest rate spikes erode debt sustainability. This is particularly important in EMDEs, which tend to suffer sharp capital flow stops or reversals during times of stress in financial markets.

Low-cost debt can be just the medicine EMDEs need to mend some of their development gaps. But, as the old adage goes, the dose makes the poison: excessive debt accumulation has adverse side effects. In this context, EMDEs should not allow low interest rates to lull them into complacency. Even if the cost of debt is currently low, the historical record suggests that it could increase sharply during periods of financial stress, as some EMDEs have painfully learned once again in recent years. When an EMDE has an elevated level of debt, it often takes time to reduce it (Figure 7.A and 7.B).[21] Excessive debt burdens may make governments more vulnerable to crises, limit the size and effectiveness of fiscal stimulus during future cyclical downturns, and weigh on investment and longer-term growth. As the long history of financial crises in EMDEs has repeatedly shown, debt cannot be counted as free lunch.

[21] IMF (2012) also concludes that reducing public debt takes time based on public debt accumulation episodes in advanced economies.

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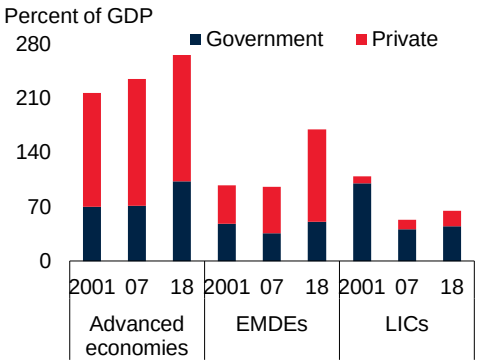
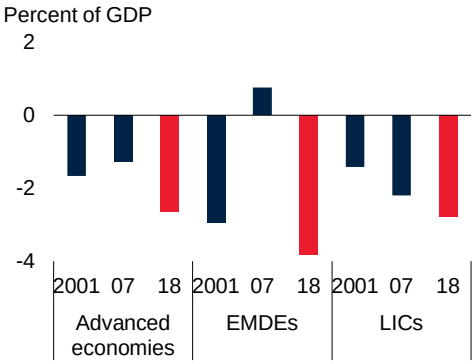
## Figure 1. Debt and deficits

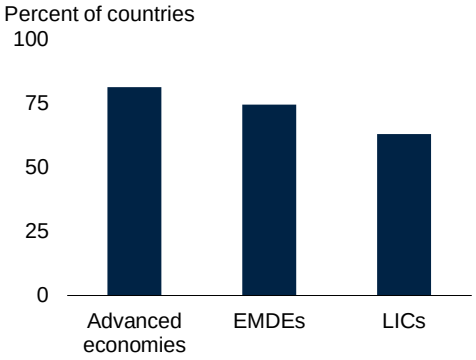
A. Government and private debt



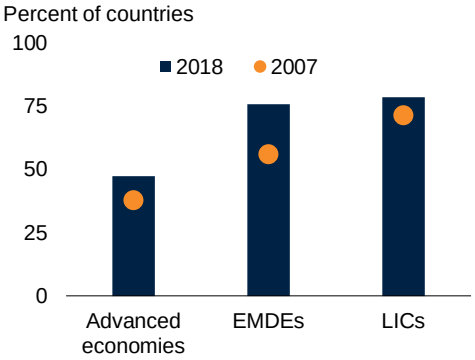

B. Fiscal balance



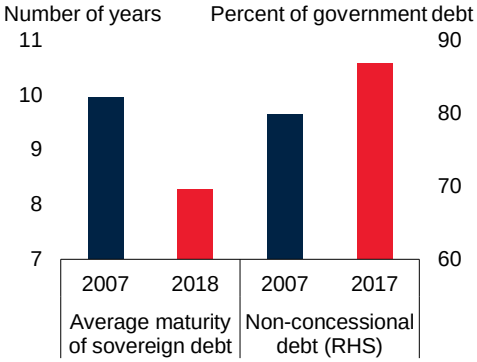

C. Countries with higher government debt in 2018 than 2007



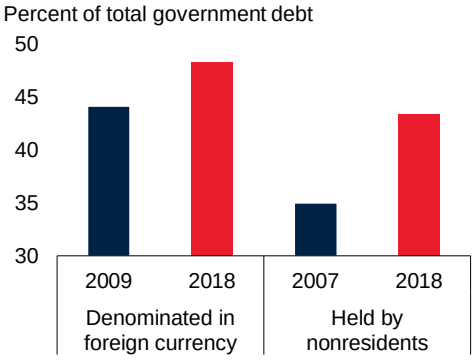

D. Countries with fiscal deficits




E. Average maturity and non-concessional debt in EMDEs




F. Debt denominated in foreign currency and held by nonresidents in EMDEs




Sources: Kose et al. (2017); World Bank.

A.B. Averages computed with current U.S. dollar GDP as a weight, based on 38 advanced economies, 154 EMDEs, and 29 LICs, though the sample size varies by year.

C. Share of total number of countries in which government debt in percent of GDP in 2018 was higher than in 2007. Sample includes 37 advanced economies, 144 EMDEs, and 27 LICs.

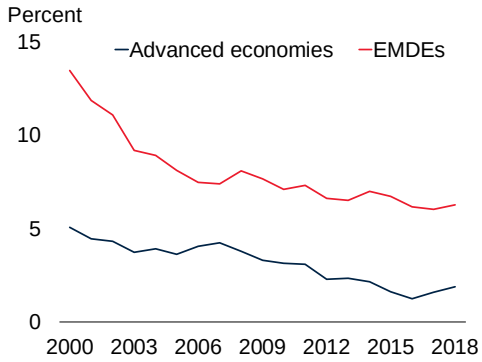
D. Share of total number of countries with fiscal deficits in 2007 and 2018. Sample includes 38 advanced economies, 153 EMDEs, and 28 LICs.

E. Median of 65 EMDEs for maturity and 120 EMDEs for non-concessional debt, though the sample size varies by year.

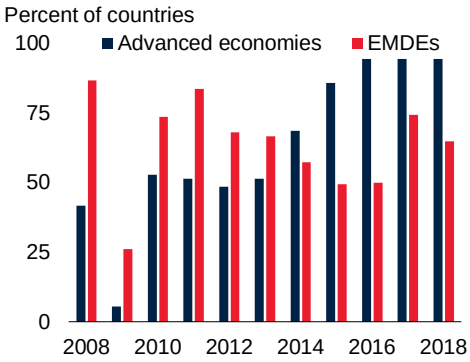
F. Median of 37 EMDEs for currency denomination and 49 EMDEs for residency, though the sample size varies by year.

## Figure 2. Borrowing costs

A. Long-term interest rates




B. Countries with interest rates below growth



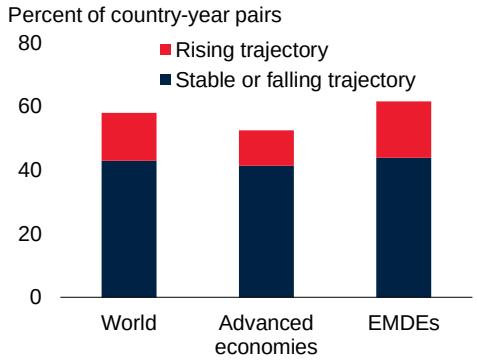

Sources: Kose et al. (2017); World Bank.

A. Average long-term nominal government bond yields (with maturity of 10 years or close) computed with current U.S. dollar GDP as a weight, based on at most 36 advanced economies and 84 EMDEs.

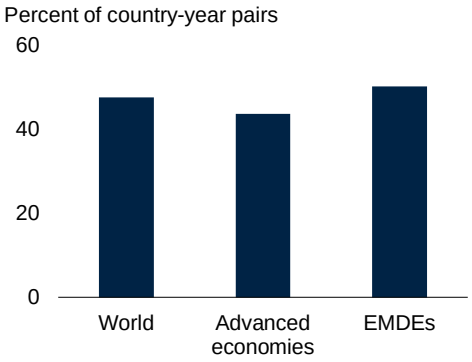
B. Share of countries where long-term nominal interest rates (represented by 10-year local currency government bond yields or with close maturity) are below nominal GDP growth. Sample includes 36 advanced economies and 84 EMDEs, though the sample size varies by year.

## Figure 3. Sustainability of government debt

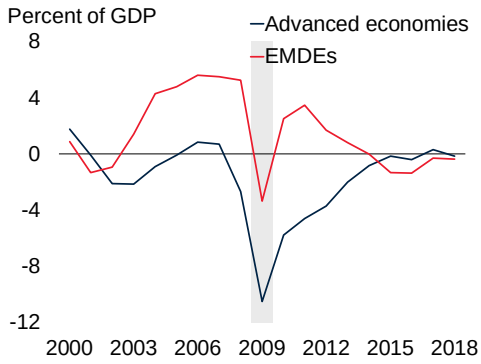
A. Instances of interest rates below growth



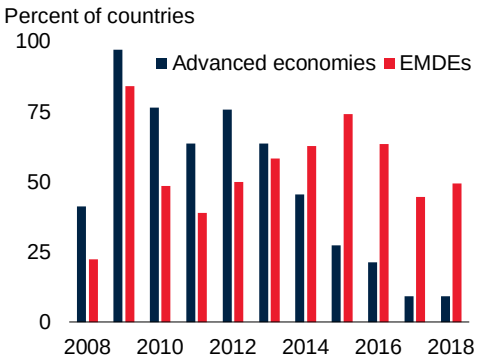

B. Instances of rising debt trajectories




C. Sustainability gaps




D. Countries with negative sustainability gaps




Sources: Kose et al. (2017); World Bank.

Note: A sustainability gap is defined as the difference between the actual primary balance and the debt-stabilizing balance.

A. Share of country-year pairs in each country group when long-term nominal interest rates (represented by 10-year local currency government bond yields or with close maturity) are below nominal GDP growth for 1990-2018 in 34 advanced economies and 83 EMDEs. Red bars indicate the share of country-year pairs in which debt is on a rising trajectory (i.e., negative sustainability gaps), notwithstanding interest rates below growth rates; blue bars indicate country-year pairs in which debt is on a stable or declining trajectory (i.e., positive sustainability gaps).

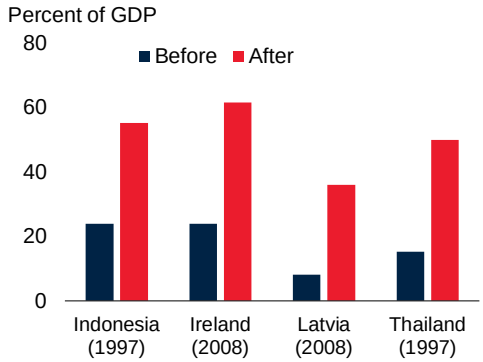
B. Share of country-year pairs for 1990-2018 for 34 advanced economies and 83 EMDEs in which debt is on a rising trajectory (i.e., negative sustainability gaps).

C. Averages computed with current U.S. dollar GDP as a weight, based on at most 34 advanced economies and 83 EMDEs.

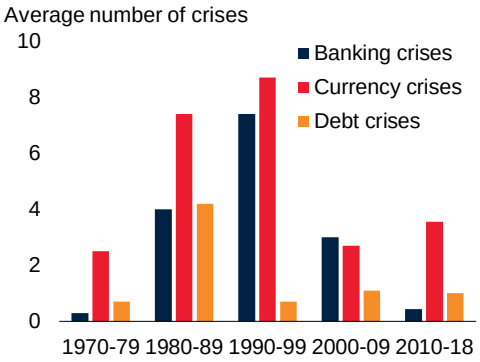
D. Share of countries in which sustainability gaps are negative (i.e., debt is on a rising trajectory, or debt-increasing fiscal positions). Sample includes 34 advanced economies and 83 EMDEs.

## Figure 4. Government debt and crises

A. Government debt during past banking crises




B. Crisis frequency

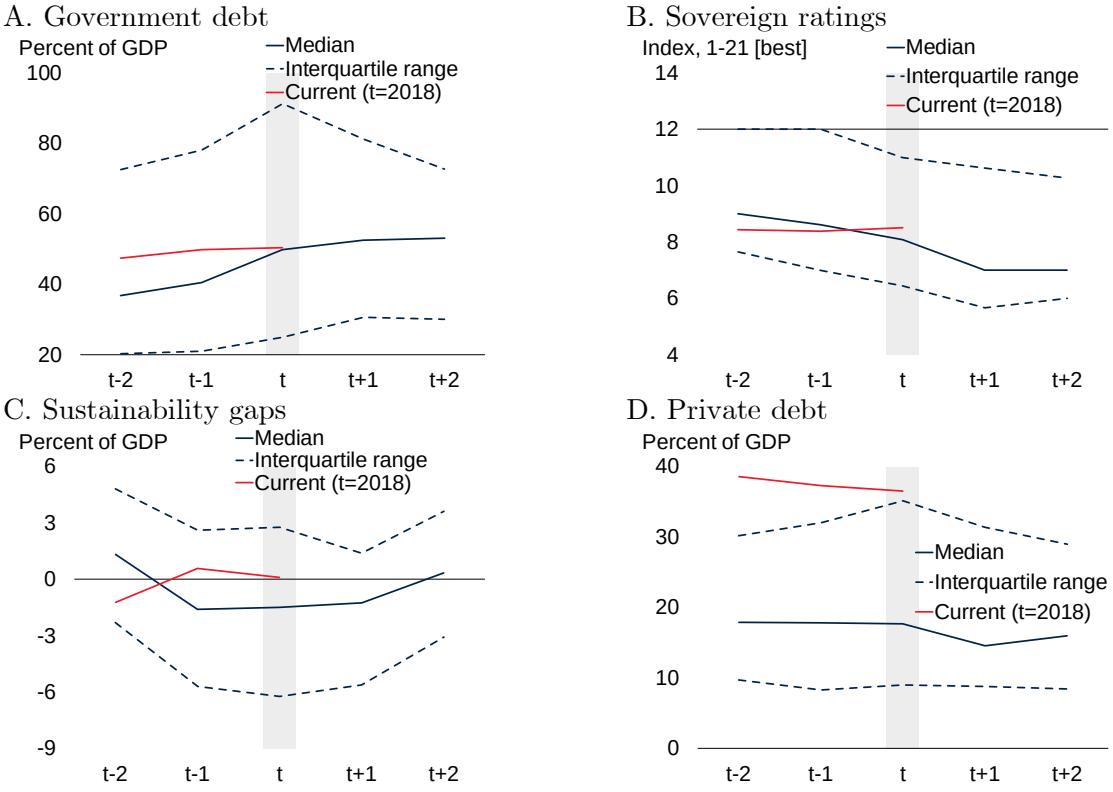



Sources: International Monetary Fund; Kose et al. (2017); Laeven and Valencia (2018); World Bank.

A. "Before" and "after" denote, respectively, one year before and after the onset of banking crisis, as shown by numbers below the corresponding country names. Government debt refers to general government debt in all cases except for Indonesia, where data are for central government only.

B. The figure shows the average number of financial crises in each decade in all countries. Years of crises are taken from Laeven and Valencia (2018), while it includes currency crises in 2017 and 2018, which are computed with data on nominal exchange rates from the International Monetary Fund and the methodology described in Laeven and Valencia (2018).

## Figure 5. Debt sustainability around financial crises in EMDEs

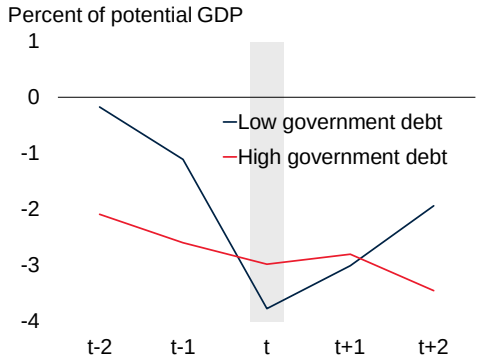



Sources: Kose et al. (2017); Laeven and Valencia (2018); World Bank.

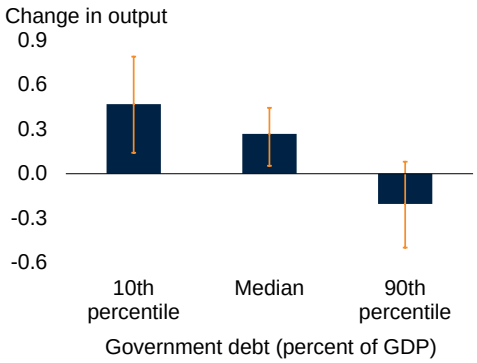
Note: Year "t" refers to the year of onset of financial crises in EMDEs. Medians, as well as interquartile ranges, based on balanced samples. Crises considers banking, currency, and debt crises, as defined in Laeven and Valencia (2018). When there are multiple crises identified within five years, the one with the lowest real GDP growth is counted as an event. Sample includes 79 crisis episodes (Panel A), 56 episodes (Panel B), 34 episodes (Panel C), and 126 episodes (Panel D). The red line shows median based on all EMDEs, though it is not a crisis episode.

## Figure 6. Size and effectiveness of fiscal policy

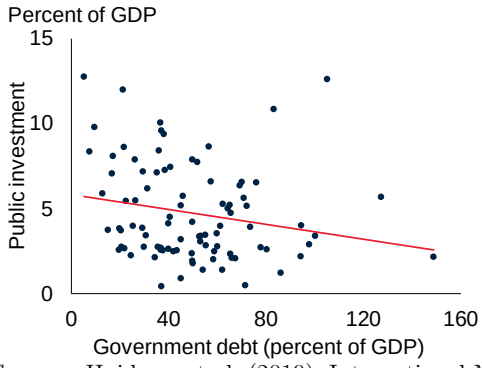
A. Cyclically-adjusted fiscal balance in EMDEs around the global financial crisis



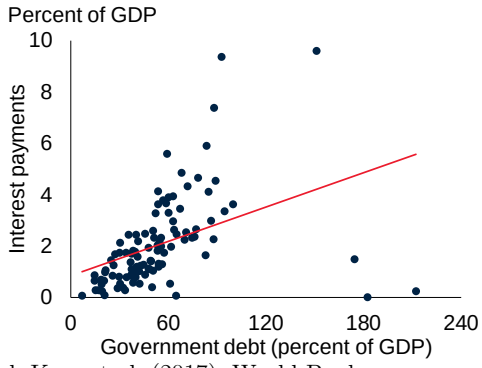

B. Fiscal multipliers after 2 years




C. Public investment and debt in EMDEs, 2017-18




D. Government debt and interest payments in EMDEs, 2018




Sources: Huidrom et al. (2019); International Monetary Fund; Kose et al. (2017); World Bank.

A. Year "t" is the year of trough of business cycle in 2008 or 2009. Median of balanced samples over t-2 to t+2, based on 22 EMDEs where troughs are identified. Small states, as defined by the World Bank, are excluded. Troughs are defined as the years of negative GDP growth that is one-standard-deviation below average growth over 1960-2018 per country. When there are multiple troughs identified within six years, the one with deeper contraction is counted as an event. "Low government debt" indicates countries with below-median debt-to-GDP ratio (34 percent of GDP) in 2007 in the sample countries, while "high government debt" does countries with above-median ratio in 2007.

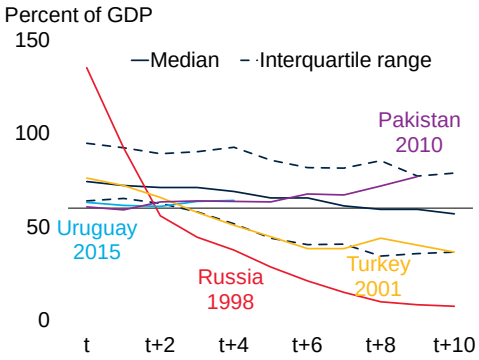
B. Bars show the conditional fiscal multipliers for different levels of government debt after two years. Fiscal multipliers are defined as cumulative change in output relative to cumulative change in government consumption in response to a 1-unit government consumption shock. They are based on estimates from the interacted panel vector autoregression model, where model coefficients are conditioned only on government debt. Values shown on the x-axis correspond to the 10th to 90th percentiles in the sample. Bars represent the median, and vertical lines are the 16-84 percent confidence bands.

C. General government gross debt on the horizontal axis and public investment on the vertical axis. Public investment refers to a sum of net investment in non-financial assets and consumption of fixed capital, in general or central government (depending upon data availability). Sample includes 91 EMDEs.

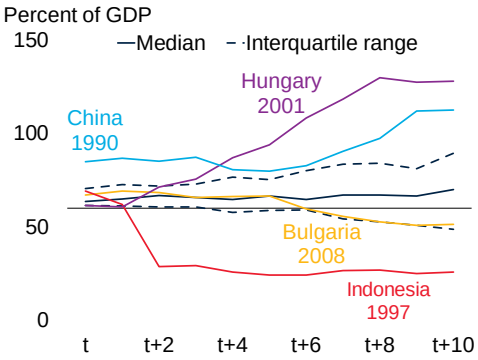
D. General government gross debt on the horizontal axis and interest payments on the vertical axis. Sample includes 105 EMDEs, excluding small states as defined by the World Bank.

## Figure 7. Evolution of debt in selected economies

A. Government debt dynamics in EMDEs after crossing the 60 percent threshold




B. Private debt dynamics in EMDEs after crossing the 60 percent threshold




Sources: Kose et al. (2017); World Bank.

Note: The horizontal axis shows the number of years after the government debt-to-GDP ratio (Panel A) and private debt-to-GDP ratio (Panel B) exceeds 60 percent (in year "t"). Based on unbalanced samples over t to t+10 but only include events where data are available at least until t+5. Data start in 1990. Sample includes 75 episodes (Panel A) and 46 episodes (Panel B) in EMDEs excluding HIPC-participating countries.