2. Japan's public debt sustainability before and after COVID-19

Jérémie Cohen-Setton and Keita Oikawa¹

1. INTRODUCTION

The secular decline in interest rates is fundamentally reshaping the way economists assess debt sustainability (Blanchard 2019; Blanchard et al. 2020; Furman and Summers 2020). When high interest rates prevail, a large stock of debt necessarily translates into elevated fiscal costs. But with low interest rates, the level of debt becomes less informative as an indicator of debt sustainability.

Figure 2.1 illustrates such disconnect between the level of debt and its cost. Over the last 40 years, Japan has experienced the largest increase in its public debt (Box 2.1). And yet, that buildup in government debt has been associated with a decline in debt service costs, rather than an increase. While the debt-to-GDP ratio increased fivefold from less than 50 percent of gross domestic product (GDP) to more than 250 percent of GDP, interest payments have been halved as a share of GDP and have fallen by 80 percent as a share of government revenues. Surely, paying 50 percent less in debt service costs makes the level of government debt more, not less, sustainable.²

The rest of this chapter develops this argument in more detail. We begin our analysis by considering how the decline in interest rates affects the traditional analysis of debt sustainability. Our analysis shows that with a negative interest rate–growth rate differential, the government can stabilize its debt-to-GDP ratio despite running primary deficits permanently. It also shows that a large increase in the debt ratio does not automatically translate into a worsening of fiscal sustainability as the effect of a favorable interest rate–growth rate differential increases with the level of debt.

We illustrate these theoretical findings by simulating the impact of different macroeconomic and fiscal conditions on the trajectory of Japanese public debt. To account for the impact of the coronavirus disease (COVID-19) on debt sustainability, we run scenarios on both pre- and post-pandemic economic forecasts. Our analysis suggests that, despite a significant deterioration of public finances with COVID-19, Japan's long-term fiscal outlook remains for the most part unchanged thanks to the favorable interest rate–growth rate differential.

We then discuss whether this benign environment for public finances is likely to persist and how it affects other economies. Based on market forecasts and an analysis of the impact of higher debt on the safe interest rate, we argue that the recent buildup in government debt is unlikely to reverse the favorable interest rate–growth rate differential for advanced economies. While the decline in the safe interest rate also helps emerging and developing

economies (EMDEs), we note that the buildup in government debt associated with COVID-19 is likely to generate rollover risks for countries with weak institutions and high foreign currency-denominated debt.

Note: GDP = gross domestic product.

Sources: International Monetary Fund. World Economic Outlook Database, October 2020; and authors' calculations.

Figure 2.1 Public debt and interest payments: debt-to-GDP ratio and interest payments-to-GDP ratio

BOX 2.1 A BRIEF HISTORY OF JAPAN’S DEBT-TO-GDP RATIO

Today, Japan has the highest public debt-to-GDP ratio in the world. In fact, the only economy with a comparable debt level is Venezuela.³ Before exploring why and how Japan can maintain such a high debt level, we look at how it has evolved since the late nineteenth century.

After being stable for 25 years, the debt ratio spiked for the first time during the Russo–Japanese war of 1904–1905. Although the ratio experienced a threefold increase, it reverted relatively quickly to its prewar lows thanks to sustained nominal GDP growth, and the introduction of new temporary and permanent taxes (Ministry of Finance 1969).

After reaching its trough in 1919, the ratio monotonically increased until the eve of World War II, especially in the 1930s during the Great Depression and military preparations. But it was not until Japan officially entered the Pacific War that the ratio exploded and increased by more than 100 percent of GDP throughout the war.

By 1944, the ratio was above 200 percent of GDP. According to Reinhart and Rogoff (2009), Japan’s outstanding government debt as of the end of March 1945 was equivalent to about 267 percent of national income. That spike was eventually reversed through outright default, a sudden burst in inflation,⁴ and various forms of financial repression.

Notes: IMF = International Monetary Fund. Debt is defined as the gross debt of the general government. Japan Cabinet Office (2020b) excludes liabilities of the social security fund.
Sources: IMF Historical Public Debt Database; IMF World Economic Outlook (after 1980); and Japan Cabinet Office (2020b).

Figure 2.2 Japan’s debt-to-GDP ratio from 1880 to 2019 (% of GDP)

To see this, consider the basic equation of debt dynamics, where $(i - g)$ is the interest rate–growth rate differential:⁶

$$\left(\frac{Debt}{GDP}\right)_t - \left(\frac{Debt}{GDP}\right)_{t-1} \approx (i_t - g_t) \left(\frac{Debt}{GDP}\right)_{t-1} + \left(\frac{Primary\ Deficit}{GDP}\right)_t$$

The equation shows that the change in the debt-to-GDP ratio is a function of two terms:

- 1. the product of the interest rate–growth rate differential and the stock of debt;
- 2. the primary deficit.

Clearly, the higher the level of debt the the more the interest rate–growth rate differential matters for a country’s fiscal trajectory (Furman and Summers 2020). With a debt level close to 200 percent of GDP in 2019 (Japan Cabinet Office 2020a), the interest rate–growth rate differential was already critical to Japan’s debt trajectory before COVID-19.⁷ With a positive differential, Japan would have had to run primary surpluses to stabilize its debt-to-GDP ratio. With a negative differential, Japan could already stabilize its debt ratio while running primary deficits (Table 2.1).

Table 2.1 Primary balance required to stabilize the debt-to-GDP ratio at 194.5%

Effective nominal interest rate (%)								
Growth rate (%)			0	0.5	1	1.5	2	2.5
	0		0	1.0	1.9	2.9	3.9	4.9
	0.5		–1.0	0	1.0	1.9	2.9	3.9
	1		–1.9	–1.0	0	1.0	1.9	2.9
	1.5		–2.9	–1.9	–1.0	0	1.0	1.9
	2		–3.9	–2.9	–1.9	–1.0	0	1.0
	2.5		–4.9	–3.9	–2.9	–1.9	–1.0	0

Note: GDP = gross domestic product.
Sources: Japan Cabinet Office (2020a); and authors’ calculations.

3. JAPAN’S GOVERNMENT DEBT SUSTAINABILITY

To see more precisely how different interest rates, growth rates, and primary deficits affect Japan’s debt trajectory, we conduct a standard debt sustainability analysis. More specifically, we show how various assumptions about future macroeconomic conditions and fiscal policies impact the debt-to-GDP trajectory. To isolate the impact of COVID-19, our analysis is first done using pre-pandemic forecasts (Japan Cabinet Office 2020a) and then using post-pandemic forecasts (Japan Cabinet Office 2020b).

For years after 2021, nominal GDP is assumed to grow at a rate of 1.5 percent per year. This rate corresponds to the growth rate of Japan between FY2013 and FY2018. It is higher than the baseline scenario of Japan’s Cabinet Office, which assumed before the pandemic that nominal growth would decline below 1.5 percent after 2023 to stabilize at around 1.1 percent (Japan

3 percent per year.⁸

Figure 2.3 Alternative paths for nominal and effective 10-year interest rates: 10-year JGB yields

We also consider three paths for the 10-year nominal rate after 2025: 0 percent, 1 percent and 2 percent (Figure 2.3). With a significant part of current outstanding debt issued in the past, current increases in Japanese government bond (JGB) yields do not, however, translate one-to-one into higher interest payments now. To account for this transmission lag, we follow Baba (2020a) and estimate a model where the effective interest rate (calculated by dividing interest payments by the debt stock) follows a 10-year moving average of nominal interest rates.

4. JAPAN'S GOVERNMENT DEBT TRAJECTORY BEFORE COVID-19

Figure 2.4 shows the two scenarios we consider for fiscal policy after 2021. The solid black line shows the path with no fiscal consolidation. With government expenditures and GDP growing at the same rate, the primary deficit would remain close to its 2021 level and be equal to 1.8 percent of GDP in 2022 and forever after. The dashed gray line shows the primary balance path associated with a fiscal consolidation scenario where government expenditures grow at around half the rate of GDP.

The specific parameters underlying the fiscal consolidation scenario are meant to illustrate the impact of a relatively slow and mild adjustment to fiscal policy. At this pace, the primary balance would only turn into a surplus by 2030. Under that scenario, the pace of consolidation over the next six years would be equal to one-third of the adjustment of 2013 and 2019 and would bring the primary deficit from 7 percent to 2.6 percent of GDP.¹¹

Note: GDP = gross domestic product.

Sources: Japan Cabinet Office (2020a); and authors' calculations.

Figure 2.4 Alternative paths for the primary balance before COVID-19 (% of GDP)

Figure 2.5 shows the results of our simulations for the debt trajectory. A first notable result is that it is possible to sustain a stable or even declining debt-to-GDP ratio without consolidating fiscal policy. At 1.8 percent in the no consolidation scenario, the primary deficit is in fact lower than the one Japan could afford with an interest rate–growth rate differential between -1.5 percent and -0.5 percent (Table 2.1). A second notable result is that higher interest rates could be countered with a relatively mild adjustment to fiscal policy. In fact, even with JGB yield converging to 2 percent after 2025, the debt-to-GDP ratio would decline under our relatively mild fiscal consolidation scenario.

Note: GDP = gross domestic product; JGB = Japan government bond.
Sources: Japan Cabinet Office (2020a); and authors' calculations.

Figure 2.5 Debt trajectory before COVID-19: pre-COVID-19 debt-to-GDP ratio without consolidation (upper panel) and with consolidation (lower panel)

COVID-19 has had a large impact on Japan's public finances. With Japan not only letting automatic stabilizers operate—through increases in regular unemployment allowances, increases in the volume of means-tested social benefits, and declines in personal and corporate income tax liabilities—but also implementing one of the largest fiscal policy packages (see Box 2.2), the primary deficit is expected to increase by more 10 percent of GDP in 2020.

In its July 2020 projections, Japan's Cabinet Office estimated that the downturn in economic activity and the fiscal measures taken in response will increase the primary deficit by about 10 percentage points from 2.6 percent to 12.8 percent of GDP and increase the debt-to-GDP ratio by almost 25 percentage points in 2020 (Table 2.2).

	2019	2020	2021
Nominal GDP growth (%)		0.8	-4.1
Primary balance (% of GDP)		-2.6	-12.8
Debt-to-GDP (% of GDP)		192.5	216.4

BOX 2.2 THE COVID-19 FISCAL PACKAGE

Because Japan's fiscal package combines grants, loans and equity support, not all policy measures (such as the Fiscal Investment and Loan Program) directly impact the fiscal balance.¹³

Direct Expenditures (¥69.1 Trillion, 12.5% of GDP)

1. Health Sector

Transfers to local governments for spending on COVID-19-related measures (¥5.4 trillion).

Production, procurement, and distribution of critical equipment such as masks and ventilators (¥0.6 trillion).

Other health-related measures (such as support for the development of vaccines).

Cash handout to all residents (¥12.9 trillion).

Rent relief program (¥6 million per firm for SMEs, ¥3 million for the self-employed) (¥2.0 trillion).

Subsidies for job retention (¥2.1 trillion).

Subsidies for public/private financial institutions' lending (¥15.5 trillion).

Measures to accelerate recovery and rebuild resilient economic structures such as incentive measures for consumption in affected service sectors and infrastructure investments (in the post-containment phase) (¥10.8 trillion).

Contingency reserve funds for COVID-19 (¥11.5 trillion).

Other measures: reduction of property tax, expansion of the loss carry-back program, etc.

Deferral of payment of taxes and social security premiums by affected firms and households for 1 year (¥26 trillion).

Government-boosted special financing and guarantees primarily for micro, small and medium-sized business operators affected by COVID-19 through the Japan Finance Corporation and other institutions (¥129.1 trillion).

Other off-budget operations using the Development Bank of Japan and other agencies (primarily for infrastructure projects in the post-containment phase) (¥8 trillion).

Guarantees on bonds/borrowing by the Development Bank of Japan and the Japan Finance Corporation (¥1 trillion).

Guarantees on external bonds issued by the Development Bank of Japan and Japan Bank for International Cooperation (¥1 trillion).

Addendum: Prime Minister Suga announced a new economic package in December 2020 with a headline size of ¥73.6 trillion (14 percent of GDP) and “fiscal measures” of ¥40 trillion (7.6 percent of GDP). The government’s accompanying documentation suggests that of the ¥30.6 trillion in central government spending, the FY2020 supplemental budget, which will finance a bulk of net new additional spending, will be ¥20.1 trillion (3.8 percent of GDP).

Note: Measures are expressed in percentage of 2019 GDP.

Sources: IMF Fiscal Policies Database (June 2018); Ministry of Finance, Japan Cabinet Office; and authors' calculations.

After COVID-19, Japan is expected to end FY2020 with a primary fiscal deficit of almost 13 percent of GDP and a debt-to-GDP ratio of over 215 percent of GDP. How does this change Japan's dynamics debt? In short, by not much. To see why, it is useful to apply the exact same scenarios but to the post-pandemic macroeconomic and fiscal conditions.

One should note that by “the same scenarios”, we do not mean the exact same primary deficits after 2021 as in the previous section. Rather, we simply mean scenarios both with and without fiscal consolidation. Given the deterioration of public finances during COVID-19, the “without fiscal consolidation” scenario now implies a primary deficit of 2.9 percent of GDP, rather than just 1.8 percent, after the year 2021. Similarly, the “with fiscal consolidation” scenario implies that the primary balance would only turn into a surplus in 2036, a delay of six years compared to the pre-pandemic period (Figure 2.6). The size of the fiscal adjustment that we assume is modest as it would imply a reduction in the primary deficit of less than 3 percent of GDP over six years. This is smaller than the adjustment that occurred under Prime Minister Abe.¹⁴

Sources: Japan Cabinet Office (2020b); and authors' calculations.

Figure 2.6 *Alternative paths for the primary balance after COVID-19 (% of GDP)*

Note: GDP = gross domestic product; JGB = Japan government bond.
Sources: Japan Cabinet Office (2020b); and authors' calculations.

Figure 2.7 Debt trajectory after COVID-19: post-COVID-19 debt-to-GDP ratio with and without consolidation

Figure 2.7 shows the results of the new simulations. The initial debt ratio in 2020 is over 215 percent of GDP.¹⁵ Clearly, and despite the sizable deterioration of public finances in the immediate short run, the long-term sustainability outlook is not fundamentally different than before the pandemic.

As in the pre-pandemic analysis, the same caveats apply with respect to the simplifying assumption that fiscal policy has no short-term effect on output. Even with an economic recovery under way at the start of 2021, the amount of spare capacity may remain considerable for at least several quarters until pre-pandemic GDP levels have been restored. Until then, the withdrawal of fiscal support could have large effects (Cohen-Setton et al. 2019; Ramey 2019). If anything, it would be prudent to backload rather than frontload fiscal consolidation in that environment.

Discussing the exact reasons underlying low natural rates and what they imply for the persistence of the trend is beyond the scope of this chapter.¹⁷ Whatever the exact reason, bond markets however expect that low rates will persist. The 5-year forward 10-year JGB nominal bond rate is at the time of this writing only 0.5 percent. Even the 10-year forward expectation of the 10-year JGB rate is only around 1 percent (Figure 2.8). That situation is not specific to Japan, with Furman and Summers (2020) documenting similar findings for the US, and Blanchard et al. (2020) for Europe. The latter not only found that the average expectation is that rates will be low, but that investors put extremely low weight on the probability that interest rates will rise above 3 percent (1 percent probability in 5 years; 7 percent probability in 10 years).

Notes: JGB = Japan government bond. Data retrieved on 10 December 2020.
Sources: Bloomberg; and authors' calculations.

Figure 2.8 Market-implied interest rates on 10-year JGB yield

BOX 2.3 CHANGES IN THE BANK OF JAPAN’S FORWARD GUIDANCE ON INTEREST RATES

Another short-term risk for fiscal sustainability would be that the Bank of Japan (BOJ) quickly normalizes policy interest rates. This risk, however, appears particularly small in the case of Japan, first, because Japan does not face the risk of a balance of payments crisis, which would require a sudden increase to stem capital outflows; second, because Japan has already managed to keep long-run interest rates (10-year JGB) around zero (or even negative) since September 2016; and third, because BOJ has if anything strengthened rather than loosened its forward guidance language with COVID-19 (Bank of Japan 2020), as we illustrate below.

31 July 2018: Introduction of Forward Guidance for Policy Rates

BOJ intends to maintain the current extremely low levels of short- and long-term interest rates for an extended period of time, taking into account uncertainties regarding economic activity and prices, including the effects of the consumption tax hike scheduled to take place in October 2019.

8. WHAT MAKES EMERGING ECONOMIES DIFFERENT

Our analysis has so far abstracted from the fact that the Japanese risk premium may also increase as a result of higher debt. With higher debt, investors may start to worry about debt sustainability and require a higher compensation. But that higher compensation required by investors may in fact create more fiscal risks and thus increase the probability of default in a self-fulfilling manner.¹⁸

For debt denominated in domestic currency, this problem can be eliminated by having the central bank commit to buy as many bonds as necessary at the lower interest rate. Doing so requires that the central bank is credible enough to maintain confidence in the currency and avoid the risk of fiscal dominance. For debt denominated in foreign currency, the risk is harder to avoid. But with only 10 percent of its government debt held by foreign creditors and 0.2 percent of its government debt denominated in foreign currency, Japan is for the most part immune from that risk.¹⁹

Notes:
FX = foreign currency.
This figure shows the interest-rate exposures to large negative growth shocks for countries with different debt levels and different shares of foreign currency-denominated debt. More specifically, it shows the estimated coefficients of regressing nominal long-term interest rates on the growth shock, defined as a dummy equal to 1 if the country-realized GDP growth in year t is 1 percent or more lower than the forecast in October of year $t-1$, and zero otherwise. The four different debt categories are defined by splitting the observations in low- and high-public debt and then, within each category, between low- and high foreign currency-denominated public debt. The low versus high split is done along the sample median. The lines show the 90 percent confidence intervals of the point estimates.
Source: Lian et al. (2020, Table A5).

Figure 2.9 Interest rate exposures to negative growth shocks and public debt structure

Few EMDEs are, however, in the same situation as Japan. In the case of EMDEs, the central bank cannot generally commit to buying bonds at the lower interest rate without disanchoring inflation expectations and thus turning a debt problem into an inflation problem. Despite also

Lian et al. (2020) illustrated this problem by studying the impact of large negative growth shocks for countries with different levels of public debt and levels of foreign currency-denominated debt (Figure 2.9). In advanced economies, which typically have high public debt but only a low component of it denominated in foreign currency, a negative growth surprise does not translate into a higher interest rate. For EMDEs with low public debt but high foreign currency-denominated debt, the point estimate indicates that interest rates increase by 73 basis points in response to a negative growth shock of at least 1 percent. For EMDEs with high debt and high foreign currency-denominated debt, interest rates increase by 155 basis points in response to a negative growth shock of at least 1 percent.²⁰

9. POLICY RECOMMENDATIONS FOR JAPAN

A first implication is that there is no urgency to decrease fiscal support. This lack of emergency was already clear before COVID-19. But our analysis suggests that the higher debt stock associated with COVID-19 does not require a more rapid return to fiscal balance. If anything, fiscal support will likely be needed for longer to avoid the unnecessary scarring effects that a shortfall in aggregate demand could do to the growth potential.

A third implication is that the government should make full use of the policy instruments that it possesses to mitigate the risk and impact associated with a reversal of the interest rate–growth rate differential. Issuing longer-dated debt would not only help lock in the current low rates of funding, but would also provide the government with more time to progressively adjust its fiscal trajectory if and when the differential reverses. The government could also adopt contingency plans that stipulate in advance how revenues would be increased and expenditures decreased if the interest rate–growth rate differential reversed and became persistently positive (Blanchard and Tashiro 2019).

NOTES

1. This chapter was completed before one of the authors joined the Independent Evaluation Office of the International Monetary Fund. The views expressed therein are those of the authors only and do not represent the views of the IEO, the IMF, or ADB, its Board of Governors or the governments they represent.
2. Chapter 9 of this volume shows that interest payments over GDP are a better measure of debt sustainability in advanced economies than debt over GDP by analyzing the correlations of fiscal risk with these two ratios.
3. International Monetary Fund. General Government Gross Debt. Accessed at: https://www.imf.org/external/datamapper/GGXWDG_NGDP@WEO/OEMDC/ADVEC/WEOWORLD.
4. The wholesale price index in 1949 was about 220 times higher than that in 1934–1936 (Ito 2012).
5. In 2018, the tax-to-GDP ratio was 32 percent in Japan, 33.9 percent for the OECD average, and above 40 percent for seven European countries. See OECD (2020); and OECD tax revenue (indicator), doi: 10.1787/d98b8cf5-en (accessed 13 December 2020).
6. The equation can alternatively be written in real terms with i and g defined, respectively, as the real interest rate and the real growth rate of GDP. The change in the debt-to-GDP ratio is not exactly equal to the expression on the right-hand side because of stock-flow adjustments, including valuation effects of foreign currency-denominated bonds. These adjustments would be relevant to the short-run dynamics of debt or risks of fiscal distress if Japan depended on foreign investors and issued foreign-currency bonds. The stock-flow adjustment also includes the realization of contingent liabilities.
7. To ensure consistency with available interest payment data and the Economic and Fiscal Projections for Medium- to Long-Term Analysis conducted twice a year by the Cabinet Office, government debt is defined as the sum of central and local government debt. When the liabilities of the social security funds are included, the debt ratio in 2019 is 238 percent of GDP. For more on the difference between the two definitions, see https://www.mof.go.jp/budget/fiscal_condition/related_data/202007_01.pdf. In addition, our simulation is based on the figures up to 2021 of the January 2020 Japan Cabinet Office (CAO) Projections (Japan Cabinet Office 2020a) for pre-COVID-19 debt dynamics and the July 2020 CAO Projections (Japan Cabinet Office 2020b) for post-COVID-19. The CAO only reveals primary and fiscal balance and does not disclose the levels of expenditure and revenue, and we create these series according to the method of Doi (2017). July 2020 CAO projections. Accessed at: <https://www5.cao.go.jp/keizai3/projection-e/projection202007.pdf>.
8. See January 2020 CAO Projections (Japan Cabinet Office 2020a).
9. Under the Abe administration, fiscal consolidation was not uniquely implemented through expenditure cuts. It also took the form of increases in government revenues, by increasing the consumption tax rate from 5 percent to 8 percent in April 2014 and from 8 percent to 10 percent in October 2019.
10. The forecasts for GDP and the primary balance are obtained from the January 2020 Economic and Fiscal Projections of the Cabinet Office (Japan Cabinet Office 2020c). Alternative forecasts for GDP could be obtained from the 15 January 2020 release of the Japan Center for Economic Research (JCER) (<https://www.jcer.or.jp/en/esp-forecast-top>), which surveys around 40 professional economic forecasters.
11. See IMF. Primary Net Lending/Borrowing (also referred to as Primary Balance). Accessed at: https://www.imf.org/external/datamapper/GGXONLB_G01_GDP_PT@FM/JPN.
12. The decline in economic activity is, however, expected to be smaller in Australia, Germany, the Republic of Korea, and the United States at respectively –4.1 percent, –5.4 percent, –1.0 percent, and –3.8 percent.
13. Baba (2020b), for example, estimates that only ¥32 trillion or 5.8 percent of GDP have been appropriated for the new budget. The difficulty of measuring the exact discretionary fiscal impulse from budgetary plans is not specific to Japan. For a comparison of the fiscal packages of the United States and France, see Cohen-Setton and Pisani-Ferry (2020).
14. With a primary deficit of 4.3 percent in 2021, it would imply a reduction of less than 3 percentage points over six years, which is less than two-thirds the adjustment that occurred between 2013 and

2019. See IMF. Primary Net Lending/Borrowing (also referred to as primary balance). Accessed at: https://www.imf.org/external/datamapper/GGXONLB_G01_GDP_PT@FM/JPN.
15. There is a discrepancy between the debt-to-GDP ratio in 2019 in Japan Cabinet Office (2020a) (194.5 percent) and Japan Cabinet Office (2020b) (192.5 percent). The reason is that CAO's pre-COVID-19 projection was conducted and published in January 2020, which is before the end of FY2019 (March 2020). Simply put, the figures of 2019 are projections, and not actual ones. We do not change the figures of pre-COVID-19 because the primary balance is also obtained from CAO's pre-COVID-19 projection. Moreover, the difference is small and does not affect the analysis.
 16. Chapter 11 emphasizes the importance of including explicit and implicit contingent liabilities in debt sustainability analyses as the materialization of these liabilities can lead to spikes in the debt-to-GDP ratio. Currie and Velandia (2002) provide a useful list. Explicit liabilities include (1) credit guarantees; (2) public insurance schemes (e.g., against losses associated with crop failures or disasters triggered by natural hazards); and (3) legal proceedings and disputes. As noted by Chapter 13 of this volume, future explicit liabilities also include social transfers under current law.
 17. Furman and Summers (2020) provide a useful overview. For an opposite view, see Goodhart and Pradhan (2020).
 18. As argued by Blanchard et al. (2020), the range of debt ratios for which both a good equilibrium (low rate, no default) and a bad equilibrium (high rate, default) coexist can be very large.
 19. Economic and Social Research Institute. General Government Gross Debt. Accessed at: <https://www.esri.cao.go.jp/en/sna/sddsplus/tables/ggd.xlsx>.
 20. Chapter 9 of this volume also reports that exchange rate depreciations are a significant determinant of fiscal risk in EMDEs but not in advanced economies, based on regressions of fiscal risk on changes in exchange rates.
 21. A distress event is defined as a restructuring event and/or a crisis that triggers an IMF program.

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