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Sovereign Debt Vulnerabilities in Developing Economies

Which countries are vulnerable and how much debt is at risk?

by Lars Jensen



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Sovereign Debt Vulnerabilities in Developing Economies

WHICH COUNTRIES ARE VULNERABLE AND HOW MUCH DEBT IS AT RISK?

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Glossary

CF	Common Framework	LIC	Low-income country
DSA	Debt sustainability assessment	LIDC	Low-income developing country
DSF	Debt sustainability framework	LMIC	Lower-middle income country
DSSI	Debt Service Suspension Initiative	LT	Long-term
EM	Emerging market	MAC	Market access country
EMMI	Emerging market and middle income	MIC	Middle-income country
FDI	Foreign direct investment	PP	Percentage points
FM	Fiscal monitor	PPG	Public and publicly guaranteed debt
GDP	Gross domestic product	SDG	Sustainable Development Goal
GNI	Gross national income	TDS	Total debt service
HIC	High income country	UMIC	Upper-middle income country
IDA	International development assistance	WB	The World Bank
IDS	International debt statistics	WEO	World Economic Outlook
IMF	The International Monetary Fund		

Executive summary

This paper analyzes debt vulnerability indicators across 120 developing (low- and middle-income) economies to identify vulnerable countries. The overall conclusion is that most vulnerable countries identified are not on the verge of a default, but rather risk facing a future of high economic and development costs of having to deal with large debt overhangs. A smaller group of countries will likely remain at high risk of defaulting this and in subsequent years, and in general uncertainties and risks are high. Much will depend on the strength of the economic recovery and continued access to and stability of financial markets.

In total 72 vulnerable countries are identified, 19 of which are severely vulnerable. Our results are presented for individual countries and country-groupings including the group of countries eligible under the Debt-Service Suspension Initiative (DSSI) and Common Framework (CF). Results are summarized as follows.

The DSSI has had limited success with 46 of 73 eligible countries participating and only with a request of \$5 billion — roughly equal to 10% of external total debt-service (TDS) scheduled in 2020 for all 73. A full² DSSI participation could have freed up \$12.2 billion in 2020 and another \$9.25 billion in the first half of 2021.

Debt distress and vulnerabilities are not isolated to the poorest (or DSSI- and CF-eligible) countries. Based on sovereign credit ratings for 105 developing economies, two-thirds of 73 emerging markets (EMs) are rated ‘non-investment grade’, as are all 32 low-income developing countries (LIDCs).

Total debt service (TDS) payments on external public debt at risk (‘risky-TDS’) is estimated at a minimum of \$598 billion for the group of 72 vulnerable countries from 2021-2025, of which \$311 billion (52%) is to private creditors.³ Low-income countries account for 6% (\$36.2 billion), lower-middle income countries for 49% (\$294.1 billion) and upper-middle income countries for 45% (\$268.1 billion) of total. For the year 2021, risky-TDS is estimated at a minimum of \$130 billion, of which \$70 billion (54%) is to private creditors.

Among the 72 highly vulnerable countries are 49 eligible under the DSSI and CF. Their share of risky-TDS is \$211 billion (35% of total) with \$63 billion to private creditors. Left uncovered by both the DSSI and CF are 23 vulnerable countries with risky-TDS of \$387 billion (65% of total). In 2021, uncovered risky-TDS is estimated at \$87 billion. In other words, about one-third of vulnerable countries holding two-thirds of risky-TDS are not covered by the DSSI or CF.

Based on data available for 112 developing countries, we estimate that from 2019 to 2020 the number of countries in breach of their solvency threshold went from 37 to 46 (41% of the sample), of their liquidity threshold from 18 to 26 (23%), and countries in breach of both from 12 to 21 (19%).⁴ Based on both estimated number of countries in breach and the severity of these breaches, debt vulnerabilities are not expected to fall significantly in the coming years, and are not likely to return to pre-pandemic levels before 2024/25.

When assessing the current debt outlook, it is important to keep historical trends in mind. Debt relief efforts in the 2000s coincided with a commodity price boom and helped clean up governments’ balance sheets and increase their debt carrying capacity. Countries started piling on debt after the 2008 financial crisis,

² All 73 countries with their full eligible amounts.

³ The specific debt measure used is external long-term public and publicly guaranteed debt (LT PPG) from IDS 2021.

⁴ Our chosen solvency indicator here is total gross public debt as a percentage of GDP and liquidity is total debt-service payments on external PPG debt as a percentage of revenue.

followed by massive liquidity injections by central banks, which also found its way to developing markets in a 'search for yield.' Consequently, today's average developing country has a much higher exposure to financial markets and roll-over (liquidity) risk. During the past decade of rapidly increasing debt, revenue development has remained stagnant and growth has begun to slow; both these factors are adding to debt vulnerability.

How the vulnerable developing countries will come out of this crisis will depend crucially on liquidity risk in the short term and their ability to undertake quality investments in physical and human capital to boost future growth, as well as external demand for their commodities. For all countries, this will require access to stable and low-cost finance, and for some countries a debt restructuring will have to precede such access. Beyond the short term, re-directing of expenditures, increasing spending efficiency and boosting revenue collection must be given priority.

Introduction

Debt in developing economies has built up fast over the past decade, far outpacing revenue development, and has been followed by a slowing of economic growth. The pandemic therefore hit when many countries were already highly vulnerable, and 2020 saw a record in sovereign credit rating downgrades and defaults.

Uncertainties about the economic recovery and the state of financial markets coupled with high debt vulnerability has led to a widespread belief that the developing world could be on the verge of a major debt crisis. Calls for debt restructurings as well as other faster relief efforts have followed, to help countries cope with the immediate health crisis and avoid jeopardizing their economic recovery. The main initiatives to date are the G20's Debt-service Suspension Initiative, which allows for temporary debt-service suspensions to bilateral creditors, and the Common Framework targeting debt restructurings. Both are limited to 73 of the poorest countries.

But not only the poorest countries need assistance. Only one of six countries that defaulted last year was DSSI-eligible and all were middle-income countries (MICs), and for many MICs debt vulnerability indicators look stressed. Despite this, many vulnerable MICs have still been able to borrow in global capital markets partly thanks to favorable global liquidity conditions conferred by advanced economies' central bank support (Bulow et al., 2020). The extra debt taken on to combat the crisis combined with weak revenue growth will increase debt vulnerabilities in coming years. Should interest rates start to rise, several more countries could move closer to a default. Concerns are mounting that the unprecedented liquidity support is fueling a financial bubble that could lead to global financial instability (WESP 2021).

This paper aims to give the reader a comprehensive overview of sovereign debt vulnerabilities in developing countries.

- Section 1 provides an overview of gross public debt, external public debt-service and the G20's DSSI and CF initiatives.
- Section 2 presents the main analysis of short-to-medium term debt vulnerabilities. The analysis draws on several vulnerability indicators to identify vulnerable countries and groups and provides an estimate of the amount of external debt-service payments at risk. Country results are summarized based on a ranking across five vulnerability indicators.
- Section 3 presents and discusses some of the important global debt trends that have helped shape the current debt situation and their implications for the future.
- Section 4 concludes and discusses the policy implications.

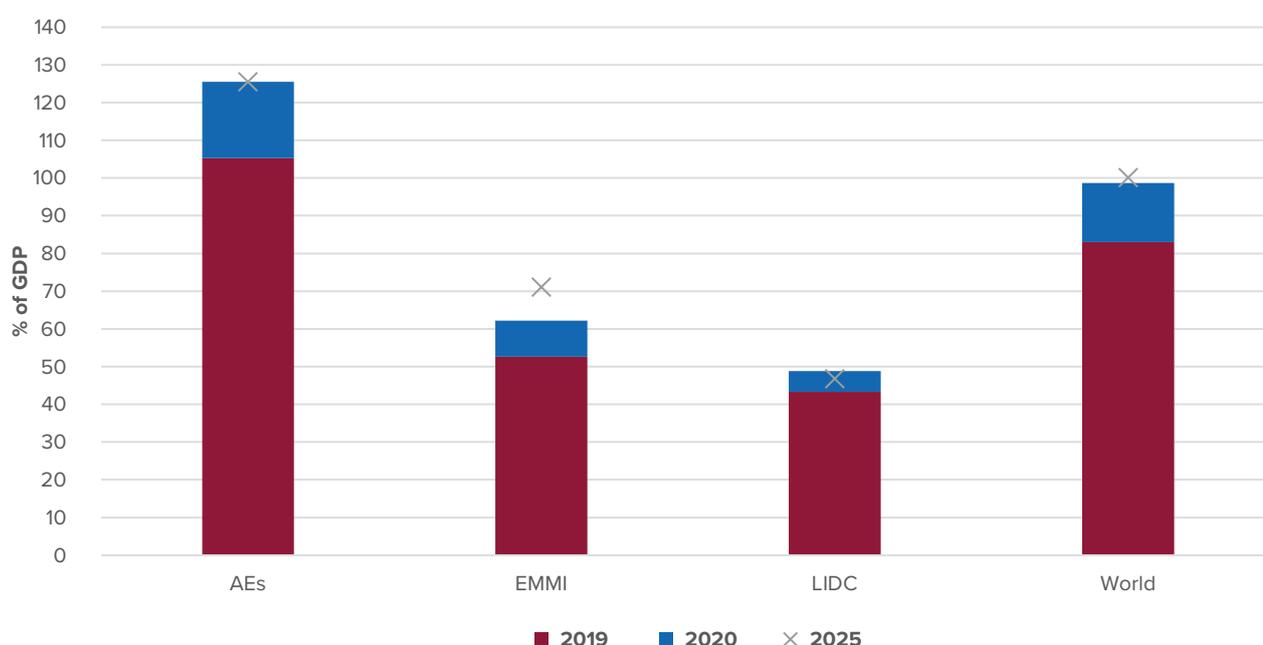
Debt and debt relief overview



1.1. Gross public debt at record levels

Coming into the crisis, gross public debt had already reached record levels. The IMF projects that if growth rebounds strongly and interest rates continue to be low and stable then global debt will stabilize at around 100% of GDP this year — the highest ever recorded (IMF, 2020a). Similarly, debt in low-income developing countries (LIDCs)⁵ is expected to stabilize just below 50% of GDP this year, and just above 70% for the group of emerging markets and middle-income economies (EMMIs),⁶ but not until 2025. The outlook is highly uncertain, and risk is high. Much will depend on a race between a mutating virus and vaccine roll-outs and continued fiscal and monetary support.

Figure 1. Gross public debt (% of GDP)



Source: Based on IMF Fiscal Monitor October 2020.

Note: Advanced Economies (AE), Emerging Market and Middle Income (EMMI), Low-Income Developing Countries (LIDC).

Debt dynamics leading up to the pandemic were worsening in developing economies with rising debt followed by a slowdown in growth. Many countries are expected to face an even worse outlook on the other side of COVID. Almost one-third (63) of the 194 countries assessed in the IMF's 2020 October forecast are expected to witness a post-COVID real growth slowdown — i.e., they will have lower real GDP growth in the five years following versus preceding the COVID 2020 shock.⁷ More than two-thirds (43) of these 'growth-slowers' are developing countries; 28 low and lower-middle income countries (LICs and LMICs) and 15 upper-middle income countries (UMICs). 17 of the top 20 are amongst the poorest 73 DSSI-eligible countries (see following section) and 11 of these 17 are already in or at high risk of debt distress according to their Debt Sustainability Assessments (DSAs).⁸

⁵ LIDC is IMF terminology. Using World Bank terminology, the LIDC group consists of LICs and some LMICs and generally all IDA countries.

⁶ In World Bank terminology this group of countries consist of lower and upper middle-income countries.

⁷ Own calculations based on IMF's WEO October 2020 forecasts

⁸ See Annex A for details.

1.2. Public external debt and the G20 debt relief initiatives

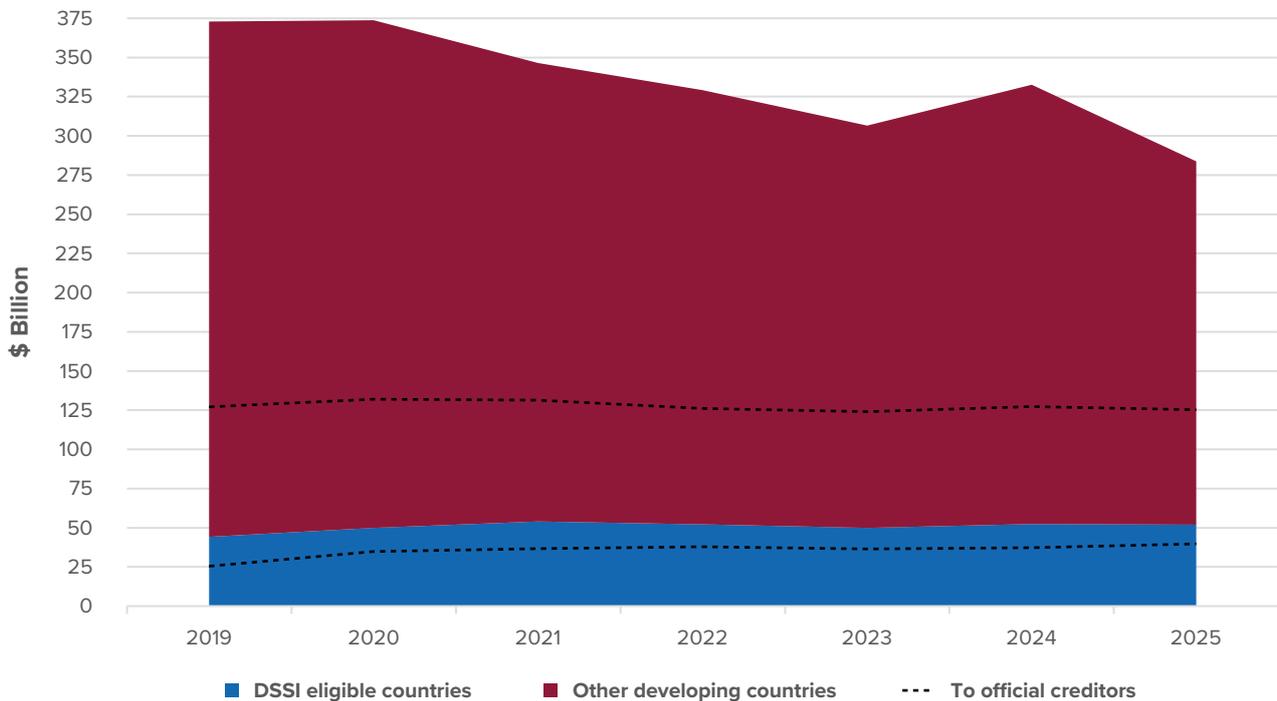
This section, as does much of the rest of the paper, focuses on external debt. Developing countries are especially vulnerable to external⁹ debt, and particularly debt denominated in foreign-currency as large shocks to export earnings and other capital inflows can make it difficult to service debt. The pandemic has disrupted not only exports, but also income from tourism, remittances and FDI flows, and it has put pressure on currency reserves, and thus strongly increased liquidity risk and worsened countries' ability to respond to the crisis.

Consequently, the G20 and the Paris Club of Creditors initiated the Debt-Service Suspension Initiative (DSSI).¹⁰ The DSSI provides temporary debt relief by allowing countries to postpone debt-service payments to official bilateral creditors from May 2020 to June 2021 and with the possibility of further extensions. But it only applies to the poorest 73 countries which only account for a fraction of scheduled debt-service payments across the developing world.¹¹

In 2019, long-term¹² public and publicly guaranteed (LT PPG) external debt stock across all 120 developing (low- and middle-income) economies stood at \$3.1 trillion. Based on the IDS 2021 dataset, Figure 2 shows the total debt-service (TDS) payments scheduled on this debt from 2019-2025 and with the poorest group of 73 DSSI-eligible countries highlighted. Also visible is each group's share to official creditors.

For all countries, TDS was estimated at \$374 billion in 2020, of which the poorest 73 countries accounted for \$50 billion (13.4%). The poorest countries rely more on official creditors, which account for about 70% of their TDS burden compared to only about 25% for the group of 'other developing countries.'

Figure 2. External debt-service payments on LT PPG debt (\$ billion)



Source: Own calculations based on WB IDS.

Note: LT = Long-Term. PPG = Public and Publicly Guaranteed. Somalia and Venezuela missing for 2019. Official is the sum of payments to both bilateral and multilateral creditors. Other developing countries cover all LICs, LMICs and UMICs in the IDS database not included under the DSSI initiative.

⁹ Debt in the IDS database is debt owed to nonresident creditors and is repayable in both foreign and domestic currency.

¹⁰ <https://www.worldbank.org/en/topic/debt/brief/covid-19-debt-service-suspension-initiative>.

¹¹ Eligible countries include all IDA, Blend and Least Developed Countries (LDCs) that are current on debt-service to the IMF and the World Bank. This means 72 active IDA borrowing countries plus Angola.

¹² The IDS 2021 dataset does not allow for a distinction between public and private short-term debt.

Table 1 provides a snapshot of TDS payments for the two country groupings for 2020. In total the DSSI had the potential to free up \$12.24 billion in 2020 equal to bilateral creditors payments from May to December, equivalent to an average of 0.65% of 2019 GDP across the 73 eligible countries. Another \$9.25 billion could be freed up in the first half of 2021. Had private creditors participated, the amount in 2020 could have been roughly \$20 billion. But, so far only 46 of the 73 DSSI-eligible countries have decided to participate and only with a total request of about \$5 billion.¹³

Table 1. 2020 debt-service payments (\$ billion) on external LT PPG debt

	A. BILATERAL	B. MULTILATERAL	C. TOTAL OFFICIAL (A+B)	D. TOTAL PRIVATE	E. Total (C+D)
DSSI countries	22.3	12.6	34.9	15.1	50.0
Other developing countries	35.8	46.1	81.9	241.8	323.7
Total	58.1	58.7	116.8	256.9	373.7

Source: Based on IDS 2021.

In summary, requests for suspension of payments under DSSI thus far only cover little more than 10% of DSSI-eligible countries' total external PPG TDS for 2020. Had all 73 countries chosen to participate and for their full eligible amounts this share could have been 24.5% and had private creditors participated in full it could have been about 40%.

The limited participation in the DSSI has been linked to fears of losing access to global financial markets through potential downgrades. The initiative has been criticized for not targeting countries most in need and for being only temporary and thus no fix for countries with solvency problems.¹⁴ It has also been criticized for not involving private creditors, making it a possibility that relief granted will go towards paying private creditors instead of responding to the pandemic.

In realization of some of these inadequacies, the G20 later launched the Common Framework (CF) which targets debt restructurings on a case-by-case basis.¹⁵ The CF is groundbreaking in the sense that it includes all official bilateral creditors, i.e. both Paris and non-Paris Club creditors. But the proposal suffers from several shortcomings. Still only the 73 DSSI countries are eligible, which leaves out several highly vulnerable MICs. Second, although emphasizing the need to involve private creditors in the burden-sharing it offers little guidance on how to ensure this in practice. Chad has become the first country to seek debt restructuring under the CF, and since then Ethiopia and Zambia have followed (Reuters, 2021a).¹⁶

Finally, it should be noted that this paper only deals with external public, not private, debt. Private debt levels are also high and may be a concern for the economic recovery (Han et al., 2021). If private sector default rates start to rise governments might be prompted to take over liabilities adding to their sovereign debt risk.

¹³ This is per February 5th 2021. For latest status on the DSSI visit link: <https://www.worldbank.org/en/topic/debt/brief/covid-19-debt-service-suspension-initiative>

¹⁴ See e.g., Kharas & Dooley (2020) for a good overview of sustainable finance options (note that the paper was written before the Common Framework).

¹⁵ Under the Common Framework, debt treatment is initiated by the debtor country which commits to full transparency and disclosure. The amount for treatment will be determined by DSAs jointly with creditors. All PPG debt with a maturity of more than one year is eligible. All bilateral creditors with claims on the country will participate. Debtor countries that enter an MoU with bilateral creditors are required to seek at least comparable treatment with private creditors.

¹⁶ It can be noted that Chad is in many ways an outlier as it is one of the poorest countries in the world, but it has a very low share of concessional borrowing (about 16%). It has not issued any publicly traded debt (and thus has no credit rating) but still owes about 50% of its external public debt to private creditors — most of it to mining company Glencore.

Debt vulnerability outlook

2

In this section we provide an outlook on debt vulnerability in the short-to-medium term across developing countries. Doing so we rely on several metrics of debt vulnerability. Most notably credit ratings, but also debt sustainability risk ratings and thresholds from the IMF and World Bank Debt Sustainability Assessments (DSAs), as well as current and projected key liquidity and solvency ratios based on forecasts for debt, revenue and GDP from the World Economic Outlook (WEO) and the International Debt Statistics 2021 (IDS 2021) databases.

The reason we rely on several measures is because countries differ. Many developing countries have no publicly-traded debt and thus no credit rating and here we instead rely on DSA risk ratings. Others that have a credit rating owe only little debt to private creditors and are therefore less exposed to market (roll over) risk, whereas others are highly exposed.

Concerns are mounting that current financial market conditions have drifted away from economic fundamentals and could lead to financial instability (WESP, 2021). This generates high risk for countries that rely heavily on access to international financial markets to roll over maturing principal payments. The creditor landscape and debt contracts in these latter countries also tend to be more complex, which can lead to costly procrastination of debt restructuring, complications when undertaken, and risk that it will fall short of needs, thereby prompting further costly rounds of renegotiation — the problem of ‘too little too late’ (Guzman & Stiglitz, 2016).

Finally, instead of applying the same debt-burden thresholds for all countries, we acknowledge that different countries have different debt-carrying capacities and therefore, to the extent possible, rely on estimates of these thresholds from the IMF and World Bank DSAs when calculating our estimates of solvency and liquidity breaches in section 2.2.¹⁷ It should be noted here that these thresholds are only indicative of debt stress and should not be interpreted too hard. Breaching thresholds are not necessarily an indication that a crisis is imminent. Indeed, many countries have been in breach of thresholds for years but can still have favorable debt dynamics. Nevertheless, their developments serve as a useful benchmarks of changing debt vulnerabilities. It should also be noted here that our chosen liquidity indicator is based on external debt service payments from the IDS 2021 database. The database does not include debt issued in 2020 why we are most likely underestimating liquidity breaches and severities.

What would a highly vulnerable country look like? A country with a bad credit rating (and/or DSA risk-rating) in breach of both its current and projected liquidity and solvency sustainability thresholds, with a high dependence on access to financial markets and large amounts of debt maturing in the near future.

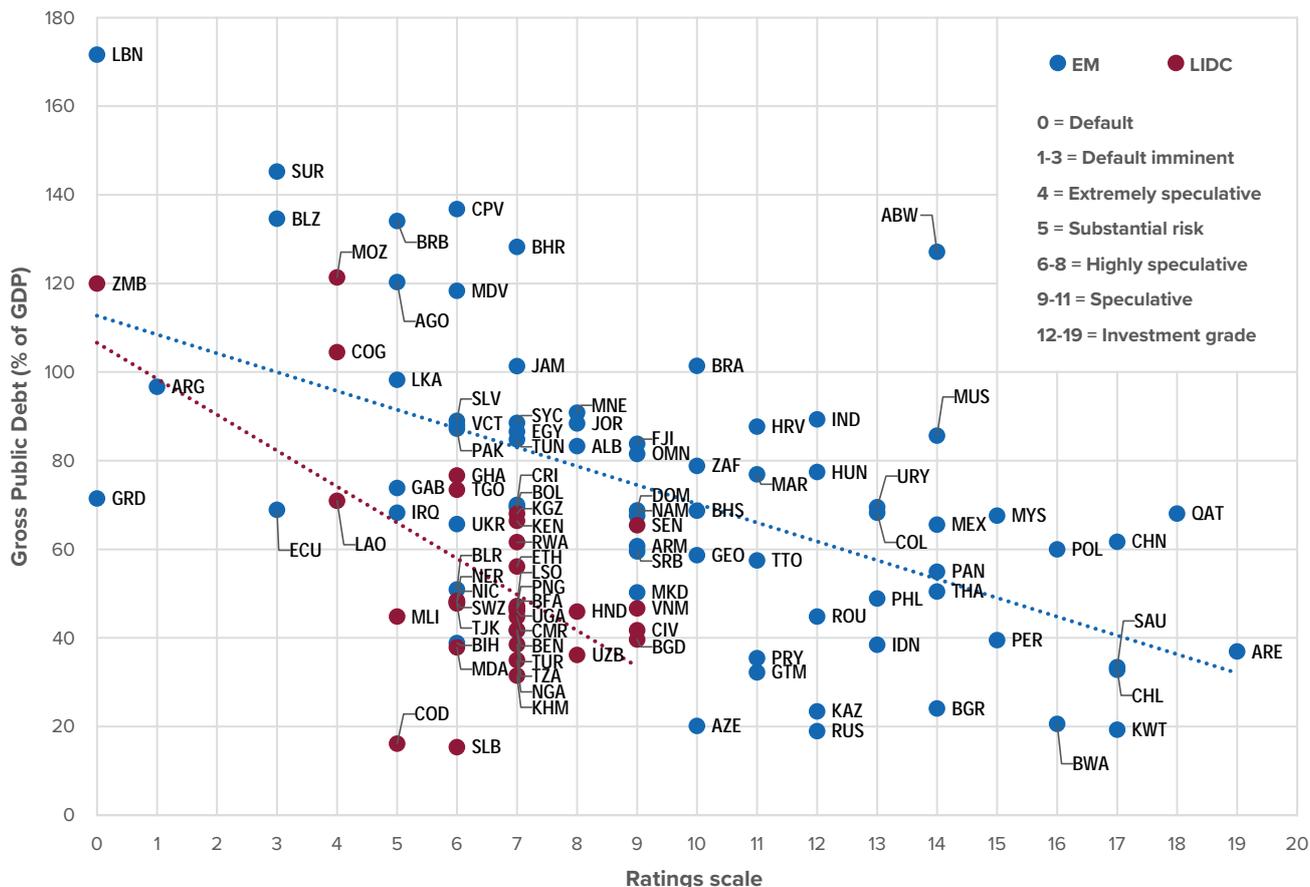
We have attempted to summarize our main results in section 2.3. A full summary for all 72 identified vulnerable countries can be found in Annex B, Table A.6.

2.1. Sovereign credit ratings

Sovereign credit ratings are useful indicators of the severity of debt distress, as they provide a forward-looking summary measure of political and economic factors that influence government’s ability to repay. In Figure 3 we plot sovereign credit ratings against gross public debt (as a percentage of GDP) for 105 developing countries with publicly traded debt, 73 EMs and 32 LIDCs. Note that not a single LIDC has an investment-grade rating and the same goes for 48 (two-thirds) of the 73 EMs.

¹⁷ For access to LIC-DSAs visit <https://www.imf.org/external/pubs/ft/dsa/lic.aspx>

Figure 3. Sovereign credit ratings (as of February 5th, 2021)



Source: Own calculations based on ratings from S&P, Fitch and Moody. IMF WEO October 2020 for debt.
 Note: Venezuela has a default rating but does not feature in the figure due to missing debt data. Both Venezuela and Grenada defaulted before the pandemic. Argentina, Belize and Ecuador defaulted in 2020 but have since cleared their default rating.

The six lowest rated LIDCs are Zambia, Mozambique, the Congo, Lao PDR, Congo DRC and Mali, and all are rated at ‘substantial risk’ or worse. The lowest rated EMs are Lebanon, Grenada, Venezuela (not in the figure), Argentina, Suriname, Belize and Ecuador. All the EMs plus Zambia are, or recently have been, at a default rating. Following these are five EMs rated at substantial risk: Barbados, Angola, Sri Lanka, Gabon, and Iraq.

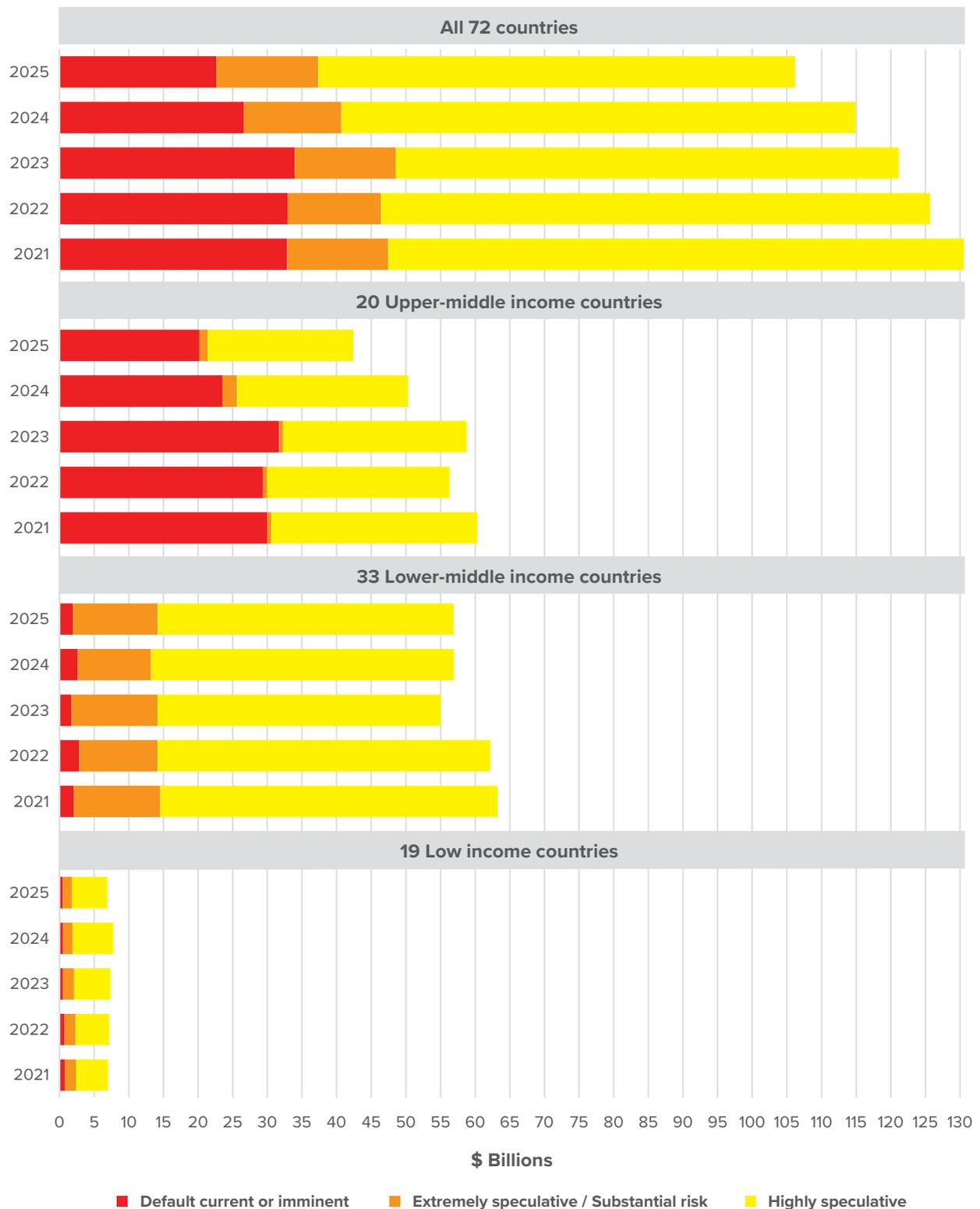
2.2. The distribution of debt service at risk

Figure 4 shows our estimates of how much external LT PPG total debt-service (TDS) is at risk (hereafter called risky-TDS) across income groups and the years 2021-2025. The estimates are based on IDS 2021 and therefore do not include debt issued in 2020 why they can be viewed as minimum estimates. The total number of countries included as vulnerable are 72 and include 19 LICs, 33 LMICs and 20 UMICs. The selection of countries is done by first taking all countries with a credit rating of ‘highly speculative’ or worse.¹⁸ This yields 56 countries including 35 DSSI-eligible. The remaining 16 countries included do not have a credit rating. Instead, we rely on their assigned DSA risk-rating to include them under our used rating categories.¹⁹ 14 of these 16 are DSSI-eligible bringing the total number of DSSI- and CF-eligible countries to 49, or 68% of the total sample of 72 vulnerable countries.

¹⁸ Highly speculative or worse is any country rated at or below B1 for Moody’s and B+ for FITCH and S&P.

¹⁹ More specifically, countries with a ‘High’ DSA risk-rating are included under the category ‘highly speculative’ and countries with an ‘in distress’ risk-rating under the ‘default current or imminent’ category.

Figure 4. Total estimated external LT PPG debt-service at risk (\$ billions)



Source: Own calculations based on sovereign credit ratings from Moody's (M), Fitch (F) and S&P (SP), DSA risk-ratings and IDS 2021 database.
 Note: The categories cover the following rating classes: Default current or imminent (CCC-;D for F and SP, Caa3;C for M), Extremely speculative / Substantial risk (CCC;CCC+ for F and SP, Caa2;Caa1 for M) and Highly speculative (B-;B+ for F and SP and B3;B1 for M). Estimates include 16 countries without a credit rating but with a DSA risk-rating of either 'in distress' or 'high risk of distress.' 'In distress' countries are included under the category 'default current or imminent' and 'high-risk' countries under 'highly speculative'.

Some key take-aways are:

Total debt-service payments at risk (risky-TDS) are estimated at a minimum of \$598 billion for the full period covering 2021-2025, of which \$311 billion (52%) is owed to private creditors. This year these figures are \$130 and \$70 billion respectively. For the group of 19 severely²⁰ vulnerable countries, risky-TDS is \$220 billion for the full period and \$47 billion this year.

LICs account for only 6% (\$36.2 billion) of the full period risky-TDS; LMICs account for 49% (\$294.1 billion); and UMICs account for 45% (\$268.1 billion).

A large share of UMIC risky-TDS is rated 'default current or imminent'. This category includes several larger economies, most notably Argentina, but also Venezuela, Lebanon and Ecuador.

Not shown explicitly in the figure is the group of 49 DSSI- and CF-eligible countries, which consists of 18 LICs, 25 LMICs and 6 UMICs. The DSSI-group accounts for 68% of vulnerable countries, and their share of total risky-TDS from 2021-2025 is 35%, equal to \$211 billion, of which \$63 billion (30%) is to private creditors.

Left uncovered by the post-pandemic debt-relief initiatives (DSSI and CF) are 23 countries (32% of total vulnerable countries) with at least \$387 billion of risky-TDS for the period 2021-2025, equal to 65% of total risky-TDS. Non-covered risky-TDS for 2021 is estimated at about \$87 billion.

In short, DSSI- and CF-eligible countries make up about two-thirds of the group of vulnerable countries but only about one-third of risky-TDS, leaving one-third of vulnerable countries, holding two-thirds of risky-TDS, uncovered.

Table 2 below summarizes the totals for each year across the three rating-categories used. It is worth noting that five (Argentina, Belize, Ecuador, Lebanon and Zambia) of the 11 countries under the 'default current or imminent' category defaulted in 2020.

Table 2. Estimated TDS on external LT PPG debt - all 72 vulnerable countries (\$ billions)

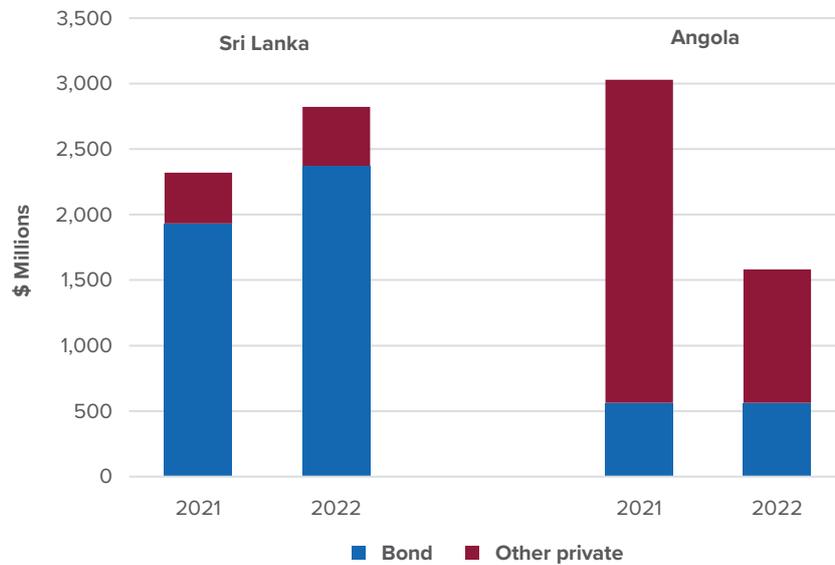
	2021	2022	2023	2024	2025
Default current or imminent (11 countries)	32.84	32.95	33.94	26.63	22.62
Extremely speculative / Substantial risk (8 countries)	14.60	13.46	14.58	14.04	14.70
Highly speculative (53 countries)	83.10	79.24	72.63	74.28	68.86
Total (\$ billion)	130.54	125.65	121.15	114.96	106.19
To private creditors (% of total)	69.9	66.3	64.8	58.9	51.0
DSSI & Common Framework share (% of total)	33.6	34.6	33.4	36.3	39.0

Source: (See Figure 4).

Eight countries are included under the 'extremely speculative / substantial risk' category and could be next in line for a default event. These are Angola, the Congo, Congo DRC, Gabon, Lao PDR, Mali, Mozambique, and Sri Lanka. Three (the Congo, Congo DRC and Mali) owe very little of their external debt to private creditors and are therefore less vulnerable to refinancing risk and could face fewer difficulties in restructuring their debt, also because all are eligible under the CF. At the other end, Angola, Gabon and Sri Lanka have higher exposure to re-financing risk and only Angola is eligible under DSSI and CF. Sri Lanka especially stands out with close to 50% of its external debt owed to private creditors and 86% of private-creditor-owed debt issued as bonds. This year Sri Lanka's TDS on bond debt is estimated at \$1.93 billion and expected to rise to \$2.37 billion next year, cf. Figure 5.

²⁰Countries rated worse than 'Highly speculative'.

Figure 5. Angola and Sri Lanka — TDS payments on external LT PPG debt owed to private creditors



Source: Based on IDS 2021 database.

2.3. Solvency and liquidity indicators

This section takes a closer look at how countries are expected to fare on two key debt-burden indicators towards 2025; (i) Solvency measured as gross public debt as a percentage of GDP (ii) Liquidity measured as TDS on external LT PPG debt as a percentage of government revenue. These two ratios are chosen because they allow us to use WEO forecast data and IDS 2021 data to gauge if debt-burden levels are expected to rise or ease in coming years.

More specifically we calculate for each year whether a country is expected to breach what is considered the sustainable debt-burden threshold for each indicator, and if so by how much (severity) measured as the percentage point (pp) distance above the assigned threshold. Thresholds are collected from countries' most recent DSAs and summarized in Table 3. Thresholds used for all MAC-DSF²¹ countries are equal to the thresholds used for LIC-DSF²² countries with a strong estimated debt-carrying capacity (see Annex A for details).

Table 3. Applied solvency and liquidity thresholds

	GROSS PUBLIC DEBT (% OF GDP)	TOTAL EXTERNAL LT PPG DEBT-SERVICE (% OF REVENUE)
MAC-DSA country	70	23
LIC-DSA country w. strong capacity	70	23
LIC-DSA country w. medium capacity	55	18
LIC-DSA country w. weak capacity	35	14

Source: (See Figure 4).

²¹ The Market Access Countries Debt Sustainability Framework (MAC-DSF) is used to assess debt sustainability in countries that have access to financial markets. The Low-Income Countries Debt Sustainability Framework (LIC-DSF) is used to assess debt sustainability in countries with little or no access to financial markets. The term LIC-DSA is a bit misleading, as this framework is also applied to many LMICs and UMICs that have limited access to international capital markets.

²²Ibid.

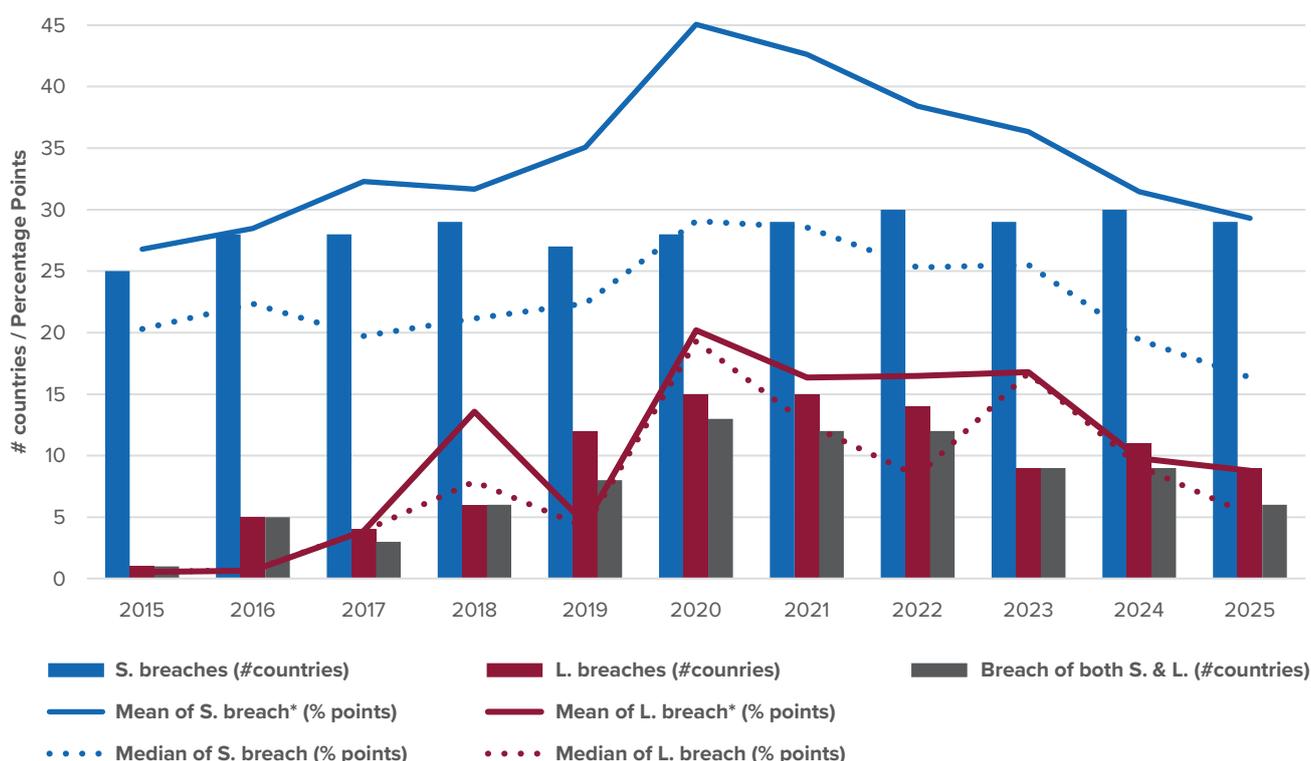
Based on data available for 63 countries evaluated under the LIC-DSF and 49 under the MAC-DSF we estimate for each year 2015-2025 how many countries were (2015-2020) or are expected to (2021-2025) breach the indicators. Based on these estimates we calculate for each of the two groups the total dollar reduction required to put all breaching countries back at their threshold values in 2021.

The poorest (LIC-DSF) countries

Figure 6 summarizes the findings for the group of 63 non-market access countries evaluated under the LIC-DSF with available data. In 2021, 29 countries (46% of the sample) can be expected to breach their solvency threshold (blue columns), 15 their liquidity threshold (red columns), and 12 both thresholds (grey columns).

The number of countries exceeding their solvency threshold was high before COVID and is expected to remain high after COVID. The severity of the solvency breaches — measured as the mean (blue line) and median (blue dotted line) of the percentage-point breaches — rises sharply in 2020, though the mean is pulled up by some large outliers. The median country in breach this year is expected to exceed its solvency threshold by about 29 pp. The number of countries in breach of their liquidity threshold rises from 12 to 15 from 2019-2020 and is also expected to stay elevated in coming years and still count nine in 2025. The severity of the liquidity breaches rises sharply from 2019 to 2020 and is expected to stay elevated all the way to 2024. The median country in breach this year is expected to exceed its liquidity threshold by 13 pp.

Figure 6. Debt-burden threshold breaches and average severity¹, LIC-DSF countries (2015-2025)

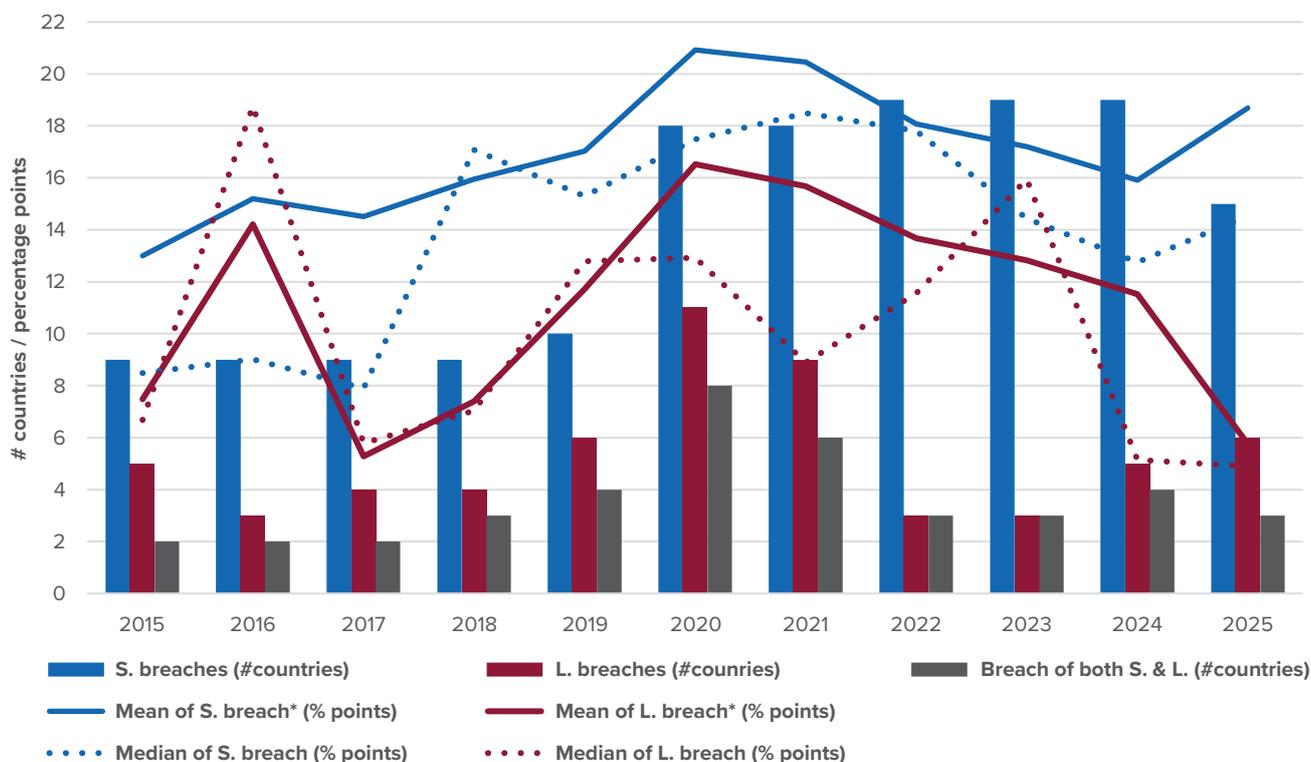


Source: Own calculations based on country LIC-DSAs for debt-burden thresholds, IDS for PPG debt, IMF WEO for gross public debt and revenue. Note: Solvency is measured as gross debt as a percentage of GDP. Liquidity is measured as total LT PPG external debt-service as a percentage of general government revenue. A breach is defined when a country exceeds the sustainability threshold assigned in its DSA.¹ Severity of breaches are plotted as means and medians and measure the percentage-point distance above the sustainability thresholds. Missing countries: Somalia, South Sudan and Syria.

Figure 7 shows a snapshot of the 63 countries for 2021. The twelve countries expected to be in breach of both indicators are shown in the upper right section of the figure: Bhutan, the Congo, Djibouti, Ethiopia, Ghana, Lao PDR, Maldives, Mauritania, Mozambique, Sudan, Yemen and Zambia. Seven are from the

2021 before falling back to pre-pandemic levels. The severity of breaches is high in both 2020 and 2021 and will not fall significantly until 2024/25. The median country in breach this year is expected to have exceeded its liquidity threshold by 9 pp.

Figure 8. Debt-burden threshold breaches and average severity¹, MAC-DSF countries (2015-2025)

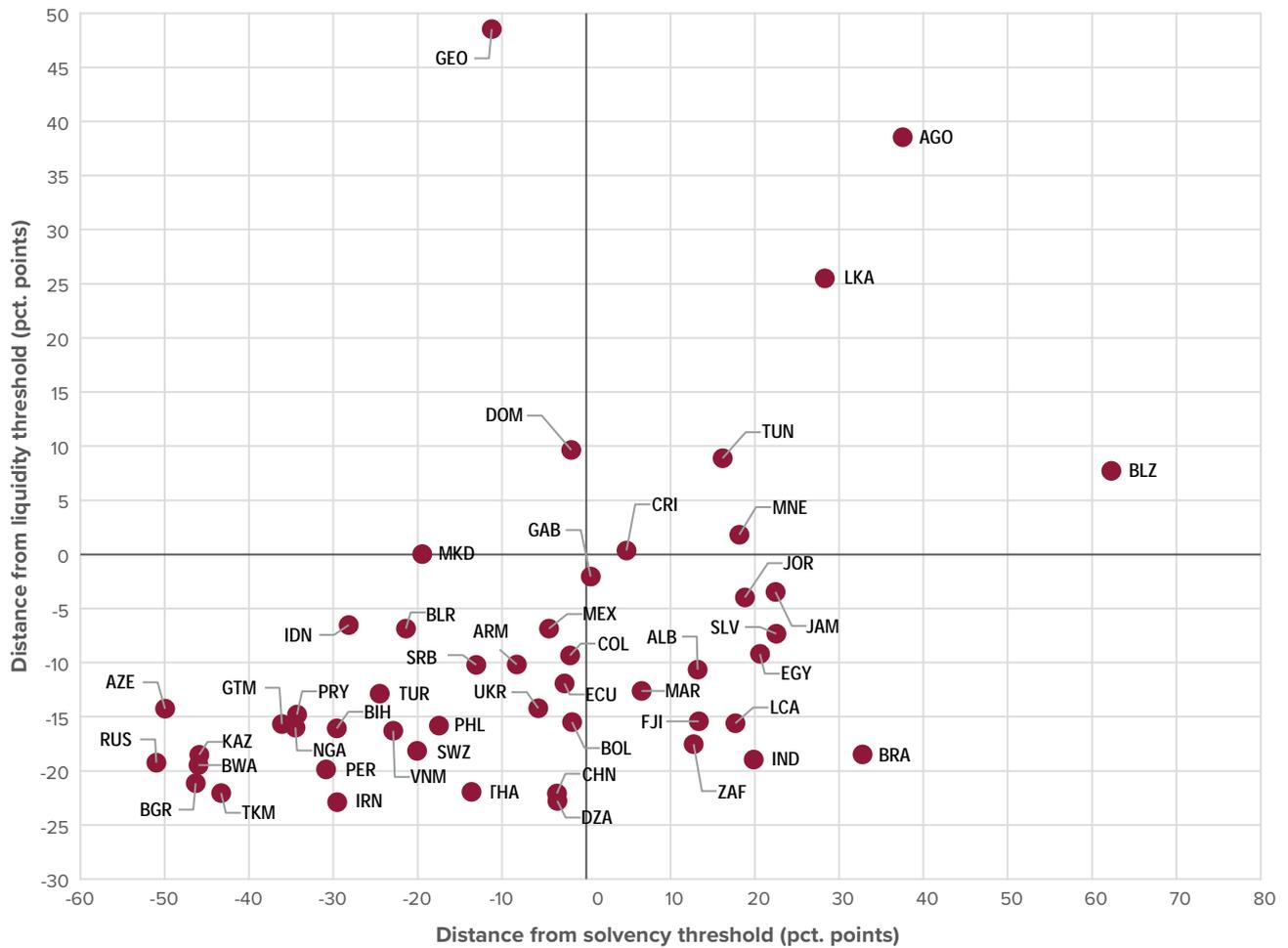


Source: Own calculations based on IDS 2020 and IMF WEO October 2020.

Note: Solvency is gross debt as a percentage of GDP. Liquidity is total debt-service (LT PPG) as a percentage of general government revenue.¹ Severity measures the average percentage-point difference between the debt-burden indicator and threshold value for countries that have exceeded their threshold. The same thresholds apply for all countries; 70% for solvency and 23% for liquidity. Missing countries: Argentina, Kosovo, Lebanon, Mongolia, Pakistan and Venezuela.

Figure 9 shows the 2021 snapshot. It should be noted that a number of important countries are not included: Lebanon's economy has recently collapsed and the government defaulted on its debt, making it the very largest outlier on both indicators. Argentina, Kosovo, Mongolia, Pakistan and Venezuela are not included in Figures 8 and 9 due to either missing forecast data for revenue or debt data. It can also be noted that Belize (BLZ) stands out in Figure 9 and the country defaulted in 2020. Angola (AGO) and Sri Lanka (LKA) stand out as well, far exceeding both thresholds.

Figure 9. Distance (pp) from debt-burden thresholds¹, MAC-DSF countries (2021)



Source: Own calculations based on IDS 2021 and WEO October 2020.

Note: X-axis measures the percentage point deviation from the country's debt-burden threshold for gross debt as a percentage of GDP. Similarly, the y-axis measures the percentage-point deviation for total external LT PPG debt-service payments as a percentage of total government revenue. A negative value indicates that the country has not breached its threshold.¹ Same thresholds are applied to all countries: 70% for solvency and 23% for liquidity. Lebanon, Kosovo, Mongolia, Pakistan and Venezuela are not included in the figure.

For the group of 18 countries in breach of solvency in 2021, total excess public gross debt is estimated at \$1.2 trillion and most of it from India and Brazil. For the 9 countries in breach of liquidity, total excess TDS on external LT PPG debt is about \$12 billion.

Summary

Both the number and severity of solvency breaches in market-access countries rise sharply in 2020 compared to the group of countries without market access for which 'only' the severity level rises significantly. Whereas most of the impact in non-market access countries goes through a fall in GDP, many countries with market access have been able to issue new debt to fight the crisis. This new debt will add to countries' debt-service payments in coming years. This increase is not adequately captured in our liquidity indicator as TDS payments are taken from IDS 2021, which does not include debt issuances made in 2020. Thus, the liquidity estimates presented above most likely underestimate the number of breaches and their severity.

2.4. Summary of results

Table 4 shows the 5 indicators and threshold values used to summarize our results across the 72 identified vulnerable countries, and Table 5 lists the 19 most vulnerable countries ranked on these indicators. A full list for all 72 countries can be found in Annex B Table A.6.

Solvency (S) and Liquidity (L) indicators are as described in section 2.2 and for the year 2021, and their cell values indicate the severity of breaches measured as the percentage-point distance between the estimate and threshold ratios. The private share indicator is the percent of 2021 external PPG TDS owed to private creditors. The TDS growth indicator is the percentage growth in external PPG TDS payments from 2021-2022.

Table 4. Indicators and thresholds used for ‘ranking’ of vulnerable countries

RATING CATEGORY	L. BREACH ¹	PRIVATE SHARE	TDS GROWTH	S. BREACH ¹
Default current or imminent	$10 \leq x$	$40 \leq x$	$10 \leq x$	$20 \leq x$
Extremely Speculative / Substantial risk	$5 \leq x < 10$	$20 \leq x < 40$	$0 \leq x \leq 10$	$10 < x \leq 20$
Highly speculative	$0 \leq x < 5$	$0 \leq x < 20$	$0 > x$	$0 \leq x \leq 10$

Note: ¹ Liquidity (L) and Solvency (S) indicators are as described in section 2.3.

Using the example of Zambia, the country currently has a default rating and is this year expected to breach its liquidity threshold by as much as 37 pp. The country owes 57% of this year’s TDS payments to private creditors, and TDS payments in 2022 are expected to increase by more than 40%. Finally, the country has exceeded its solvency threshold by almost 85 pp. In the next ratings category Sri Lanka is the most vulnerable country.

It can be noted that 11 of the 19 severely vulnerable countries are in the SSA region. However, 7 do not owe much debt to private creditors, which is why, in the event of any debt restructuring, the process is likely to be less prone to complications. On the other hand, Angola, Gabon, Zambia and São Tomé and Príncipe owe large shares to private creditors. Zambia defaulted last year (and is still at a default rating in the time of writing). The country has been facing complications in renegotiating debt, partly due to a complicated creditor landscape (FT, 2020).

Table 5. Top-19 vulnerable countries (see list of 72 in Annex C).

COUNTRY	REGION	INCOME	DSSI/CF	RATING CATEGORY	L. BREACH	PRIVATE SHARE	TDS GROWTH	S. BREACH
Venezuela, RB	LAC	UMIC	No	D. curr/imm.	..	87.7	0.1	..
Argentina	LAC	UMIC	No	D. curr/imm.	..	77.1	-12.8	..
Lebanon	MENA	UMIC	No	D. curr/imm.	..	91.0	-5.9	..
Somalia	SSA	LIC	Yes	D. curr/imm.	..	0.0	-3.6	..
Zambia	SSA	LMIC	Yes	D. curr/imm.	37.0	56.9	40.3	84.6
Belize	LAC	UMIC	No	D. curr/imm.	7.7	42.1	5.6	62.3
Ecuador	LAC	UMIC	No	D. curr/imm.		43.5	35.3	
São Tomé and Príncipe	SSA	LMIC	Yes	D. curr/imm.		29.5	6.9	11.7
Grenada	LAC	UMIC	Yes	D. curr/imm.		28.8	-0.8	18.5
Zimbabwe	SSA	LMIC	No	D. curr/imm.	1.2	0.5	1.4	
Sudan	SSA	LIC	No	D. curr/imm.	4.1	0.0	-8.5	215.7
Sri Lanka	SA	LMIC	No	E. spec./S. risk	25.5	51.4	10.6	28.3
Angola	SSA	LMIC	Yes	E. spec./S. risk	38.6	47.7	-23.4	37.5
Lao PDR	EAP	LMIC	Yes	E. spec./S. risk	26.7	25.4	-6.1	35.7
Congo, Rep.	SSA	LMIC	Yes	E. spec./S. risk	5.8	1.4	-14.1	63.4
Mozambique	SSA	LIC	Yes	E. spec./S. risk	7.4	14.5	-0.5	88.5
Gabon	SSA	UMIC	No	E. spec./S. risk		47.5	-0.1	0.5
Mali	SSA	LIC	Yes	E. spec./S. risk		0.0	9.8	
Congo, Dem. Rep.	SSA	LIC	Yes	E. spec./S. risk		7.7	-3.5	

Source: Own calculations.

Note: See Annex B for a full list of the 72 countries. A blank cell for L. and S. breach means that the country is not expected to reach or breach its threshold. Missing data is indicated by "..".

2.5. Debt dynamics example – Sri Lanka

As evident, liquidity risk remains a major issue for many countries, and if not managed well it could lead to solvency problems. But even if liquidity was not currently a challenge, would countries' public debt be sustainable? Answering this question is not easy and requires an assessment of countries' solvency debt dynamics, which is a key component of DSAs. We make no attempt to undertake such analyses for the 72 countries identified but include here a simple stress-test example for Sri Lanka, which has stood out throughout the analysis as highly vulnerable, by assessing the country's future solvency risk from lower growth and higher interest rates.

First, when assessing debt dynamics it is common to refer to the interest-growth rate differential (i-g).²³ If i-g is negative (i.e., the nominal growth rate exceeds the nominal interest rate) a country can issue debt without later having to increase taxes in order to bring down debt (public debt has no fiscal cost). If the primary balance is zero, debt as a percentage of GDP will fall.²⁴ But i-g is not a reliable indicator for countries that issue large shares of debt in foreign currencies, a category which includes Sri Lanka (which has about half its total public debt denominated in foreign currency) and many other developing economies with access to international financial markets. Here, debt-dynamic analysis should also include exchange-rate movements, as depreciation can sharply increase debt relative to GDP.

To form the baseline for our debt-dynamics analysis for Sri Lanka, we rely on the WEO October 2020 forecasts for debt, growth, primary balance, inflation and exchange rate.²⁵ The forecasts suggest that

²³E.g., see S&P (2021)

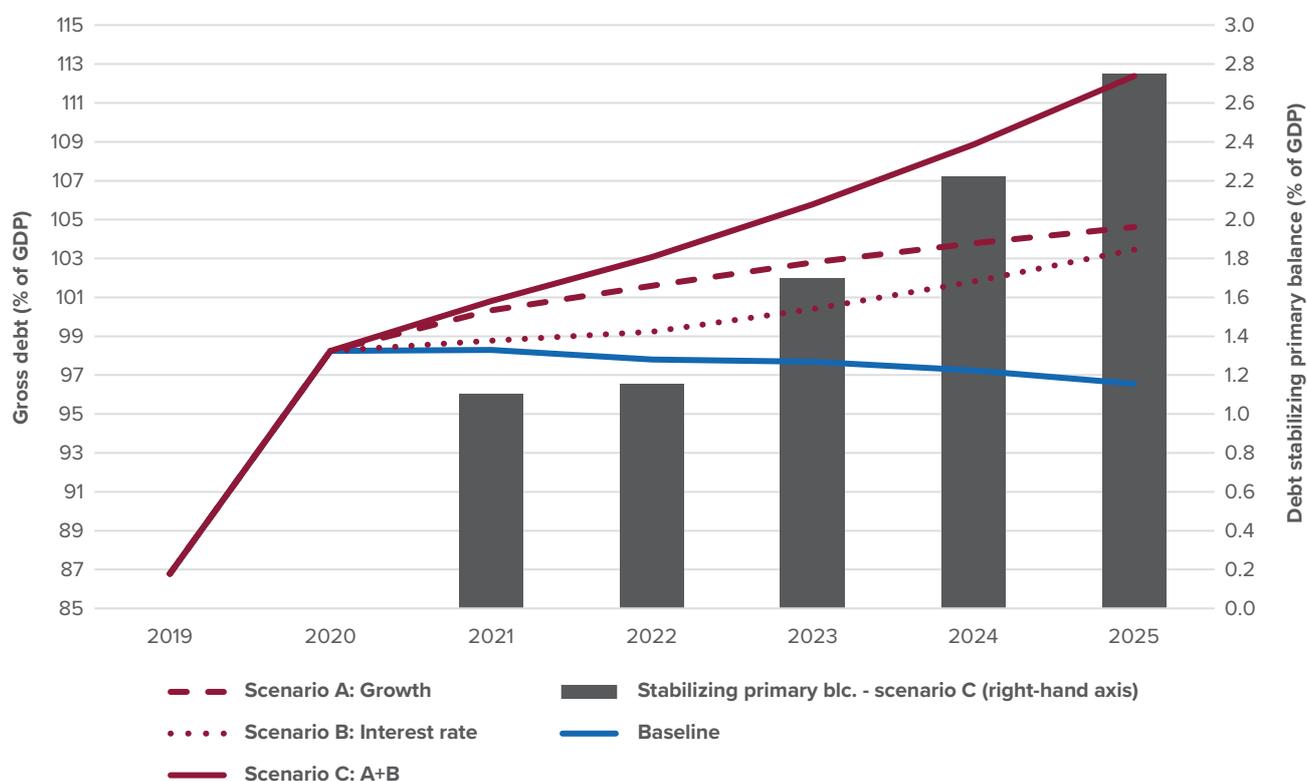
²⁴E.g., see Blanchard (2019)

²⁵Debt dynamics data and estimates can be found in annex C.

Sri Lanka’s automatic debt dynamics are favorable, i.e., debt as a percentage of GDP is expected to fall slightly from 2021-2025 while the primary balance is in a deficit all years. A closer look at the IMF forecasts reveals some of the main assumptions behind this conclusion; (i) a significant pick-up in economic growth post-2020 compared to the country’s recent pre-pandemic growth performance, combined with (ii) a significant slowdown in future exchange rate depreciation. The baseline is depicted as the solid blue line in Figure 10 where debt is expected to peak in 2021 at 98.3% of GDP and reach 96.6% in 2025.

But what will happen to debt dynamics if growth falls short of expectations or if financial market conditions tighten? Based on our analysis, the main conclusion is that meeting the solvency condition will depend crucially on (i) Sri Lanka’s ability to produce a post-pandemic real growth rate that is significantly higher than the average growth performance in the years leading up to the pandemic, and (ii) continued access to financial markets at low and stable interest rates. Both assumptions underpin the IMF forecast. Figure 10 summarizes our results. Under either scenario A (a continuation of recent pre-pandemic growth performance) or scenario B (a tightening of financial conditions), public gross debt would reach between 103-105% of GDP in 2025. For both scenarios combined (scenario C), debt would reach about 112% in 2025.

Figure 10. Sri Lanka debt dynamics — two stress scenarios



Source: Own estimates based on data from IMF WEO October 2020, IDS 2021 and WDI database.
 Note: Baseline is based on WEO October 2020. Scenario A assumes a return to recent pre-pandemic growth rates. Scenario B assumes an increase of 300 basis points in funding costs phased in gradually from 2021 to 2025. Details and data estimates can be found in Annex C.

We can also assess how Sri Lanka’s automatic debt dynamics would be affected under the two scenarios. The conclusion is that automatic debt dynamics, opposite from the baseline, would become unfavorable (i.e., automatically increase the debt ratio). To illustrate this, Figure 10 also plots the debt-stabilizing primary balance (grey bars) for the combined scenario C. Under scenario C, Sri Lanka would by 2025 need a primary balance surplus of almost 2.8% of GDP to keep the debt-to-GDP ratio from increasing. The full debt dynamic analysis for Sri Lanka can be found in Annex C.

Debt trends over the past decade and more

3.1. Growing debt and slowing growth

Debt levels in both LICs and MICs have grown rapidly the past decade and been followed by a slowing of growth. Future debt sustainability would therefore depend crucially on governments' ability increase quality investments in both physical and human capital.

The build-up of debt in developing economies has been driven by several global trends. First, the debt-relief granted in the 2000s helped clean up governments' balance sheets and improve debt-burden indicators.²⁶ It also happened to coincide with the beginning of a commodity supercycle that helped (at least temporarily) boost growth and improve countries' debt-carrying capacity. Then came the global financial crisis followed by a flooding of liquidity that also found its way to developing and emerging markets in a 'search for yield'. Consequently, many developing countries, especially the present-day group of LMICs, have gained significant access to international capital markets over the past 10 years.

Some have attributed the slowing of growth to too few resources being directed towards investments over consumption (Stiglitz & Rashid, 2020). Another important factor to consider is that the slowing largely coincided with the end of the commodity price boom and the slowing of (investment- and urbanization-led) growth in China, which was a key driver of the commodity boom. Some now argue that the world could be on the verge of a new commodity supercycle driven largely by policy-induced increases in demand for minerals and metals needed for the transition to low-carbon economies (Reuters, 2021b). Such external demand factors matter greatly for the future growth (and thus debt sustainability) outlook of developing economies, as two-thirds can be categorized as commodity-dependent and as many as 9 out of 10 in SSA (UNCTAD, 2019).²⁷

3.2. Changing debt composition

Increased market access and higher GNI per capita levels (which partly determine access to concessional borrowing) have been followed by a reduction in the share of public debt financed by official creditors.²⁸ In the mid-2000s, the share of external debt owed to official creditors was more than 95% in today's LICs and 80% in today's LMICs.²⁹ Today these shares are about 85% and 65%, respectively. In LMICs, bonds now account for about 27% of their total external debt on average, up from about 10% in the mid-2000s.

These developments have also resulted in a falling share of debt funded on concessional terms, especially for LMICs. In the 2000s the average (present-day) LMIC would have close to 50% of external government debt financed on concessional terms. Today this share is approaching 30%, as shown in Figure 11.

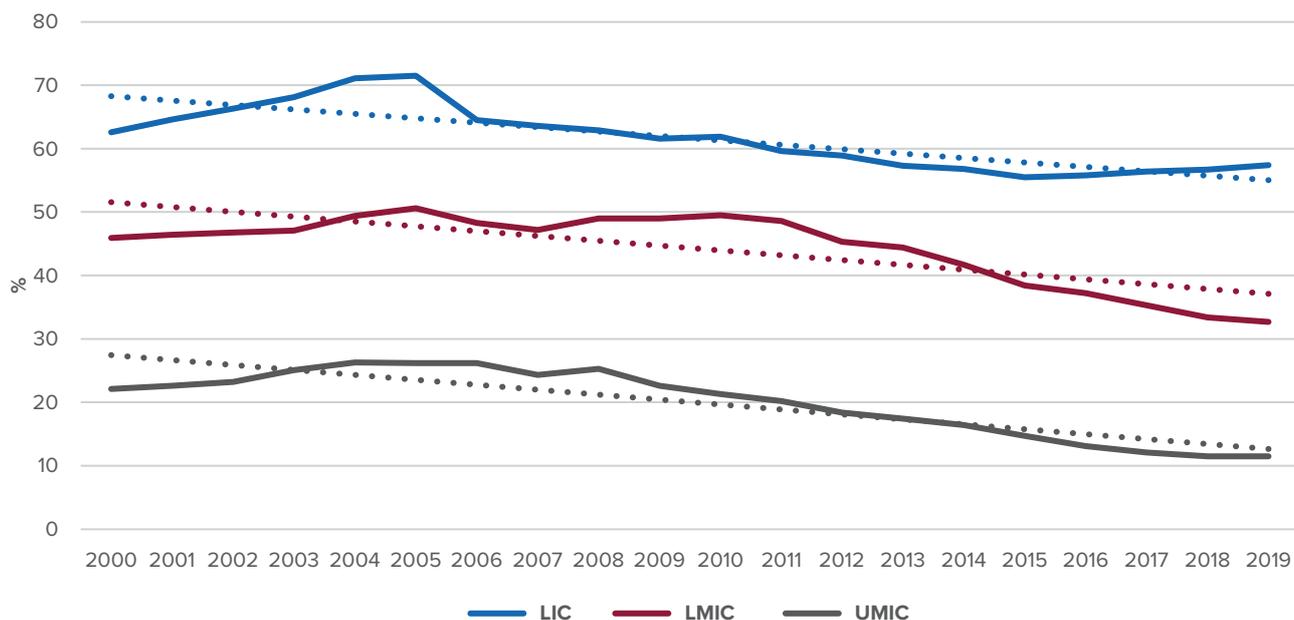
²⁶The Highly Indebted Poor Countries Initiative (HIPC), and later the Multilateral Debt Relief Initiative (MDRI) helped bring down debt. By 2010 LIC debt was 28% of GDP, down from 70% ten years earlier.

²⁷UNCTAD classifies an economy as commodity-dependent when commodities account for more than 60% of total merchandise exports (in value terms).

²⁸As an example, IDA eligibility is based on GNI per capital levels and creditworthiness.

²⁹Based on IDS 2021.

Figure 11. Concessional borrowing (% of public debt)



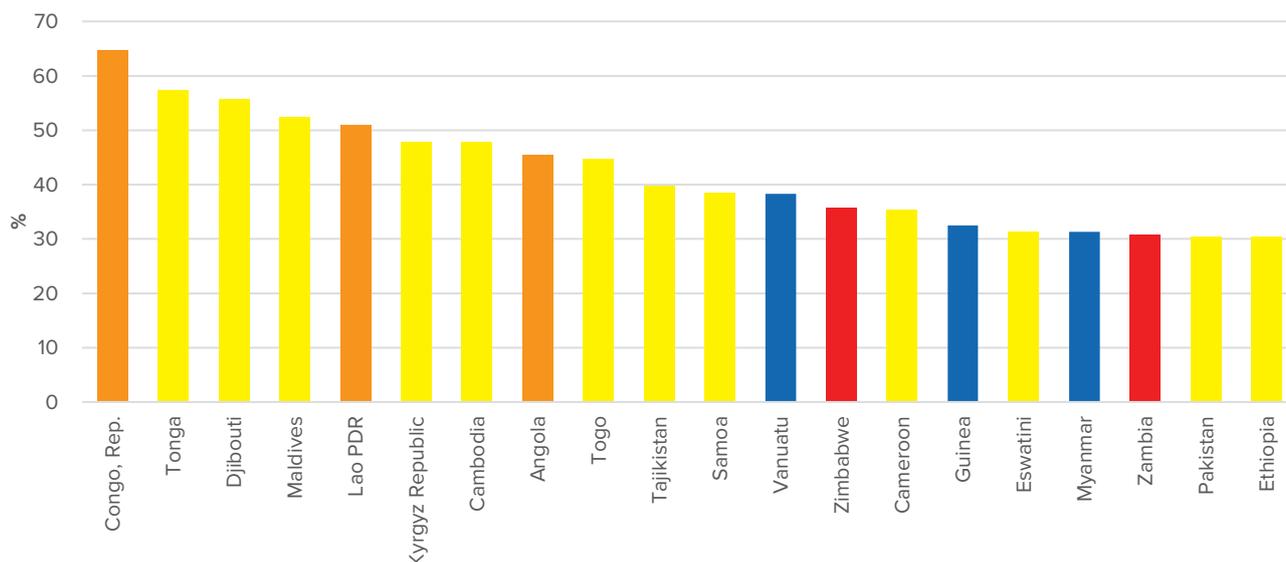
Source: Own calculations based on IDS 2021.

Note: simple averages across countries in each income group. Concessional measures the share of total debt with a minimum of 35% grant element.

3.3. Concentration of debt with a single creditor

China’s share of lending to the poorest developing countries has been rising rapidly the past 10-15 years. For the group of LICs and LMICs total external PPG debt stock almost doubled from 2010 to 2019 where it reached \$1.04 trillion. China’s official lending to the same groups increased almost fivefold over the same period from \$26.1 to \$124 billion (or from 5% to 12% of total). In 20 countries, China now owns 30% or more of the external PPG debt stock, and only three of these countries are not among our 72 identified vulnerable countries, as shown in Figure 12.

Figure 12. Top 20 - Chinese share of external PPG debt stock, 2019 (% of total)



Source: own calculations based on IDS 2021.

Note: color-coding refers to rating categories used in section 2.2. Blue here means that the country is not amongst the 72 identified vulnerable countries.

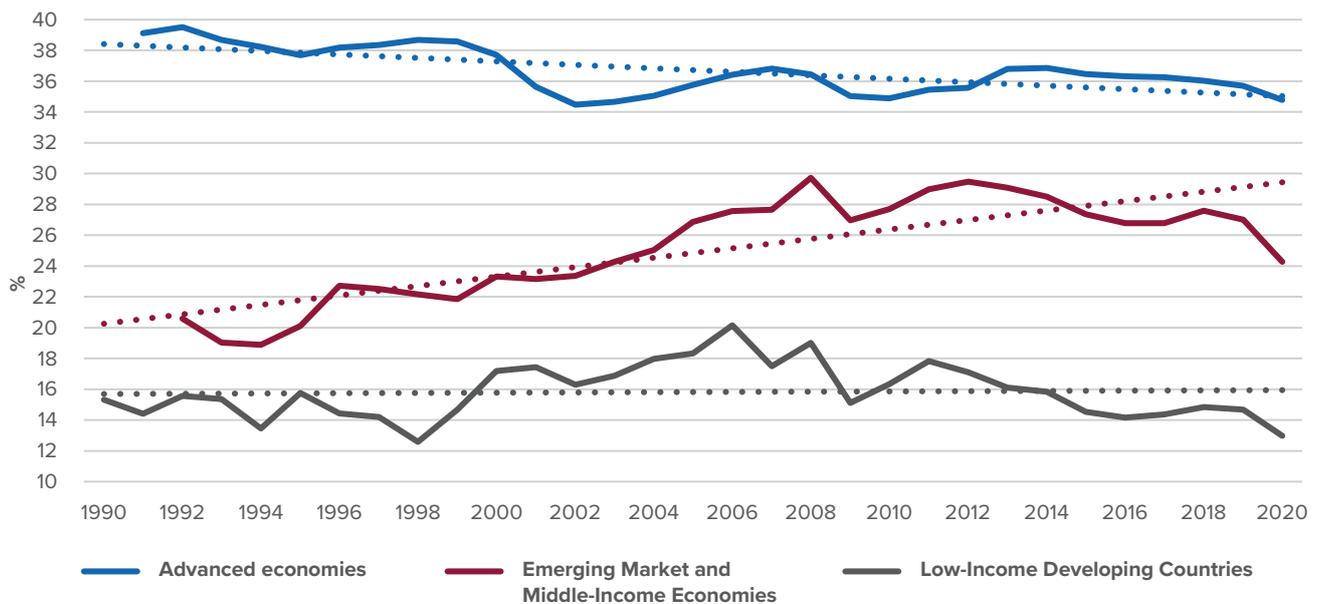
Whether a higher concentration of debt with a few or a single creditor is good or bad is not straightforward. On one hand, having fewer creditors might make it easier to renegotiate debt. On the other, large creditors could have more bargaining power. Importantly China has announced that it has and will continue to provide debt relief as per the DSSI and is also participating in the CF.

It can be noted that China’s increased official lending can also be linked to the falling share of concessional borrowing described in section 3.2. Based on data available for 54 developing countries, we estimate that for every \$1 of bilateral lending from China, eight cents are on concessional terms compared to an average of 46 cents for non-Chinese bilateral lenders.³⁰

3.4. Poor revenue development

In the poorest countries, revenue development has been decoupled from debt for many years adding to higher debt vulnerability. According to data from the IMF, gross public debt as a percentage of GDP rose by 15.4 pp while revenue decreased by 1.7 pp from 2010-2019 for the poorest group of countries (LIDCs). The poorest countries today do not collect more revenue as a percentage of GDP than they did three decades ago, as shown in Figure 13.

Figure 13. Government revenue in % of GDP (1990-2020)

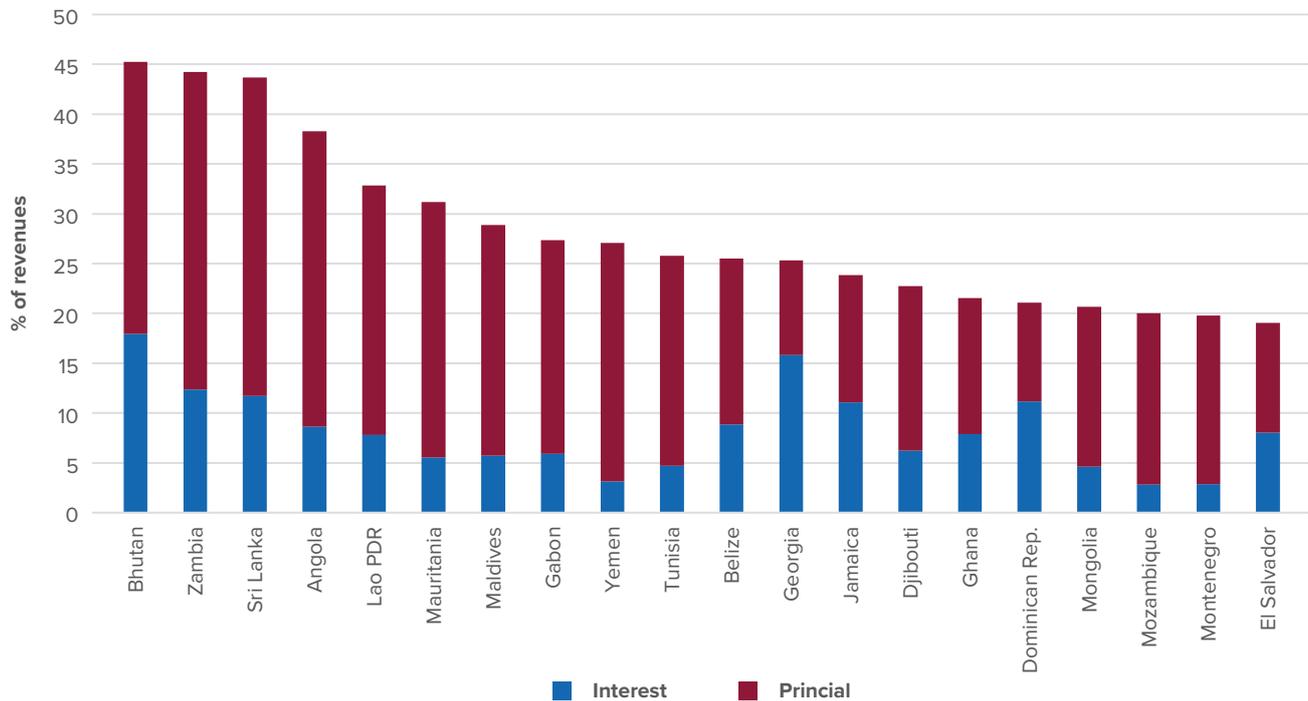


Source: IMF Fiscal Monitor, October 2020.
 Note: dotted lines show the linear trend.

The result of a decoupling of debt and revenue growth plus a higher share of debt financed on commercial terms has led to an increasing share of revenues being directed towards debt-service payments. Based on WEO and IDS 2021 data, total (interest and principal) debt service payments on external debt amounts to 20% or more of revenues in 18 countries over the period 2019-2025 as shown in Figure 14.

³⁰Our estimate is produced based on the IDS 2021 dataset. We use the series for bilateral PPG debt (total and concessional) for the most recent year 2019. Total bilateral debt across the 54 countries was \$247 billion whereof China owns \$90 billion (36%).

Figure 14. Top-20 – Total external debt-service payments as a percentage of revenues (2019-2025)



Source: Own calculations based on IDS 2021.

Note: Argentina, Kosovo, Lebanon, Pakistan, Syria and Venezuela are not included due to missing forecast data.

However, as mentioned earlier, a high TDS relative to revenues need not be a problem as principal payments can be rolled over during normal times, leaving ‘only’ interest rate payments to be financed by revenues. However, high principal payments do pose a risk if countries are suddenly unable to access financial markets at affordable rates.

Table 6 shows total (domestic and foreign) interest payments as a percentage of government revenue in 2010 compared to today³¹ across the three World Bank income groups. All groups, measured either by the average or median, today have a higher ratio of interest payments to revenue than in 2010. The increase has been strongest for LICs and LMICs. As an example, in 2010 the median (average) LMIC government had interest payments equal to 4.7% (8.9%) of revenue and today 9.9% (12.3%).

Table 6. Total government interest payments as a percentage of revenue, 2010 and latest¹

	LIC (N=9)		LMIC (N=25)		UMIC (N=34)	
	2010	LATEST	2010	LATEST	2010	LATEST
Median	3.0	5.7	4.7	9.9	7.3	8.8
Average	3.9	7.2	8.9	12.3	9.3	10.1

Source: Based on WDI.

Note: ¹ Most observations are from 2019 and no observations are earlier than 2017.

³¹ See table 6 note.

Conclusion and policy implications

4

This paper presents post-COVID sovereign debt vulnerabilities across developing countries. The analysis uses several measures of debt vulnerability spanning credit ratings, debt sustainability risk ratings and threshold values, debt-service profiles, solvency and liquidity indicators, as well as exposure to financial markets and private creditors. The main sources of data used are the IDS 2021 and WEO October 2020 databases, the IMF and World Bank Debt Sustainability Assessments (DSAs) and credit-rating agencies.

The analysis identifies and ranks 72 vulnerable countries, 19 of which are severely vulnerable, on five debt-vulnerability summary indicators. We estimate for the 72 countries that their total amount of external debt-service at risk (risky-TDS) is at least \$598 billion for the period 2021-2025, with \$311 billion (52%) to private creditors. Risky-TDS in 2021 is estimated at \$130 billion, with \$70 billion to private creditors. MICs' share of total risky-TDS is \$562 billion (94% of total) for the full period. Among these 72 vulnerable countries are 49 eligible under the DSSI and CF. Those 49 countries' share of total risky-TDS across all 72 countries is \$211 billion (35% of total) of which \$63 billion (30%) are owed to private creditors. This leaves 23 countries holding at least \$387 billion (65%) of risky-TDS uncovered by both the DSSI and CF. This year alone, uncovered risky-TDS is estimated at a minimum of \$87 billion.

Based on forecasts of the number of countries in breach of their solvency and liquidity debt threshold ratios, and the severity of those breaches, there is little evidence that debt vulnerabilities will ease significantly in coming years, and are not likely to return to pre-pandemic levels until 2024/25. Uncertainty and downside risks are high. An economic recovery that falls short of expectations — e.g., due to delays in vaccine roll-outs, a mutating virus and/or a tightening of financial market conditions — could result in severe debt distress and defaults for more countries. Either way, most vulnerable countries face an uncertain future where they risk bearing the economic and development cost of debt overhangs, rather than finding themselves on the brink of default.

Our results also have implications for policy. First, liquidity is likely to remain a key concern this year also for many MICs currently not covered by the DSSI and CF initiatives. As our analysis showed, the debt relief initiatives do not cover about one-third of vulnerable countries that account for almost two-thirds of the total amount of debt service at risk. It would therefore make sense to address liquidity concerns by prolonging the DSSI until at least end of 2021 and expand eligibility to cover all vulnerable developing economies. Similarly, it would make sense to increase allocations of IMF's Special Drawing Rights to address these same liquidity concerns and help keep financial markets calm.

To avoid the problem of 'too little too late,' a multilateral framework targeting sovereign debt restructurings is needed. The time is ripe for such an initiative, given the elevated debt vulnerabilities today and in coming years, and the CF has opened up the possibility. The CF should be expanded upon to cover all countries in need of debt restructuring. The framework should ensure full transparency, equal burden-sharing by private creditors, and that decisions on the size of debt to be treated are based on improved debt-sustainability assessments.

It is also important to remember how we got here. A decade of rapid debt build-ups was not followed by equal growth in revenue development, which for most developing economies remains at very low levels. Looking ahead, fiscal adjustments should focus more on revenue generation, a re-direction of expenditures and on improving spending efficiencies — all with a focus on achieving the Sustainable Development Goals. As an example, this could come in the form of replacing fossil-fuel subsidies with formalized social-protection systems and through increased taxation of negative 'SDG externalities' such as the phasing in of carbon taxation.

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Annexes

Annex A. Debt sustainability frameworks

The LIC-DSF³²

While the name LIC-DSF implies that the framework applies only to low-income countries (LIC), this is misleading as many both lower- and upper-middle income countries with limited or no access to international capital markets are included.

In the LIC-DSF a country's overall debt-carrying capacity is estimated based on several political, economic and institutional indicators and labelled either weak, medium or strong. Each category has its own sustainability thresholds for various liquidity and solvency ratios (debt-burden indicators), cf. Table A.1. Based on latest DSAs for 64 countries, 19 have weak capacity, 28 medium and 17 strong.

Table A.1. Debt-carrying capacity: number of countries and liquidity and solvency thresholds

DEBT-CARRYING CAPACITY	# COUNTRIES	PV OF TOTAL PUBLIC DEBT	PV OF PPG EXTERNAL DEBT		PPG EXTERNAL DEBT-SERVICE	
		% of GDP	% of GDP	% of Exports	% of Exports	% of Revenue
Weak	19	35	30	140	10	14
Medium	28	55	40	180	15	18
Strong	17	70	55	240	21	23

Source: IMF-WB Debt LIC-DSF.

Note: PV refers to present value. PPG refers to public and publicly guaranteed debt. Table is based on latest DSAs, most of which are from Q2 in 2019 or 2020.

The overall DSA risk ratings (one for overall public debt and one for external public debt) are determined based on whether a country breaches its thresholds under a baseline and stress-test scenario, cf. Table A.2. Six countries are currently considered to be in distress and 27 at high risk of distress as per their external PPG debt risk-ratings.

Table A.2. Debt risk-rating based on PPG external indicators

DEBT-CARRYING CAPACITY	# COUNTRIES	BREACH OF ANY DEBT-BURDEN THRESHOLD UNDER BASELINE TEST	BREACH OF ANY DEBT-BURDEN THRESHOLD UNDER STRESS TEST	EVIDENCED DIFFICULTIES IN SERVICING DEBT
Low	11	x	x	x
Moderate	21	x	✓	x
High	27	✓	✓	x
Distress	6	NA	NA	✓

Source: Based on LIC-DSF.

Note: The primary output of the DSA is a risk-rating determined by whether a country is expected to breach one or more debt-burden thresholds for the external public and publicly guaranteed (PPG) debt. The 'countries' column is based on the 73 DSSI eligible countries as per October 27, 2020. Eight of 73 countries have not been assigned a rating. Seven are not included under the LIC DSF.

³²<https://www.imf.org/en/About/Factsheets/Sheets/2016/08/01/16/39/Debt-Sustainability-Framework-for-Low-Income-Countries>

The MAC-DSF

It should be noted that the MAC-DSF has recently been revised and the new methodology will be operationalized later this year (IMF, 2021). This section describes the current MAC-DSF.³³

The MAC-DSF is designed for countries with significant access to international capital markets. Prior to the DSA a country will be classified as either a low- or high-scrutiny case. For an EM to be a high scrutiny case, any of the following conditions must be met: (i) current or projected debt-to-GDP ratio exceeds 50%, (ii) current or projected gross-financing-need-to-GDP ratio exceeds 10%, (iii) the country has exceptional access to IMF assistance.

A high-scrutiny case is subjected to further risk-analysis on three main indicators: debt-to-GDP, gross-financing-need-to-GDP, and debt profile. The first two will be tested on their sensitivity to four macro-fiscal shocks, real growth, primary balance, real interest rate and exchange rate, and the risk of contingent liabilities under a baseline and stress-test scenario. As an example, if one shock will push the debt-to-GDP ratio above 70% in both scenarios it will be assigned a ‘high’ risk rating, if only under the stress test then a ‘moderate’ rating. Table A.3 below shows the thresholds.

Table A.3. Debt and GFN thresholds (MAC-DSF)

EMs	DEBT-TO-GDP RATIO		GFN-TO-GDP RATIO	
	Baseline	Stress Test	Baseline	Stress Test
High risk	>70	>70	>15	>15
Moderate risk	<=70	>70	<=15	>15
Low risk	<=70	<=70	<=15	<=15

The debt-profile analysis includes another set of shock variables; bond spreads, external financing need, change in short-term debt, share of debt held by non-residents, debt in foreign currency. Table A.4 shows the risk thresholds for the debt profile.

Table A.4. Debt profile thresholds (MAC-DSF)

Debt-Profile Risk Assessment for EMs			
Debt Profile Indicators	Low	Moderate	High
EMBI Global Bond Spreads (Basis Points)	<200	200~600	>600
External Financing Requirements (% of GDP)	<5	5~15	>15
Annual Change in the Share of Short-Term Public Debt (% of Total Debt)	<0.5	0.5~1.0	>1.0
Public Debt Held by Non-Residents (Share of Total)	<15	15~45	>45
Public Debt in Foreign Currency (Share of Total)	<20	20~60	>60

Unlike the LIC-DSA the main output is not a single overall risk rating, but a risk heatmap which is a three-by-five matrix where three are the indicators and five are the types of shocks applied to each indicator, cf. Table A.5.

Table A.5. Risk heatmap (MAC-DSF)

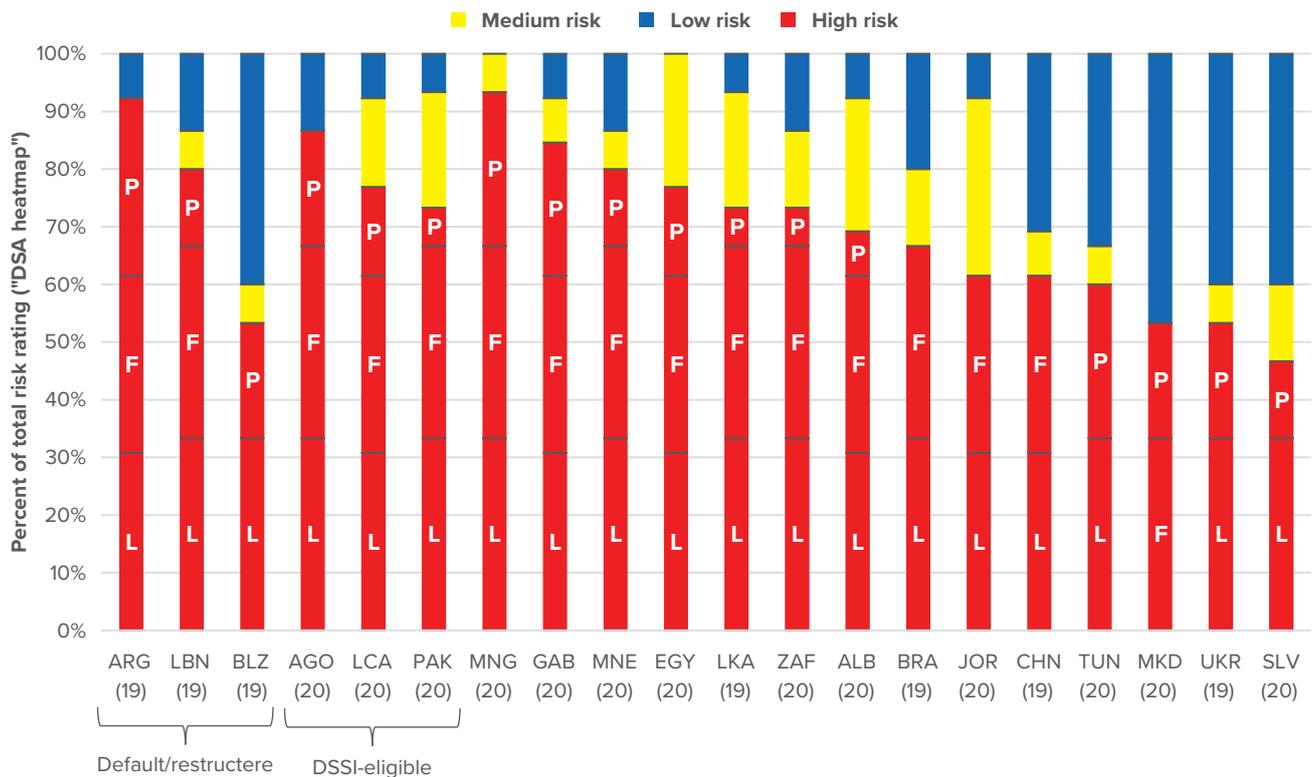
Debt Level	Real GDP Growth Shock	Primary Balance Shock	Real Interest Rate Shock	Exchange Rate Shock	Contingent Liability Shock
Gross Financing Needs	Real GDP Growth Shock	Primary Balance Shock	Real Interest Rate Shock	Exchange Rate Shock	Contingent Liability Shock
Debt Level	Real GDP Growth Shock	Primary Balance Shock	Real Interest Rate Shock	Exchange Rate Shock	Contingent Liability Shock

³³<https://www.imf.org/external/pubs/ft/dsa/mac.htm>

Gross Financing Needs	Real GDP Growth Shock	Primary Balance Shock	Real Interest Rate Shock	Exchange Rate Shock	Contingent Liability Shock
Debt Profile	Market Perception	External Financing Requirements	Change in Share of Short-Term Debt	Public Debt Held by Non-Residents	Foreign Currency Debt

To give the reader an idea of what the heatmap looks like across MAC-DSAs we summarized the heatmaps from fifty-three developing countries with a MAC-DSA from either 2019 (20) or 2020 (33). We ranked countries according to the percentage of their overall heatmap rated high risk; Figure A.1 shows the top-20 countries. The red high-risk column is further separated into L, F and P where L is the proportion of the high risk-rating coming from the debt level, F the gross financing need, and P the debt profile.

Figure A.1: The 20 most debt-distressed MACs – based on (latest) DSA risk heatmaps



Source: Own calculations based on countries with a DSA from either 2019 (20) or 2020 (33).
 Note: *Countries that have defaulted this year as per S&P sovereign ratings. Each column represents each risk level's (low, medium, high) share of the 15-entries heat map matrix. The high-risk level is further divided into the proportion of high risk coming from shocks to the debt profile (P), gross financing need (F) and debt level (L). Contingent liability shocks are included for countries that have them as part of the DSA.

Annex B. Summary table – 72 vulnerable countries

Table A.6 below summarizes the results of the debt vulnerability analysis for all 72 identified vulnerable countries. Indicators and values are as described in section 2.3 in the main text.

Table A.6: 72 vulnerable countries – summary

COUNTRY	REGION	INCOME	DSSI/CF	RATING CATEGORY	L. BREACH	PRIVATE SHARE	TDS GROWTH	S. BREACH
Venezuela, RB	LAC	UMIC	No	D. curr/imm.	..	87.7	0.1	..
Argentina	LAC	UMIC	No	D. curr/imm.	..	77.1	-12.8	..
Lebanon	MENA	UMIC	No	D. curr/imm.	..	91.0	-5.9	..
Somalia	SSA	LIC	Yes	D. curr/imm.	..	0.0	-3.6	..
Zambia	SSA	LMIC	Yes	D. curr/imm.	37.0	56.9	40.3	84.6
Belize	LAC	UMIC	No	D. curr/imm.	7.7	42.1	5.6	62.3
Ecuador	LAC	UMIC	No	D. curr/imm.		43.5	35.3	
São Tomé and Príncipe	SSA	LMIC	Yes	D. curr/imm.		29.5	6.9	11.7
Grenada	LAC	UMIC	Yes	D. curr/imm.		28.8	-0.8	18.5
Zimbabwe	SSA	LMIC	No	D. curr/imm.	1.2	0.5	1.4	
Sudan	SSA	LIC	No	D. curr/imm.	4.1	0.0	-8.5	215.7
Sri Lanka	SA	LMIC	No	E. spec./S. risk	25.5	51.4	10.6	28.3
Angola	SSA	LMIC	Yes	E. spec./S. risk	38.6	47.7	-23.4	37.5
Lao PDR	EAP	LMIC	Yes	E. spec./S. risk	26.7	25.4	-6.1	35.7
Congo, Rep.	SSA	LMIC	Yes	E. spec./S. risk	5.8	1.4	-14.1	63.4
Mozambique	SSA	LIC	Yes	E. spec./S. risk	7.4	14.5	-0.5	88.5
Gabon	SSA	UMIC	No	E. spec./S. risk		47.5	-0.1	0.5
Mali	SSA	LIC	Yes	E. spec./S. risk		0.0	9.8	
Congo, Dem. Rep.	SSA	LIC	Yes	E. spec./S. risk		7.7	-3.5	
Mongolia	EAP	LMIC	Yes	High spec.	..	71.7	115.2	..
Pakistan	SA	LMIC	Yes	High spec.	..	22.1	-6.2	..
Ghana	SSA	LMIC	Yes	High spec.	13.0	53.4	-25.6	19.7
Maldives	SA	UMIC	Yes	High spec.	24.9	29.9	56.0	84.2
Djibouti	MENA	LMIC	Yes	High spec.	12.6	0.1	1.8	6.7
Mauritania	SSA	LMIC	Yes	High spec.	23.1	0.0	-6.1	10.9
Tunisia	MENA	LMIC	No	High spec.	8.9	41.2	-32.7	16.2
Jamaica	LAC	UMIC	No	High spec.		55.3	25.2	22.4
Egypt, Arab Rep.	MENA	LMIC	No	High spec.		47.5	3.3	20.6
Jordan	MENA	UMIC	No	High spec.		69.4	5.9	18.8
Ethiopia	SSA	LIC	Yes	High spec.	3.5	50.0	4.1	3.5
El Salvador	LAC	LMIC	No	High spec.		40.6	-0.9	22.5
Montenegro	ECA	UMIC	No	High spec.	1.8	59.4	-43.4	18.1
Costa Rica	LAC	UMIC	No	High spec.	0.4	78.4	-52.9	4.8
Nigeria	SSA	LMIC	Yes	High spec.		57.0	-4.2	
Papua New Guinea	EAP	LMIC	Yes	High spec.		56.4	-34.2	
Turkey	ECA	UMIC	No	High spec.		79.6	-13.6	
Ukraine	ECA	LMIC	No	High spec.		78.3	-5.0	
Cabo Verde	SSA	LMIC	Yes	High spec.		25.6	11.3	67.6

COUNTRY	REGION	INCOME	DSSI/CF	RATING CATEGORY	L. BREACH	PRIVATE SHARE	TDS GROWTH	S. BREACH
Benin	SSA	LMIC	Yes	High spec.		36.2	12.9	
Rwanda	SSA	LIC	Yes	High spec.		20.4	13.2	
Kenya	SSA	LMIC	Yes	High spec.		27.7	3.9	0.5
Albania	ECA	UMIC	No	High spec.		35.3	-15.9	13.2
Tanzania	SSA	LMIC	Yes	High spec.		39.1	-4.5	
Bolivia	LAC	LMIC	No	High spec.		11.9	66.0	
Kyrgyz Republic	ECA	LMIC	Yes	High spec.		0.0	15.6	
Cambodia	EAP	LMIC	Yes	High spec.		0.0	10.0	
Niger	SSA	LIC	Yes	High spec.		0.0	17.6	
Nicaragua	LAC	LMIC	Yes	High spec.		0.9	25.1	
Uganda	SSA	LIC	Yes	High spec.		5.6	15.4	
Burundi	SSA	LIC	Yes	High spec.		0.0	6.2	33.9
Sierra Leone	SSA	LIC	Yes	High spec.		0.0	8.0	23.5
St. Vincent and the Grena	LAC	UMIC	Yes	High spec.		4.0	2.1	34.7
Burkina Faso	SSA	LIC	Yes	High spec.		0.9	9.1	
Belarus	ECA	UMIC	No	High spec.		4.6	0.3	
Central African Republic	SSA	LIC	Yes	High spec.		4.8	8.2	9.0
Honduras	LAC	LMIC	Yes	High spec.		19.7	2.5	
Lesotho	SSA	LMIC	Yes	High spec.		0.3	9.4	
Solomon Islands	EAP	LMIC	Yes	High spec.		0.0	0.9	
Tajikistan	ECA	LIC	Yes	High spec.		12.6	5.1	
Uzbekistan	ECA	LMIC	Yes	High spec.		8.3	6.2	
Dominica	LAC	UMIC	Yes	High spec.		19.8	-0.7	34.0
Gambia, The	SSA	LIC	Yes	High spec.		0.0	-0.6	22.0
Togo	SSA	LIC	Yes	High spec.		3.3	-3.6	16.1
Afghanistan	SA	LIC	Yes	High spec.	0.0	0.0	-2.3	
Bosnia and Herzegovina	ECA	UMIC	No	High spec.		14.4	-9.6	
Cameroon	SSA	LMIC	Yes	High spec.	3.8	18.6	-0.6	
Haiti	LAC	LIC	Yes	High spec.		3.3	-1.0	
Moldova	ECA	LMIC	Yes	High spec.		1.2	-3.2	
Eswatini	SSA	LMIC	No	High spec.		2.7	-0.4	
Chad	SSA	LIC	Yes	High spec.		0.0	-4.3	9.4
Tonga	EAP	UMIC	Yes	High spec.		0.0	-1.9	
Samoa	EAP	UMIC	Yes	High spec.		0.0	-1.4	

Annex C. Debt dynamics example – Sri Lanka

We use the WEO October forecast for Sri Lanka as the baseline, cf. Table A.8 for details. Here, debt in Sri Lanka is expected to have peaked last year at 98.3% of GDP and will by 2025 have fallen to 96.6%. A closer look at the IMF data reveals that the main assumptions behind the stabilization are; (i) a significant pick-up in real growth post-2020/COVID compared to the country's recent pre-COVID growth performance, and (ii) a significant slowdown in future exchange rate depreciation. These two effects are so large that debt stabilizes despite an expected primary balance deficit in all years 2020-2025.

For our two 'stress-tests' we look at how sensitive solvency debt dynamics (debt as a percentage of GDP) are in three scenarios:

Scenario A – “Return to pre-COVID growth performance”: Real growth returns to recent average pre-COVID (2017-2019) performance from 2021 of 3.1% per annum.

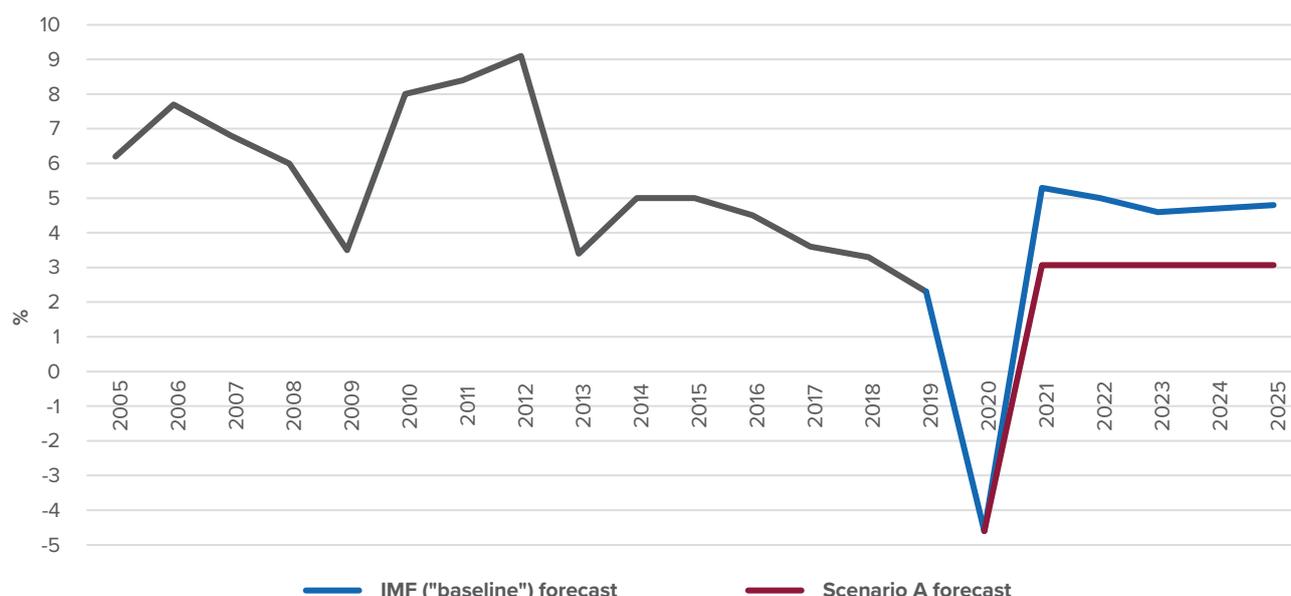
Scenario B – “Tightening of credit conditions”: Credit conditions tighten, represented by an assumed 300 basis points stepwise increase in both the foreign and domestic interest rate on general government debt from 2020-2025.

Scenario C – “Slow growth and tight credit conditions”: Scenarios A and B combined.

Scenario A – Growth returns to pre-COVID performance

Sri Lanka's real GDP growth had been trending downwards years before COVID, cf. Figure A.2. After taking a hit of -4.6% in 2020, the IMF expects a strong rebound growth of 5.3% in 2021 and that growth will remain close to 5% per annum until the end of their forecast horizon, i.e., the year 2025 (blue line). The last time Sri Lanka grew at 5% was in 2015, and growth in 2019 was only 2.3%. The annualized growth rate in the three years prior to COVID (2017-2019) was only 3.1%. We assume in scenario A that Sri Lanka will return to its recent 'pre-COVID growth trajectory' of 3.1% real growth per annum in the period 2021-2025 (red line), and that annual inflation will be 5%.

Figure A.2: Real GDP growth - Sri Lanka



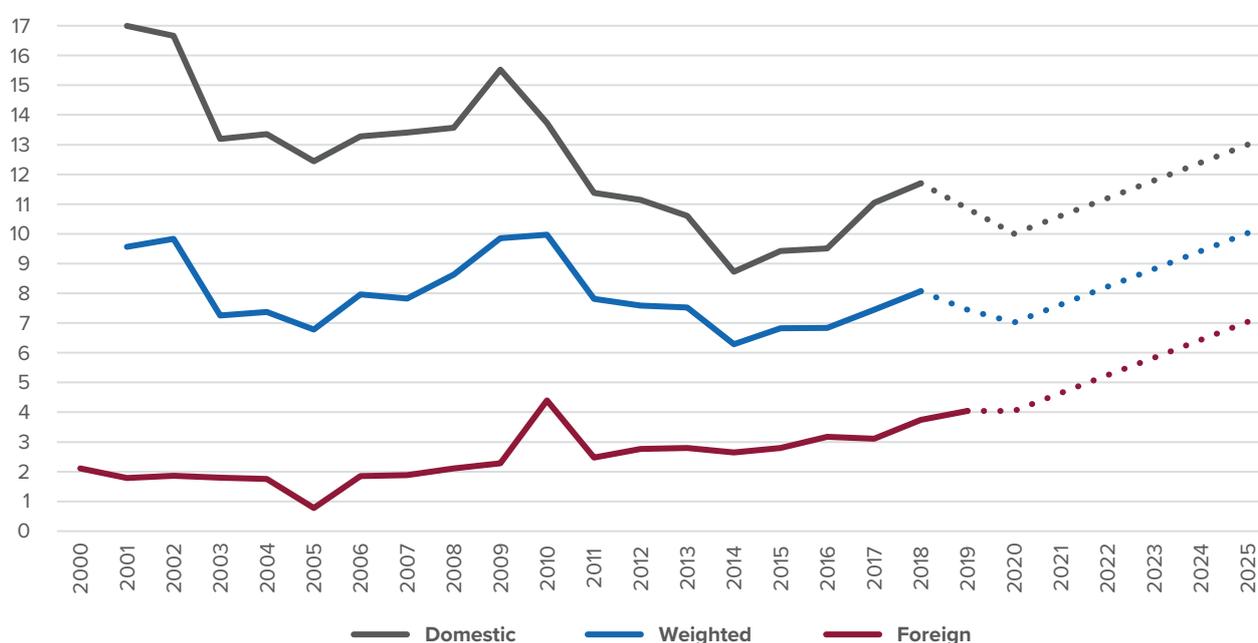
Source: IMF WEO October 2020 and own calculations.

Scenario B – Tightening of credit conditions

About 50% of total public debt in Sri Lanka is denominated in foreign currency (IMF 2018). The country has had one of the fastest transformations of its external PPG debt composition. From 2005 until today the share of private creditors in total external government debt has gone from about 6% to 50%, and about 85% of external debt owed to private creditors is now issued in bonds. Consequently, the interest rate on external debt has been drifting upwards since the mid-2000s, as shown in Figure A.3 (red line).

In scenario B we assume that a tightening of credit conditions / loss of investor confidence, starting in 2021, gradually pushes up the interest rate on general government debt by a total of 300 basis-points over the period 2021-2025. This would in 2025 leave the foreign interest rate at 7%, the domestic interest rate at 13% and the total weighted interest rate at 10%, cf. Figure A.3. Details on how we estimate the interest rates can be found below.

Figure A.3: Sri Lanka – interest rates



Source: Own calculations based on GFS, IMF WEO October 2020 and IDS 2021.

Note: Foreign interest rate is estimated as period t interest payments divided by period $t-1$ debt stock. The domestic interest rate is estimated using this and several other series as described in this Annex.

Results

Results are summarized in Figure 10 in the main text. Under scenarios A and B, the debt ratio will grow and in 2025 reach between 104-105% of GDP compared to a baseline value of 96%. Under scenario C, debt will reach 112% in 2025. The debt-stabilizing primary balance will have reached a surplus of little less than 3% of GDP by 2025.

Debt-dynamic equations

Debt dynamics under the three scenarios are studied using the debt-dynamics equations (1) and (2) below where d is debt, pb is the primary balance, and all are expressed as a percentage of GDP. i_d is the domestic nominal interest rate, i_f is the foreign nominal interest rate and i_w is the weighted interest rate as by the share of foreign debt α . Real GDP growth is g , inflation is π , nominal exchange rate depreciation (local currency per foreign currency) is ε .

Equation (1) is the debt-law-of-motion linking debt in period t-1 to period t.

$$(1) \quad d_t = \frac{(1+i_t^w) + \alpha_{t-1} * \varepsilon_t * (1+i_t^f)}{(1+g_t) * (1+\pi_t)} * d_{t-1} - pb_t$$

Subtracting period t-1 debt-to-GDP on both sides of (1) and rearranging allows us to express the year-on-year change in debt-to-GDP as a function of changes to the real interest rate, real growth, nominal exchange rate and primary balance, as in (2).

$$(2) \quad \Delta d_t = \underbrace{\left(\frac{i_t^w - \pi_t * (1+g_t)}{(1+g_t) * (1+\pi_t)} \right)}_{\text{Real interest rate}} * d_{t-1} + \underbrace{\left(\frac{g_t}{(1+g_t) * (1+\pi_t)} \right)}_{\text{Real growth rate}} * d_{t-1} + \underbrace{\left(\frac{\varepsilon_t * \alpha_{t-1} * (1+i_t^f)}{(1+g_t) * (1+\pi_t)} \right)}_{\text{Nomn. exch. rate}} * d_{t-1} - pb_t$$

Setting the change in debt equal to zero on the LHS of (2) and isolating for the primary balance, pb, gives the debt stabilizing primary balance, pb*, shown in (3). In other words, the primary balance needed to keep the debt to GDP ratio constant.

$$(3) \quad pb^* = \frac{i_t^w - \pi_t * (1+g_t) - g_t + \alpha_{t-1} * \varepsilon_t * (1+i_t^f)}{(1+g_t) * (1+\pi_t)} * d_{t-1}$$

Estimates for the missing variables used in the debt dynamic equations

We estimate three missing variables needed for the debt dynamic equations listed above: The stock of domestic/local-currency denominated debt (D_d); the interest rate on external/foreign-currency denominated debt (i_f); and, the interest on domestic/local-currency denominated debt (i_d). Table A.7 lists the three variables (grey-shaded) and the variables used to produce the estimates. Equations (4) to (6.3) below show the calculations.

Table A.7. Missing variables and variables used for estimation of variables

VARIABLE	DESCRIPTION	UNIT	SOURCE
GDP	Gross domestic product	Local currency units (LCU)	WEO Oct 2020
D_tot	Stock of total gross public debt	LCU	WEO Oct 2020
D_f	Stock of external general government (GG) debt	USD	IDS 2021
e	Nominal exchange rate	LCU per USD	WEO Oct 2020
INT_tot	Total interest payments on total public debt	LCU	GFS*
INT_f	Total interest payments on foreign GG debt	USD	IDS 2021
D_d	Stock of domestic public debt	LCU	Estimated
i_f	Interest rate on foreign GG debt	%	Estimated
i_d	Interest rate on domestic debt	%	Estimated

Note: *IMF's Government Finance Statistics database.

Domestic debt expressed in local currency, D_d is calculated as in (4) where D_{tot} is total gross government debt in local currency taken from WEO, e is the exchange rate (LCU per USD) and D_f is foreign currency denominated debt.³⁴ As an estimate for D_f we use external general government debt as reported in IDS 2021.³⁵

$$(4) \quad D_t^d = D_t^{tot} - D_t^f * e_t$$

The interest rate on GG foreign debt, i_f , is estimated as period t total GG interest payments on foreign debt, INT_f , divided by period $t-1$ total GG foreign debt stock, D_f , as in (5). Again, we use as an estimate for INT_f interest payments on external GG debt from IDS 2021.

$$(5) \quad i_t^f = \frac{INT_t^f}{D_{t-1}^f}$$

The interest rate on domestic debt, i_d , is estimated using equation (6) below.

$$(6) \quad i_t^d = \frac{INT_t^{tot} - i_t^f * D_{t-1}^f * e_t}{D_{t-1}^{tot} - D_{t-1}^f * e_{t-1}}$$

Equation (6) is derived as follows, starting from total interest payments denominated in local currency, INT_{tot} , as in (6.1).

$$(6.1) \quad INT_t^{tot} = INT_t^d + INT_t^f * e_t$$

Where each interest rate component can be estimated as the interest rate in period t multiplied by period $t-1$ debt stock as in (6.2).

$$(6.2) \quad INT_t^d = i_t^d * D_{t-1}^d \quad \& \quad INT_t^f = i_t^f * D_{t-1}^f$$

Substituting (6.2) into (6.1) and isolating for the domestic interest rate gives (6.3)

$$(6.3) \quad i_t^d = \frac{INT_t^{tot} - i_t^f * D_{t-1}^f * e_t}{D_{t-1}^d}$$

Where the denominator is total domestic debt in period $t-1$, which can be written as in (4) which then gives equation (6) stated above.

³⁴The exchange rate used is USD-denominated GDP divided by local currency GDP, both from WEO.

³⁵For Sri Lanka, external and foreign-currency-denominated public debt should be very similar. In IDS 2021, one cannot see exactly how much external debt is issued in domestic currency. But one can see that for Sri Lanka at least 95% is issued in foreign currency, of which 78.3 pp is in USD.

Baseline data

The baseline data for Sri Lanka is listed in the table below. Yellow shadings are based on IMF WEO October 2020. Share of domestic (foreign) debt is a (1-a) and the rest of the variables as stated above. Beyond 2025 (IMF's last forecast year) it is assumed that yearly exchange rate depreciation (LCU per USD) is constant at 2.4%, real growth 4.8% (same value as 2025), inflation 5% (the current target rate) and the primary balance a deficit of 0.5 percentage points. The domestic interest rate, i_d , is set at 10% in 2020 (and beyond). This value is chosen for two reasons. It is within the range of the historical domestic interest rate as estimated using equation (6) above, and it ensures that the 2020 debt (as a percentage of GDP) value matches the IMF 2020 forecast value.

Table A.8. Sri Lanka – baseline scenario data

YEAR	D	I_W	A	1-A	E	I_F	I_D	G	INFLATION	PB
2019	86.78	-	50	50	-	-	-	-	-	-
2020	98.26	7.02	50	50	3.47	4.04	10.00	-4.55	4.50	-3.21
2021	98.29	7.10	50	50	3.14	4.19	10.00	5.27	4.80	-1.46
2022	97.81	7.17	50	50	2.48	4.34	10.00	4.96	5.00	-1.07
2023	97.55	7.25	50	50	2.46	4.49	10.00	4.65	5.00	-0.94
2024	97.07	7.32	50	50	2.41	4.64	10.00	4.66	5.00	-0.68
2025	96.31	7.40	50	50	2.36	4.79	10.00	4.79	5.00	-0.47
2026	95.68	7.47	50	50	2.40	4.94	10.00	4.79	5.00	-0.50
2027	95.12	7.55	50	50	2.40	5.09	10.00	4.79	5.00	-0.50
2028	94.63	7.62	50	50	2.40	5.24	10.00	4.79	5.00	-0.50
2029	94.22	7.70	50	50	2.40	5.39	10.00	4.79	5.00	-0.50
2030	93.87	7.77	50	50	2.40	5.54	10.00	4.79	5.00	-0.50

