



THE COMING DEBT CRISIS

MONITORING LIQUIDITY AND
SOLVENCY RISKS

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Acknowledgement

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Executive Summary

External public debt risks in developing countries are on the rise and have been for several years. Higher debt stocks, debt service and assessed risks by international institutions have led to intensified calls to strengthen debt restructuring initiatives. This project's ambition, of which this paper is the first of a series, is to provide a global snapshot of the debt situation in developing countries. It does so by applying a simple Debt Sustainability Analysis to 113 Low- and Middle-Income Countries. The model will be updated when new data is released, and the full dataset made public in early 2023. It will be progressively enriched, integrating more metrics, more scenarios and feedback loops. We also look forward to receiving advice from readers on next steps.

The main findings from the current version show that while debt stocks remain relatively low, current costs of funding make debt service hard to sustain, with an expected peak in 2024-25. We find that under a conservative scenario, where financial conditions return to their 2015-19 average with lower interest rates and a stable exchange rate, those tensions would be manageable for most (the median country would pay 10% of its government revenues in external debt service, against 8% in 2019). However, a significant minority of countries (about 28) reach 18% in 2025, which is about the combined health and education budgets for the average country. The number of countries crossing risk thresholds also rises moderately, peaking at 28 in 2024, from 22 in 2020.

However, when accounting for higher real interest rates and the appreciation of the US dollar, debt service rapidly rises to levels that would require high external financing flows. 35 countries would cross debt service risk thresholds (against 22 currently), and would double in Sub-Saharan Africa, from 10 to 18. Lower Middle-Income Countries are especially vulnerable: their median debt service to revenues rises to 15% from 10% in 2020. Their exposure to commercial debt markets makes them especially vulnerable to the ongoing funding shock.

Countries with high and growing external debt stock problems tend to be small upper middle-income economies. For most countries, under current assumptions of growth and control of fiscal deficits, debt stocks tend to decline from their 2020 levels. 23 countries breach external debt stock risk thresholds as defined for the IMF, but mostly in 2022-23, with an expected decline. Countries with debt stocks above thresholds tend to be upper middle income economies, with higher prevalence of small islands than in the case of countries with debt service breaches.

Can developing economies sustain this prospective fast rise in debt service and associated financing needs? Bond issuances have largely played this role in the 2010s. However, in 2022, a large number of previous issuers have not been able to return on markets. How could emerging and developing countries replace this large source of finance for their economies? In 2022-26, we estimate that financing needs could represent USD2.5 trillion across all emerging and

developing countries, including USD300 billion for countries eligible to the IMF Poverty Reduction and Growth Trust (PRGT), and USD340 billion for Sub-Saharan countries. Those are large sums, which could trigger major debt crises. It is therefore essential to reduce the cost of debt and enhance the resilience to shocks.

The main goal of this paper is to present the model and establish key findings, which are hinting at policy challenges – to be discussed in future publications. The range of policy options available for developing countries remains limited, and include: fiscal consolidation, increased reliance on domestic, enhanced access to concessional financing (including grants), and debt restructuring. Each have their benefits and costs, which we discuss in the conclusion. However, more remains to be done, notably at the global level, and this would be precisely discussed in upcoming publications.

Table of Contents

Acknowledgement	2
Executive Summary	3
1. Introduction	6
2. Debt has become increasingly risky	9
2.1. Increasing debt levels, since the 2000s	9
2.2. A shifting structure of external public debt	10
2.3. Moderate GDP growth and decline in fiscal deficits	12
3. Mapping out debt vulnerabilities	14
3.1. The big picture: increasing debt service levels	14
3.1.1. A sustained increase in debt service, especially commercial	14
3.1.2. The median story: an increasing debt service burden	17
3.2. From levels to risks: are countries crossing risk thresholds?	19
3.2.1. Risks metrics and thresholds	19
3.2.2. Liquidity risks: a growing number of countries in “risky” territory	20
3.2.3. Solvency risks: debt stocks are projected to decline until 2026	22
3.2.4. Cumulated risks: liquidity and solvency	24
4. Stress-testing the outlook	27
4.1. Higher interest rates and exchange rate depreciation	27
4.2. An overall increase in external debt vulnerabilities	29
4.3. Total amounts of debt at risk well beyond the magnitude of global safety nets	31
5. Discussing the results	34
Conclusion: Debt in developing countries has become too expensive and risky	36
References	37
Appendix 1 – List of countries included in the analysis	38
Appendix 2 – Debt sustainability assumptions	40

1. Introduction

External debt sustainability risks for developing countries have increased for a few years, but have become more acute since the Russian invasion of Ukraine. Since the 2010s, public debt levels have been rising on the back of large investment needs, stagnating domestic revenue mobilisation and within a global context of low interest rates. China's emergence as a major lender to lower income countries has also played a role. More recently, the COVID-19 crisis exacerbated these vulnerabilities.

In 2020, as the financial consequences of the COVID-19 crises were materializing, a global debt crisis for emerging markets was widely expected. Those fears, however, proved to be exaggerated. In 2020, many central banks, both in advanced and in emerging economies, put aggressive quantitative easing in place. This kind of coordinated action tamed capital outflows in emerging markets. For other countries, rapid loans from the IMF and Multilateral Development Banks (MDBs) allowed governments to partially weather the crisis. The Debt Service Suspension Initiative (DSSI) was quantitatively smaller, but proved helpful for countries with large exposure to bilateral lenders. Having ended in December 2021, the debt service that had been deferred now must be paid back.

The situation has changed with the acceleration of inflation in developed economies. The US Federal Reserve and the ECB have embarked on a large tightening cycle, which might continue well into 2023. The impacts of rising real interest rates are reverberating through the developing world today, which bears an increasing risk premium; all but three African countries with outstanding bonds face yields above 10%. High borrowing costs, coinciding with high financing needs, could in turn lead to exploding dynamics. Governments as well as international institutions and civil society have been sounding the alarm in response, especially in the context of slow progress on a global framework for debt restructuring.

This paper aims to put concrete numbers to two questions: how worried should we be for debt sustainability in developing countries, and at what horizon? We forecast external public debt service dynamics and illustrate the increasing pressure of debt in developing economies. While domestic debt is an important consideration, we focus on the external aspects of government (Public and Publically Guaranteed, or PPG) debt. There are several reasons for this. First, we place an emphasis on the *external* debt service, which can be particularly challenging for developing sovereigns, as it does not only depend on the country's budget performance (fiscal constraint) but also on its access to foreign currency (external constraint). Second, rich information (while often incomplete) allows us to better model future flows of public debt. Third, debt restructuring can be better predicted by external public debt variables over domestic variables (IMF 2021a).

Our exercise is intended as a simple external DSA-lite for 113 countries. By providing aggregate results in terms of future debt stock and debt service, we are able to compare country dynamics.

This generality carries a cost in terms of precision. Debt Sustainability Analyses (DSAs) are tailored for each country, and their parameters (debt perimeter, accounting of arrears, treatment of contingent liabilities, refinancing assumptions, etc.) can differ substantially. By grouping together all developing countries (except for China, Russia and a few countries with missing data¹) and simplifying assumptions to the extreme, such richness is lost². What we gain in exchange are answers to questions at global level, as well as heatmaps for specific regions or income groups.

To our knowledge, this is the first exploration of its kind. Others have used future debt service to stay alert to rising risks for developing countries. More recently, the V20 (2022) computed debt stocks and debt service owed to various creditor groups, and Jensen (2021) compared key debt sustainability ratios with thresholds as defined by the IMF. Like us, they rely on the World Bank's International Debt Statistics (IDS³). However, debt service data in IDS is static in the sense that only existing signed debt contracts are used, and not the new debt rolled over or raised to finance ongoing deficits. By adding a set of simple assumptions, we are able to more accurately model the risks ahead. In this sense, our model is closer to estimates from the IMF (2021b) on post-COVID-19 financing needs of Poverty Reduction and Growth Trust (PRGT)-eligible countries. This report had found a gap of USD450 billion in total external funding needs between 2021 and 2025, including USD50 billion for government finance, both in debt refinancing and new deficits.

This dynamic model also allows us to run simple "shock scenarios." Under the baseline, countries can issue debt at similar conditions as in the 2015-19 period. Under our "shock" scenario, each country suffers a 400 basis points increase in its commercial borrowing rate, and 10% depreciation of its exchange rate. Our main result finds that if such conditions were to hold, a significant liquidity crisis would quickly turn into a widespread solvency crisis.

Our results point to a rising burden of external debt service, especially in 2024-25. Bonds tend to have a "wall" shape, with principal repaid at maturity in one or several installments. Loans, meanwhile, whether commercial or official, tend to be amortized over the course of the repayment period. As a result, some countries face "walls" that are essentially liquidity alarms but which could potentially lead to distress. Other countries, often with more limited access to markets, see a permanent increase in their debt service and more difficult refinancing conditions. However, debt stocks remain low, especially when considering the present value, i.e., taking into account the concessional nature of debt for lower income countries.

¹ We exclude China because its size would overwhelm any aggregate figures, and its dynamics are different from all other developing countries; Russia because some datapoints in IDS are hard to reconcile with other sources; and 13 small developing countries owing to a lack of data in the IMF WEO and/or in the WB Database (*see Appendix 1*)

² In some cases, of course, much more granularity is required, as we will illustrate in future work

³ We rely on the 2020 version of the database, whereas much has happened in the past two years. We integrate some evolutions (in particular, the DSSI), but not all. The results will be updated with the new IDS vintage in December 2022.

Alleviating those risks will require reforming the international financial architecture across several dimensions. Several options are available for countries under debt pressure. First, countries can seek to reduce their fiscal deficits, which is a demanding strategy as it can depress growth and reduce social welfare. They can also revisit their financing strategy and gear it towards domestic funding sources, which however tend to be limited and relatively expensive, especially in lower income countries. On the external front, another option is to secure additional funding from official creditors who typically lend under concessional terms. Last but not least, countries can seek to renegotiate their external debt obligations – that is, a sovereign debt restructuring. In practice, a combination of these four options will be likely used. And the latter two – official funding and debt restructuring – will entail additional support from both multilateral and bilateral creditors.

We hope that the contributions of the model will go beyond this paper: the model will be updated with new macroeconomic projections, and be progressively enriched. More metrics of sustainability and tailored scenarios will be added. We expect to share the results and a full database by early-2023 on our website. We hope that this public good will allow academics, policymakers and civil society organizations alike to project external debt service and map out potential financing risks under their own chosen assumptions.

The paper is organized in four parts. First, we set the scene by describing past trends in the public debt of developing countries. These are well-known facts: debt stocks have increased, and their profile have become riskier, owing to shorter maturity and higher interest rates. This context provides the basis for our projections. In a second part, we describe the dynamics of external public debt stock and service, both in the aggregate and for different countries. As an indicator of risk, we rely on thresholds from the IMF-WB Debt Sustainability Framework for PRGT-eligible countries. We see these as an indicative tool, which illustrate that a rising number of countries are crossing the “high risk” threshold. Beyond the thresholds used, the primary substantive finding is that the entire distribution is shifting: the share of debt service in government budgets almost doubles for the median country between 2015 and 2025. The third section stress tests the results under less conservative macroeconomic assumptions and discusses a menu of policy options which range from extending maturities to sizing up the global financial safety nets (including Multilateral Development Banks). The fourth and last section discusses the key limits of the proposed methodological approach.

2. Debt has become increasingly risky

This section highlights the most recent debt and macro-fiscal trends across developing economies and outlines the implications for our forecasting exercise.

Concerns about increasing public debt levels in developing countries are not new. After a rapid fall in the 2000s due to the Highly Indebted Poor Countries (HIPC) initiative and the Multilateral Debt Relief Initiative (MDRI), public debt stocks rebounded in the 2010s. This “fourth wave” of debt (Kose et al. 2021) threatens to become a tsunami, built on supply factors (e.g., growing bond markets with appetite for yields and risk, increasing bilateral finance from China) and demand for investment in infrastructure.

Starting around 2016, multilateral institutions were increasingly sounding the alarm. In 2019, the World Bank reformed its sustainable lending policies and, in a joint paper with the IMF, illustrated the dangerous dynamics of increasing debt stocks and debt service. Countries with reduced access to concessional borrowing were considered especially vulnerable. Indeed, more than the stock, debt service is becoming concerning, as interest rates have increased and maturities have shortened slightly, reflecting a shift from official to commercial creditors (IMF-WB 2018, Calderon and Zeufack 2019, Essl et al. 2019).

The COVID-19 crisis upended economic dynamics, causing major shocks to growth, exports, and fiscal revenues. While the recovery was forecasted to be lower for developing countries, the risks of divergence have grown starker with the Russian invasion of Ukraine and the tightening of interest rates by central banks in advanced economies. These factors have made public debt riskier - but at what horizon? In this section, we review the main trends and forecasts, which also provide the building blocks for our modelling exercise.

2.1. Increasing debt levels, since the 2000s

Debt levels have rapidly increased since 2010: the median Low-Income Country saw its public debt-to-GDP ratio rise from 31% to 49% in 2019⁴. Median levels of debt-to-GDP ratio were similar for other income groups in 2019. During the COVID-19 crisis, Upper Middle-Income Countries (UMICs), which were able to use stimulus policies, saw larger increases of their debt-to-GDP ratios. Behind those median figures, however, lies significant heterogeneity: in 2019, of 54 LMICs countries, 13 had debt-to-GDP ratios above 70%. In the median developing country, about half of this debt was found to be external (as defined by the World Bank, see Appendix for our data sources and their interpretation), reflecting the much larger role of domestic public debt.

⁴ Many countries experienced severe contractions due to COVID-19 in 2020, making debt to GDP ratio “jump” to high levels. Since this section reviews longer term trends, we use 2019 figures.

At the same time, the weight of debt service on external public debt has also increased, as a share of GDP. For all country groups, the median level doubled since 2010, reaching, respectively, 0.8%, 1.9% and 2.4% of GDP in 2019 for LICs, LMICs and UMICs. Since, as we have seen, median debt levels are similar across groups. The reason for differences in debt service burden essentially stem from differences in concessionality levels: UMICs tend to rely on market financing, and LICs overwhelmingly on official lenders.

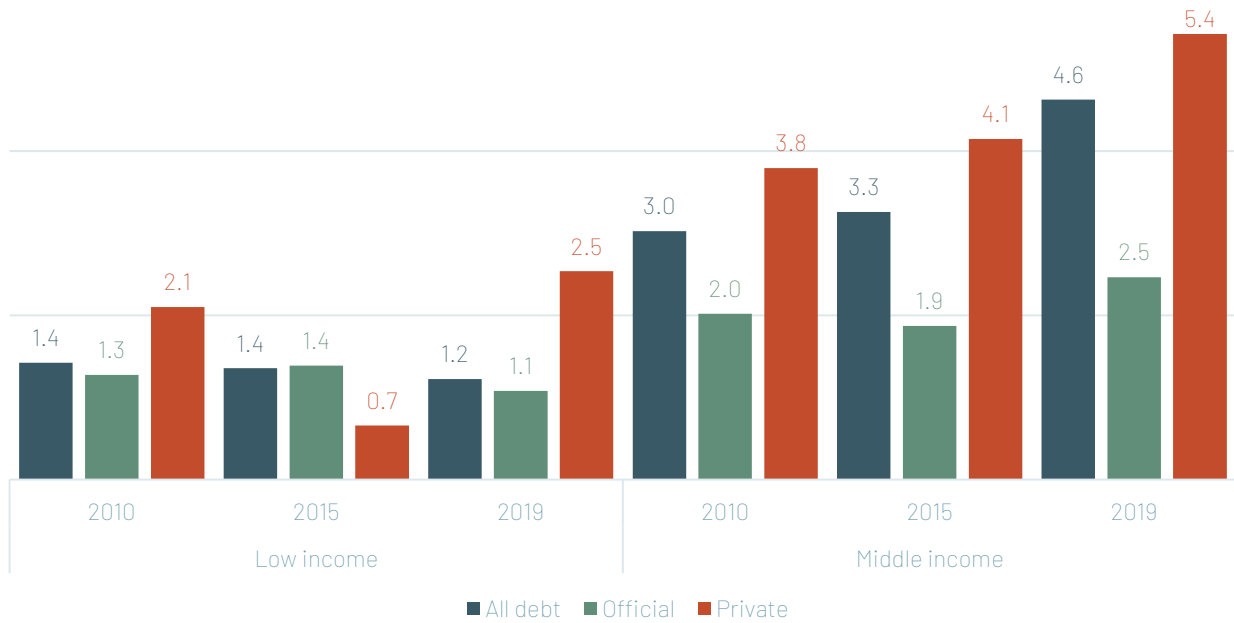
2.2. A shifting structure of external public debt

The *structure* of external public debt is another key building block to forecasting debt service. A country that essentially relies on debt lines with long maturities and low interest rates would have a greater capacity to service its debt, as its interest payments will be contained and its refinancing obligations pushed to the medium term. Conversely, public debt trajectory is riskier when maturities shorten and interest rates increase. It is therefore fruitful to map the recent evolution of these characteristics, before forecasting debt service obligations. We also rely on these historical characteristics to model future debt issuances, using the 2015-19 average (see appendix for more details).

The average interest rate on newly issued external debt was of about 2% over 2015-19, with increasing and volatile trends. LICs have been able to secure external debt at very low rates, averaging 1.3% over 2015-19. The cost of external funding of MICs was higher, averaging 4.5% in 2019. The combination of a low risk-free rate and a compressed risk spread explained sustained low private interest rates until the mid-2010s, after which these forces progressively loosened. Within categories, of course, there is a lot of heterogeneity. Morris et al. (2020) for instance show us that bilateral Chinese lending is more expensive than other official lenders, in particular multilateral⁵ lenders. In our forecasting exercise, we make the hypothesis that countries borrow from bilateral, multilateral and private creditors according to the historical 2015-19 shares, and with similar interest rates.

⁵ See also Mihalyi and Trebesch (2022) in the case of Africa

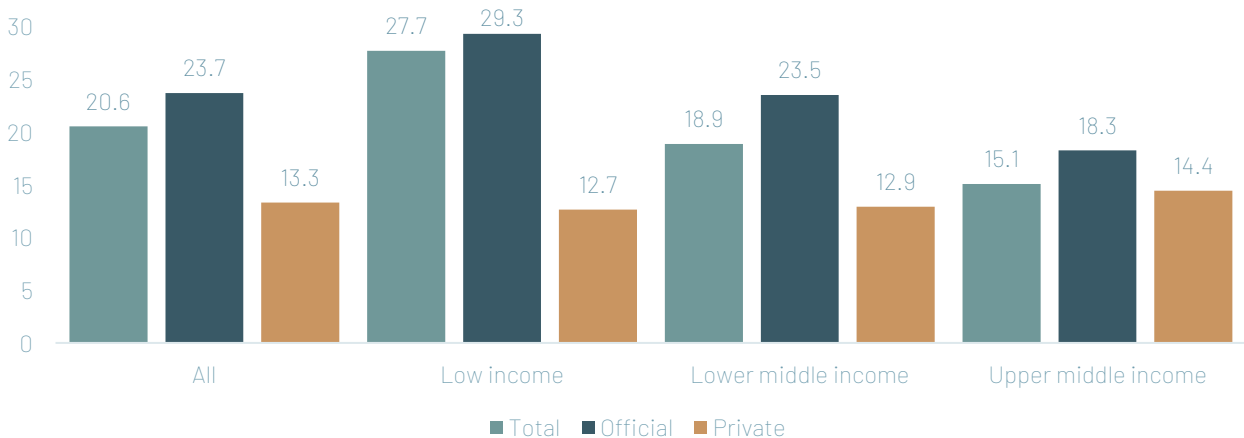
CHART 1: AVERAGE INTEREST RATE FOR NEW DEBT, 2015-19 (IN %)



SOURCES: WORLD BANK IDS(2021), FDL

On average, debt maturities have slightly shortened. Developing countries were able to borrow at an average maturity of 20.5 years prior to the COVID crisis. LICs on average borrowed at an even longer maturity of around 28 years, since they essentially rely on official lenders and secure debt lines at concessional terms. The average debt maturity was significantly lower for LMICs and UMICs, at respectively 19 and 15 years, as wealthier countries had more limited access to official sector debt. Across these different country levels, maturities have remained fairly constant since 2010, although they reflect different trends. The average private sector maturities increased, as markets were more confident, but at the same time funding shifted to commercial lenders who offer shorter maturities than official lenders.

CHART 2: AVERAGE MATURITY AT ISSUANCE, 2015-19 (IN YEARS)



SOURCES: WORLD BANK IDS(2021), FDL

2.3. Moderate GDP growth and decline in fiscal deficits

Modelling future debt service finally requires taking a stance on macroeconomic and fiscal trends, so as to quantify future funding needs and estimate the impact of potential shocks. The World Bank International Debt Statistics (IDS) provide information on debt service due on existing contracts, but additional information is needed to know how much new debt will be issued. We use a standard debt-stock equation to measure debt rolled-over, and IMF scenarios from the World Economic Outlook (April 2022) for all countries with data in IDS⁶. This provides us with an estimate of future primary fiscal deficits and economic growth. We also rely on historical data from IDS to calibrate countries' funding mix (i.e., share of domestic vs. external financing, and – for external financing – respective share of the different debt categories). We refer the reader to the appendix for details.

As projected by the IMF in April 2022, growth is expected to rebound sizeably and fiscal deficits to tighten. This is the case across all income levels, but especially for UMICs, which are expected to reach a zero primary deficit by 2026, on average. The trajectory of LICs and LMICs is “flatter,” as they had lesser leeway to stimulate the economy in 2020 during the COVID-19 crisis: in the 2023 to 2026 period, they are expected to reduce their primary deficit to about -1% of GDP on average.

CHART 3A: PROJECTED FISCAL DEFICITS, 2019-26 (IN % OF GDP)

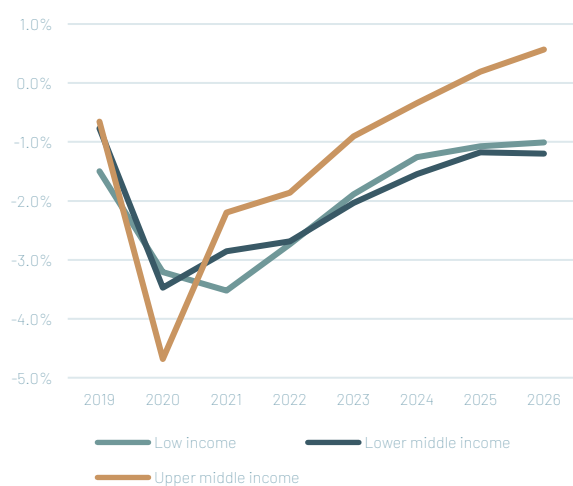
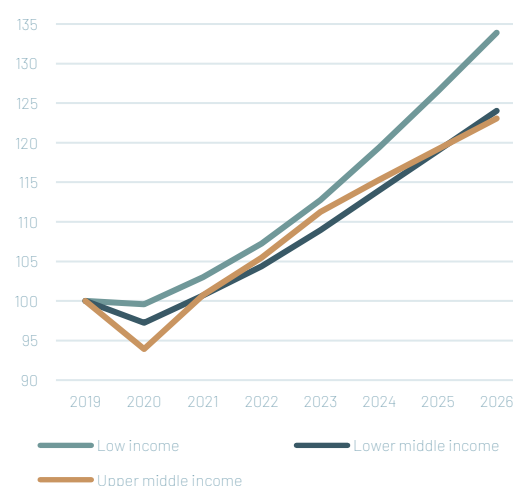


CHART 3B: PROJECTED REAL GDP, 2019-26 (REBASED AT 100 IN 2019)

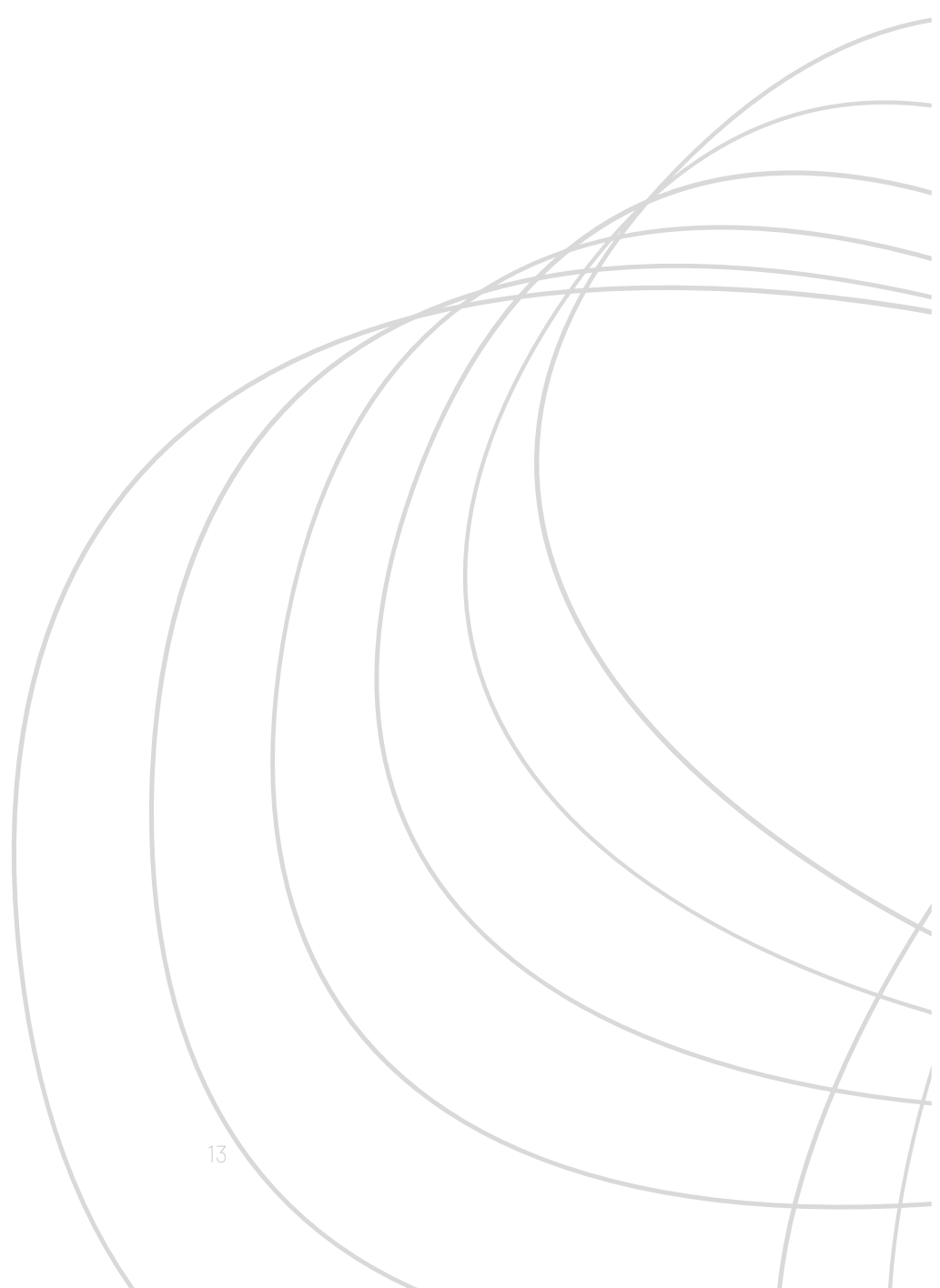


SOURCES: IMF WEO (APRIL 2022), FDI

By 2026, GDP is expected to be 25% to 30% above its 2019 level. Our estimates are based on the IMF's World Economic Outlook published only a couple of months after Russia's invasion of Ukraine. As a result, they do not reflect the negative impact of a protracted war and the aggressive tightening in advanced central banks. The paper will be accordingly updated with

⁶ WEO projections for October 2022 were made available only shortly before publication of this paper.

new projections, and could also accommodate shocks to GDP growth, although we do not attempt these variations in the current version. Overall, a rapid fiscal tightening and high real growth could confer an “optimism bias”, which will tend to make debt look more sustainable than it really is.



3. Mapping out debt vulnerabilities

This section builds on a coherent debt sustainability model, which combines the trends described above. It analyses the key results obtained, first in aggregate and then at individual country level, against the sustainability thresholds set by the IMF.

The proposed debt analysis relies on a dynamic approach, and comprehensively reflects debt service obligations on both existing and future debt lines. The forecasting exercise first assumes that existing external public debt will be repaid under the contractual terms, as informed by the World Bank database. It also includes the debt service on new debt lines, which are expected to be raised throughout the forecasting period. Indeed, new debt lines will be raised to finance ongoing fiscal deficits and to refinance debt payment (see Appendix for details). They are thus added to obtain a full picture of future debt service.

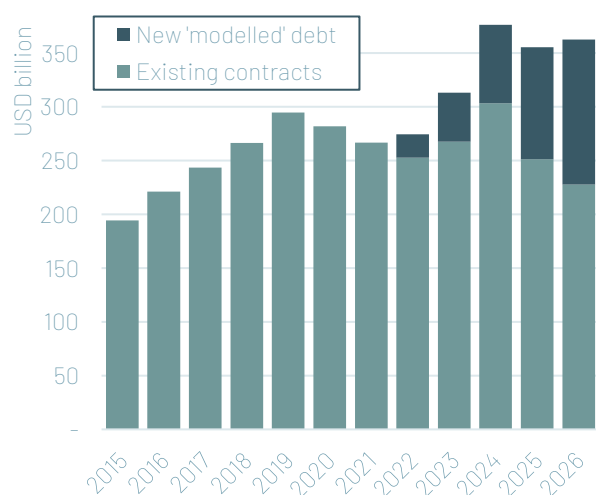
3.1. The big picture: increasing debt service levels

3.1.1. A sustained increase in debt service, especially commercial

Aggregate external gross financing needs in 2022-26 for developing countries amount to USD2.4 trillion. These are dynamically financed according to the share of each sector (multilateral, bilateral, and commercial), as reflected historically in 2015-19. We assume that the borrowing terms are those experienced on average during the same period. By 2026, in the aggregate, existing contracts indicate declining debt service back to its 2021 level. Taking into account debt dynamics shows that debt service will peak in 2024 (at USD377 billion), and only slightly decline until 2026 (at USD361 billion).

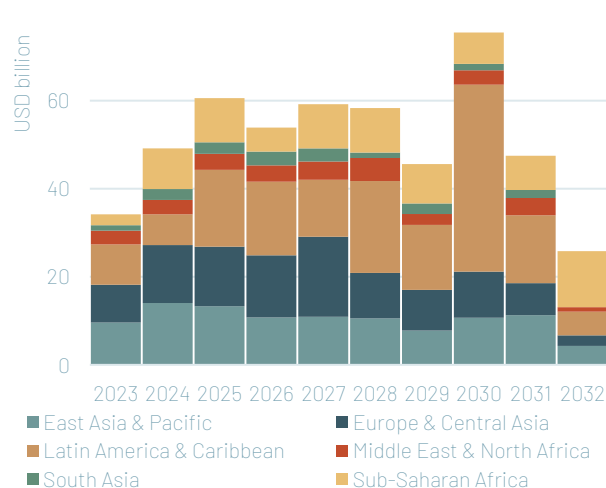
The model thus confirms the view that 2024 and 2025 will be challenging for developing countries due to the coming “debt walls”. It also provides some nuances. The increase in debt service is likely to be sustained beyond 2024, even though international bond redemptions plateau. This is due to new debt accumulated through borrowing for gross financing needs in 2021-23, both with commercial and official lenders. The 2024-25 increase, especially well documented for bonds (and in particular in Sub-Saharan Africa and Latin America), is likely to continue afterwards. Overall, those spikes will be especially significant for Sub-Saharan Africa (even excluding South Africa), with an increase in Eurobond redemptions from USD2.5 billion in 2019 to about USD9-10 billion in 2024 and 2025. For Latin America, 2025 is a pivotal year, with USD17.5 billion in Eurobond redemptions contrasted with USD9 billion in 2023.

CHART 4A: DEBT SERVICE FOR DEVELOPING COUNTRIES



SOURCE: FDL

CHART 4B: BOND REDEMPTIONS IN DEVELOPING COUNTRIES



SOURCE: CBONDS

How does it affect different country groups? Even at these highly aggregated levels, strong differences will affect income levels. UMICs, under current dynamics, will see a slight decrease in their aggregate debt service compared to 2019. The aggregate USD60 billion increase is entirely accounted for by LMICs, with a peak in 2024. In relative terms, LICs see the largest increase, as compared to 2019, but their economic size remains small. In terms of regions, the service on external public debt of Latin American & Caribbean (LAC) countries declined in 2021-22 to rebound to high, but comparable levels reached in 2018. The story is different for East Asia & Pacific (EAP), Middle East & North African (MENA) countries, and Sub-Saharan Africa (SSA): each of these regions are threatened by deteriorating debt service throughout 2026, well above the levels previously encountered.

TABLE 1: EXTERNAL PUBLIC DEBT SERVICE OF LOW AND MIDDLE-INCOME COUNTRIES

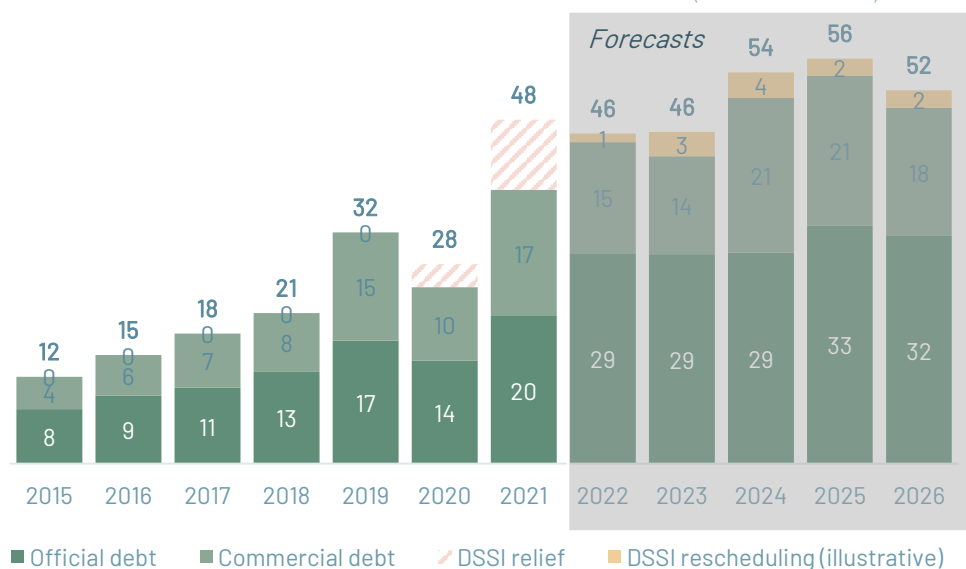
Debt service in USDbn		2019	2020	2021	2022	2023	2024	2025	2026
Total	N = 113	294.5	282.0	261.6	274.4	313.5	376.8	356.1	363.0
Low-Income	N = 23	5.5	5.9	7.4	8.8	10.0	11.2	11.1	11.4
Lower Middle-Income	N = 50	105.9	118.7	121.8	140.4	151.4	195.6	185.9	189.4
Upper Middle-Income	N = 40	183.1	157.4	132.4	125.3	152.0	170.0	159.1	162.0
East Asia & Pacific	N = 15	35.4	42.8	38.6	43.6	48.8	70.4	51.6	50.8
Europe & Central Asia	N = 18	38.7	37.7	42.6	41.9	44.8	54.8	55.1	51.8
Latin America & Caribbean	N = 22	134.8	106.4	80.8	76.1	101.3	107.0	95.9	101.5
Middle East & North Africa	N = 7	12.0	16.0	18.8	22.2	22.8	31.9	38.4	46.4
South Asia	N = 7	32.8	39.0	39.6	45.2	47.9	56.9	57.0	53.8
Sub-Saharan Africa	N = 44	40.9	40.1	41.3	45.4	47.9	56.0	58.1	58.7

SOURCES: WORLD BANK IDS(2021), IMF WEO (APRIL 2022), FDL

The Debt Service Suspension Initiative (DSSI) is not a major cause in the rebound in 2023-24, though it will matter for some countries. Countries that applied for the DSSI received a temporary debt relief of about USD12.9 billion over May 2020-December 2021, in the form of bilateral debt rescheduling at constant present value terms. This represents about 60% of the

official bilateral debt service that was due over the period – which highlights its incomplete implementation. While the details of the agreements are not public, the Paris Club published country-by-country deferred amounts, and the World Bank has published data on actual debt deferred in 2020. Taking into account the broad parameters of the terms at hand, we project that debt service will increase by USD3.3 billion in 2023 and USD3.5 billion in 2024 (when flows due in 2020 and 2021 will be cumulated). Compared to existing official debt service, this remains small. And even for countries where the debt relief was relatively large (such as Papua New Guinea or Angola), the rescheduled debt payments remain manageable as they are spread over several years.

CHART 5: STYLIZED EFFECT OF THE DSSI ON COUNTRIES WHICH APPLIED (IN USD BILLION)



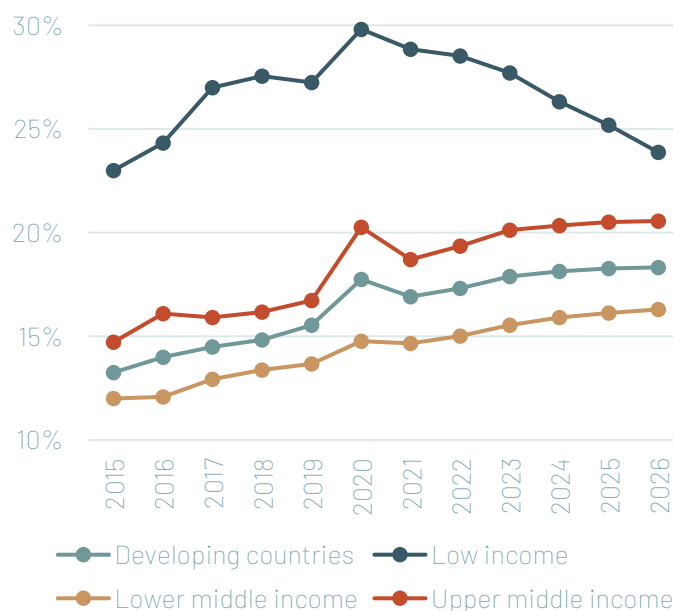
SOURCES: WORLD BANK (DSSI) PAGE AND IDS, PARIS CLUB (AMOUNTS DEFERRED UNDER THE DSSI), G20 COMMUNIQUE

Official debt service continues to dominate for Low- and Lower Middle- Income Countries, while commercial debt is by far the most important for Upper Middle-Income Countries. Under our assumptions, the funding mix of new external debt builds on 2015–19 actual funding mix, which implies there will be some stability in debt service proportions in the long run. In this framework, debt service to external commercial lenders is broadly stable at 25% of total external debt service for LICs, and at about 50% for LMICs. It remains well above, at 75% for UMICs. Because of the large redemptions planned in 2024, debt service to commercial lenders spike in 2024 for all country groups.

As for debt levels, external debt stocks also have risen significantly between 2015 and 2019, but forecasts indicate that this increase could be dampened after 2022. Developing countries' external debt as a whole has increased from USD2.0 trillion in 2016 to USD2.9 trillion in 2021. Our forecasts indicate that this pattern will continue, with USD4.3 trillion in aggregate debt in 2026. In comparison, nominal GDP grew at a slower pace over 2016–21, and is expected to continue to trail debt growth in the coming years. As a result, we expect public external debt to rise to 18.3% of developing countries' GDP in 2026 from 14% in 2015 and 17% in 2021. Income groups vary in

their trajectory in different ways from debt service: debt stocks, expressed in proportion to GDP, decline significantly in LICs thanks to a much higher GDP growth forecasted by the IMF, while they increase for MICs.

CHART 6: EXTERNAL PPG DEBT STOCK TO GDP (WEIGHTED AVERAGE)



SOURCES: WB IDS (2021), IMF WEO (APRIL 2022), FDL

3.1.2. The median story: an increasing debt service burden

Debt service represents an increasing share of government revenues, especially for poorer countries. While this is true overall, it is also clear that a majority of countries are experiencing an increase in the burden of debt service. Debt service for the median developing country has increased from 6% in 2015 to 8% in 2019 and projected to reach 10% in 2026, doubling in just 10 years. More worryingly, the third quartile, i.e., the 24th country with the highest debt service to revenue ratio (which can change year-to-year) has since seen a rapid increase from 10% in 2015 to 16%, and is likely to experience another rapid evolution to 18% in 2025. This represents education and health budgets combined in the budget for developing countries on average.

Across income groups, the worst evolution is for LMICs, where the median country is likely to reach 12% of revenues in 2026. For the median LIC, the highest level of debt service is expected to appear in 2023, and is then projected to decline (to a relatively high level: 10% of revenues, or twice the median level in 2015–19). As regards UMICs, there are less tensions: for the median count, debt service to revenue remains stable. Comparing 2025 to 2019 shows that a large majority of countries experience increase in debt service to revenues, often by significant amounts. Whether this constitutes a risk will depend on the thresholds that we review in the next section.

CHART 7A: QUANTILES OF DEBT-SERVICE-TO-REVENUES RATIO, AND MEDIAN BY INCOME GROUP

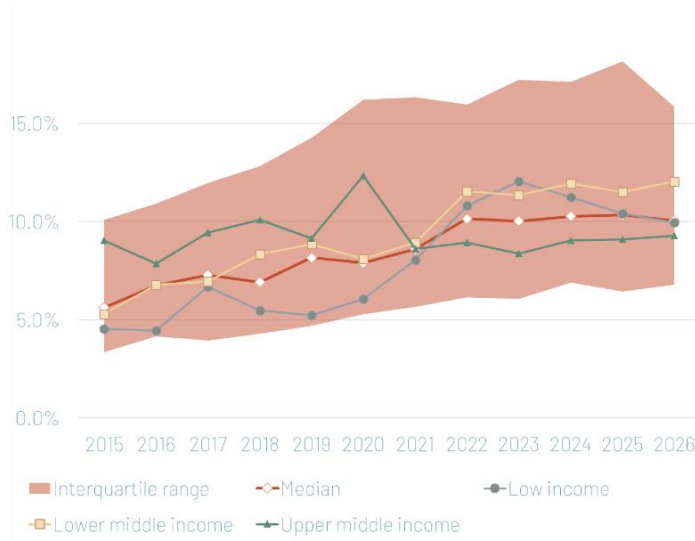
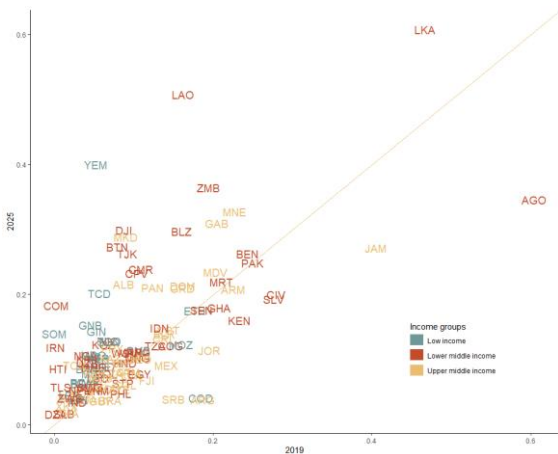


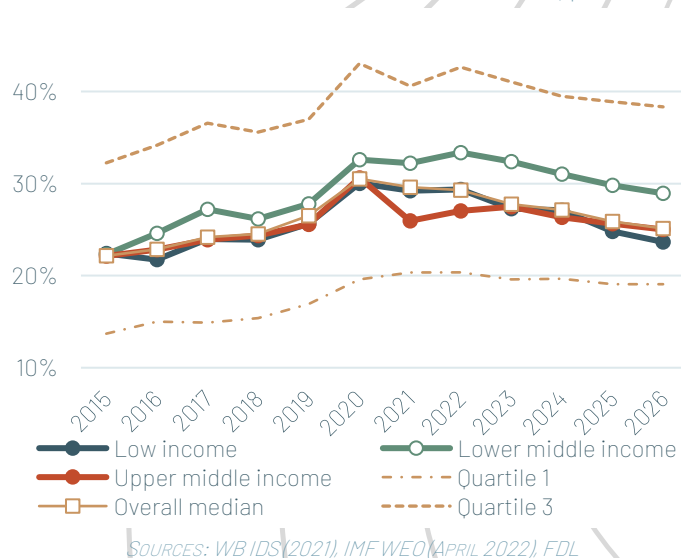
CHART 7B: DEBT-SERVICE-TO-REVENUES RATIO, IN 2019 AND 2025



SOURCES: WB IDS(2021), IMF WEO(APRIL 2022), FDL

At the same time, the median country's external public debt stock declines between 2021 and 2026, from 29% of GDP in 2021 to 25% in 2025. Large countries tend to have lower external public debt ratio, so the median level (Chart 8) is much higher than in aggregate (Chart 6). But even at a higher level, the dynamics show a decline in debt stocks after 2022 for every income group and for the entire distribution. Even most indebted countries (the third quartile) see a decline in external public debt to GDP ratio. This is in large part linked to the assumptions in terms of fiscal deficits, which remain optimistic.

CHART 8: EXTERNAL PPG DEBT STOCK TO GDP (QUANTILES)



SOURCES: WB IDS(2021), IMF WEO(APRIL 2022), FDL

3.2. From levels to risks: are countries crossing risk thresholds?

3.2.1. Risks metrics and thresholds

An increasing level of debt service does not *per se* indicate a risk of default. The analysis in nominal terms and the growth of GDP, revenues and exports will help governments manage debt service. How does it compare to these indicators? In practice, the IMF-World Bank Low Income Country-Debt Sustainability Framework (LIC-DSF) relies on four main ratio indicators, which constitute an alert system on debt sustainability: 1/ debt service-to-exports; 2/ debt service-to-revenues (which jointly determine the liquidity of debt, or the ability to pay on its commitments in a given year); 3/ present value of debt-to-GDP; and 4/ present value of debt-to-exports (as indicators of solvency). For each indicator, the LIC-DSF framework proposes a threshold, which defines the “debt-carrying capacity” of a given country and depends on its economic and institutional characteristics⁷.

Such indicators are a useful, but imperfect proxy to assess public debt sustainability: at the end of the day, net transfers are what really matters - i.e., the availability of new debt inflows to cover financing needs. Typically, a country with high public debt service, but strong growth prospects and robust creditworthiness, will continue to attract new financing flows, and is therefore likely to stay current on its debt obligations. In the medium term, however, such a strategy can be risky: the higher the debt service, the more vulnerable the country's debt service capacity is to a deterioration of its macroeconomic performance as well as to a sudden drop in external financing. These indicators thus act as warnings, and lead to some context-specific questions: are the sources of new debt lines, whether official or commercial, still going to be available next year? And are growth and fiscal prospects realistic? Debt indicators are also relevant practically, as they determine how a country is perceived by creditors.

Out of the four WB-IMF variables, this report uses two main metrics as warning signs: (i) external PPG debt service-to-revenue ratio and (ii) present value of external PPG debt-to-GDP ratio. The first ratio denotes liquidity risk, while the second refers to the solvency risk. To capture whether a country has entered risky territory, we use the thresholds proposed by the IMF and determined by each country's debt-carrying capacity (Table 2 for the thresholds). For countries with market access, which are not subject to those threshold, we automatically set the debt carrying-capacity to “Strong”. As a result, we classify the likely evolutions of country groups according to whether (and how often) they cross those thresholds after 2022.

⁷ More precisely, the ability of countries to carry debt is linked to the CPIA (Country Policy and Institutional Assessment), its level of reserves as a percentage of GDP, its past and forecasted growth, world growth and remittances. The weights are provided by a logit regression predicting distress, but the facts that they are fixed across time and countries makes them slightly arbitrary.

TABLE 2: IMF DEBT SUSTAINABILITY THRESHOLDS

Debt carrying capacity	Weak	Medium	Strong
Present Value (PV) of external debt-to-GDP ratio	30	40	55
External PPG debt-service-to-revenues ratio	14	18	23
PV of PPG external-debt-to-exports ratio	140	180	240
External PPG debt-service-to-exports ratio	10	15	21

SOURCE: IDA-IMF DEBT SUSTAINABILITY FRAMEWORK (IDA-IMF, 2018)

NOTE: WE USE THE TWO UPPER ROWS IN OUR EXERCISE, BUT NOT THE TWO LOWER ROWS

Although these thresholds are often criticized, they remain useful anchors in practice. Thresholds are often criticized for being arbitrary and for poorly “predicting” default risk, especially as real interest rates have decreased and reached negative values (Cohen et al. *forthcoming*). Despite this, thresholds have a direct practical relevance that ultimately justifies their use. They may, for example, determine the loan/grant mix by the World Bank under the Sustainable Development Finance Policy, and are used to inform non-concessional borrowing limits. They are also used by IMF as a ceiling to quantify debt restructurings objectives. All this eventually influence development finance modalities of other multilateral and bilateral lenders. This, besides their analytical importance, justifies their inclusion in this analysis as a warning signal.

3.2.2. Liquidity risks: a growing number of countries in “risky” territory

As described above, determining whether higher debt service indicates debt sustainability risk is not easy. We therefore rely on the IMF’s indicators of risk. While imperfect, they remain relevant for their practical importance. Both the World Bank International Development Association (IDA) and the IMF under its Debt Limit Policies tend to rely on risk levels as implied by those thresholds to set possible non-concessional borrowing limits. It is thus useful to ask how many countries cross those indicative lines.

In the baseline, the number of countries entering risky territory is likely to reach its record in 2024 and 2025. The combination of pre-existing trends and the COVID-19 shock clearly pushed many countries above this threshold: far from a temporary shock, it made debt service a large and persistent weight on budgets of developing countries. Looking forward, in our standard scenario, 28 out of 113 countries in our sample cross the debt service risk threshold in 2024, and

26 in 2025. Most of these countries are in the poorer groups, either LIC (6 in 2024 and 5 in 2025, out of a total of 23 LICs) or LMIC (respectively 18 and 15, out of a total of 50 LMICs)⁸.

But how permanent are those “breaches”? Much more so than before the COVID-19 crisis. Over the 2015-19 period, only two economies were in breach consistently in all five years, and one country was in breach four years out of the five. Over 2022-26, no less than 15 economies are expected to breach their sustainability threshold consistently over the five years period of forecast, and 7 over four out of the five years.

CHART 9A: ANNUAL BREACHES OF LIQUIDITY THRESHOLD

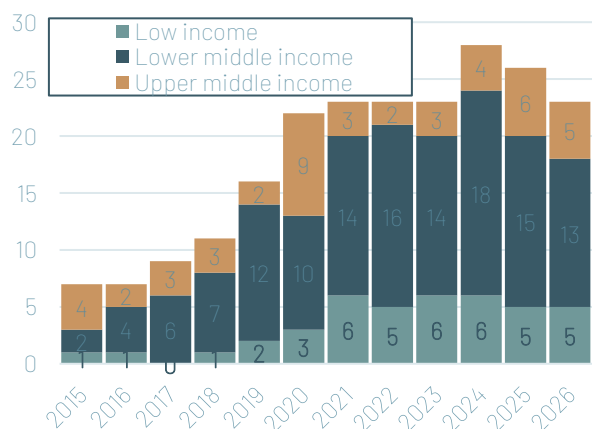
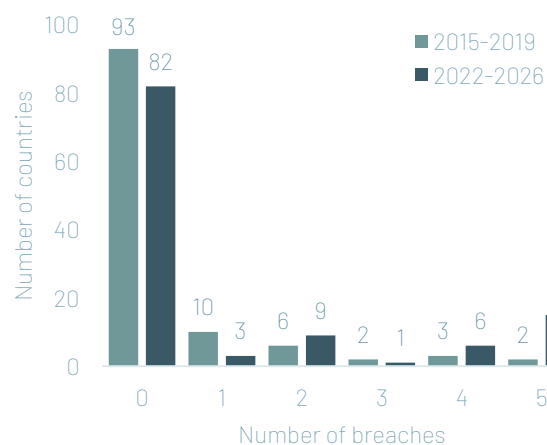


CHART 9B: FREQUENCY OF BREACHES – A DISTRIBUTION



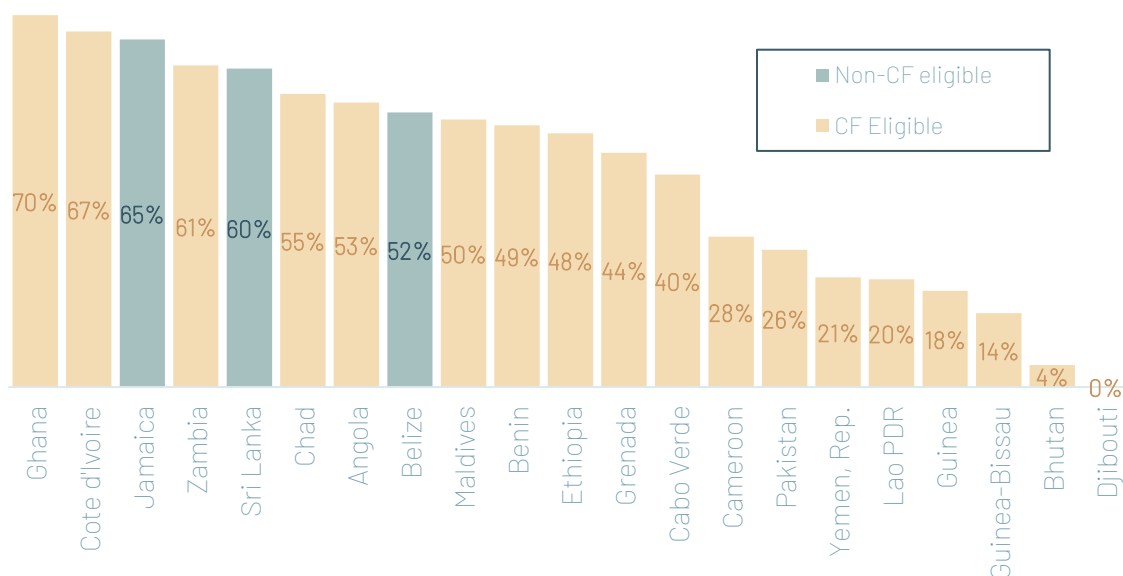
SOURCES: WORLD BANK IDS(2021), IMF WEO (APRIL 2022), FDI

The creditor landscape varies significantly among countries in risky territories. 21 countries at risk of debt distress, or already in debt distress, will owe a large share of their debt service in the next few years to commercial creditors. Of those countries, half will pay over 50% of their debt service to commercial creditors, collectively representing more than USD100 billion between 2022 and 2026, over USD200 billion of debt service at risk in total. On the other end of the spectrum, some countries like Pakistan and Cameroon, owe a significant share of their debt to official creditors, with China frequently standing as a major creditor.

Some countries are pre-emptively addressing their external debt vulnerabilities, through market operations. Roll-over risks indeed tend to be larger with commercial creditors, who are more risk sensitive. Therefore, some sovereign issuers performed liability management exercises in 2021: they leveraged favourable market conditions and bought back Eurobonds that were coming due in 2025 or 2026. This is the case for Côte d'Ivoire (for its Eurobond due in 2025), which successfully smoothed its debt redemption profile at limited costs.

⁸ This is only partly due to the mechanics of the thresholds: with lower capacity, reserves, etc. comes a lower limit. For a given debt service levels, poor countries are thus more often above the threshold defined by the IMF. However, even with uniform thresholds, poor countries see their risk levels deteriorate more than Upper Middle-Income Countries.

CHART 10: SHARE OF COMMERCIAL EXTERNAL PPG DEBT IN 2022-26



SOURCES: WORLD BANK IDS(2021), IMF WEO (APRIL 2022), FDL
 NOTES: COUNTRIES WITH 4 OR 5 BREACHES, CF STANDS FOR COMMON FRAMEWORK

Finally, even for countries without a “breach,” sudden jumps in the level of debt service or “debt walls,” could be difficult to manage. Countries with significant external bonded debt, such as Cameroon, Kenya, or Senegal, but also Albania and Macedonia, are set to face sudden increases in external public debt-service in 2024-25, which can reach 0.5% of their GDP. Such temporary spikes in debt service are *a priori* set to be financed on the international debt markets. However, as of October 2022, market financing options have dried up for most developing countries and a debt refinancing would come at extremely prohibitive costs – if only possible. It would therefore require a strong creditworthiness, and a relatively low stock of debt, for refinancing options to remain available. We thus turn now to the dynamics of debt stocks.

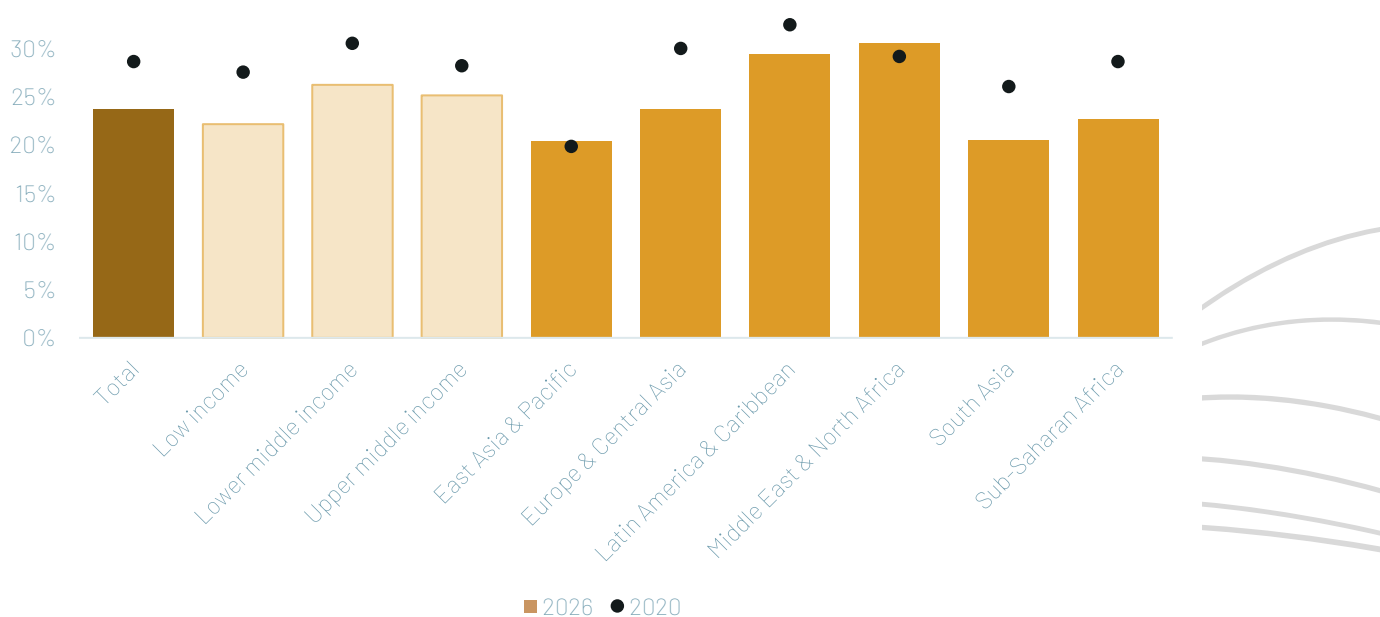
3.2.3. Solvency risks: debt stocks are projected to decline until 2026

In addition to flow indicators, debt stocks can also inform on sustainability risks. As developing countries tend to rely on concessional debt (i.e., with relatively low interest rates and long maturities), nominal debt stocks may be misleading. Present value debt indicators provide a more accurate picture of sustainability risks⁹. We therefore forecast present value of external debt using our model, which can be compared to the IMF DSF thresholds of 30%, 40%, and 55% – depending on the country’s debt-carrying capacity.

⁹ Using the standard (but contestable) 5% discount rate

The present value of external public debt declines on average, and the number of countries above their risk threshold as well. Our projections indicate that average levels decline slightly for almost all country groups. The overall average slightly falls below 28% in 2026. LMICs have the highest level, at 35% in 2020, and the slowest decline through 2026. In terms of region, East Asia and Pacific countries would experience a slight increase in the present value of their external PPG debt stock, up to 30% of GDP. Debt levels would remain broadly stable for MENA and South Asia countries, at respectively c. 28% and 40% of GDP, while it would decrease in other regions by at least 4 percentage points.

CHART 11: AVERAGE PRESENT VALUE OF EXTERNAL PPG DEBT TO GDP



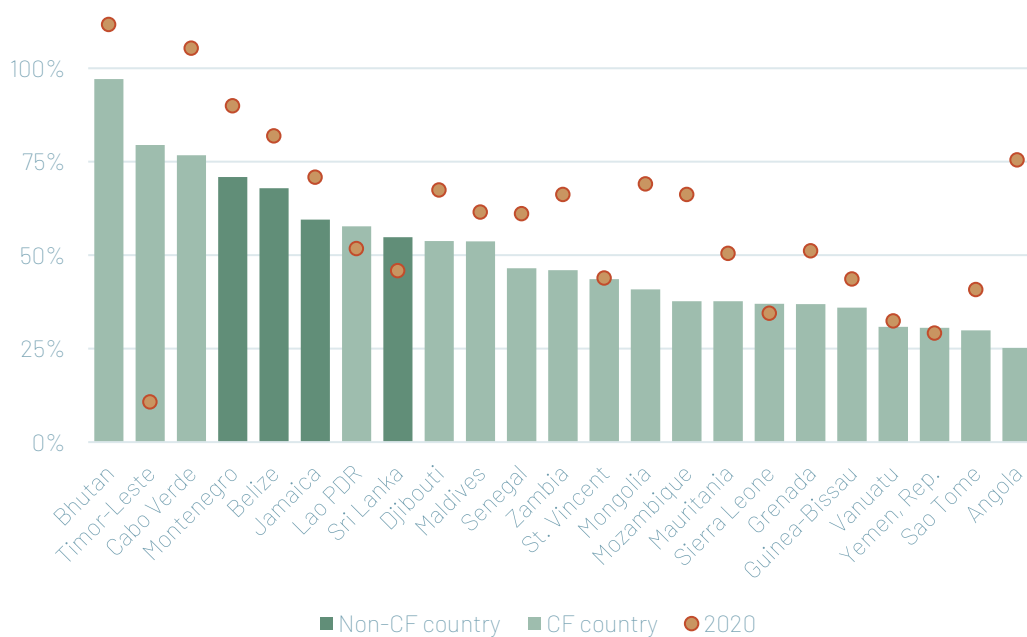
SOURCES: WORLD BANK IDS(2021), IMF WEO (APRIL 2022), FDL

While the difference between debt service and debt stock trends can seem puzzling, they are only a superficial paradox: debt dynamics are underpinned by primary deficits, while debt service can vary a lot according to repayment schedule. Variations in debt stocks are a function of fiscal deficit, which add to the stock, as well as of the “concessionality” of new debt, since we focus here on the present value. In this regard, optimistic projections of future fiscal deficits by the IMF explain in large part declining debt stocks in the future. In contrast, debt service reflects the repayment schedule of existing debt, which can be unevenly spread over time and even concentrated over a small number of years. For instance, a principal repayment each year can have a significant impact on debt service metrics, but would be irrelevant for debt stock dynamics, provided of course it is refinanced. To put it differently, debt service highlights refinancing risks that are virtually ignored in the debt stock dynamics.

Several countries, in all regions and mainly at Lower Middle-Income level, are above risk thresholds. Of 113 countries in the sample, 23 are expected to have debt stocks in excess of their sustainability threshold at least one year over 2022-26. Most of the countries experience a decline in their debt stock, and end up under the risk threshold, but some, such as Timor-Leste,

see a remarkable rise in their external PPG debt to GDP ratio. Countries with high debt stock in PV terms often have little access to concessional finance, tend to be small and with high levels of incomes, such as Belize (which restructured its debt recently through a debt-for-nature swap), Jamaica or Vanuatu. Some CF-eligible countries also follow these characteristics, such as St. Vincent and the Grenadine or Grenada.

CHART 12: PV OF EXTERNAL PPG DEBT TO GDP FOR COUNTRIES WITH BREACH OF THRESHOLD



SOURCES: WORLD BANK IDS(2021), IMF WEO (APRIL 2022) FDI

3.2.4. Cumulated risks: liquidity and solvency

Which countries come at the intersection of those risks, and how does our assessment compare with existing risk estimates by the IMF or credit rating agencies? Putting together our two criteria, we find a relatively good correspondence between existing assessments and our dynamics, which illustrate that a relatively simple tool can reproduce in a wide array of cases. When our projections differ from IMF-WB DSAs or market ratings, this is often the case because debt management operations, or outright defaults have occurred in the past two years and have changed the debt profile of the country. In future iterations of this paper, we will aim to regularly update with public information.

Taking countries with at least 2 breaches in either criterion, we find that 19 countries are high on both liquidity and solvency. Among them, Sri Lanka and Zambia have defaulted, and Belize restructured its debt. Bhutan and Senegal are the only country classified as “Moderate” by the

IMF, for the former mainly because a large share of its debt (and debt service) is tied to predictable revenues.

Beyond this pool of countries, with alarming debt levels, a second pool of 16 countries evidence stress on debt service indicators. These countries have high debt service, but less than 2 breaches on debt stock indicator. For Ethiopia and Chad, this translated into applications to the Common Framework with lengthy process, ultimately resulting in limited relief for Chad. Benin and Côte d'Ivoire have managed this risk by refinancing bonds due in 2025 or 2026, and Ghana and Pakistan are negotiating IMF programs at time of writing.

Overall, this confirms that the main concern for a large share of countries is future debt service in the next four years, much more than a stock problem, at least assessed through those thresholds. Indeed, only 6 countries have high debt stocks, but less than 2 breaches in debt service: they may face tensions around solvency, although their financing risk remains manageable in the short run.

Finally, 72 countries have zero or only one breach for either criterion, among which 10 are considered as high risk by the IMF-WB. This is for several reasons. First, under the LIC-DSF, a high external debt service to exports can also trigger alarms. We do not include this as an indicator in our model yet, as the WEO does not provide readily available forecasts of nominal exports, but we plan to include it in our next iteration. For at least five countries, the debt service-to-exports ratio is the one which crosses risk thresholds (Burundi, Dominica, Samoa or Tonga for example). Second, in some cases (such as Malawi), the debt perimeter is broadened for the DSA compared to IDS. Third, some risks identified by the IMF materialize only beyond 2026 - i.e., beyond the scope of our analysis - as is the case of the Central African Republic or Haiti. Finally, for Gambia and Papua New Guinea, differences with our model are small, and the "high risk" assessment stems from relatively small breaches. Among countries with access to markets, only 3 countries with no thresholds are rated B- or less by rating agencies: Argentina, El Salvador and Nigeria, all of which had important debt changes in the last two years.

TABLE 3: BREACHES FOR STOCK AND FLOW INDICATORS



SOURCES: WORLD BANK IDS, IMF WEO, S&P, FITCH, MOODY'S, FDL

Our model offers a useful comparison to the existing LIC-DSAs, and a useful tool to assess and test scenarios at the global and regional levels. It allows us to show that most breaches, under baseline like under a protracted shock, are mainly ones of liquidity than solvency, and that active management of debt service can be used to alleviate those pressures. However, as we reveal in the next section, with high interest rates and the appreciation of the dollar, such opportunities are vanishing, and risks are magnified.

4. Stress-testing the outlook

This section discusses a stress-test scenario, which reflects most recent macro-financial developments. It analyses the resulting debt vulnerabilities and puts them in perspective with the existing global financial safety nets.

The projections we rely on are inherently uncertain. Growth is likely to have deteriorated since April 2022. Interest rates have risen fast throughout emerging markets. The dollar has soared, leaving currencies in developing countries under sharp depreciation. If these levels remain permanent, there will be deep and protracted consequences on debt service and the level of debt risks. Which countries and regions would be most severely hit? Building on our model, we stress-test the macroeconomic baseline and identify the implied external debt vulnerabilities. We focus on the most salient evolutions since April 2022: higher interest rates and a soaring dollar.

4.1. Higher interest rates and exchange rate depreciation

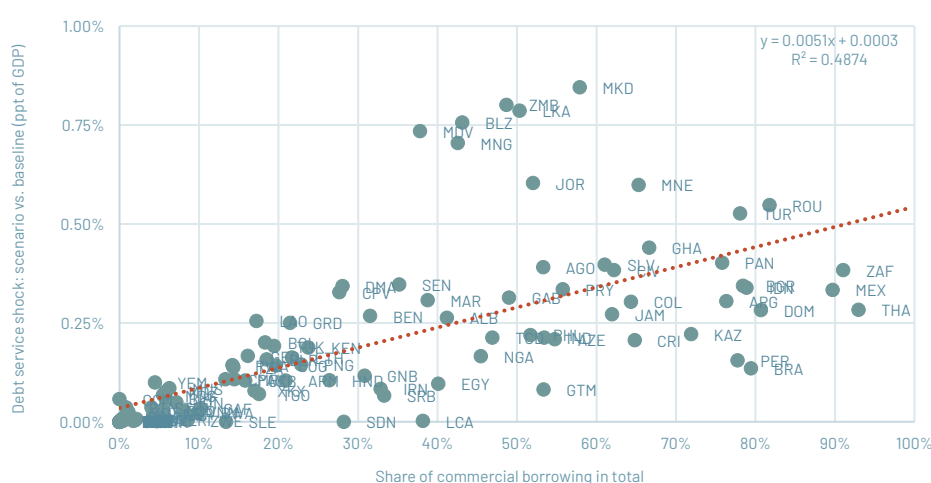
We first model an update to the current situation, with across-the-board rise in yields and depreciation. Our interest rate shock is assumed to be of 400 basis points on all private external debt new issuance, reflecting the evolution of the Emerging Market Bond Index which was close to 4.5% on average over 2015-19 and increased to about 8-9% since April 2022. This is an illustrative exercise: the rise in yields is very differentiated across perceived levels of risk, regions, etc. Overall, this is a relatively conservative hypothesis. 10-Y yields on US Treasury Bonds have increased by about 200 basis points (from an average of 2% in 2015-19 to about 4% in October 2022), and spreads have grown rapidly throughout risky assets.

In this scenario, countries with little access to private lending are sheltered from this increase in interest rates. This should also be nuanced: first, because a share of official lending is under variable interest rates and will have an immediate impact on debt service. This includes a large share of non-concessional official lending, including the IBRD or the China Development Bank (Morris et al. 2020). We have not attempted to uncover the impact on public debt specifically for this paper. Second, official rates also will change for new loans, but less than private loans, especially with respect to concessional lending.

Conversely, countries with extensive recourse to external commercial debt are more vulnerable to interest rate shocks. Obviously, countries with exposure to bond markets are more directly affected by adverse conditions. More interesting is the fact that the materialization of this risk is rapid: by 2026, countries with more than 50% of their funding mix from private sources are

exposed to higher interest of 0.5% of GDP per year, cumulating to 1.3% of GDP over 2024–26, or about 6% of their revenues on average. This illustrates the challenge faced by countries that must refinance large amounts of commercial debt under difficult market conditions. This vulnerability is also a function of other parameters such as initial debt stock, primary deficit trend, redemption profile, and initial cost of funding– which can explain the volatility observed on the graph. Eventually, countries with large recourse to commercial funding would be more frequently in breach of sustainability thresholds. Our assumptions are “optimistic” in the sense that they rely on maturity and grace periods from 2015–19. Most likely, these conditions have worsened as well (for example by pushing countries to solicit syndicated loans, usually at shorter maturities).

CHART 13: COST OF AN INTEREST SHOCK FOR COMMERCIAL BORROWING: SCENARIO VS. BASELINE



SOURCES: WORLD BANK IDS(2021), IMF WEO (APRIL 2022), FDL

We model a second shock, focusing on exchange rate dynamics. We suppose that all emerging market currencies depreciate permanently by 10% against the dollar¹⁰, leading to an immediate fall (in dollar terms) of the GDP of all countries. Alternatively, this can be considered a 20% depreciation (which represents the rise in the dollar index over the 2015–19 average) with incomplete pass through to GDP or revenues. Indeed, a share of governments’ revenues (for instance, import taxes) are denominated in dollars. Again, this is a blunt test, as about 80% of developing countries’ debt is denominated in dollars, with many variations. We nevertheless include this hypothesis for the sake of simplicity. In future work, we will tailor more the exchange rate shock by country.

The aggregate consequences of those two shocks are very large, with differences in the time horizon. Sub-Saharan countries would be most affected. Over 2023–26, this scenario leads to a cumulative increase in debt service by about USD173 billion for developing countries in aggregate, including USD61 billion in 2026. This is close to a percentage point of GDP of transfers

¹⁰ This abstracts from several important variables: the existence of dollar pegs, the fact that many countries have borrowed in euros or other currencies.

from debtors to creditors, or 3.5% in government revenues. While this number might seem small, it is 20% over what would have happened without the shock, and it comes in addition to the increase in debt service already observed in the model. In total, debt service would double relative to government revenues compared to 2015, for all country groups. LICs' debt service would soar above 16% of their revenues in 2023 and 2024 before reverting in 2025. For LMICs, the increase is also significant, reaching 12% of revenues on average. Looking across regions, SSA is clearly the most affected, both in terms of levels and difference with the central scenario.

CHART 14A: EXTERNAL PPG DEBT SERVICE-TO-REVENUES UNDER TWO SCENARIOS (WGHT. AVGE.)

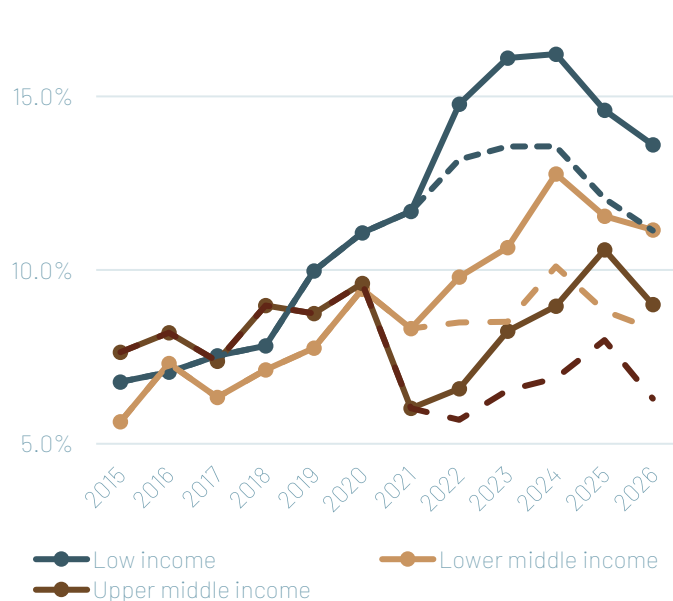
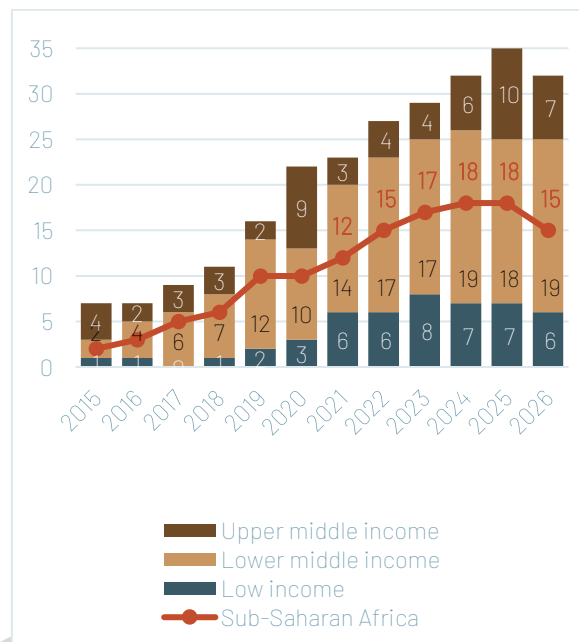


CHART 14B: BREACHES OF LIQUIDITY THRESHOLD, UNDER A PERSISTENT SHOCK SCENARIO



SOURCES: WORLD BANK IDS (2021), IMF WEO (APRIL 2022), FDI
NOTE: DASHED LINES SHOW SCENARIOS WITHOUT SHOCKS

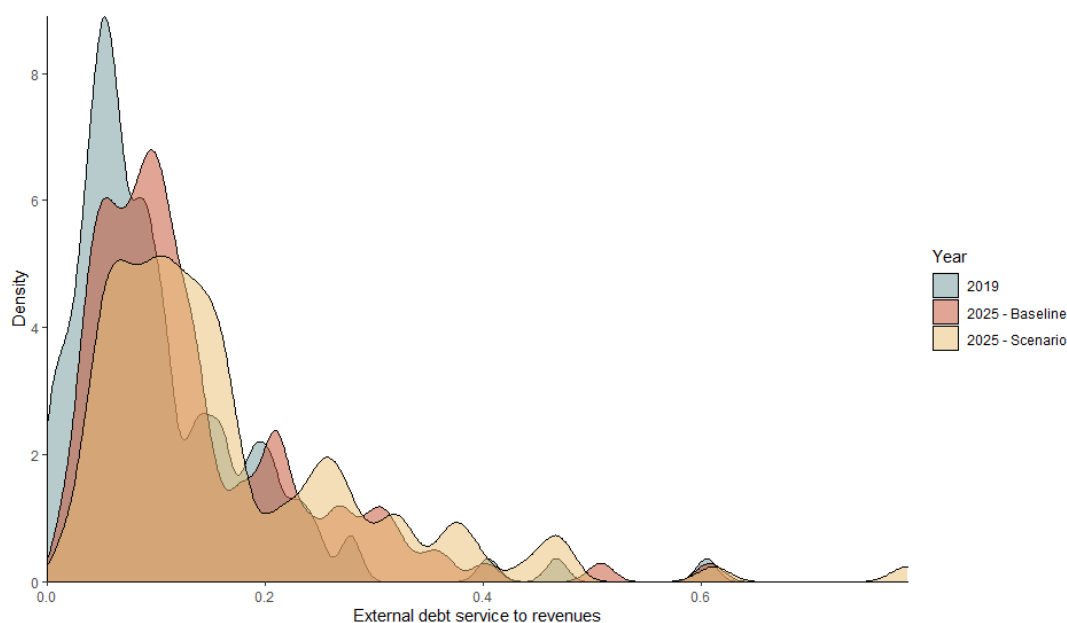
4.2. An overall increase in external debt vulnerabilities

With higher debt service, the number of countries above the risk threshold soars. 35 countries cross the risk threshold in 2025, against 26 in our baseline scenario. This occurs across all income levels, but the group most acutely affected are LMICs: 19 countries (out of 53) now trigger warnings in 2024. For UMICs, this number is 10 (out of 41 in total) who are in breach in 2025. The most affected continent is Sub-Saharan Africa, with 18 countries at risk in 2024. As a result, if current conditions were to continue, a generalized debt crisis could materialize, especially in SSA and LMICs more broadly.

Even without considering specific thresholds, the overall distribution of debt service to revenues moves to the right considerably. About 16 countries have debt service to revenues ratio above 30% in this scenario in 2026, against 6 in the baseline. All countries impacted are MICs: Belize, Benin, Bhutan, Jamaica, and Tajikistan notably cross this threshold. But even at

less stringent levels, the increase in countries with the sizable weight of debt service would increase considerably: 43 countries would have about 15% of their revenues going to debt service against 24 in 2019 and 31 under baseline. This is about equivalent to what governments in developing countries spend on education, and three times their budget on health.

CHART 15: DISTRIBUTION OF DEBT SERVICE UNDER BASELINE AND SHOCKED SCENARIO



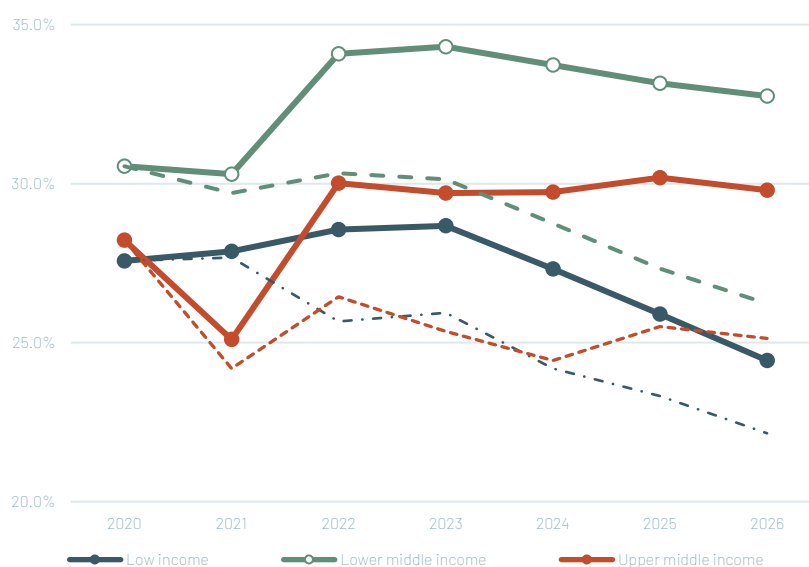
SOURCES: WORLD BANK IDS(2021), IMF WEO(APRIL 2022), FDL

In the current global context, where growth is declining and fiscal deficits are likely to be higher, other sources of risk should be considered. Declines in real growth would essentially have the same effect as an across-the-board currency depreciation. Updated GDP figures will allow to better consider the current crisis on real economies. More importantly, the endogenous reaction of sovereigns to higher rates is not modelled here. This occurs across creditor groups, for example from commercial to multilateral, but also within commercial creditors, there have been reports of switching from bond issuance to the syndicated loan markets, which tend to have shorter maturities and variables interest rates. Such financing options tend to skew debt service obligations to the very short term.

The impact on debt stock metrics would be sizeable across countries and immediate under present value accounting. The present value approach has strong implications for new debt issued after 2022: under a 400 basis points shock, the present value of new debt is much higher than previous debt, and it rises faster in countries with large commercial borrowing needs. As a result, while debt levels decline in LICs, they rise continuously in MICs. For the median MIC, external public debt stocks would increase by about 4 percentage points compared to the baseline. Keeping debt costs low therefore requires more reliance on official sources. Some of this support is likely to materialize with higher interest rate as well, yet this is not taken into account in the present analysis.

This increase in debt stocks would result into more frequent breaches of risk thresholds, which would however remain concentrated on the same group of countries. Risk thresholds would indeed be breached 96 times over 2023–26, as compared to 77 times under the baseline. Yet only a couple of countries – Congo¹¹ and Ghana – would be in breach under the shock scenario, when they were not in the baseline. This implies that countries already in breach in the baseline would be so more repeatedly under the shock scenario: 23 countries would typically exceed their risk threshold at least 3 times over 2023–26, while they were only 16 countries under the baseline.

CHART 16: PUBLIC DEBT STOCK TO GDP UNDER TWO SCENARIOS



SOURCES: WORLD BANK IDS (2021), IMF WEO (APRIL 2022), FDI
 NOTE: DASHED LINES SHOW SCENARIOS WITHOUT SHOCKS

4.3. Total amounts of debt at risk well beyond the magnitude of global safety nets

In the face of such risks, bond markets have largely closed in 2022, especially for African issuers. Only Angola, Nigeria and South Africa have managed to issue foreign bonds since the war started for a total of USD6 billion, less than half of last year over the same period, and the smallest amount since 2016. Latin American issuances have also sharply declined. Average coupon rates have grown for both regions. In Asia, while some countries have not had problems accessing

¹¹ Although there might be biases for those two countries: for Congo, the exchange rate shock might be less relevant as a large share of revenues are denominated in dollar, due to the concentration of its exports on oil. For Ghana, recent yields show that the shock considered here might be an underestimate.

markets, others are close to debt distress. What would a prolonged reduction in issuance volumes mean for gross financing needs of sovereigns?

In the aggregate, we estimate that a persistent shock due to the war in Ukraine would imply external PPG debt service of around USD480 billion per year across developing countries between 2022 and 2026, or a cumulative USD2.5 trillion in total. Sub-Saharan countries would need to raise USD290 billion, of which USD160 billion would come from the private sector over the same period; and PRGT-eligible countries USD300 billion (of which USD80 billion from the private sector). A major concern is whether other sources substitute, at least partially, to a reduced commercial sector.

The policy response to such pressures rests on four options. Our model assumes that countries do not react to such shocks: they simply refinance expected deficits at higher costs. Obviously, this is unlikely: they will rely on alternative policies. It is however useful, as a benchmark, to use those parameters to provide an idea of the scale of the challenge. Higher interest rates have led Eurobonds issuance to fall dramatically. Foreign bonds have been partially replaced by syndicated lending, often with shorter maturities and higher interest rates, which corresponds to our assumptions in the model, but are also more opaque. Alternatively, borrowing countries can rely on a mix of four strategies: (i) reducing primary fiscal deficits; (ii) increasing funding from domestic capital markets, which however tend to be thin and expensive – at least for countries with lower levels of income; (iii) borrowing more from the official sector; and (iv) restructuring existing debt.

The third option – increased reliance on concessional finance – is likely to be limited, at least from multilateral institutions as the needs we estimate are well above the current capacity of international lenders. In cases where debt dynamics would not be controlled, it would also not be desirable, as it would lead IFIs to bail out the private sector. In other cases, avoiding a default can allow countries to regain access to markets faster (although subject to considerable debate, with Caselli et al. 2021 showing that a soft bailout may not provide substantial benefits compared to an outright restructuring). However, the multilateral system is not currently equipped to substitute to the role taken by private lenders.

- The PRGT is the IMF's concessional trust and will be important to cover shortfalls for eligible countries. It currently has about USD20 billion in credit outstanding, and according to IMF staff projections¹², could sustain a doubling of its commitments to about USD40 billion by 2026.
- On the side of the World Bank, IDA's financing capacity for 2022-25 is USD93 billion (including grants). This would thus meet a third of the gross financing needs of eligible countries under our projections. Other concessional funds such as the African Development Fund, are much smaller, with about USD7.5 billion in capacity and replenishment coming in December 2022.

¹² See IMF's [Review of Adequacy of PRGT finances](#) (2022, April).

- For other countries eligible to IBRD, the expansion of Multilateral Development Banks' balance sheets could be an important compensation for the reduction in volume and the increase in costs of market financing. This makes the implementation of the measures recommended by the G20 Independent Review MDB Capital Adequacy Framework urgent. The headline numbers of about USD500 billion in additional lending would go a long way in meeting the needs of non-distressed countries, although further capital would be needed to finance additional investment needs.

In some cases, bilateral sector financing could be secured to roll-over existing debt, especially for large bilateral creditors. Indeed, official bilateral lenders could assist by lending at low rates and long maturities to developing countries facing large refinancing risks. This approach is already proposed by multilateral creditors, which have provided positive net financing flows to countries. In the case of bilateral creditors, coordination problems may such debt refinancing option to cases where a single lender is dominant and does not think it is bailing out other lenders.

The latter option – debt rescheduling – remains feasible in some cases. Given that the challenge is essentially one of flow, it would be advised to reschedule debt payments to a later (and more prosperous) period. For instance, the UN Economic Commission for Africa called for a two-year extension of the DSSI¹³. Given the challenges, this has some merits, especially for countries with high share of official debt. For countries with access to markets, applying to the DSSI also allowed to reduce government bond spreads, at least on average (Lang, Mihalyi and Presbitero, 2021). The DSSI process, however, has shown its limits: many countries would receive only moderate debt service relief, due to their larger exposure to commercial lending. In addition, the DSSI is a transaction-intensive process, which has been costly and will be difficult to replicate. Simplifying debt service relief by commercial creditors could be an important area of progress in the current situation, as high liquidity tensions have not materialized yet into widespread solvency concerns.

¹³ <https://www.uneca.org/stories/african-ministers-called-for-urgent-deployment-of-financial-instruments-as-continent-suffers>

5. Discussing the results

Given the uncertain times, how robust are these results? Debt sustainability is a complex, multi-dimensional, political process. Can it be treated through a mechanistic model, universally applied? This section aims at putting some context and limitations over the results and discusses some possible extensions.

Are DSA thresholds relevant?

A large part of the analysis relies on the thresholds as defined by the LIC-DSF. Are they really relevant? As a predictive tool, they have shown their limits. There is no reason to believe that these thresholds should be fixed over time, in particular with regard to a changing macroeconomic environment. Indeed, with low interest rates, they tend to lose their predictive power (Cohen et al., *forthcoming*). Other approaches which better account for the relative position of countries seem to perform better. However, rising real interest rates could precisely provide a better rationale for such metrics. There is an even stronger reason for using those metrics: they are of practical importance. When the IMF is involved in a debt restructuring, it usually relies on thresholds to determine the quantum of debt reduction needed. In that case, they are a relatively good indicator of the second argument for using those thresholds: they are of practical importance as the IMF uses those limits as parameters in debt restructuring cases.

Feedback loops from investment to growth

Our model is purely mechanistic in the sense that it is based on simple debt dynamics underpinned by many assumptions and not by macroeconomic relationships, which are taken as given from the IMF WEO. However, a central question in the literature is whether public investment can increase growth and thus improve creditworthiness in the long run. The IMF developed useful models (DIG and DIGNAR) to integrate those aspects to DSAs, highlighting the importance of public investment efficiency to mitigate the risks of a debt-fuelled public investment increase (Gurara et al. 2019). We will also endeavour to extend our model in such directions in future iterations.

Why are we using nominal interest rates?

Developing countries tend to issue debt in hard currency, and are consequently exposed to exchange rate risk. When US inflation is high, real interest rates on dollar bonds is lower – although nominal interest rates have risen, current real rates in the US are still below 0. For developing countries, the situation is different: government incomes are mainly denominated in local currency. Part of their revenues is tied to prices in dollars, which are stable in real terms. As shown by Nair and Sturzenegger, the gains for developing countries can be substantial. However, it hinges on the assumption of Purchasing Power Parity: nominal exchange rates adjust to reflect the difference between US and domestic inflation. This could take years, and even decades, before PPP materializes. As a result, in the short- to medium- run, nominal

interest rates can be used as a proxy of the cost of debt for countries subject to the “original sin” (Hausman et al. 2007). This reasoning would however fail, should we focus on debt indicators relying on exports, as denominator, since most exports are denominated in US dollars, and would be much less affected by nominal depreciation.

Conclusion: Debt in developing countries has become too expensive and risky

This paper aimed to project debt service and map the landscape of public debt risks in developing countries. Doing so requires many assumptions that can be further debated, and future iterations of these exercises will seek to allow a more varied array of scenarios. While it would be too crude to provide certainty on any individual case, this paper nevertheless shows that the overall level of debt risk has increased. This is not so much due to high external debt stocks: they remain relatively low, and on average will remain stable until 2026. The countries that do cross risk thresholds on debt stocks are mainly small island nations, where overlapping crises, including climate shocks, justify an immediate reduction in the stock of debt.

For many countries, the real danger comes from increases in debt service. Reducing the cost of debt and resiliency to shocks is therefore essential. While the April 2022 IMF scenarios were relatively optimistic, five additional months of war in Ukraine, high energy and fuel prices, and most worryingly, tightening policies from advanced central banks have created a perfect storm of depreciations, recession and market exclusion. Few countries have sufficient self-insurance buffers to rely on.

For countries with exposure to official creditors, whether bilateral or multilateral, some kind of forbearance and rolling over of debt will allow for breathing space during this shock. Developing the ability to reschedule debt payments will be important: existing proposals that emerged during the COVID-19 crisis could come back. The most urgent step, however, seems to be scaling up the official development finance system including global and regional financial safety nets.

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Appendix 1 – List of countries included in the analysis

The 113 developing countries listed below are considered in this analysis. 15 developing countries are excluded from the analysis: (i) China because its size would overwhelm any aggregate figures, and its dynamics are different from all other developing countries; (ii) Russia because some datapoints in the World Bank IDS database are hard to reconcile with other sources; and (iii) 13 other developing countries (Afghanistan, Ecuador, Kiribati, Lebanon, Marshall Islands, Micronesia, South Sudan, Russia, Syria, Tunisia, Turkmenistan, Tuvalu, Ukraine, Venezuela) owing to a lack of data either in the World Bank IDS or in the IMF WEO databases.

Country	Region	Participation to DSSI
Low-Income Countries (LICs)		
Burkina Faso	Sub-Saharan Africa	Yes
Burundi	Sub-Saharan Africa	Yes
Central African Republic	Sub-Saharan Africa	Yes
Chad	Sub-Saharan Africa	Yes
Congo, Dem. Rep.	Sub-Saharan Africa	Yes
Eritrea	Sub-Saharan Africa	Not Eligible
Ethiopia	Sub-Saharan Africa	Yes
Gambia, The	Sub-Saharan Africa	Yes
Guinea	Sub-Saharan Africa	Yes
Guinea-Bissau	Sub-Saharan Africa	Yes
Liberia	Sub-Saharan Africa	Yes
Madagascar	Sub-Saharan Africa	Yes
Malawi	Sub-Saharan Africa	Yes
Mali	Sub-Saharan Africa	Yes
Mozambique	Sub-Saharan Africa	Yes
Niger	Sub-Saharan Africa	Yes
Rwanda	Sub-Saharan Africa	No
Sierra Leone	Sub-Saharan Africa	Yes
Somalia	Sub-Saharan Africa	No
Sudan	Sub-Saharan Africa	Not Eligible
Togo	Sub-Saharan Africa	Yes
Uganda	Sub-Saharan Africa	Yes
Yemen	Middle East & North Africa	Yes
Lower Middle-Income Countries (LMICs)		
Algeria	Middle East & North Africa	Not Eligible
Angola	Sub-Saharan Africa	Yes
Bangladesh	South Asia	No
Belize	Latin America & Caribbean	Not Eligible
Benin	Sub-Saharan Africa	No
Bhutan	South Asia	No
Bolivia	Latin America & Caribbean	Not Eligible
Cabo Verde	Sub-Saharan Africa	Yes
Cambodia	East Asia & Pacific	No
Cameroon	Sub-Saharan Africa	Yes
Comoros	Sub-Saharan Africa	Yes
Congo, Rep.	Sub-Saharan Africa	Yes
Cote d'Ivoire	Sub-Saharan Africa	Yes
Djibouti	Middle East & North Africa	Yes
Egypt	Middle East & North Africa	Not Eligible
El Salvador	Latin America & Caribbean	Not Eligible
Eswatini	Sub-Saharan Africa	Not Eligible
Ghana	Sub-Saharan Africa	No
Haiti	Latin America & Caribbean	No
Honduras	Latin America & Caribbean	No
India	South Asia	Not Eligible
Indonesia	East Asia & Pacific	Not Eligible
Iran, Islamic Rep.	Middle East & North Africa	Not Eligible
Kenya	Sub-Saharan Africa	Yes

Kyrgyz Republic	Europe & Central Asia	Yes
Lao PDR	East Asia & Pacific	No
Lesotho	Sub-Saharan Africa	Yes
Mauritania	Sub-Saharan Africa	Yes
Mongolia	East Asia & Pacific	No
Morocco	Middle East & North Africa	Not Eligible
Myanmar	East Asia & Pacific	Yes
Nepal	South Asia	Yes
Nicaragua	Latin America & Caribbean	No
Nigeria	Sub-Saharan Africa	No
Pakistan	South Asia	Yes
Papua New Guinea	East Asia & Pacific	Yes
Philippines	East Asia & Pacific	Not Eligible
Samoa	East Asia & Pacific	Yes
Sao Tome and Principe	Sub-Saharan Africa	Yes
Senegal	Sub-Saharan Africa	Yes
Solomon Islands	East Asia & Pacific	No
Sri Lanka	South Asia	Not Eligible
Tajikistan	Europe & Central Asia	Yes
Tanzania	Sub-Saharan Africa	Yes
Timor-Leste	East Asia & Pacific	No
Uzbekistan	Europe & Central Asia	No
Vanuatu	East Asia & Pacific	No
Vietnam	East Asia & Pacific	Not Eligible
Zambia	Sub-Saharan Africa	Yes
Zimbabwe	Sub-Saharan Africa	Not Eligible
Upper Middle-Income Countries(UMICs)		
Albania	Europe & Central Asia	Not Eligible
Argentina	Latin America & Caribbean	Not Eligible
Armenia	Europe & Central Asia	Not Eligible
Azerbaijan	Europe & Central Asia	Not Eligible
Belarus	Europe & Central Asia	Not Eligible
Bosnia and Herzegovina	Europe & Central Asia	Not Eligible
Botswana	Sub-Saharan Africa	Not Eligible
Brazil	Latin America & Caribbean	Not Eligible
Bulgaria	Europe & Central Asia	Not Eligible
Colombia	Latin America & Caribbean	Not Eligible
Costa Rica	Latin America & Caribbean	Not Eligible
Dominica	Latin America & Caribbean	Yes
Dominican Republic	Latin America & Caribbean	Not Eligible
Fiji	East Asia & Pacific	Yes
Gabon	Sub-Saharan Africa	Not Eligible
Georgia	Europe & Central Asia	Not Eligible
Grenada	Latin America & Caribbean	Yes
Guatemala	Latin America & Caribbean	Not Eligible
Guyana	Latin America & Caribbean	No
Jamaica	Latin America & Caribbean	Not Eligible
Jordan	Middle East & North Africa	Not Eligible
Kazakhstan	Europe & Central Asia	Not Eligible
Kosovo	Europe & Central Asia	No
Maldives	South Asia	Yes
Mauritius	Sub-Saharan Africa	Not Eligible
Mexico	Latin America & Caribbean	Not Eligible
Moldova	Europe & Central Asia	No
Montenegro	Europe & Central Asia	Not Eligible
North Macedonia	Europe & Central Asia	Not Eligible
Panama	Latin America & Caribbean	Not Eligible
Paraguay	Latin America & Caribbean	Not Eligible
Peru	Latin America & Caribbean	Not Eligible
Romania	Europe & Central Asia	Not Eligible
Serbia	Europe & Central Asia	Not Eligible
South Africa	Sub-Saharan Africa	Not Eligible
St. Lucia	Latin America & Caribbean	Yes
St. Vincent and the Grenadines	Latin America & Caribbean	Yes
Thailand	East Asia & Pacific	Not Eligible
Tonga	East Asia & Pacific	Yes
Turkey	Europe & Central Asia	Not Eligible

Appendix 2 – Debt sustainability assumptions

The external debt sustainability analysis aims at assessing the evolution of external public debt service in developing economies. In this regard, it relies on two databases: (i) external debt service, as published by the World Bank in its IDS database (October 2021), and (ii) the IMF World Economic Outlook (April 2022) for macroeconomic data.

For each country, external/gross financing needs are estimated annually as the sum of:

- (i) the external public debt service coming due this year, that we assume to be refinanced externally; and
- (ii) a fraction of the primary fiscal deficit, that we assumed to be financed externally, based on 2015-19 historical average.

We implicitly assume the domestic debt service is refinanced domestically, as well as a share of the primary fiscal deficit.

These *external* gross financing needs are assumed to be financed by three “types” of instruments:

- 1) Multilateral debt, in an amount covering (i) the multilateral debt service coming due this year as well as (ii) a share of the primary fiscal deficit based on 2015-19 average;
- 2) Bilateral debt, in an amount covering (i) the bilateral debt service coming due this year as well as (ii) a share of the primary fiscal deficit based on 2015-19 average;
- 3) Commercial debt, in an amount covering (i) the commercial debt service coming due this year as well as (ii) a share of the primary fiscal deficit based on 2015-19 average;

The terms of these new debt instruments are defined as follows:

- For multilateral (1) and bilateral (2) debt, the new issues of each country are assumed to hold an average interest rate, a grace period and a final maturity equal to the country's historical average over 2015-19 (for reference, the cross-country average stands at: 2% for nominal interest rate, 27 years for final maturity and 5 years for grace period).
- For commercial debt (3), the same 2015-19 historical reference is used for each country (average across countries: 6% of real interest rate, 9 years to final maturity with 1 year of grace period).



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