Finance for Development Lab

Mapping external debt vulnerabilities – an update

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Summary

Debt dynamics are deteriorating for developing countries due to repeated shocks over the last four years. The stock and cost of debt have increased significantly, and global interest rates have risen to unprecedented levels. This note analyses the impact of these changes on developing countries.

With simple assumptions on future exchange rates, interest rates, primary balance and growth, it is likely that external debt service burdens will continue to rise until 2024-25. For the median low-income country, external debt service will reach 15% of government revenues in 2023 and only slightly decline¬¬ until 2028. Lower-middle income countries will require particularly large financing in 2024 and 2027, with median debt service to revenues jumping from 12 to 15% in 2024. This is a median, by definition, many countries will have much larger debt cost pressures. We compute that 26 of the countries considered are likely to owe more than 20% of their government revenues in debt service in the coming years. The present value of debt will also increase considerably – more than 5 percentage points in 4 years – if interest rates remain high, as countries roll over their obligations.

Using the IMF/World Bank's risk thresholds as benchmarks for risk levels, we find that a large set of developing countries will face two types of risks. 19 countries already had high external debt levels in 2022 (about 55% of GDP at present value). This does not mean that they are insolvent, but that they will need sustained policy efforts to avoid debt distress. Another 24 countries will face "flow" problems between 2023 and 2028, meaning they will have to pay high external debt service at least once during that period. In aggregate, $75 billion of debt service is at risk per years. Moreover, in our pessimistic scenario, those flow concerns turn into high debt stock before 2028, for 6 countries, often among the larger lower middle income countries, with contagion risks.

Such a problem would be manageable if global conditions allowed countries to refinance their obligations, but markets have been closed and bilateral financing is in decline. No country eligible to the World Bank's concessional arm was able to issue bonds since March 2023. A protracted decline in funds from bond markets and Chinese banks would create a financing gap of $35 billion a year for this group. What sources can replace them? Multilateral institutions disbursed $23 billion in 2021 for the same set of countries, so they could only fill the gap by more than doubling their annual disbursements. Foreign exchange reserves of countries have already dwindled, especially for the most indebted. As a result, preventing flow tensions from turning into over-indebtedness will require coordinated action across debtors and creditors. The aim of this note is to document those trends, but a future companion paper will outline what policy options could match the challenges of such countries.

FDL short notes

Introduction

The rising debt obligations of developing countries are threatening both their development achievements and climate investments. Last month, ahead of the IMF/World Bank Annual Meetings in Marrakech, the President of Kenya, William Ruto, and the presidents of three regional institutions wrote an opinion piece in the New York Times, arguing that the weight of external debt would obstruct the achievement of climate goals in Africa.

Our data indicate that this challenge is not limited to Africa but is general across developing countries. The dynamics of external debt in these countries are deteriorating. Last year, we released a model that forecasted these risks until 2027, and our latest updated covering 2023 to 2028, further confirms that tensions are growing. Both the stock of debt and the flow of debt service[1] have sharply increased since the COVID-19 pandemic and are expected to continue to rise. Interest rates have also risen globally and are expected to remain elevated, even under conservative assumptions. Worse, at high interest rates, market access simply shuts down. Most low and lower-middle-income economies have not been able to roll-over debts coming due.

Despite these tensions, a wave of defaults can be avoided. Defaults proceedings have proven slow and unpredictable. Governments highly value market access and the option of borrowing in the future, even bond markets are largely closed to most developing countries. Additionally, many governments consider their debt stocks to be relatively low, and their main challenge is to refinance their obligations in the coming years at reasonable rates.

Our projections allow us to quantify these pressures and estimate of the breadth and scope of the challenge. This is not a new suggestion. Chuku et al. (2023) have compared similar indices between the HIPC period and now, finding that flow variables are deteriorating, but both arrears and debt stocks remain well below pre-HIPC levels. Many experts (such as Masood Ahmed in an eloquent op-ed) are concerned that a development crisis might precede a debt crisis if countries insist on paying back their debt. However, our findings indicate that in the relatively short run, under a "pessimistic scenario" of high-interest rates and a strong US dollar, a systemic crisis could occur before 2028, in the sense that many relatively large countries would have unmanageable liquidity and solvency stresses unless policies to improve their creditworthiness are undertake,.

[1] This paper focuses exclusively on external debt dynamics. In some places, for ease of reading, we refer to debt service, or debt. In each case, it denotes specifically external public debt service. While public debt in general also generates key tensions, constraints are tighter on external debt, especially for developing countries. Indeed, monetary policy, as well as other tools, can be used to manage domestic debt risks.

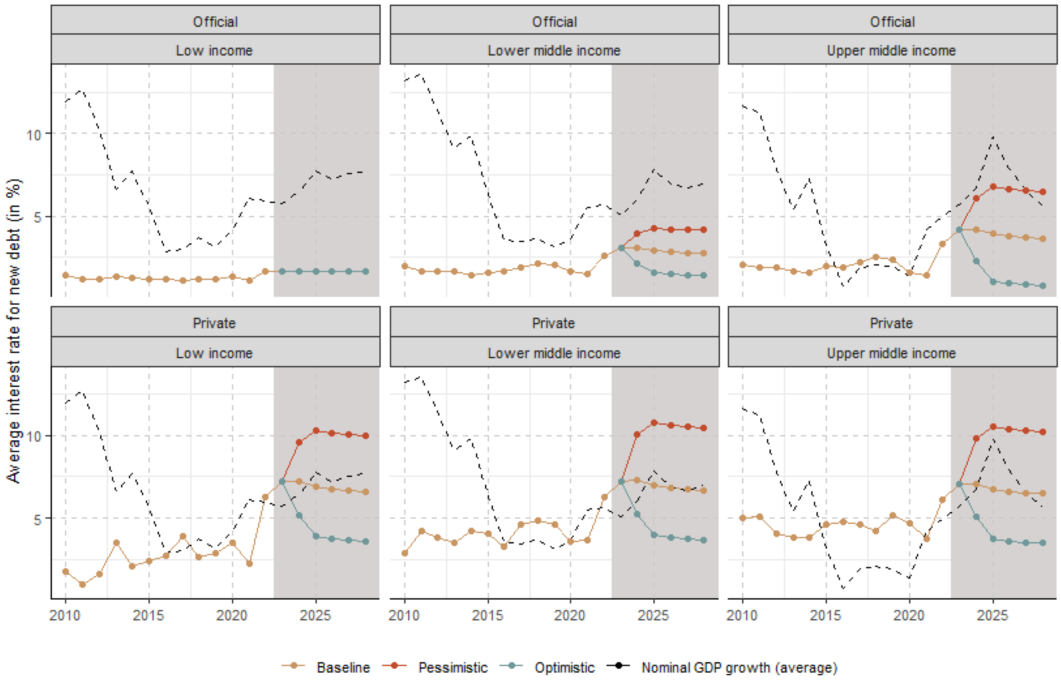
1. Both private and official financing sources became more expensive

This update of our 2022 paper is in line with the previous version and now reflects the adverse scenario that materialised over the past year with high interest rates and a relatively strong US dollar. This has caused costs of rolling over debt for emerging markets to increase significantly, resulting in frontier markets being excluded from bond markets. As a result, they have turned to limited alternative financing sources such as syndicated loans or credit enhanced bonds. Official loans will also become more expensive, at least on the non-concessional sources, such as IBRD loans. We assume that IDA clients are protected from the global rise in interest rates on their official borrowings[2]. The sustainability dynamics are already clear from chart 1, as median nominal growth rates are above official lending rates in all scenarios, but below private lending rates in the pessimistic scenario. This means that the funding mix will drive evolution towards risks of unsustainability. Those are conservative assumptions: as of September 2023, most low and lower-middle-income economies faced yields on their existing bonds above 8%, and many above 10%.

Despite the fact that real rates remain relatively low, they are likely to be just above GDP growth rates, even under the baseline. As a result, the growth rate of the ability to repay (GDP or public revenues) will be barely above the growth rate of debt[3]. In addition, we have also modelled a pessimistic scenario which includes a progressive depreciation of local exchange rates by 5% over 2024 and 2025[4], and an optimistic scenario which reverts to levels seen in 2015-19. As of end-2023, financing conditions resemble more our "pessimistic" scenario, although they could ease as policy rates normalise in advanced economies.

[2] This is a somewhat conservative assumptions: IDA and PRGT loans are fixed and do not rise with global interest rates, but several other bilateral, plurilateral and multilateral sources do adjust their lending rates. However, this remains a credible first approximation for the bulk of borrowing from poor countries.
[3] In this note, we focus less on exports, another key indicator to assess external sustainability. One reason is that while projections of real exports exist, nominal exports depend on future commodity prices, where off-the-shelf forecasts are hard to find.
[4] In contrast to the version of the model published in 2022, we take into account the currency composition of the public debt stock.

Chart1: Average nominal interest rates by income group and scenario



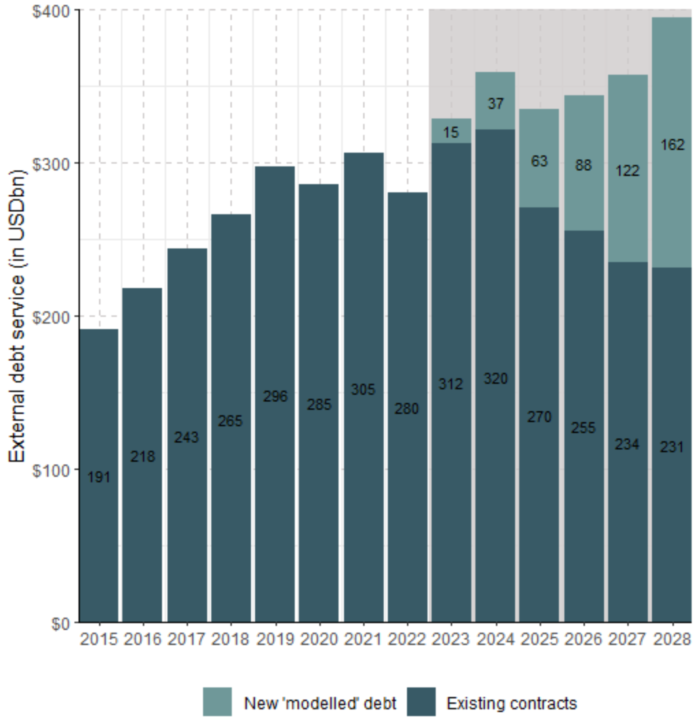
Source: IDS for historical average, authors for projections, WEO for USD nominal growth rates
Note: See technical appendix for the details of each scenario

2. And these dynamics create rising debt service

We use our model to forecast future debt using IMF forecasts to complement information on existing debt commitments. Our dynamic debt sustainability approach allows us to forecast the effect of those evolutions on future external debt service. It takes forecasts of primary balances and GDP growth as given by the IMF World Economic Outlook (October 2023), which determine the evolution of public debt, and tend, on average, to be optimistic on growth and future path of primary balances. Assumptions on financing conditions by external sources stem from the World Bank IDS database[5], which documents existing external debt commitments. Our forecasts then take reasonable assumptions regarding the funding of future financing needs. As a result, we not only obtain information from existing external debt burden from IDS, but also a projected debt burden stemming from our model. As such, in addition to $1700 bn of service on external debt already contracted, we anticipate an additional $480bn of new debt service over 2023-28. This means that our model reveals 28% more debt service than if we were to take a purely static debt service approach as given in IDS[6].

[5] With IDS 2022, covering 2021 as its last year. We will update the results once IDS 2023 is released.
[6] More details on the mechanics of the model are in the appendix. We will release the results in 2024.

Chart 2: Debt from existing contracts and projected by our model under the baseline

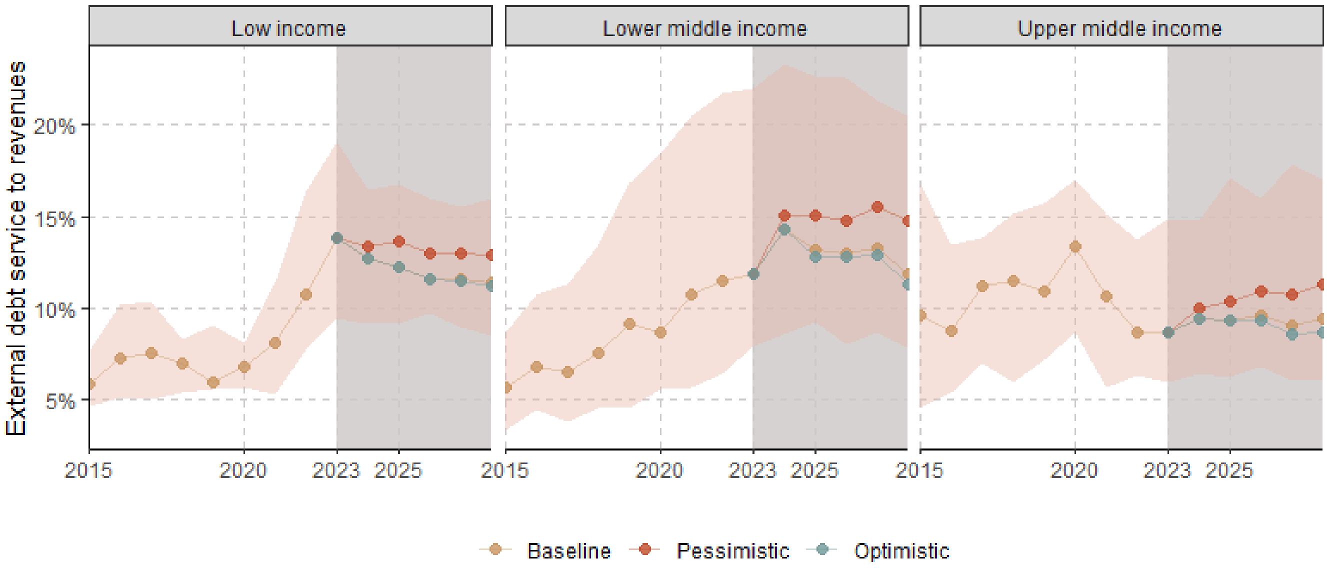


Source: IDS for historical average and "existing" series, authors for "modelled" debt

Our exercise enables us to simulate debt dynamics for 104 countries[7], and provide a comprehensive view of future risks. Our findings reveal that debt service to revenues has increased for all income groups, especially in the wake of the COVID-19 crisis. It is important to note that in the future, different income groups will experience varying trends. Debt service in the median low income country (LICs) will reach its peak in 2023 with 14% of revenues dedicated to external debt service, and then decline slowly through 2028 under the baseline, or remain at high levels under the pessimistic scenario. Even with this possible decline, resources dedicated to external debt service would remain above all historical values. Lower middle-income countries (LMICs) also experienced a rapidly climbing debt service until 2023, with 12% of revenues going to external debt service, but a peak will be reached in 2024, at 15%. Under the baseline, debt service then plateaus at around 13%, but could also continue above 15% under the pessimistic scenario.

[7] Out of 120 countries in IDS. We remove countries for a variety of reasons: lack of data in the WEO or IDS, datapoints that we could not explain and attributed to errors, as well as countries where the situation is to complex and uncertain to fit in this analysis, such as conflict-afflicted countries (Russia, Ukraine, Yemen, etc.). We also exclude China.

Chart 3: External debt service dynamics

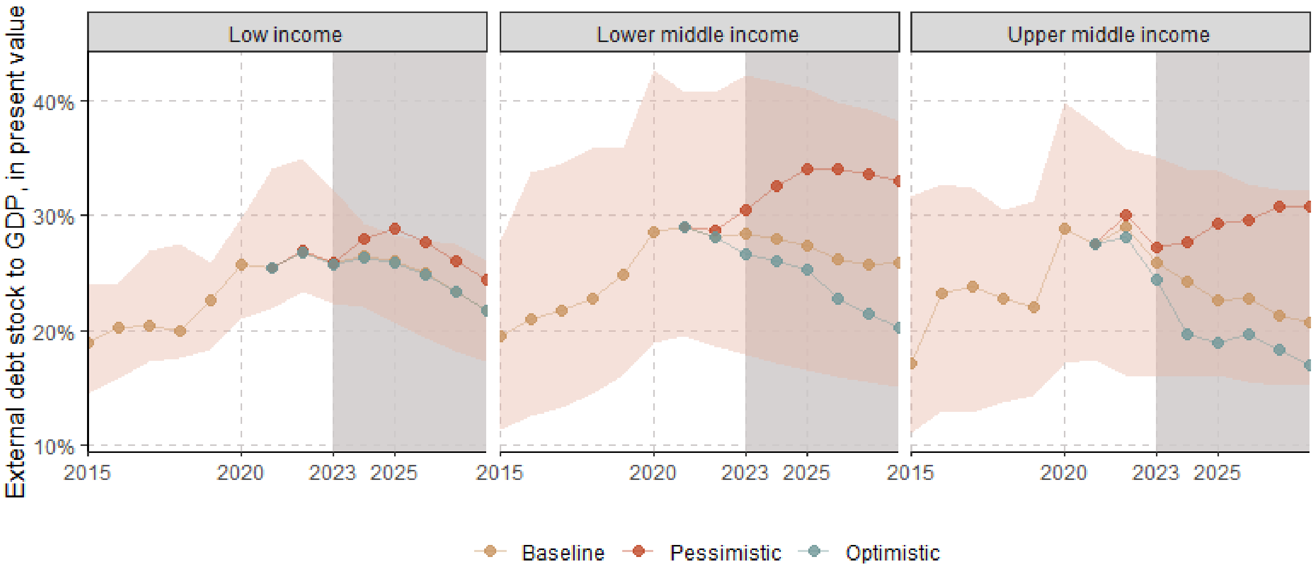


Source: Authors' calculations.
Note: The shaded area is the interquartile range for the baseline scenario. In other words, under baseline, 75% of LMICs have debt service to revenue ratio between 7.5% and 22.5% in 2023

Beyond medians, a subset of countries faces acute difficulties. The shaded area covers the interquartile range – meaning that a fourth of countries are above the shaded levels. This represents 11 out of 46 LMICs in our sample. This group will have a debt service above 23% of their revenues in 2024 and 2025. A minority of LICs is also not spared, with 5 countries (over 20) above 18% of revenues. In other words, in the best case scenario, debt service will plateau in the coming years, at the very least forcing the median country to divert significant budgets to external debt service everywhere. Note that the mechanics of our scenarios also exclude roll-over tensions: financing is supplied at any interest rate. Next section examines the consequences of a market shutdown.

The composition of debt in low-income and upper-middle-income countries offers some protection against rising interest rates in the US, but for different reasons. Low-income countries may witness a slight improvement in dynamics after 2023 under our baseline, as their debt refinancing strategy relies more on official sources of finance whose cost less dependent on the evolution of global interest rates. Rising rates are painful for UMICs but they start from a lower level, creating fewer concerns than LMICs. Furthermore, our pessimistic scenario embeds "spreads": rates rise faster for countries with worse ratings, which explains why the deterioration is most evident for LMICs. So-called "frontier markets" are the most affected in a liquidity crisis: they do suffer from the transmission of US interest rates to their borrowing costs, but in addition their investor base is thinner than emerging markets with a longer track record of borrowing from bond investors.

Chart 4: External Debt to GDP ratios, in present value terms



Source: Authors' calculations

After an explosive path from 2015 to 2021, we expect debt stock to moderate and decline under the baseline. If debt service rises above a given share of government revenues, it raises a "flow" concern. In contrast, the level of external debt stocks in relation to GDP (in present value terms) indicates possible "stock" concerns. The dynamics of this variable depend primarily on future primary balances on the one hand and "r-g" on the other, that is the difference between the interest rate and GDP growth. Since primary balances increase, external debt stocks decline under baseline for LICs and UMICs, while external debt in LMICs is expected to remain stable However, a shock to exchange and interest rates, as included in our pessimistic scenario, would derail this decline: external debt to GDP ratios would remain elevated, peaking in 2025 in LMICs and UMICs at about 35% of GDP.

3. Countries at risk of breaching prudential thresholds

Should we be concerned by these evolutions? Debt is deemed unsustainable when fiscal policy is not able to react enough to a rising stock of debt, thus creating uncontrollable dynamics (Willems and Zettlemeyer, 2022). Interest rates are rising, but remain close to growth rates for most countries, limiting such dynamics. A relatively low stock of external debt also provides time to adjust fiscal policies. However, roll-over risks can also occur, especially with bonds financing, where large redemptions can be difficult to refinance. Even in the absence of large, sudden redemptions, volatility in global markets and investors' beliefs can lead to a run on sovereign debt which would prevent the government to repay. Those crises can be "fast" : a country unable to issue bonds or borrow enough from other sources, at any interest rate, can suddenly default (Cole and Kehoe 2000). Crises can also be slow: governments issue debt at higher rates as expectations progressively worsen (Calvo, 1988 and Lorenzoni and Werning, 2019).

The IMF and the World Bank's Debt Sustainability Framework for Low Income Countries (LIC-DSF) devised indicative thresholds for those risks. We will use those indicators to determine whether a country is in a "risky zone", and whether the risk stems from flow considerations (akin to a liquidity concern), or stock consideration (akin to a solvency concern). While imperfect, those indicators are also directly practically relevant: the IMF and the World Bank considers them explicitly to assess the ability of a debt restructuring to restore sustainability, the level of concessionality in World Bank loans, as well as to determine debt limit policies. Table 1 reproduces the IMF/World Bank indicators. Thresholds are determined by countries' "Composite Indicator", which meshes together variables predictive of a countries' capacity to repay[8], also called "Debt Carrying Capacity". This indicator is only computed for countries subject to the LIC-DSF, so we set IBRD countries' debt carrying capacity to "strong".

Table 1: IMF/World Bank's Debt Carrying Capacity

Debt carrying capacity (CI classification)	PV of PPG external debt in percent of		PPG external debt service in percent of	
	GDP	Exports	Exports	Revenue
Weak	30	140	10	14
Medium	40	180	15	18
Strong	55	240	21	23

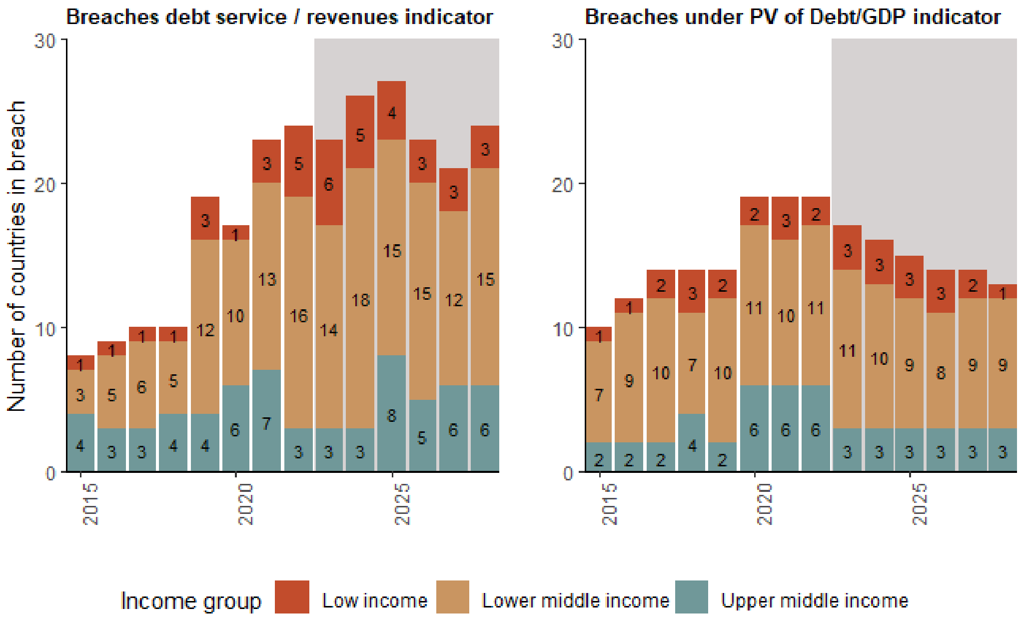
Source: DSF Guidance Note

In this brief note, we focus on a single indicator for each type of risk. We will consider that a country is at risk of a solvency crisis (resp. liquidity) if it crosses one of its thresholds for debt at present value over GDP (resp. debt service to revenues) under the baseline, as we do not have a good forecast for future nominal exports[9]. The results are striking: stock level risks peaked during the COVID crisis at 19, but are stagnating and expected to decline with current forecasts. On the other hand, flow risks are only increasing until 2025, especially for LMICs, with a total of 27 countries expected to be at risk by 2025.

[8] Namely: CPIA, real GDP growth, remittances, reserves cover and its square, and world growth. The IMF operational guidance offers details on those risk assessments. We also paste the corresponding thresholds in the appendix.

[9] A forthcoming working paper will use a richer set of variables, including variables relatives to exports..

Chart 5: comparing breaches under liquidity and solvency indicators



Source: Authors' calculations

Table 2 presents our main results at the country-level, although each case must be taken with a grain of salt. We consider countries that have already crossed the thresholds for debt to GDP (at PV) in 2022 as being more affected by solvency problems, which can be solved mainly through restructuring. It is not surprising that countries like Ghana, Zambia, and Congo feature in this list, as they are in debt distress, but it is also worth noting that even countries like Mauritania or Lesotho are over this threshold despite being considered as "moderate risk of debt distress" by the IMF/World Bank assessment[10]. These caveats notwithstanding, which speak to the fact that this is not meant as a diagnostic for each single country, indicate that this group tends to be of lower income and smaller economies. For those, in addition, a rescheduling strategy might work as well, depending on their financing conditions.

Flow problems affect more countries, which are also often relatively large. After filtering out countries already over their stock thresholds in 2022, we focus on countries with high debt service during the period, crossing at least once the debt service threshold, as well as countries expected to cross their stock thresholds in the next five years. 22 countries are in this case in the baseline, and 24 in the pessimistic scenario. In addition, six countries could enter the insolvency zone in the next five years under pessimistic conditions: Angola, Côte d'Ivoire, El Salvador, Kenya, Papua New Guinea and Tunisia are driven to high levels of public debt by the rise in interest rates. In other words, without policy actions, simply rolling over their debt at current interest rates would turn their current "flow" difficulties into solvency risks. As noted above, markets could also not allow countries to reach this point and stop offer refinancing before, thus triggering a default.

[10] Our model is often too mechanical to take into account some recent changes: Mauritania for example recently rebased its GDP, lowering its risk level.

Two examples are useful to make things concrete. For Kenya and Côte d'Ivoire, those pressures stem from large bond redemptions in 2024 and 2025. In the case of Kenya, the government is actively mobilising sources of finance, including multilateral, private and bilateral, to refinance them. In the case of Côte d'Ivoire, rated as moderate risk by the IMF/WB DSA, and which markets price at 6% yield, the "strong track record of reform and active debt management"[11] provide reasons for optimism. Liquidity tensions thus could be resolved, but will require considerable policy mobilisation. **A possible option to avoid a roll-over crisis, will be to offer the possibility of rescheduling some obligations to spread out the weight of debt service over several years, given that those 22 countries are still solvent.**

[11] IMF/WB DSA for Côte d'Ivoire, July 2023: https://www.elibrary.imf.org/view/journals/002/2023/204/article-A002-en.xml

Table 2: Countries at risk of debt distress according to our Debt Sustainability Analysis

Countries breaching in 2022
present value of external PPG debt to GDP

Income Group	Country	IMF-WB DSA Risk
Low income	Guinea-Bissau	High
	Mozambique	High
Lower middle income	Bhutan	Moderate
	Cabo Verde	Moderate
	Congo, Rep.	In debt distress
	Djibouti	High
	Ghana	In debt distress
	Lao PDR	In debt distress
	Lesotho	Moderate
	Mauritania	Moderate
	Mongolia	
	São Tomé and Príncipe	In debt distress
	Zambia	In debt distress
Upper middle income	Dominica	High
	Grenada	In debt distress
	Jamaica	
	Maldives	High
	Montenegro	
	St. Vinc. and Gren.	High

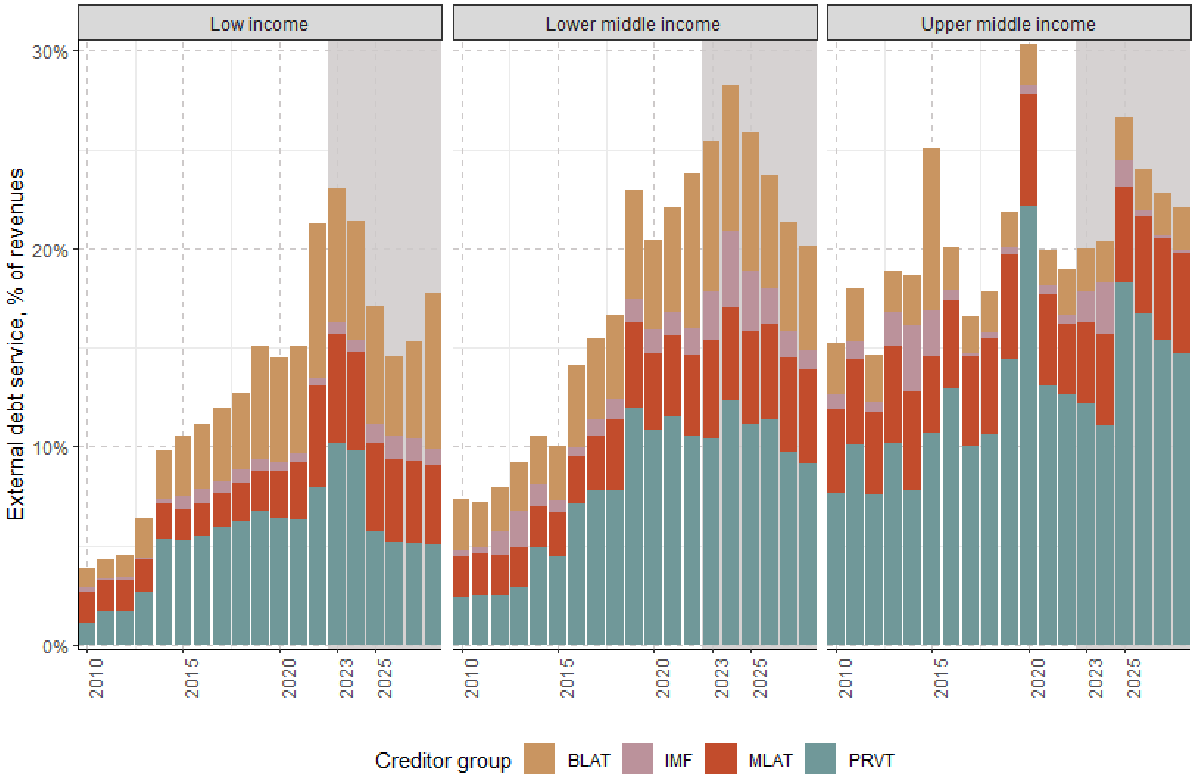
Countries breaching in 2023 - 2028
Debt service and/or stock

			Baseline	Pessimistic	
Income Group	Country	IMF-WB ..	Flow only	Flow only	Stock breach
Low income	Central African Rep..	High	✓	✓	
	Chad	High	✓	✓	
	Ethiopia	High	✓	✓	
	Gambia, The	High	✓	✓	
	Madagascar	Moderate	✓	✓	
	Togo	Moderate		✓	
Lower middle income	Angola		✓		✓
	Benin	Moderate	✓	✓	
	Cameroon	High	✓	✓	
	Comoros	High	✓	✓	
	Côte d'Ivoire	Moderate	✓		✓
	Egypt, Arab Rep.		✓	✓	
	Guinea	Moderate	✓	✓	
	Jordan		✓	✓	
	Kenya	High	✓		✓
	Pakistan		✓	✓	
	Papua New Guinea	High	✓		✓
	Senegal	Moderate	✓	✓	
	Tajikistan	High		✓	
	Tanzania	Moderate		✓	
	Tunisia		✓		✓
Upper middle income	Dominican Republic		✓	✓	
	El Salvador		✓		✓
	Gabon		✓	✓	
	North Macedonia		✓	✓	

Important caveat: This is purely an indicative list based on a general analysis over all countries, without taking into account specificities of each country. The generality of the analysis is an advantage to obtain a global picture, but also a drawback, as we might miss important specificities. We therefore caution against interpreting it as a statement over any specific country.

It is important to caution that this list is indicative. However, the magnitudes are useful to assess the scale of the problem. This group of countries with “flow problems” has an aggregate GDP of $2 trillion in 2022, and a total external debt of $700 billion. Its debt service is (by selection) large, but also front-loaded, with a peak of repayments of 25% of its government revenues to repay as early as 2024 (Chart 6). This is acute for LMICs, but also LICs, where 2023 and 2024 have particularly high ratios.

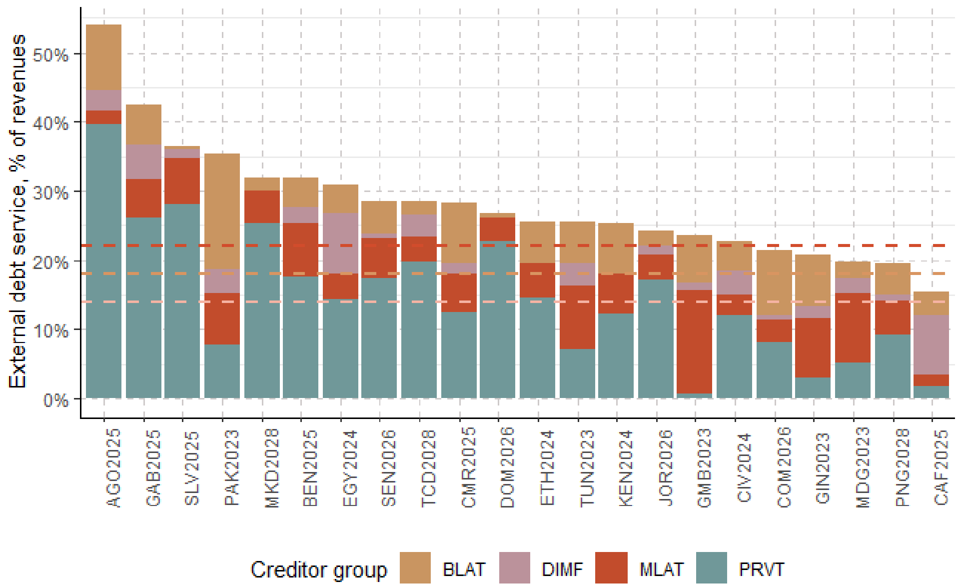
Chart 6: Debt walls by creditors and income groups *for liquidity breachers*



Note: Chart 6 is expressed in weighted average, i.e. total debt service of the 22 liquidity breachers divided by total government revenues

The peak in debt service due varies by country, but is a generalised problem. The median level of debt to revenues for those countries is 23% in the baseline for breachers in 2024, and remains above 21% until 2026. As indicated by Chart 7, which looks at the maximum level of debt service to revenues ratio for each country under liquidity breach in the baseline, the peaks are well above the thresholds defined in the Debt Sustainability framework, for many of these countries. While some countries can sustain a one-time breach, it depends on the ability of markets or other sources to refinance.

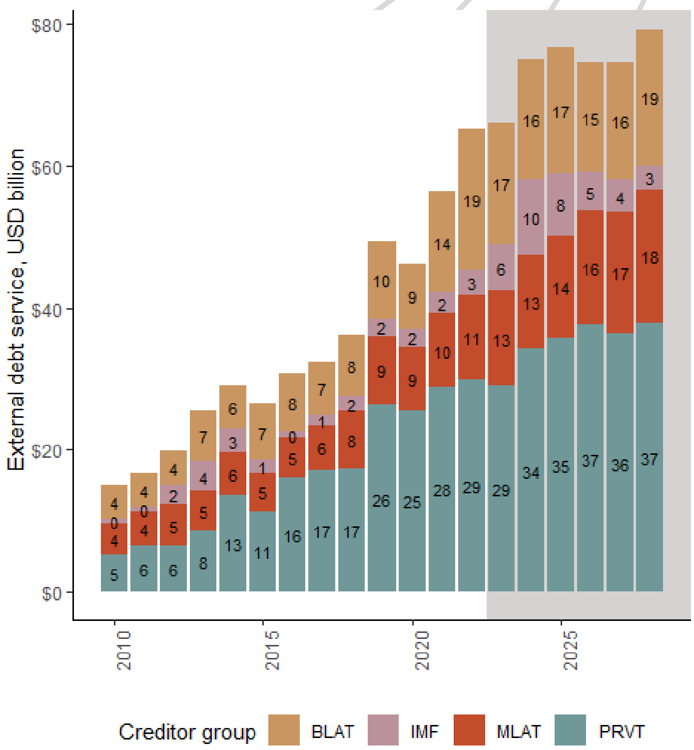
Chart 7: Peak debt service to revenues for breaching countries



Note: The three dotted lines show the threshold for countries at weak (14% of revenues), medium (18%) and strong (23%) debt carrying capacity.

Aggregated together, large amounts of debt service are at risk, making the problem, even if mainly of liquidity, a systemic issue. Aggregate debt service payments over all income groups represent more than $70 billion per year (Chart 8). This sum remains stable between 2023 and 2028, with its decline in chart 6 primarily due to projected growth of GDP and government revenues in those countries. Among those $70 billion per year, half is due to private creditors, and a quarter to bilateral creditors.

Chart 8: Debt service at risk under the baseline



4. At a time when new loans are scarce

Large debt service obligations are an indicator of *a potential liquidity* crisis, but *one that* would materialise only if rolling-over debt became impossible. This is precisely what we are witnessing. Since 2023, countries at the "frontier" have been unable to tap bond markets, illustrating the risk of a rapid-onset liquidity crisis. Most countries have been entirely excluded from bond markets since March 2022, whilst other private lenders have only partly filled the gap. Meanwhile, China has been a major provider of net positive flows in the 2010s, which have turned negative in 35 IDA countries by 2021, probably worsening in 2022 as new commitments continued to decline[12]. Refinancing existing obligations is therefore not only a problem with regards to price, but also to quantity. Crucially, we have assumed so far that each creditor group continues to provide sufficient new debt to refinance existing service, and then additional funding to cover a primary deficit. In other words, supply always matches demand. Given financing conditions since 18 months, this is clearly not the case: at some interest rate, markets simply shut down and do not supply loans.

In this second set of scenarios, even countries with relatively good fundamentals can be subject to a crisis. We model this phenomenon by assuming a (realistic) decline in new bilateral loans and limited private refinancing. We use credit ratings to project the magnitude of the decline[13]. In this section, we will focus on IDA-eligible countries and blend countries, which have suffered the largest financing shock in the past year. Those countries need to raise $80 billion in 2023, growing to $106 billion in 2028, about a third from each external source (bilateral, multilateral, official). A fall in bilateral and market sources as we project them would lead to a financing shortfall of $30 billion in 2023, growing to $42 billion in 2028. This is the scale of the liquidity crisis. What are possible options for governments to manage such an external financing shock on their own?

We can examine two of them: reserves and fiscal restraint. Using reserves is possible, but can lead to further depreciation, and monetary contraction. Reserves data are imperfect, and several of countries in question are in currency unions, making an assessment difficult. With this caveat, it seems that the reserves situation of countries in breach, either of their liquidity or solvency thresholds, provides little breathing room: the median country in breach has only the equivalent of 2 years of debt service in reserves, against 6 in 2017. For comparison, countries with no breach have reserves covering 10 years of debt service. Fiscal austerity is also a possibility: in aggregate, the financing shortfall represents 1% of GDP for those countries, which should be achieved as the liquidity gap hits. This figure is equivalent to the

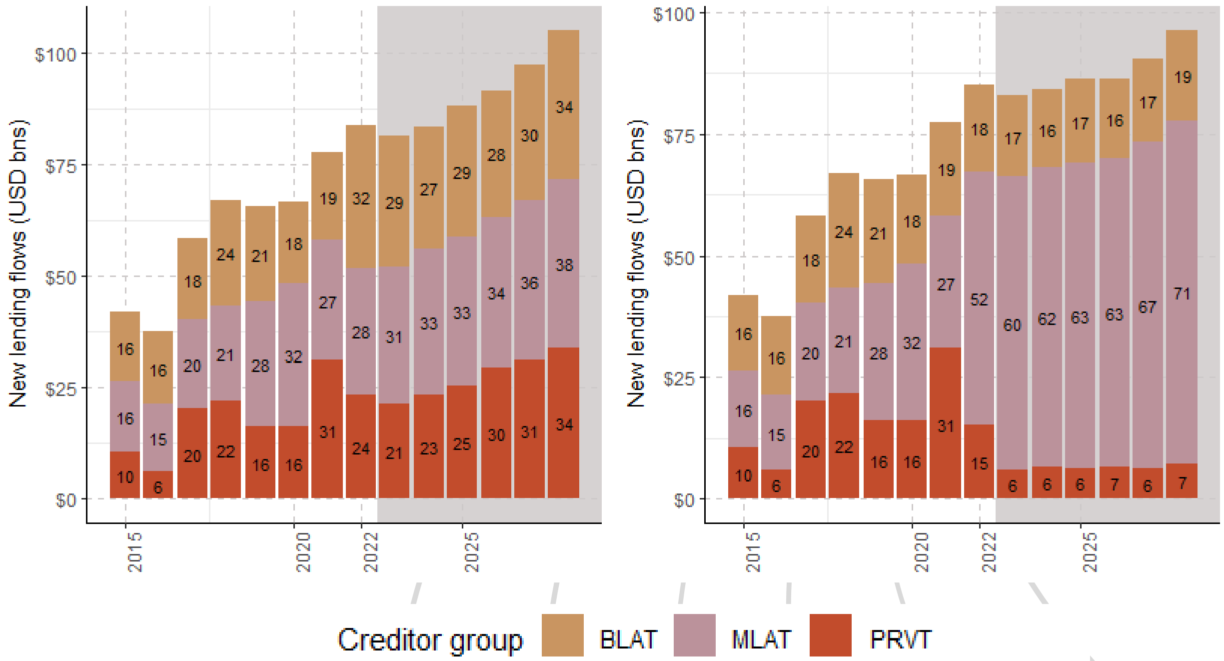
[12] Though less dramatically than as usually been believed, as shown by Malik et al. (2023). However, as is relevant in this section, the large share of new loans do not provide new net positive financing but only help refinance debt service for existing loans.

[13] Specifically, we use ratings to determine the level of market access. An investment grade country is not affected by loss of financing, while each notch reduces projected new private financing, with a maximum reduction of 90% for C-rated countries. Indeed, even though bond markets are closed, we consider that countries access loan markets. Appendix table 2 provides details.

entire adjustment projected by the IMF over 2023-28, and given that redemptions are often bunched in one year, well too sudden to manage.

Additional multilateral financing, from the IMF, the World Bank, or other development banks, would help. Notice that this "baseline" scenario already embeds a growth of multilateral financing (both concessional and non-concessional) of about $10 billion per year compared to 2022. Now assume that access to both bilateral and private finance is severely limited. In this scenario, only a drastic expansion of multilateral finance would maintain positive net flows to those countries, jumping to $60 billion per year in 2023 from $27 billion in 2021. Doing the same exercise with IBRD countries included does not fundamentally affect results, as the largest IBRD clients have good ratings and relatively little bilateral loans. Is such a sudden and drastic expansion of multilateral financial safety net possible? It seems unlikely: current evolution plans would increase by about $30 billion a year (cumulating $200 billion by the end of the decade) the lending ability of MDBs for all countries, whereas Chart 9 below only covers IDA countries. Even adding IMF lending capacity increase would be well below the challenge.

Chart 9: New lending flows under "Baseline" and "Financing shock" for IDA and blend countries



Conclusion

This note sought to provide a comprehensive landscape of external fiscal tensions in developing countries and emerging markets, through the lens of a simple model of Debt Sustainability Analysis. Under relatively conservative assumptions, where interest rates increase and a moderate depreciation of exchange rates, 24 countries face high debt service “walls” putting them at high risk of debt distress, precisely at the moment when financing has stopped being available. In addition, 19 other countries have high external debt stock, some of which would be manageable without debt restructuring, but will be more difficult in a stressed environment. The current landscape, with high needs for refinancing combined with a reduced supply of loans – bilateral or private – and bonds lead to dangerous outcomes: costly defaults could occur even in solvent countries.

Can lenders of last resort support borrowing countries in this crisis? The magnitude of the gap is large, compared with existing lending capacity: in this global exercise we obtain a $30 billion shortfall in 2023, rising to $42 billion in 2028. Countries have coped by reducing their reserves, tightening fiscal policy and tapping domestic markets. Those strategies which impact growth by reducing public or private sector demand. They are not sustainable as buffers are progressively depleted. Countries will require a global strategy adapted to their needs, with a mix of new official finance, debt obligations rescheduling, and strong macroeconomic management. The specifics of such a proposal are outlined in a separate note.

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Appendix 1 – List of countries included in the analysis

We consider 104 countries in our analysis. We excluded (i) China because its size would overwhelm any aggregate figures, and its dynamics are different from all other developing countries; (ii) a number of countries in conflicts where projections are too uncertain and (iii) Countries with no or limited data in IDS/WEO

Appendix Table 1

List of countries

Income Group	Lending Category: IDA	Lending Category: Blend	Lending Category: IBRD
Low income	Burkina Faso, Burundi, Central African Republic, Chad, Congo, Dem. Rep., Ethiopia, Gambia, The, Guinea-Bissau, Liberia, Madagascar, Malawi, Mali, Mozambique, Niger, Rwanda, Sierra Leone, Togo, Uganda		
Lower middle income	Bangladesh, Benin, Bhutan, Cambodia, Comoros, Côte d'Ivoire, Djibouti, Ghana, Guinea, Haiti, Honduras, Kyrgyz Republic, Lao PDR, Lesotho, Mauritania, Myanmar, Nepal, Nicaragua, São Tomé and Príncipe, Senegal, Solomon Islands, Tajikistan, Tanzania, Vanuatu, Zambia	Cabo Verde, Cameroon, Congo, Rep., Kenya, Nigeria, Pakistan, Papua New Guinea, Uzbekistan, Zimbabwe	Algeria, Angola, Bolivia, Egypt, Arab Rep., Eswatini, India, Jordan, Mongolia, Morocco, Philippines, Tunisia, Vietnam
Upper middle income	Maldives, Tonga	Dominica, Fiji, Grenada, St. Lucia, St. Vincent and the Grenadines	Albania, Argentina, Armenia, Azerbaijan, Belarus, Belize, Bosnia and Herzegovina, Botswana, Brazil, Bulgaria, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Gabon, Georgia, Guatemala, Indonesia, Jamaica, Kazakhstan, Mauritius, Mexico, Moldova, Montenegro, North Macedonia, Paraguay, Peru, Serbia, South Africa, Thailand, Türkiye

Appendix Table 2:

Private lending remaining after a shock

	Lending Category		
Rating	IDA	Blend	IBRD
Baa			100%
Ba	66%	66%	100%
B	33%	33%	50%
C	10%	10%	10%
No rating	10%	10%	10%

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 mainly on two databases: (i) external debt service, as published by the World Bank in its International Debt Statistics database (October 2022), and (ii) the International Monetary Fund's World Economic Outlook (October 2023) for macroeconomic data.

We also use:

- IMF BoP and African Regional Economic Outlook for reserves
- Existing DSA list for assessments of Debt Carrying Capacity
- Cbonds for an update on bonds issued in 2022
- WDI for a number of macroeconomic series

Financing assumptions:

In each year, countries need to issue new debt to refinance their external needs. Those are the sum of:

(1) External debt service due and (2) primary deficit financed externally.

We assume that (1) is fully refinanced externally, and (2) is financed partly externally and partly from domestic sources.

The share of primary deficit financed externally is equal to the share of external debt in general government debt (comparing WEO public debt with IDS external debt). When the primary balance is in surplus, the surplus is affected to the same sources.

The same procedure applies to each of the three sources: multilateral, bilateral and private.

Financial conditions:

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

- We use conditions for new loans in 2015-2019 as our "reference rate", for each source, official (r_o) and private (r_p). We then apply the following procedure:
    - We compute a "spread" between r_o, r_p and the US interest rate. Future interest rates are equal to US interest rates between 2023 and 2028.
    - US interest rates are projected to revert back to 3% nominal linearly (1% real + 2% inflation), following IMF (2023).
- We "protect"' IDA eligible countries from the spread by assuming that the official rates they borrowed at during 2015-19 apply in 2023-28.
- This describes the "baseline". The two other scenarios add some assumptions.

SCENARIOS

1. **Pessimistic:**
    a. *Exchange rates:* 5% depreciation in 2024 and an additional 5% depreciation in 2025.
    b. *Interest rates:* +200 bps in 2024 and +300 bps from 2025 to 2028.
    c. *Spreads:* we shock private interest rates by increasing the spreads (as determined by Moody's rating) by 300bps from 2024 to 2028.
2. **Optimistic:**
    a. *Exchange rates:* no shock.
    b. *Interest rates:* -200 bps in 2024 and -300 bps from 2025 to 2028.
    c. *Spreads:* no shock.

ADDITIONAL NOTES:

- To estimate Pakistan's GDP in USD for the missing years (from 2023 to 2028) in the WEO we use IMF's Article IV information on Current Account Balance in USD and as a share of GDP in USD.
- Given the net flows of multilateral, bilateral and private external debt accumulated over a given period, we compute the share of fiscal deficit that will be covered by each type of debt. If accumulated net flows of all debt types are zero, then the shares for all types are assumed to be 1/3.
- We compute a per-country exchange rate index over time. This index tracks a basket of currencies whose weights are given by the PPG debt currency composition in the last year before the simulation starts.
- We include the 2022 bond issuances in the private debt redemption profile, if bonds raised in 2022 are used to cover debt service on private debt in 2022 and - if any fund left - primary fiscal deficit.

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