

Paper No. 03/2024

Navigating Debt Sustainability: An In-Depth Analysis of the IMF's Debt Sustainability Framework and its Critique*

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Abstract

This paper evaluates the IMF's debt sustainability analyses (DSAs), delving into their methodologies and implications and highlighting their problems. Since 2002, the DSAs have been the cornerstone of the IMF programs, providing the primary analytical tool to justify and determine the paths and targets specified. Although the DSAs evolved significantly over time, they have severe foundational problems. They rely heavily on strong assumptions and staff judgments, and thereby, they are primarily non-transparent.

Secondly, there are significant issues regarding the conduct of DSAs. They have grown excessively complex, hindering consensus on components without necessarily improving assessment quality. Thirdly, the IMF makes very high-stakes decisions with low precision, relying on persistent over-optimism in growth forecasting and paving the way for tighter fiscal policies.

Fourthly, the debt dynamics equation of DSAs is inconsistent with stock flow dynamics because it focuses heavily on the primary balance as the main driver. Fifthly, the IMF's framework does not pay enough attention to the underlying reasons for accumulating external debt in developing nations. It often treats external borrowing as a substitute for domestic debt without accounting for the asymmetric international financial architecture.

JEL Classification:

F34; H63; F33

Key Words

Debt Sustainability Analysis, Public Debt, Debt Crisis, Debt Sustainability Framework, Sovereign Risk and Debt Sustainability Framework, Debt Dynamics Equation, Risk Rating, IMF, Debt Distress

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*The authors thanks Jayati Ghosh and C. P. Chandrasekhar for their constructive feedback and insights on earlier drafts of this article. We also extend our gratitude to the participants of the Sovereign Debt and Climate Finance Conference, held on May 3–5, 2024, at PERI, for their questions and critiques. All remaining errors are our own.

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1 Introduction

Developing nations have experienced multiple debt cycles. The period after 2002 represents a distinct episode in the history of developing nations. During this period, both private and public debt, in the form of external and internal debt, increased significantly. However, nearly all regions and income groups among developing nations followed suit. Remarkably, the scale of global public debt has increased more than fivefold since 2000 (UN, 2023).

In the first phase of this cycle, despite the rapid accumulation of debt, the relatively high economic growth in developing countries and the stability of their exchange rates helped prevent the external debt-to-GDP ratios from reaching alarming levels, at least until 2014 for some countries and, more recently, for others¹. After 2008-09, persistently low interest rates in advanced economies, coupled with an increasing willingness among private lenders to extend credit to developing nations, created a conducive environment for external debt accumulation. In fact, many developing countries even began issuing substantial amounts of bonds denominated in their own currencies in the international bond market. However, this phase of global expansion started to wane around 2014, just after the Federal Reserve's indications of tapering². This was associated with diminishing global risk appetite for the liabilities of developing countries and mounting pressure on developing countries' currencies. Consequently, developing countries experienced more erratic economic growth and higher volatility in their exchange rates.

From 2016 onward, the Federal Reserve initiated a series of interest rate hikes and gradually

¹ Although some developing countries experienced significant negative growth during the global crisis of 2008-09 and some experienced a slowdown in their growth, many did not experience a financial or real sector collapse (Comert and Colak 2018).

² It seems that growth cycles in these countries were, to a certain extent, synchronized with capital flow cycles. Capital inflows in these countries (some of which were in the form of direct borrowing by the private sector) contributed to credit expansion, stability of exchange rates, and declining trends in domestic interest rates, which supported their relatively high growth performance. However, as these flows began to wane out—particularly around 2014, following the Federal Reserve's indications of tapering—this trend ended.

commenced quantitative tightening, further exacerbating the situation for many developing countries. The emergence of the COVID-19 pandemic and its aftermath further worsened the debt sustainability challenges faced by developing countries. In this context, the global economic recession and the substantial expenses necessary for healthcare and social support due to the COVID-19 shock heightened the need for fiscal expansion. Subsequently, increases in commodity and food prices, in addition to supply chain disruptions, resulted in inflationary pressures worldwide.

The Federal Reserve and many other major central banks in advanced countries rapidly increased policy rates in response to rising inflationary pressures. Adding to the challenge, beginning in mid- 2022, the Federal Reserve resumed quantitative tightening. These not only increased the US market interest rates but also raised interest rates on new and existing debt for developing countries to varying extents. This led to financial reversals and increased demand for foreign currencies, further depreciating the currencies of these nations and intensifying inflationary pressures and debt-related problems in developing countries (Chandrasekhar and Ghosh, 2022), within an environment where macroeconomic indicators were already deteriorating.

Currently, many developing countries are struggling with debt servicing issues, with some teetering on the brink of default and some already having defaulted. Based on debt sustainability analyses of the IMF and the World Bank, approximately two-thirds of low-income countries are grappling with considerable debt distress, among which 12 countries are classified as “in debt distress”, and 28 countries are classified under “high risk of external debt stress” (Chuku et al., 2023)³. Notably, a recent World Bank (2023) report indicates that around 60 percent of all emerging and developing countries face similar challenges. In response, countries like Argentina and Ecuador have restructured their debt using IMF-supported mechanisms, while others like Lebanon and Surinam have defaulted (UN Background Paper, 2023).

While the general indicators may not appear as dire as during the pre-Heavily Indebted Poor

³ See the next section for the details of these classifications.

Countries (HIPC) era⁴, experts, including UNCTAD (2023), warn of a looming developing country debt crisis while others convincingly argue that “since the start of the COVID-19 pandemic, much of the global South has been immersed in a debt crisis of a breadth and depth not seen since the early 1980s” (Fischer and Storm, 2023: 5). The foreseeable global trends do not bode well for developing nations. Geopolitical risks, such as the Ukraine-Russia war and ongoing conflicts driven by Israel’s aggression in the Middle East, pose significant threats to energy and food prices, which could be exacerbated by a surge in financial speculation in commodity markets. Adding to the complexity, financial instruments have become more intricate, and creditors are more heterogeneous today, making it challenging to discern the true nature of risk exposure for developing countries. Furthermore, the future appears even more daunting when considering the overlapping challenges of climate change and increasing debt stress.⁵

Historically, as in the current period, debt-driven pressures in emerging markets consistently heightened the roles of the IMF (and World Bank) in these countries. During debt crises, the IMF and World Bank have enforced fiscal and monetary tightening policies in these countries in the name of resilience, structural changes, and debt sustainability. For example, a very recent IMF (2024) announcement on the IMF program for Egypt states that “[k]ey economic reforms include a move to a flexible exchange rate system, tightening of monetary and fiscal policies, and a slowdown in infrastructure spending to reduce inflation and preserve debt sustainability while fostering an environment that enables private sector activity. These policies will help preserve macroeconomic stability, restore confidence, and allow Egypt to manage the challenges associated with recent external shocks”. In many cases, in the past, these programs ended up with disastrous social and economic consequences.

Since its introduction in 2002, the IMF's "debt sustainability framework" (DSF) has served as the primary analytical tool to justify and determine the paths and targets of these programs. Initially, the IMF introduced a single framework. Later, this framework became specifically

⁴ The Heavily Indebted Poor Countries (HIPC) Initiative is a program initiated by the International Monetary Fund (IMF) and the World Bank in 1996 to provide debt relief and low-interest loans to developing countries with high levels of poverty and debt overhang.

⁵ Developing countries are increasingly vulnerable to climate-related threats, further destabilizing their debt sustainability challenges by causing more volatile economic growth and necessitating greater public investment (UNCTAD, 2022).

tailored for market-access countries (MACs) and was designated as MAC DSF. This change occurred after the introduction of the LIC DSF for low-income countries (LICs). The DSFs have evolved for two decades in response to numerous internal and external critiques, although their conceptual base, analytical underpinnings, and core tools have remained the same.

Given the increasing debt-related challenges in developing countries, understanding the underlying assumptions, inputs, and implications of DSFs is crucial. This paper comprehensively evaluates the IMF's debt sustainability approach, scrutinizes its methodology, assesses its implications, and proposes some preliminary policy recommendations.

The main findings of this paper are as follows. Firstly, DSAs have serious foundational problems. They heavily rely on strong assumptions and staff judgments, and are mostly non-transparent. The reliance on mysterious models and staff judgments undermines the replicability of DSAs. The IMF approach to debt sustainability and debt dynamics equations puts all the burden of adjustment onto the primary fiscal balance in achieving debt sustainability, which justifies the requirement of fiscal austerity, even though due to the implicit assumption of the predictability of the future (disregarding deep uncertainty), DSAs are little more than educated guesses. Secondly, there are significant concerns regarding the conduct of DSAs. They have grown excessively complex, hindering consensus on components without necessarily improving assessment quality. Moreover, the undue focus on total public debt within MAC DSAs disregards the predominant issue of external or foreign currency-denominated debt in developing countries, potentially imposing unjustified costs on many groups in these countries. Thirdly, the IMF makes very high-stakes decisions with low precision, based on persistent over-optimism in growth forecasting, which paves the way for the implementation of tighter fiscal policies. Also, the IMF has a tendency to underestimate the contractionary effects of fiscal adjustments on growth and related macroeconomic variables. As a result, overly optimistic growth projections make ambitious deficit reduction targets appear more politically viable. However, such significant fiscal adjustments, by affecting output and employment and increasing inequalities, can render IMF programs socially unsustainable. By assuming that the negative growth impact of these adjustments will be minimal, the IMF can justify the program as socially feasible. The incentive structure of the IMF further compounds these challenges, necessitating the promotion of fiscal austerity

as a path to sustainability despite its potential drag on the economy. Fourthly, the debt dynamics equation of DSAs is stock-flow inconsistent. The IMF focuses heavily on the primary balance as the main driver of debt dynamics. However, the importance of stock-flow adjustments, reflecting among other things changes in debt due to revaluation effects, is often underestimated. Neglecting these adjustments, especially in volatile developing economies, can lead to flawed debt sustainability assessments and inadequate or even counterproductive policy recommendations.

Fifthly, the IMF's framework lacks adequate consideration of the underlying reasons for external debt accumulation in developing nations. It often treats external borrowing as a substitute for domestic debt without accounting for the asymmetric international financial architecture. Consequently, IMF programs typically recommend budget cuts and tax increases to bolster government balances, while overlooking the fact that public savings in domestic currency cannot service foreign debt. Addressing the structural reasons behind external borrowing is essential for formulating effective policy recommendations tailored to the specific needs of developing economies.

The outline of the paper is as follows: the next section focuses on the details of the Debt Sustainability Frameworks (DSFs). Following this, the third section elucidates the main flaws of the DSFs. The fourth section consists of possible policy proposals aimed at addressing the flaws of DSFs. The last section concludes.

2 Debt Sustainability Frameworks

Definition and introductory remarks

DSFs are two sets of standardized procedures designed to assess a country's public and/or external debt position. These frameworks, using various tools to analyze potential debt-related vulnerabilities, aim to standardize country staff assessments that inform critical decisions at the IMF/World Bank.

DSFs started with IMF (2002), which proposed a framework to standardize country reports on the medium-term public and external debt projections, by suggesting the use of a standard sensitivity analysis around such projections. The proposal was in immediate use in Article IV

consultations for market-access countries (MACs) and in General Resources Account (GRA) requests (IMF, 2003a). This original framework was later called MAC DSF.

The analysis of medium-term debt projections and their sensitivity to shocks (stress tests) around the baseline projections has been the core tool since its origins (IMF, 2002). Subsequent reviews added new tools and refined the core. After some early modifications (IMF, 2003a; 2005a), the first publicized guidance came only in 2013, with a comprehensive review (IMF, 2011; 2013a), aiming to modernize the framework and increase the standardization in practice. A risk-based approach was embraced: countries are divided into lower and higher scrutiny groups based on debt levels, gross financing needs, and their requests for access to IMF funding. Thereafter, lower scrutiny cases have been assessed by relying solely on the core tool, whereas higher scrutiny cases have been analyzed by using additional risk identification tools. The most recent MAC DSF (IMF, 2021, 2022) still relies on medium-term projections of debt as a core tool, but its role is somewhat diminished with the addition of other risk analysis tools that are applied for all countries and with the aggregation of the results of other newly introduced tools.

IMF (2003b) discussed the need for a different framework for low-income countries (LICs), by drawing attention to heavy reliance on external official debt, the high level of concessional debt, fragile growth patterns and developmental needs of such countries. After the introduction of the first set of rules (IMF, 2004a, 2004b) in 2005, the first LIC DSF was approved by the IMF and the World Bank as a tool that would be jointly used by both organizations (IMF, 2005b) with the aims of supporting development (achieving Millennium Development Goals) without creating debt problems and keeping the countries that have received debt relief under HIPC on track.

LIC DSFs have been reviewed and updated on several occasions.⁶ Nonetheless, the distinguishing elements of the framework have remained unchanged since its beginning. Those elements are as follows:

- (i) the preferred measure is the present value of the debt⁷ (instead of nominal debt), due to

⁶ After early reviews (IMF, 2006a, 2006b, 2009), the first guidance note was released and had been updated during the second half of the 2000s (IMF, 2007, 2008, 2010). Coinciding with the comprehensive review of the MAC DSF at the beginning of the 2010s, the LIC DSF was reviewed in IMF (2012a) and its guidance note was updated in IMF (2013b). The final review was made in IMF (2017) and its latest guidance note was released through IMF (2018).

⁷ The discount rate has been set at around 5 percent, though it has been reviewed and updated on several occasions, relying on simple rules that typically monitor the US dollar reference rates. The current rate of 5 percent has not been changed since 2013. For a short summary, see (IMF, 2017: 44-45).

the high level of concessional debt in LICs;

- (ii) the public and publicly guaranteed (PPG) external debt stock and also debt service measures are at the center of LIC DSF, due to high levels of debt and heavy reliance on external public borrowing;
- (iii) long-term (instead of medium-term) debt projections are used, considering the developmental needs of LICs;
- (iv) indicative debt thresholds for country groups (based on institutional quality) are explicitly set in LIC DSFs.

The definition of debt sustainability has also remained same since the beginning. The IMF's definition has three pillars: (i) the solvency condition needs to be satisfied; (ii) without any liquidity (rollover) risk; and (iii) the projected adjustment path for the debt variables should be "feasible". The solvency condition is derived from an intertemporal budget constraint. Additional conditions require that the projected adjustment path will be economically, socially and/or politically "feasible" (i.e., debt stabilization path will not clash with satisfactory potential growth and political/social backlash) given that the rollover risk on the path is acceptable (IMF, 2002, 2013a, 2022)⁸. This implies that debt is called unsustainable when there is no acceptable growth path to stabilize debt ratios with manageable rollover risk without restructuring and/or exceptional support, even with the Fund financing (IMF, 2021, 2022). When debt is deemed unsustainable due to the violation of solvency condition and the uncertainty of debt repayment, the prerequisite for the IMF lending and program is not met.

Debt sustainability assessments mainly seek to stabilize the projected debt path under both baseline and stress scenarios. The latest MAC DSF framework separates the concept of "debt non-stabilization under the baseline" from "unsustainable debt". For the former case, the prime examples are the US and Japan, both of which currently exhibit explosive debt-to-GDP paths under the baseline scenarios. However, for the surveillance-only countries, like the US and

⁸ IMF (2021:6; 2013a:4): "public debt can be regarded as sustainable when the primary balance needed to at least stabilize debt under both the baseline and realistic shock scenarios is economically and politically feasible, such that the level of debt is consistent with an acceptably low rollover risk and with preserving potential growth at a satisfactory level." IMF (2002:4-5): "An entity's liability position is sustainable if it satisfies the present value budget constraint without a major correction in the balance of income and expenditure given the costs of financing it faces in the market"; and "the assumption of no expectation of major corrections in income or expenditure captures the notion that there are social and political limits to adjustment that determine willingness (as opposed to ability) to pay."

Japan, the IMF carries out baseline medium-term debt assessments based on projections driven by most-likely policies that will be implemented by the policymakers. This may yield an explosive path for the projection horizon, and thus, it will be dubbed as the case of “debt non-stabilization path under the baseline”. However, if the country in question does not satisfy the criteria for sovereign stress, and if the IMF evaluates that there are economically, socially and politically “feasible” policy sets, with low financing risk, that will stabilize debt variables, then it is not called as unsustainable debt. On the other hand, in the IMF program cases, sovereign stress is either materialized or highly likely, so that the baseline projection of the debt in such cases includes IMF lending and a set of “feasible” policies to ensure a debt stabilization path. If the assessment of the baseline in such cases still results in “debt non-stabilization under the baseline”, that means debt is unsustainable (IMF, 2021; 2022).

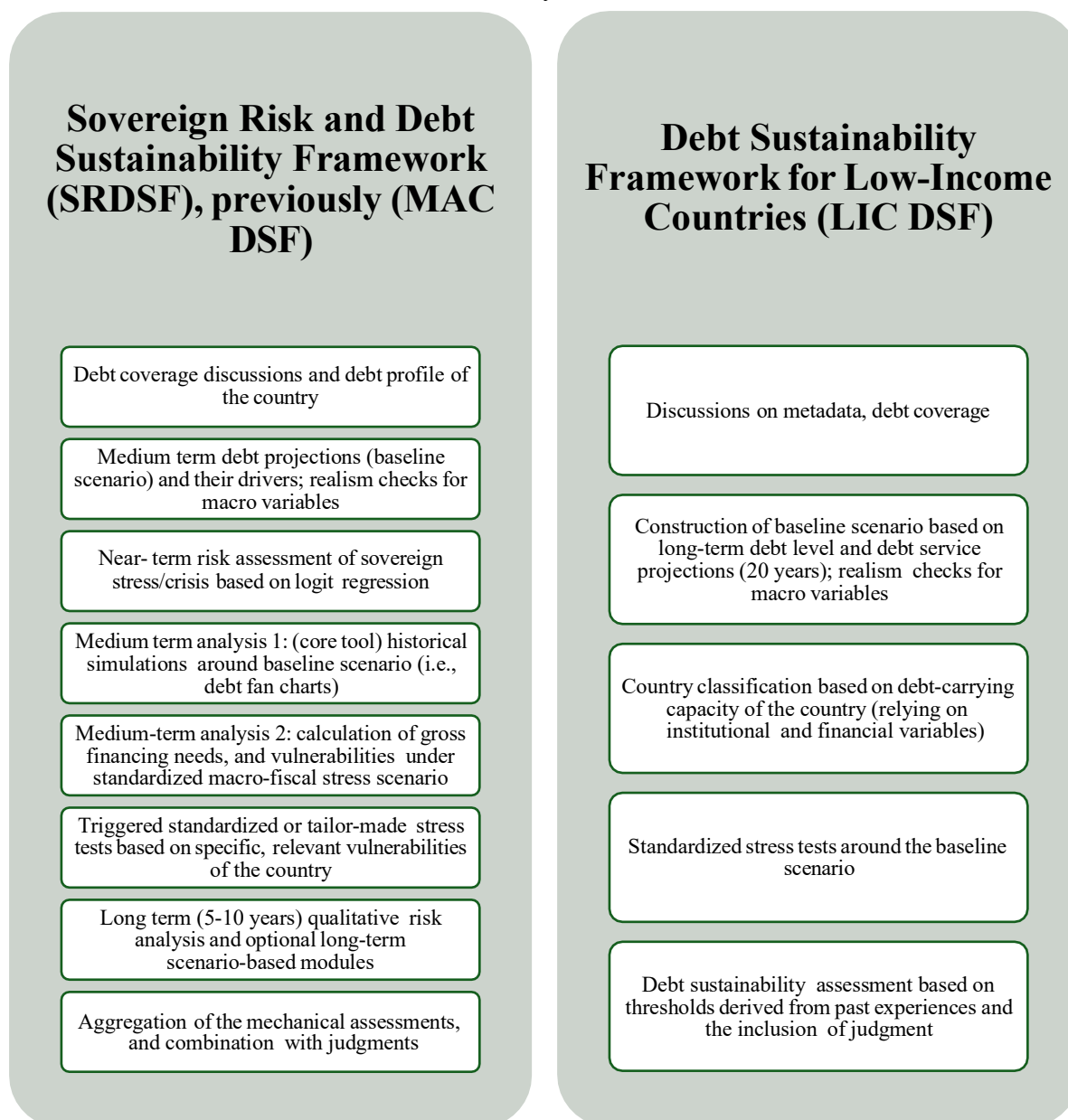
The following subsections describe the latest versions of DSFs by relying on the last guidance notes on MAC DSF (IMF, 2022) and LIC DSF (IMF, 2018). The workflows of these frameworks are summarized in Figure 1, with further details provided in the text.

Sovereign Risk and Debt Sustainability Framework (SRDSF)

The sovereign risk and debt sustainability framework (SRDSF), formerly known as MAC DSF (used interchangeably), is the IMF’s framework for assessing sovereign debt-related risks and public debt sustainability in MACs. MACs include all advanced and most emerging market economies with substantial and stable access to international and financial markets⁹. This framework serves three primary purposes: (i) it provides information on IMF member countries’ vulnerabilities related to sovereign debt stress as part of the IMF’s surveillance functions; (ii) it helps verify compliance with IMF prerequisites in precautionary arrangement cases; and (iii) when sovereign debt stress materializes, it informs the IMF about appropriate actions required, such as fiscal adjustment, new Fund financing, debt restructuring, and setting debt relief targets in the case of debt restructuring.

⁹ This framework is also applied for some LICs that satisfy “eligibility” requirements of the IMF (see IMF, 2018).

Figure 1. Workflows of the Sovereign Risk and Debt Sustainability, and the LIC Debt Sustainability Frameworks



Source: Our own compilation

The sovereign risk and debt sustainability analysis (SRDSA) for any country starts with a detailed summary of metadata, debt concepts and coverage used in the analysis. The IMF suggests using gross debt¹⁰ as the basis. In terms of the coverage, the “general government” concept is opted for, since it covers the entities that “fulfill the functions of government as their primary activity” (IMF, 2022:17)¹¹.

¹⁰ Liquid assets and net debt are separately accounted for when required.

¹¹ Although general government concept was the preferred option to ensure broad and consistent coverage since 2011 13 reviews (IMF, 2011;2013a), IMF (2021) notes the problems in practice and widespread use of central government concept in applications.

The instruments covered in the public debt are loans, debt securities, currency and deposits, account payables, special drawing rights (SDRs), insurance, pension and guarantees. Depending upon the conditions and the use, liquidity papers issued by central banks and bilateral foreign exchange (FX) swaps are also suggested to be consolidated into public debt when they are expected to create a future debt burden. The initial stage of SRDSAs is completed with a discussion on the public debt structure, including the currency composition, the breakdown of creditors, the distribution of governing law or legal basis for public debt issued, and marketability and maturity distributions.

In the second stage, historical data and 10-year projections of public debt and a set of macroeconomic variables considered as the key drivers of the public debt-to-GDP ratio are uploaded to DSA templates as inputs, and then, expected debt issuance assumptions and expected terms of finance are added.

Interestingly, the IMF's guidance notes do not specifically explain how the IMF staff produce those medium-term projections. The SRDSF guide (IMF 2022: 27) only states that "projections should reflect the user's expectations of the likely outcomes for these variables and there are no ex-ante constraints so long as the scenario is realistic". IEO (2014), which discusses IMF forecasts, in general, states that medium-term forecasts are not produced based on a unified model and are based upon the choices of country staff, and the country staff may use different methods/assumptions and also judgment to estimate those basic ingredients¹². After the entry of data and projections, DSA templates produce the "baseline scenario", i.e., the projected evolution of public debt-to-GDP and its key drivers based on a debt dynamics equation.

The debt dynamics equation the IMF uses is as follows (IMF 2022):

$$D_t = \frac{e_t}{e_{t-1}} D_{t-1}^f + D_{t-1}^d + I_t - PB_t + SFA_t \quad (1)$$

where D stands for the public debt with the superscripts d and f indicating domestic currency and foreign currency, respectively, e represents the nominal exchange rate, I stands for the effective interest paid on previous stock of public debt (in which foreign currency interest

¹² The use of different setups and procedures by the country staff while constructing the medium-term projections is generally attributed to widespread differences in economic development and data quality (IEO, 2014). Authors also appreciate the comments from Jeromin Zettelmeyer for clarifying these issues.

payment is valued using the current year exchange rate), PB is the primary balance and SFA is the stock-flow adjustment that represents all other known and unknown factors.

After rewriting the interest paid on debt as the previous period debt stock multiplied by the effective interest rate (implied average interest rate on the previous debt stock), we divide the equation (1) the current year GDP to get:

$$d_t = \frac{e_t}{e_{t-1}} \frac{d_{t-1}^f}{\rho_t} + \frac{d_{t-1}^d}{\rho_t} + i_t \frac{d_{t-1}}{\rho_t} - pb_t + sfa_t \quad (2)$$

where the lower cases of the previous variables are their GDP-normalized versions, i represents the effective interest rate and ρ represents nominal GDP growth from the previous year to the current year.

Rearranging the terms in the equation (3) to write it in difference form gives the below equation that contains all of the main drivers of change in debt:

$$\Delta d_t = z_t \frac{d_{t-1}^f}{(1+g_t)(1+\pi_t^f)} + \frac{r_t - g_t}{(1+g_t)} d_{t-1} + \frac{\pi_t^d - \pi_t^f}{(1+\pi_t^f)\rho_t} d_{t-1}^f - pb_t + sfa_t \quad (3)$$

where g is the real growth rate, π is the inflation rate, superscripts on it stands for domestic and foreign inflation, z is the real exchange rate change defined by $1 + z_t = \left(\frac{e_t}{e_{t-1}}\right) (1 + \pi_t^f) / (1 + \pi_t^d)$ and r is the real interest rate defined by $r_t = (1 + i_t)(1 + \pi_t^d) -$

1. The equation (3) can verbally be stated as:

change in debt = real exchange rate effect + real growth-interest differential effect
+ relative inflation effect + primary balance effect + stock-flow adjustment
component

Finally, relying on the last equation, the concept of “debt stabilizing primary balance” is introduced by setting the change in debt equal to zero, assuming that there is no change in real exchange rate and setting the stock-flow adjustment component to zero. The solution of the equation (4) under these assumptions for the primary balance component gives “debt stabilizing primary balance”, which is equal to real growth-interest differential plus relative inflation effect. This is, then, used for the calculation of debt non-stabilization probabilities. The formula for debt stabilizing primary balance, $dspb$, is:

$$dspb_t = \frac{r_t - g_t}{(1 + g_t)} d_{t-1} + \frac{\pi_t^d - \pi_t^f}{(1 + \pi_t^f) \rho_t} d_{t-1}^f = \frac{d_{t-1}}{(1 + g_t)} \left(\frac{\pi_t^d - \pi_t^f}{(1 + \pi_t^d)} \alpha_t^f + r_t - g_t \right) \quad (4)$$

where α_t^f is the current share of foreign currency component of public debt.

After constructing the projected key ratios and before using them as inputs for the production of risk or sustainability metrics, the IMF prioritizes ensuring the quality of these projections, likely in response to significant criticism. The latest version of the MAC DSAs includes realism assessment tools to evaluate the realism of the baseline scenario. There are nine tools to check for this:

(1) persistent forecast errors via forecast track record of debt drivers; (2) optimistic potential output projections by using past output gap revisions; (3) large shifts in the projections of debt drivers compared to their past 5-year performance; (4) the projections of debt-to-GDP ratio compared to the distribution of historical realizations for all MACs; (5) fiscal adjustments in the projections in comparison to the distribution of historical fiscal adjustments for all MACs; (6) real effective exchange rate (REER) projections (which are confidential, and therefore unpublished); (7) real GDP growth projections in comparison to potential growth, output gap and historical averages; (8) the consistency between fiscal adjustment paths and projected growth, and (9) assumptions on the new debt issuance in comparison to the historical average of the country and on financing terms via projected credit spreads compared to the spreads implied by the Laubach (2009)¹³ rule. These realism tools raise flags with regard to the baseline scenario, which require either an explanation or a revision of the main inputs.

After baseline projections are set, risk and sustainability assessment tools are applied. The SRDSF consists of three main modules that are applied to all MACs:

- (i) a near-term (1-2 years) module based on a logit model that produces the probability of sovereign stress relying on a set of independent variables (or the probability of a crisis in case of the existence of sovereign stress);
- (ii) a medium-term debt fan chart module, which produces solvency risk metrics based on the analysis of the simulations of medium-term debt projections, and

¹³ Laubach (2009) finds that one percentage points increase in projected debt-to-GDP ratio leads to 3 to 4 points increase in interest rates. IMF (2022) uses 1 to 4 rule.

- (iii) a gross financing needs (GFN) module, which produces liquidity risk metrics based on the analysis of financing needs under normal and severe stress scenarios.

The risk metrics produced by the last two modules are also aggregated into Medium-Term Index (MTI) by simple averaging. The outputs of these modules need to be compared to some thresholds in order to produce mechanical signals and assign countries to low, moderate and high-risk groups. These thresholds are calibrated to produce the lowest possible (10 percent) missed crisis ratio (type II error) and false alarms (type I error) so that the low-risk group is associated with less than 10 percent of missed crisis when no stress event is predicted and the high-risk group is associated with less than 10 percent of false alarms when a stress event is predicted. The details of these three tools can be found Appendix 1.

Debt Sustainability Assessments

The latest framework separates risk assessment from debt sustainability assessment. Risk assessment, based on the results of those three modules, is employed for all countries. Debt sustainability assessment is, on the other hand, not obligatory for "surveillance-only" countries. Debt sustainability assessments are suggested to be carried out in cases of sovereign stress to inform stress resolution measures and the design of IMF programs. In such cases, the near-term risk analysis becomes obsolete since there is already a case of sovereign stress. Instead of a sovereign stress predictor, then, the DSA utilizes a sustainability logit model to forecast the likelihood of unsustainable debt events (such as default, restructuring, hyperinflation, or large transfers) over a 4-year horizon. It is worth noting that the model used in this context is confidential and internal to the IMF staff.

Other than the necessary change of the near-term module, for both sustainability assessments and risk assessments, the rest of the procedures and tools are the same. While both risk and sustainability assessments share similar frameworks, sustainability analyses are more confidential and less transparent, especially in terms of their methodologies and communication of results. The numerical sustainability index combines a near-term sustainability metric with the results of the other two tools, but the aggregation method remains confidential in the case of DSAs.

The final assessment of debt sustainability is based on the sustainability index, which is categorized as either "sustainable with high probability," or "sustainable but not with high probability," or "unsustainable." This index is compared against thresholds calibrated using

historical unsustainable debt events.¹⁴ The mechanical signals are combined with staff judgment, which particularly focuses on borderline or conflicting results, distorted variables, omitted factors, the country's track record, clear signals related to rollover risks, impending defaults, or the unmanageability of public debt. Additionally, staff judgment should account for the “feasibility” condition for achieving debt stabilization.

The cases of debt restructurings require special treatment in DSAs. In such cases, DSAs are expected to inform the determination of targets for debt relief. In general, a 10-year horizon is used as the basis for medium-term modules (instead of 5 years), and they are expected to produce sustainability signals under debt relief targets and expected adjustments.

Finally, the latest IMF review in 2021 heavily criticized previous practices in communicating the results of previous DSAs. It pointed out that previous DSAs lacked a clear bottom-line assessment and had unclear judgments. Nonetheless, in the latest framework, although risk assessments include a bottom-line risk score, since DSAs involve sensitive information, this still leads to opacity in communicating their results. While DSAs conducted under Fund arrangements require clear bottom-line assessments, the formulation of the final assessment, its publication, and the content of the publication follow a complex set of procedures that vary depending on the type of arrangement and the severity of the case.

Debt Sustainability Framework for Low-Income Countries

The IMF and World Bank's joint debt sustainability framework for LICs (LIC DSF) was developed to guide borrowing and lending/grant decisions of relevant counterparties (International Development Association (IDA), Multilateral Development Banks (MDB), etc.) and to inform policy advice of the IMF and World Bank (IMF, 2013b, 2017). The LIC DSF produces a risk rating for the external debt distress of LICs and that rating becomes an input for

- (i) determining the room for non-concessional borrowing for such countries in the IMF's debt-limits policy and the IDA's non-concessional borrowing policy;

¹⁴ These thresholds aim to ensure that: (i) at least 50 percent of the probability is associated with sustainable assessments, and (ii) the "sustainable with high probability" category is linked to unsustainable events with a maximum probability of 20 percent (or they are associated with sustainable outcomes with at least an 80 percent probability).

(ii) determining the grant provision by the IDA,

(iii) and informing the lending policies of MDBs or other creditors (IMF, 2017).

LIC DSF is specifically designed for countries that have limited or no access to international financial markets and a large share of concessional borrowing in external finance. For all PRGT-eligible¹⁵ countries and all countries that are eligible for IDA grants, LIC DSF is suggested to be used. Since the IMF Article IV consultations and IDA credit/grant allocations require DSAs, they are produced annually. Also, the IMF and/or the World Bank financing requests, and modifications to the performance criteria related to IMF's debt limits for IMF program countries require a further update to DSA, even when there exists an updated DSA.

Whereas nominal public debt-to-GDP ratio is the main variable in MAC DSF, LIC DSF has four main variables: the present value (PV) of public and publicly guaranteed (PPG) external debt-to-GDP, debt-to-exports, debt service-to-exports and debt-service-to-revenues of the government¹⁶. Due to high levels of concessional debt in LICs, the PV of debt service payments (discounted by a fixed rate determined by the IMF-World Bank) is preferred over nominal debt. The LIC DSF suggests using the broadest public debt coverage, including the debts issued by the general government, central bank and non-financial public enterprises, plus private sector debt guaranteed by the public sector. The choice of PPG external debt is justified by the claim that the weight of PPG external debt in LICs is typically high and has been the primary source of risk (IMF, 2013b).

The projections of those main variables and the set of macro variables are analyzed to produce an "external risk rating", which is considered as the explicit assessment of a country's risk of external debt distress in LIC DSF. Besides that, DSAs involve the evaluation of private external debt and public domestic debt while producing a complementary rating of "overall risk of debt distress". As opposed to MAC DSAs, 10 years of historical data and 20 years of interrelated projections of key macroeconomic variables are the main inputs, since returns to the public investments and long maturities and grace periods for the debts LICs are required to be captured (IMF, 2013b).

The long-term projections are a collaborative effort between both institutions, with the IMF

¹⁵ PRGT stands for Poverty Reduction and Growth Trust. It is the IMF's main vehicle for providing concessional financing to LICs.

¹⁶ Previous LIC DSFs have used more alternatives than those four variables.

staff leading the medium-term projections (0-5 years) and the World Bank staff guiding the longer-term projections (5 to 20 years). Long-term projections take into account the specific characteristics of the country and developing country trends. They also factor in the outputs of neoclassical growth models, growth accounting and empirical regularities related to growth, inflation, productivity, REER, and more. These projections also incorporate financing assumptions, including projected loans in the pipeline, and maintain consistency with medium-term and long-term financing sources, instruments, and creditors.

The latest guidelines recommend avoiding “overly optimistic” assumptions in projections, such as large increases in the capacity of domestic financial markets, large fiscal improvements, growth accelerations, large FDI inflows, large deviations from historical experience and large returns to the public investments (IMF, 2013b). Similar to the recent MAC DSF, the latest LIC DSF includes realism tools, consisting of (i) the comparison of the evolution of key debt ratios and their drivers obtained from the current DSA, previous DSA and the DSA produced 5 years ago, (ii) the comparison of planned 3-year adjustment projections of the primary balance to a distribution of such 3-year adjustments in primary balances obtained from LICs that have a similar experience, (iii) the comparison of the baseline growth projection against several growth paths derived by assuming only a fiscal impact (via plausible fiscal multipliers) from the last growth observation, and (iv) the comparison of the projections to the historical contribution of public investment to growth, by using a simple growth accounting framework. In addition, DSAs may include an in-depth analysis of public investment and growth by using several different growth models developed by IMF and World Bank researchers (Buffie et al., 2012; Pennings, 2017; Burns et al., 2019). When there is a flag in any of these realism checks, either a reasonable explanation for it or a revision to macroeconomic projections is required.

The LIC DSF places a particular emphasis on country classifications based on the “debt carrying capacity” of the country (see Appendix 2)¹⁷. Countries are assigned to one of the three groups (weak, medium, strong), depending on their scores and thresholds derived from the distribution of the scores of all LICs.

After the baseline projections and country classifications are settled, the country's external risk rating and the overall risk of public debt distress are found by comparing the key debt ratios from both the baseline scenario and stress scenarios at the end of a 10-year projection period to

¹⁷ For an in-depth analysis and critique of the components of the risk model within the LIC-DSF, refer to the recent policy note (Von Luckner, 2024).

the indicative thresholds for four key debt ratios specific to each country group (see Appendix 2).

The LIC DSF final ratings combine both staff judgment and mechanical risk ratings. The IMF guidance suggests the use of judgment when there are short-lived threshold breaches, market financing pressures, non-guaranteed private external debt that would impact upon government exposure to contingent liabilities, liquid financial assets that can mitigate risks, and additional country-specific risk exposures such as conflicts, reserve pooling arrangements, insurance-type agreements and so on.

The final “external risk rating” based on mechanical analysis and the judgment of the staff is considered the primary output of LIC DSAs, while “the overall risk rating” is considered supplementary. A final judgment is required to assign the following ratings: low, moderate, or high, for both the risk of external debt distress and the overall risk of debt distress. An “in debt distress” status applies to countries with ongoing or imminent debt restructuring negotiations or outstanding arrears on external debt, and further qualifications guide this determination. Additionally, a country may be labeled as “in debt distress” when the analysis indicates a high likelihood of a future debt distress event due to significant breaches in debt service indicators or sustainability concerns.

3 Critique of the IMF Debt Sustainability Approach

As discussed in the previous section, the DSFs have evolved over time. However, they still suffer from significant flaws. We will discuss the issues regarding the IMF’s analysis under the following headings: the foundational problems of DSAs, practical difficulties with the DSFs, high-stakes decision-making under biased accuracy and low precision, theoretical and practical challenges with the debt dynamic equation, and incomplete understanding of the nature of external debt.

Foundational Problems of DSAs

At present, DSAs primarily provide country outlooks based on available information, used by IMF staff to deliver modeling exercises and subjective judgements. Since these are used to make decisions that have significant impact on a country's economic trajectory, there should be solid evidence of the reliability and consistency of the procedures. As discussed in what follows, the evidence suggests that these have serious flaws because of the models, assumptions and

subjective judgments involved. Moreover, despite having comprehensive guidelines for applying debt sustainability assessments, it is impossible to independently replicate the DSA because of the use of classified information from country authorities, undisclosed macro models, and subjective judgment by the IMF staff at almost every step of the process.

As explained in the previous section in detail, DSAs produced by the IMF/World Bank consist of judgments combined with the results of several analytical tools. While some of the analytical tools may have merits on their own and may be informative in different contexts, it should be underlined that DSFs are essentially frameworks “intended to inform, rather than replace, judgment” (IMF, 2005a). Therefore, we should emphasize that the decision-making process is ultimately not based solely on DSAs. There is nothing inherently wrong with using judgment or utilizing analytical tools as informative guides to the ultimate judgment. However, issues arise when such tools are presented as a means to portray objectivity and transparency in decision-making and “ensure the credibility” of the IMF's assessments (IMF, 2002), even when the process is not as transparent as implied. The overall process of assessing debt sustainability is mostly non-transparent due to its judgmental nature, and the analytical works that underlie those assessments are based on projections of variables that the IMF also admits are “intrinsically uncertain,” “highly variable,” and “frequently incorporate judgments” of the country staff (IMF, 2002).

As emphasized, the IMF's guidance notes include no specific discussion or explanation of how the medium-term projections are produced. Those medium-term forecasts are not produced based on a unified model but upon the choices of country staff, who may use different methods/assumptions and judgments to estimate the basic ingredients of DSAs. In sum, the analyses of debt sustainability that are supposed to provide transparency and credibility for the decision-making process of the IMF/World Bank are based on mystical models and non-replicable projections.

Moreover, what makes the main inputs of official DSAs non-arbitrary is unclear. DSFs have increasingly relied on realism check tools, which supposedly correct the mistakes in baseline projections by tagging out-of-the-line projections (compared to historical and peer-group realizations). The problem with this approach is that if those realism checks raise too many flags and require an update, then those unexplained model-based projections are meaningless. If those realism checks raise no flag, which is the case when the projections are around the historical and peer-group averages, then why is there a need for undisclosed models instead of

using those averages as the best predictors?

The definition of debt sustainability, as well as its implementation, poses additional challenges. With the untenable assumptions that the change in the real exchange rate and SFA are zero, the first pillar of the IMF's definition of debt sustainability—the solvency condition—reduces to the requirement of a non-explosive path for all future primary balances. As a result, this approach places the entire burden of adjustment on primary balances to achieve debt sustainability, thereby justifying fiscal austerity in any scenario. Both by definition and by construction, any assessment of unsustainable debt by the IMF naturally implies the implementation of austerity measures.

Another fundamental issue with DSFs is the assumption that the future is somewhat stochastically predictable. As a result, DSFs attempt to anticipate all possible outcomes and assume that all relevant probability distributions for key macro variables are known, including stock-flow adjustments (SFAs). However, when there is deep uncertainty, such a practice can be nothing more than an educated guess. Indeed, this was precisely why Wyplosz (2011) called the DSA “mission impossible.” Noting that sustainability is entirely forward-looking, he rightly argued that “any practical definition is arbitrary, and that any sustainability indicator will be both arbitrary and too imprecise to serve as a tool for policy prescription (Wyplosz 2011, p. 3).”¹⁸ Although some IMF researchers recognize that conducting a sovereign debt sustainability analysis “is far from a precise science (Buchheit et al. 2020, p. 330),” the IMF and World Bank have yet to account for the deep uncertainty inherent in nearly all variables in their debt sustainability frameworks. The increasing complexity of recent frameworks cannot address this deep uncertainty.

Practical difficulties with the DSFs

A major problem of the current DSFs is that they have become increasingly complex, making

¹⁸ On a similar point, see also, Guzman and Heymann (2015) and Panizza (2022). More recently, invoking the concept of deep uncertainty and embracing the view of Wyplosz (2011) that a debt sustainability anchor is “mission impossible,” Orszag et al. (2021) argued that any chosen fiscal policy anchor (such as simple limits on deficits or debt as a share of the economy that governments adopt to check their spending and borrowing) would be arbitrary and “even with a well-defined anchor, when a country would reach it is subject to massive forecast uncertainty” (Orszag et al. 2021, p. 11). After expressing their skepticism about the usefulness of basing fiscal policy on any top-down anchor, they claim that although such anchors are supposed to promote fiscal sustainability, it is hard to know where any such sustainability threshold is. Further, given the role of impossible-to-predict events such as pandemics, wars and bubbles, they recommend copious amounts of humility and a framework that accounts for deep uncertainty.

it nearly impossible to reach a consensus on each component. Even the IMF (2021) executive directors who approved these frameworks have different opinions on various aspects, including public debt coverage, the use of net versus gross debt, the consideration of the impact of climate change on debt sustainability, the use of perception-based institutional quality variables, transparency and public disclosure related issues with regard to risk assessment results, and more.

While the addition of new tools and the refinement of old ones add to the complexity, it is questionable whether they add anything to the quality of the overall assessment. The increasing complexity may also result in simple inconsistencies. As previously explained, the IMF employs two distinct frameworks. All PRGT-eligible low-income countries undergo analysis within the joint IMF/World Bank LIC DSF, while the remaining countries are subject to the MAC framework. For all reasons, borderline cases should be consistently separated, and a borderline case should not be encountered by different IMF programs/conditionalities based on the analyses from these two frameworks. However, this is not always the case. As Setser (2024) noticed, for instance, Sri Lanka, with a per capita GDP of nearly \$3000, close to the low-income country threshold, and an IDA-eligible country as of 2023, was assessed under the MAC framework, whereas Ghana, which had more access to international bond markets recently, was considered under the LIC framework. Another example, Zambia, which has similar levels of public and external debt-to-GDP to Sri Lanka, has been evaluated under LIC DSF, and the target set for Zambia's external debt service-to-revenue has been less than half of Sri Lanka's "implicit" target¹⁹ although Zambia had a larger export and revenue base (Setser, 2024).

One reason behind such inconsistencies is the unjustified central role of the total public debt variable in MAC DSF. It includes both domestic and external debt and also local currency and foreign currency-denominated public debt. However, as elaborated below, external or foreign currency-denominated debt is a problem unique to developing countries, whether they have market access or not.

Another reason might be the inconsistencies produced by the risk models of both LIC and MAC DSFs. For example, Von Luckner 2024 discusses, in the context of LIC DSF, the possibility of

¹⁹ There is no explicit external debt service-to-revenue projection or target under MAC framework, but it can be calculated implicitly by combining the projections of foreign currency gross financing needs and government non-interest revenues from the published DSAs.

unrealistic country risk classifications due to procedures that rely on incorporating past information into the model and risk tolerance, all of which require staff judgment, leading to non-transparency issues.

Failing to differentiate between domestic and international public debt within the MAC framework leads the IMF to impose additional costs on domestic lenders, even if the crisis is unrelated to domestic debt. Many historical examples show that ignoring the importance of external debt leads to massive financial crises, as in the case of the Latin American Debt Crisis of 1982 (FDIC, 1997) and the East Asian Crises (Furman and Stiglitz, 1998). Argentina's debt crisis of the early 2000s serves as a stark reminder of the limitations of the total public debt variable. During this period, the IMF's policy prescriptions focused primarily on fiscal austerity measures aimed at reducing public debt levels. However, these measures failed to address the underlying issue of unsustainable external borrowing, which was a significant driver of Argentina's economic woes.

Furthermore, when the primary objective is to improve the overall public debt situation in a scenario in which foreign lenders resist substantial haircuts, the IMF's policy prescription for debt sustainability typically involves implementing budget cuts and regressive tax increases. In critical situations, the responsibility for debt restructuring is placed on domestic institutions, assuming that this will create some fiscal leeway for the government to meet its external debt obligations. The Sri Lankan case is a pertinent example, where the main problem was the external debt trap. Imposing domestic debt restructuring in this context put an additional burden on retirement savings funds, effectively transferring the weight of the IMF program onto the shoulders of the Sri Lankan population (Chandrasekhar et al., 2023).²⁰

High Stakes Decision-Making under Biased Accuracy and Low Precision

The fundamental building block of any DSA is the medium-term projections of debt ratios, which depend on the projections of key macroeconomic variables over the medium-term. Any inaccuracy in these projections has significant ramifications for IMF/World Bank decisions, program design, debt relief targets, and restructuring operations. So DSAs are used for high-stakes decisions. However, even though how their projections are produced is not public information, their performance has been evaluated many times, and the record seems poor.

²⁰ In the case of Sri Lanka, local banks were excluded from the debt restructuring process because they were considered weak (Chandrasekhar et al., 2023).

As several empirical studies and the self-evaluations of the IMF indicate, there is persistence in overoptimistic growth forecasting by the IMF, especially during times of stress, specifically for the IMF program countries and especially for low-income groups²¹. These imply that IMF country outlooks and DSAs are prone to underestimate the risks associated with the evolution of debt ratios.

In the case of IMF programs, overoptimistic forecasts suggest that the adverse effects of IMF conditionalities are underappreciated or ignored, resulting in ambitious fiscal targets and excessive austerity measures. Ismael et al. (2020) show that, for the sample of 2003-2017 IMF surveillance and program cases, planned fiscal and external adjustments were associated with optimism in growth projections. Mooney and de Soyres (2017) demonstrate that, for LICs during the 2005-2015 periods, there was overoptimism in public and external debt projections, even after controlling for unanticipated events, and this was driven mainly by optimism on the fiscal side, ambitious fiscal forecasts, optimistic returns to investment and projected residuals (i.e., SFA). Surprisingly, even, the latest self-review of IMF program design and conditionality, for the 2011-2017 period, finds that growth assumptions in IMF program countries have been too optimistic, resulting in skewed debt-to-GDP projections and positive bias in debt sustainability assessments, which, in turn, forces the countries at risk either to implement more contractionary measures to achieve targets or to go off-track (IMF, 2019).

An examination of the performance of IMF programs suggests that refinements to DSFs have not greatly helped alleviate this situation. The IMF's 2019 review indicated that there was a notable increase in the proportion of programs that went off track compared to the findings of the 2011 review. The 2019 review indicates that one-quarter of the 78 programs evaluated (50 of which

²¹ Genberg and Martinez (2014) find that growth forecasts of the IMF tend to be overoptimistic in times of stress. IEO (2014) compares the IMF forecast performance to private sector forecasts and finds that both suffer from over-optimism during times of stress, and negative biases are related to recessions or crises. IEO (2014) also claims that the IMF's forecasting performance varies over time and among different country groups. This study demonstrates that the short-term forecasting performance of the IMF swings from over-optimism for the 1990s and early 2000s to pessimism for the mid-2000s. Although this time-varying swing is valid for all country groups, growth forecasts for low income countries were generally optimistic. Timmermann (2006) analyzes IMF forecast performance for the 1990-2003 periods and confirms over-optimism for growth forecasts and its prevalence and consistency over time for IMF program countries. De Resende (2014) makes an evaluation of IMF WEO's medium-term forecast performance for the 1990-2012 periods and finds that optimism bias exists in medium-term forecasts; though the frequency is less, average optimistic bias tends to be higher for advanced economies; the over-optimism problem is exacerbated for IMF program countries. Also, this bias is found to be related to the inability to predict crises/recessions and using informal rules for closing output gaps. In a similar fashion, Aromi (2019) compares the medium-term forecasts of WEO for the 1997-2016 periods with predictions from three basic autoregression models of growth (enhanced by GDP per capita and current accounts), and finds that expert forecasts do no better than such basic econometric models and the optimism bias in expert forecasts are driven by excessive responses to growth accelerations and under-appreciation of current account balances.

were PRGT-eligible) failed to achieve their main objectives of reducing vulnerabilities, promoting recovery and achieving medium-term sustainability. Another quarter of the programs were successful, while the remaining programs were only partially successful. This performance, which is not significantly better than chance, raises doubts about the effectiveness of the IMF program design.

The details of success stories are even more revealing. During the 2010s, success cases were often related to forecast realism, program completion and ownership, debt operations (involving restructuring) and favorable commodity prices (IMF, 2019). Notice that only two of those factors are under the influence/control of the IMF: appropriate debt restructuring operations and producing realistic forecasts. Moreover, the details of the self-review (IMF, 2019) reveal that the fiscal adjustment targets of programs were met for some success cases due to the implementation of harsher measures than planned, or targeted external adjustments were achieved via import compression rather than planned export improvements.

Under the IMF programs during 2011-2017, although for almost one-third of cases, mechanical debt sustainability signals improved (thanks mainly to debt restructuring cases in the Eurozone), almost one-quarter of mechanical debt sustainability signals deteriorated, and debt projection errors reached almost 20-30 percent of GDP in one-sixth of those cases (IMF, 2019). The primary reasons for inaccurate projections were unforeseen fiscal slippages, low growth rates, natural disasters, conflicts, security issues, commodity price shocks, bank recapitalization, assumption of State-Owned Enterprise (SOE) liabilities, and other contingent liabilities. The decomposition of public debt projection errors across all cases reveals that growth forecast errors and currency depreciation, were among the main contributors. Real interest rate or primary deficit forecasts, though important for specific groups, had less impact on the overall errors. These findings support our assertion that the IMF focuses on the wrong components of debt dynamics.

Even more, IMF programs may have worsened the developmental prospects in low-income countries that required IMF funding and assistance. Due to severe criticisms in the previous decades, the IMF/World Bank programs allow for and even promote, in low-income countries, social and developmental spending by the governments. Social spending targets were among the core indicators for the performance of the programs in PRGT-eligible countries. Although these social spending targets were generally met for the IMF programs in such countries during the 2010s, the quality of social spending has been questionable, and capital expenditures and real

growth targets have been met by only one-fifth and one-third of the group countries (IMF, 2019). Most program designs also overestimated total factor productivity gains and capital accumulation (IMF, 2019). These imply that the developmental needs of the most vulnerable countries were superseded by arbitrary sustainability designs and associated austerity measures.

There may have been several reasons for such a consistently poor performance in forecasting/projecting the main ingredients of DSAs. First, leaving aside technical difficulties in forecasting recessions and crises, strong trend changes may influence predictions based on historical patterns. IMF (2019) shows that rosy growth²² assumptions for the 2010s arose from global forecasting errors, underestimation of the impact of policy adjustments and overestimation of the payoff to the structural reforms. Further analyses in this self-evaluation notes that growth forecasts were too rosy because of the unpredicted downward trend in global productivity after the global financial crisis²³, underestimation of financing and adjustment assumptions in program design, and other factors such as lower commodity prices and weak external demand. The underestimation of the impact of adjustments resulted from misjudgment about the adjustment-growth interactions and fiscal multiplier effects that were neglected/ignored or assumed to be low.

Nonetheless, more permanent and stickier factors could also explain overoptimistic IMF projections. The incentive structure for debt sustainability assessments and IMF program design does harm to making realistic projections. As said, the IMF approach to debt sustainability reduces down to a single component: controlling primary balances and there is the fact that evaluating an IMF program as leading to “debt sustainability” is a prerequisite for the Fund financing. Therefore, the IMF, always, has to propose a strategy that includes fiscal austerity in its program design. However, that strategy must also be “feasible,” and it is expected to improve the country's conditions. Then it naturally follows that the IMF has to defend and promote that strategy is viable and “feasible” even if optimistic elements are embedded in it. Another issue is misaligned incentives in predicting stress periods and crises. IEO (2011; 2014) discusses that widespread failure in predicting such episodes is not only driven by the difficulties in forecasting recessions and crises but also by the incentives of the IMF staff. Whereas the private sector forecasters do not want to “rock the boat” by forecasting a recession, the IMF

²² Rehbein (2022) analyses cases of over-over optimism in IMF forecasting by calling them as rosy forecasts.

²³ Although growth forecasts for the 2010s were problematic, partly due to global trends, inflation forecasts and monetary conditionality have been benefited from the global low inflation environment (IMF, 2019).

staff does not want to “destroy any career” by objecting to the “consensus” or prevailing views (IEO, 2011). As mentioned before, medium-term forecasts, which are the basis of DSAs, are specifically not based on a unified method or model, and there is no analytical or methodological consistency at the country, regional, or global level for medium-term forecasting. In addition to model-based estimates, the use of judgment in the estimation of key variables (such as potential output) is widely prevalent in medium-term projections (De Resende, 2014). Notwithstanding the diversity in projection methods, the prevalence of over-optimism in the medium-term projections, hints at the misaligned incentives along with methodological and theoretical problems.

Overall, there is persistence in the over-optimism in growth forecasting, especially during times of stress, specifically for the IMF program countries, and especially for low-income countries. Unmet capital accumulation and growth targets for the IMF programs in low-income countries is also a pressing concern. Since the Covid-19 pandemic hit, global economic conditions have displayed a chaotic pattern, rapidly swinging from a depressionary environment to an inflationary wave followed by contractionary policies. Although only further self-evaluations of the IMF will reveal the true performance of IMF programs and the performance of DSAs for these turbulent periods, based on the past performance, there is reason to believe that this time will not be different.

Theoretical and Practical Challenges with the Debt Dynamics Equation

The foundation of the debt sustainability analyses conducted by the IMF and the World Bank is the debt dynamics equation introduced in Section 2. The assumption is that the primary balance—the fiscal balance excluding net interest payments—is the primary driver of the debt dynamics equation, forming the basis for the IMF's policy proposals on debt management. In contrast, the role of stock-flow adjustments appears to be considerably underestimated. These adjustments, which reflect changes in the stock of debt due to factors other than the primary balance, such as exchange rate movements or changes in asset prices, can substantially impact a country's debt trajectory. Particularly in developing countries where external shocks and economic volatility are common, ignoring the significance of stock-flow adjustments can lead to flawed assessments of debt sustainability and misguided policy recommendations.

To begin with, there is a challenge posed by accounting methods. In the IMF/World Bank debt dynamics equation, some variables, such as interest payments, are based on cash accounting,

while others, like primary deficits, rely on accrual accounting principles (Casalin et al., 2021). Moreover, the variables in these equations represent a mix of stock and flow variables, with some based-on book price/historical cost and others on market price/current cost. These disparities necessarily lead to stock-flow inconsistency within the debt dynamics equation, which is one of the significant reasons (though not the only one) for the appearance of the stock-flow adjustment term.

Another significant reason that necessitates the stock-flow adjustment term is central banks' conduct of monetary policy. In nearly every country today, central banks' open market operations, which are crucial for monetary policy, require safe collateral, primarily in the form of government bonds. Moreover, since banks are creators of deposits through credit extension and asset purchases (though some narrow banks may function differently), bank-created money is endogenous (Borio, 2012). As the deposit base expands endogenously, banks' growing need for central bank-created reserves, even in countries with zero reserve requirements, may lead to a shortage of safe collateral. This, in turn, requires the issuance of government bonds, which will be ultimately held by the central bank as collateral against lending interbank reserves to the banking system.

In addition, particularly in advanced and high-income developing economies, liquidity needs in the money markets, such as the repo market, where government bonds serve as primary collateral, and regulations that require banks and other financial institutions to hold high-quality liquid assets, may further increase the demand for government debt. Consequently, governments may be forced to borrow beyond their budgetary needs if the supply of existing bonds fails to meet demand. Moreover, as we elaborate in the next subsection, in non-reserve currency countries such as emerging and low-income economies, governments may find themselves in a position where they must borrow in reserve currencies to meet the hard currency needs of their nations, extending beyond their budgetary requirements.

The above examples show that governments do not borrow only to balance their net expenditures, debt service, and debt rollover requirements; therefore, the stock-flow adjustment term cannot be neglected. As elaborated below, since the IMF ignores many important contributors of the debt when they operationalize their debt dynamics equations, the IMF's debt sustainability analysis is inherently stock-flow inconsistent.

To show that the IMF analysis is inherently stock-flow inconsistent, let us rewrite the debt

dynamics equation (1) as

$$D_t = D_{t-1} + \left(\frac{e_t}{e_{t-1}} - 1 \right) D_{t-1}^f + I_t - PB_t + SFA_t, \quad (5)$$

and recall that $D_t = D_t^f + D_t^d$.

Now, define ND_t^f and ND_t^d as the newly issued net foreign and domestic debts in period t , respectively. Stock-flow consistency requires

$$D_t = D_{t-1} + ND_t^f + ND_t^d + \left(\frac{e_t p_t^f}{e_{t-1} p_{t-1}^f} - 1 \right) D_{t-1}^f + \left(\frac{p_t^d}{p_{t-1}^d} - 1 \right) D_{t-1}^d, \quad (6)$$

where p_t^f and p_t^d are the prices of the foreign and domestic debts at time t , respectively. In other words (Burgess et al., 2016),

$$\begin{aligned} \mathbf{Stock}(t) &= \mathbf{Stock}(t-1) + \mathbf{Net\ New\ Issuance\ in\ Period\ } t + \mathbf{Revaluation} \\ &\quad \mathbf{Effects\ due\ to\ Price\ Changes.} \end{aligned}$$

Comparing equations (5) and (6), we find

$$SFA_t = ND_t^f + ND_t^d + \frac{e_t}{e_{t-1}} \left(\frac{p_t^f}{p_{t-1}^f} - 1 \right) D_{t-1}^f + \left(\frac{p_t^d}{p_{t-1}^d} - 1 \right) D_{t-1}^d + PB_t - I_t. \quad (7)$$

From equation (7), we then observe that unless the newly issued net foreign and domestic debts satisfy the condition

$$ND_t^f + ND_t^d = I_t - PB_t - \frac{e_t}{e_{t-1}} \left(\frac{p_t^f}{p_{t-1}^f} - 1 \right) D_{t-1}^f - \left(\frac{p_t^d}{p_{t-1}^d} - 1 \right) D_{t-1}^d, \quad (8)$$

where the government borrows only to finance its deficit by taking into account revaluation effects, setting $SFA_t = 0$ renders the debt dynamics equation (5) stock-flow inconsistent. Furthermore, since no government borrows solely to finance its deficit by taking into account revaluation effects, SFA_t can never be zero, except for coincidence.

To elaborate on this, we rewrite equation (5) as

$$D_t = D_{t-1} + I_t - PB_t + SFA'_t, \quad (9)$$

where $SFA'_t = (e_t/e_{t-1} - 1)D_{t-1}^f + SFA_t$. We define $\gamma_t = \rho_t - 1$ and divide the both sides of equation (9) by GDP to get

$$\Delta d_t = \frac{i_t - \gamma_t}{1 + \gamma_t} d_{t-1} - pb_t + sfa'_t, \quad (10)$$

where d_t , ρ_t , i_t and pb_t are as previously defined, while $sfa'_t = SFA'_t/GDP_t$. We refer to the first term on the right-hand side of equation (10) as the interest-growth differential.

Many empirical studies utilized equation (9) instead of equation (5). They find that SFA' term cannot be assumed to be zero. For example, Weber (2012), examining a sample of 163 economies (34 advanced, 68 emerging, and 61 low-income) and spanning the period from 1981 to 2010, demonstrates that stock-flow adjustments have, on average, been positive across all three types of economies, with the means and volatilities increasing in the order of advanced, emerging, and low-income economies²⁴. Similarly, Jaramillo, Mulas-Granados, and Kimani (2017) find that the main driver of public debt spikes is neither primary deficits nor output, nor interest payments.²⁵ Instead, they show that large stock-flow adjustments are the primary driver. Besides, they explore the link between the downward bias in debt forecasts and the underestimation of stock-flow adjustments and conclude that proper forecasting of stock-flow adjustments is needed to improve debt sustainability analysis. In agreement with previous studies, a relatively recent comprehensive study by Moreno Badia, Arbelaez, and Xiang (2021) finds that fundamental characteristic of fiscal crises in emerging and developing economies is the accumulation of stock-flow adjustments, which consistently emerges as a crucial aspect during the onset of such crises. They also identify valuation effects associated with foreign exchange debt and currency depreciation as pivotal factors driving these stock-flow adjustments. Furthermore, they highlight that the realization of contingent liabilities associated with the private sector is another potential contributor to this dynamic in emerging and

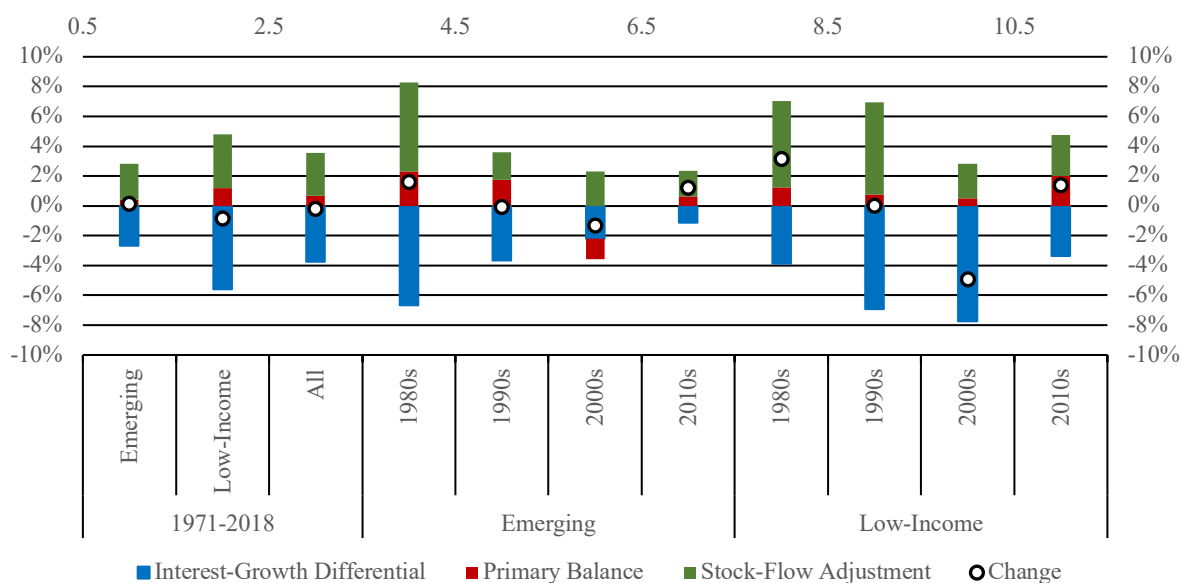
²⁴ She also reports that out of the total sample, only 38 economies (5 advanced, 11 emerging, and 22 low-income) register negative cumulative stock-flow adjustments between 1981 and 2010. Weber argues that the higher prevalence of negative cumulative stock-flow adjustments in low-income economies, compared to advanced and emerging economies, is likely the result of extensive debt relief and forgiveness.

²⁵ Jaramillo, Mulas-Granados, and Kimani (2017), identifies 179 debt spike episodes of multiyear debt accumulation greater than 10 percent of GDP across a sample of 90 countries, encompassing advanced, emerging, and low-income economies, and spanning the period from 1945 to 2014. Of these 179 episodes, 80 are among advanced economies, and 99 are among developing economies, spanning 76 countries (28 advanced, 26 emerging, and 22 low-income).

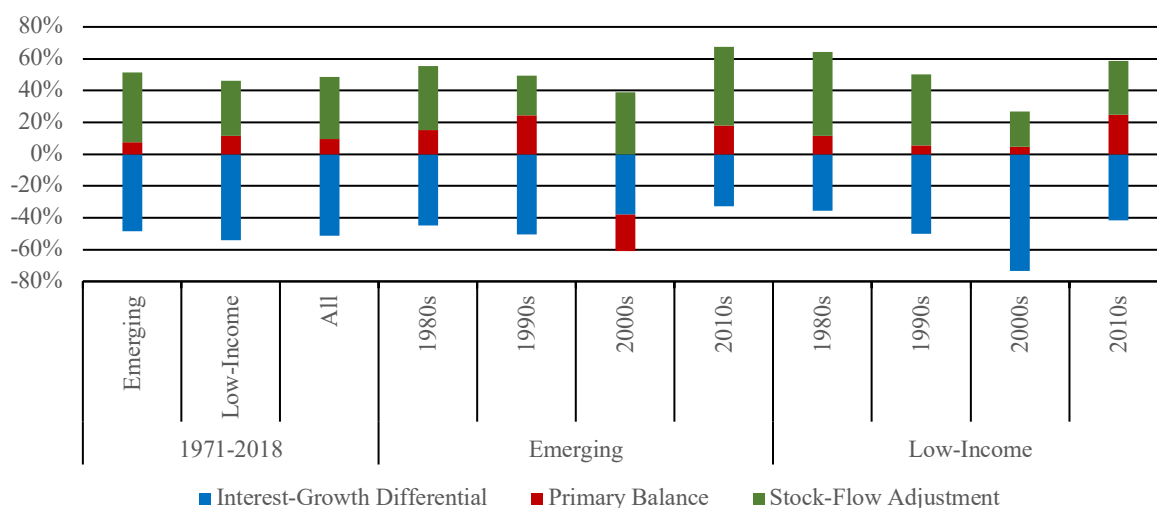
developing economies²⁶.

In Figure 2, we reproduce their Table 3 in graphical form. It is evident from the figure that the interest-growth differential and stock-flow adjustments play non-negligible roles in changes in debt stock in emerging and low-income economies.

Figure 2. Decomposition of Average Annual Changes in Debt Stock in 92 Emerging and 58 Low-Income Economies (1981-2018)



a) Components of Change in Debt Stock as Percentage of GDP



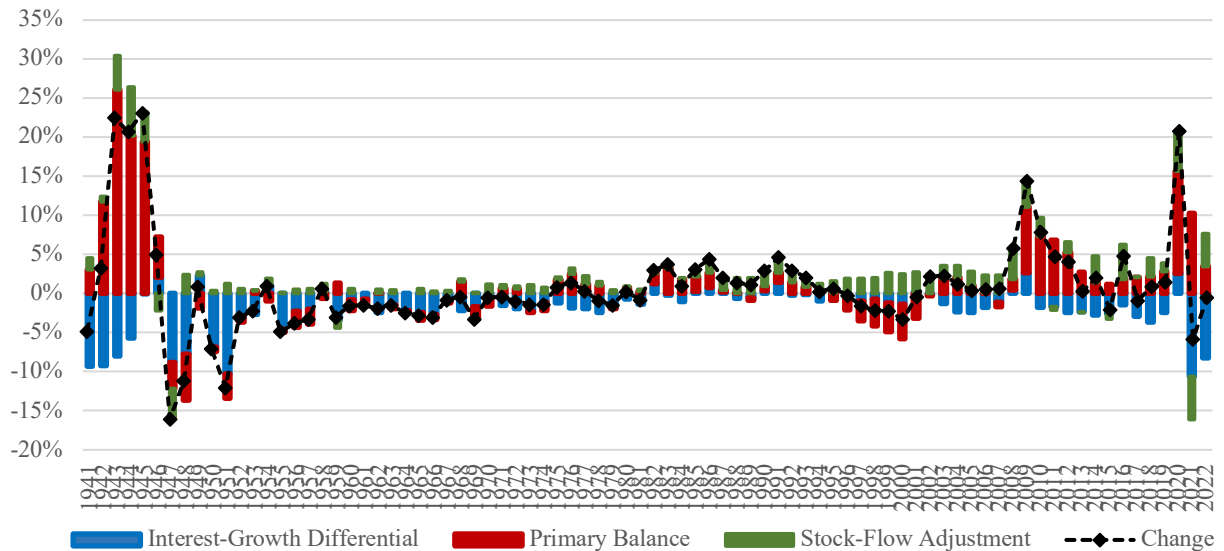
b) Components of Change in Debt Stock by Relative Contribution

Source: Moreno Badia, Arbelaez, and Xiang (2021), Table 3

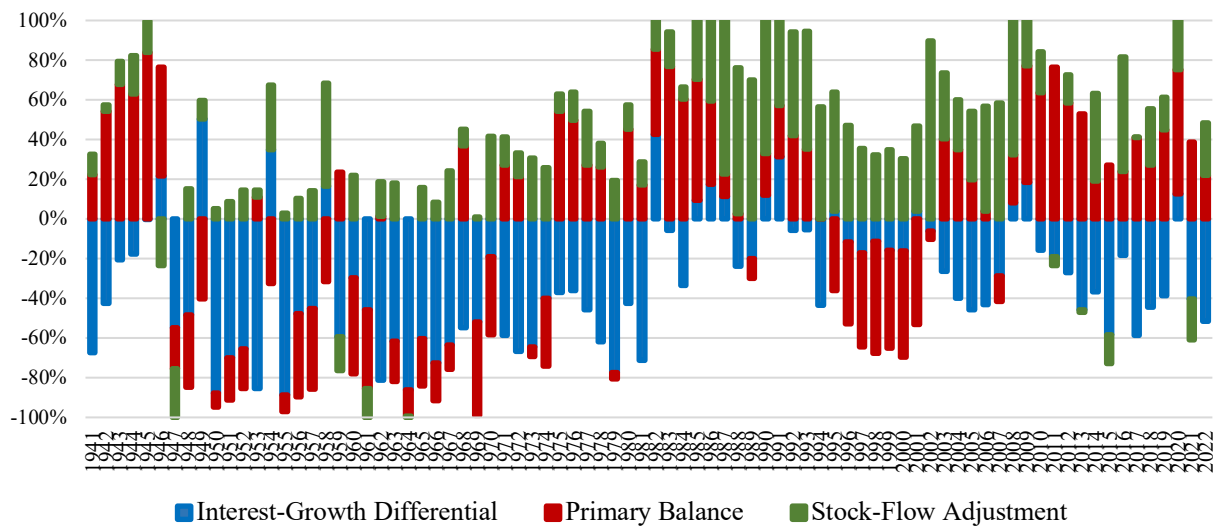
²⁶ The research by Moreno Badia, Arbelaez, and Xiang (2021) utilizes a comprehensive dataset comprising 150 emerging and low-income economies, including 92 emerging economies and 58 low-income economies, categorized according to the IMF's World Economic Outlook classification at the time. The dataset covers the period from 1971 to 2018.

To further elucidate this issue, we utilize equation (10) to decompose the debt changes in the United States (US), a major reserve currency country, from 1941 to 2022, (depicted in Figure 3) and those in Turkey, a major middle-income country, from 2004 to 2023 (depicted in Figure 4).

Figure 3. Decomposition of Annual Changes in Federal Debt Stock in the US (1941-2022)



a) Components of Change in Debt Stock as Percentage of GDP



b) Components of Change in Debt Stock by Relative Contribution

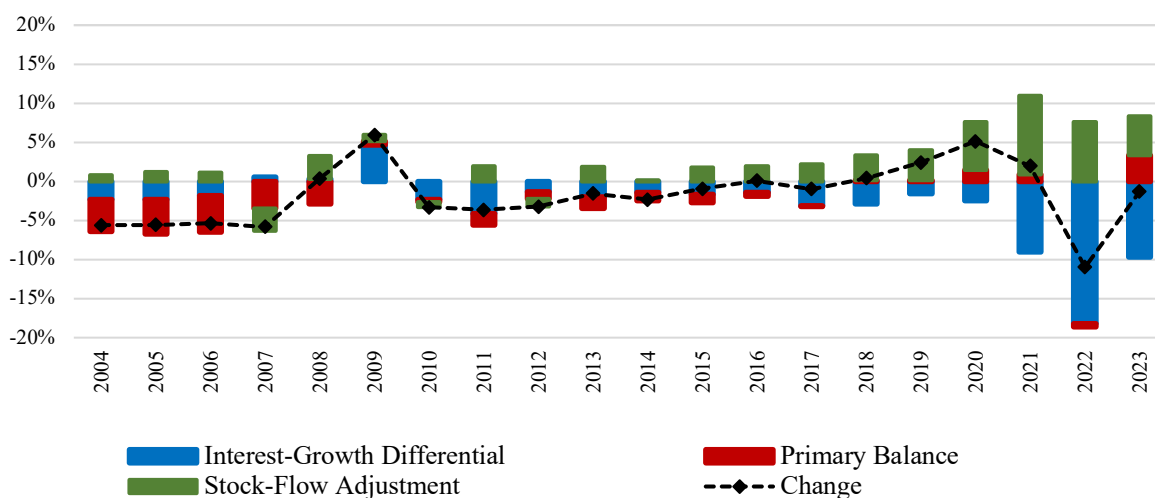
Source: Authors' calculations based on Federal Reserve Bank of St. Louis, FRED data

Figure 3 clearly illustrates that the contributions of both the interest-growth differential and the stock-flow adjustment components to the debt changes in the US are consistently significant. Furthermore, the stock-flow adjustment component of the debt changes is negative only for nine of the 81 years in the period, and averages at 1.19% of GDP with a standard deviation of

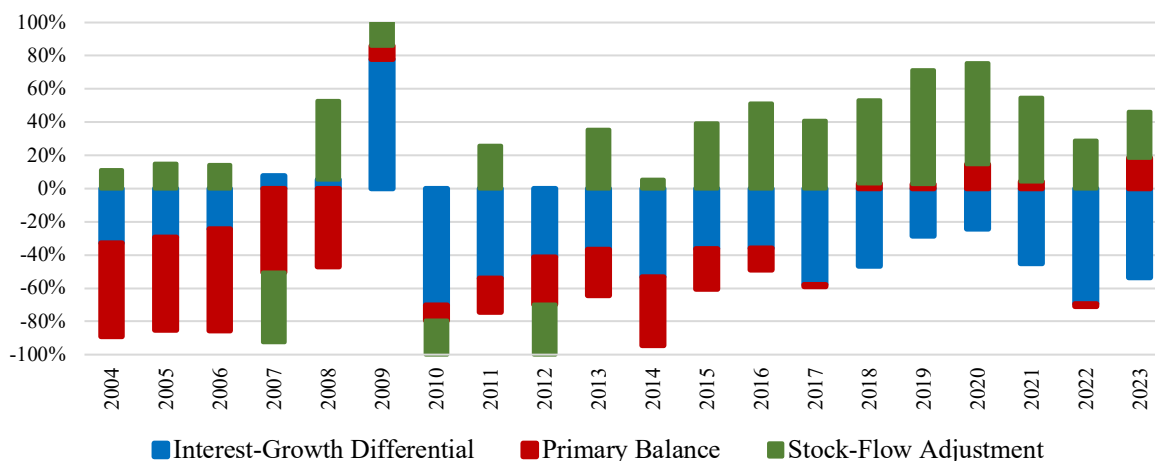
1.67%.²⁷ It is also evident from Figure 3 that the interest-growth differential plays a more significant role than the primary surplus in reducing the Federal debt stock in the US throughout the period.

When we turn our attention to Türkiye, a non-reserve currency emerging market economy with limited available data and replicate the same analysis for the period 2004-2023 in Figure 4, our findings align with those from Figure 3.

Figure 4. Decomposition of Annual Changes in Central Government Debt Stock in Türkiye (2004-2023)



a) Components of Change in Debt Stock as Percentage of GDP



b) Components of Change in Debt Stock by Relative Contribution

Source: Authors’ calculations based on the Treasury and Finance Ministry and the Central Bank of the Republic of Türkiye data.

²⁷ The averages and the standard deviations of the interest-growth differential and primary balance components as percentage of the GDP are as follows: -2.00% and 1.67%, and 1.67% and 5.07%, respectively.

In Türkiye, both the interest-growth differential and the stock-flow adjustment components are consistently significant throughout the entire period. Notably, the stock-flow adjustment component was negative in only three years over this 20-year period. This indicates that the significance of these components of the change in debt stock is not unique to the US, although the factors influencing the stock-flow adjustment component may differ. For example, Türkiye has faced significant challenges since 2016, including two major foreign exchange shocks in August 2018 and December 2021, leading to substantial stock-flow adjustments due to rapid currency depreciation. While these shocks played a significant role in the realization of large stock-flow adjustments, other factors may have also contributed. Regardless, the significance of the stock-flow adjustment in both the US and Türkiye is undeniable.

To sum up, our theoretical analysis demonstrated the necessity of the stock-flow adjustment term for maintaining stock-flow consistency in debt dynamics equations. Additionally, our empirical analysis, along with existing recent literature, underscores the significant impact of stock-flow adjustments on the accumulation of public debt that can render the debt unsustainable, irrespective of primary balance. This impact extends beyond emerging and low-income economies to advanced economies, even though the reasons for the stock-flow adjustments may vary across countries.

Incomplete understanding of the nature of external debt

LIC DSFs, by design, deal with PPG external debt, since the countries under this category have less developed domestic financial markets, mainly borrow from abroad, and heavily rely on governments acting in international financial markets. MAC DSFs, on the other hand, deal with total public debt, including both domestic and external public debt, without incorporating any private sector debt (except for contingent liabilities of the governments).

The MAC framework applies to a wide range of countries, including the reserve currency issuing country, all advanced and emerging market economies, middle-income countries, and borderline cases of lower-middle/low-income countries. However, the need for public debt issuance and the constraints on the form of that debt are totally different for different groups of countries. As mentioned before, failing to differentiate between domestic and international public debt within the MAC framework leads the IMF to impose additional costs on domestic players, even if the crisis is unrelated to domestic debt.

The fundamental problem is the IMF's approach to external borrowing in developing countries, which it views as an almost perfect substitute for domestic debt (Blejer and Cheasty, 1986)²⁸, harmless or natural up to a certain threshold. This perspective has roots both in the neoclassical growth model and the loanable funds theory of interest rates, which pave the way to the belief that many developing countries suffer from low saving rates, resulting in higher interest rates and hindering capital accumulation. In this view, foreign capital, in the form of external borrowing, portfolio flows, and foreign direct investment, can help fill the savings gap and stimulate domestic capital accumulation²⁹. Capital account liberalization was seen as a complementary part of these efforts by lowering barriers to external borrowings by non-public institutions.

In the case of debt sustainability, as discussed above, the IMF programs generally propose budget cuts and higher taxes to increase the primary government balance. However, public saving in terms of domestic currency in developing countries cannot be used to service foreign debt. Therefore, it is crucial to first acknowledge the structural reasons behind why developing countries resort to external borrowing to properly analyze the sustainability of their existing debt levels. The policy recommendations would differ significantly if these underlying structural reasons were appropriately highlighted.

Developing countries often seek external borrowing for several reasons. One key motivation is to fund imports when their exports and other foreign currency-generating activities fall short. While advanced economies can pay for imports in their own currency, developing nations typically lack this option, making them reliant on external debt. Additionally, developing countries may need to borrow externally to service existing debt, a challenge tied to the concept of "original sin," where they cannot repay debt in their own currency. Lower borrowing costs abroad can also drive external debt accumulation, especially during periods of low interest rates in advanced countries, as seen in the 1970s and early 2000s. Furthermore, external borrowing can act as a safeguard when a nation's foreign reserves fall critically low, protecting against speculative attacks on the currency. Many developing countries have borrowed heavily from

²⁸ Writing for IMF, Finance and Development, Blejer and Cheasty (1986:16) argue that "... inflows of foreign aid, for projects or for balance of payments support, have been a substitute for domestic savings."

²⁹ For example, the IMF researchers stated that "during the 1970s, foreign saving made an important contribution to the financing of investment in developing countries. In recent years, however, not only has the total supply of saving declined in industrial countries but because of the debt crisis in the developing countries such saving has been retained within the industrial countries themselves and thereby the availability of external funds for developing countries has been curtailed" (Aghevli et al., 1990:35). According to this view, external borrowings can also help countries smooth out consumption fluctuations, aligning with the permanent income hypothesis.

international institutions to stabilize their exchange rates, although reserve accumulation has not always been enough to prevent exchange rate shocks and debt crises since 2013.

In this context, external borrowing is intrinsically linked to the hierarchy of currencies, which is why developing countries cannot readily use their currencies for trade and debt payment purposes. Furthermore, interest rates on external debt are influenced by reference rates set in advanced economies, making developing countries structurally vulnerable to monetary policy shifts abroad. Therefore, from this perspective, external borrowing and associated volatility of interest rates are significantly the fallout of an asymmetric international financial structure.

The IMF's conventional stance, which views external borrowing as merely a substitute for domestic debt, has led to flawed policies that place additional burdens on indebted countries. However, if external borrowing were instead seen primarily as a natural outcome of an asymmetric international financial system, it would be easier to justify timely debt restructuring mechanisms, multilateral support for debt relief, and currency stabilization measures that would give developing countries more flexibility in times of debt distress. Furthermore, this approach also opens the door for reform in global financial architecture. Without adequately highlighting the root cause of foreign debt, the DSAs effectively serve the interests of creditors and justify harsh conditions on developing countries.

4 Policy Implications

Developing countries face many pressing problems, including growing climate change-related challenges, and there is no universal remedy for their intricate challenges. Many debt-related issues stem from deep-rooted structural problems, necessitating long-term solutions.³⁰ Unfortunately, the increasing debt burden and stringent policies aimed at compelling developing nations to manage their overwhelming debt exacerbate the initial difficulties these countries face.

The IMF's sustainability analyses are crucial in shaping potential policy recommendations to the governments of developing countries, and in determining the terms of restructuring debt across official and private lenders. In cases where the IMF assistance is required, DSAs are

³⁰ However, considering the pressing and interconnected threats posed by climate change and debt sustainability, it is crucial to explore various policy options addressing both immediate and enduring concerns.

among the critical inputs of IMF program design. However, as mentioned earlier, debt sustainability frameworks and IMF programs have major weaknesses and biases.

This amplifies the importance of immediate improvements in DSAs. It is crucial for policymakers in developing countries to comprehend the mechanisms of the IMF framework and, where possible, develop their own analysis, as this can enable them to challenge the conditionalities imposed by existing programs and negotiate or develop alternative programs.

While recent DSFs (IMF 2018, 2022) consider natural disasters and climate policies, as Maldonado and Gallagher (2022) argue that directly integrating climate shocks within DSF frameworks is essential to improve debt sustainability, especially for vulnerable economies, they emphasize that incorporating both physical climate risks and the fiscal needs for a green transition would provide a clearer understanding of these economies' debt challenges. One promising tool for this purpose is the debt service suspension clause, as used in Grenada and Barbados (Ho and Fontana, 2021), which allows debt payments to be paused during severe climate events, creating fiscal space in times of crisis. Similar to financial market circuit breakers, these clauses may enable governments to address urgent social and economic needs without destabilizing debt, offering a practical solution to pressing issues. While challenges remain—such as potential increases in borrowing costs—embedding such clauses and tailored country-specific climate risk assessments could make DSFs more adaptable to ongoing climate and external challenges

As we have discussed, the current analysis conducted by the IMF suffers from subjectivity and lacks transparency about its underlying modeling practices and assumptions. Despite the IMF's efforts to develop comprehensive guidelines for DSAs, these guidelines have become overly intricate and obscure about the key aspects of the methodology. Simplifying these guidelines would be the right first step forward³¹. Moreover, enhancing transparency requires making all relevant data, methodologies, and assumptions used in DSAs to be publicly accessible. This allows stakeholders and other researchers to scrutinize the assessment process and enables different parties to develop their own analyses.

³¹ In a similar spirit, Von Luckner (2024) suggests that incorporating country-specific thresholds, simplifying model selection, and refining risk weights would improve the responsiveness of LIC DSF risk assessments to individual country contexts and enhance transparency.

However, it is crucial to recognize that while transparency in projection generation is essential, it may not result in more accurate assessments. Economic forecasting is inherently complex, and the uncertainty in predicting macroeconomic variables presents challenges to achieving precise projections. Acknowledging this reality, decision-makers must embrace irreducible uncertainty and formulate adaptive policies to manage it effectively, as emphasized in a World Bank research paper by Kalra et al. (2014) concerning climate change. In this regard, the IMF should explicitly strive to integrate new developments in research about deep uncertainty into its debt sustainability analysis. This also requires paying close attention to the voices of stakeholders (DeMartino, 2022), including diverse groups of citizens in developing countries, and incorporating their perspectives in formulating programs to address debt issues effectively.

The IMF's growth forecasts tend to be overly optimistic despite the high stakes associated with decisions based on these forecasts. Hence, it is crucial to incorporate more realistic forecasts into DSAs, particularly during economic downturns. This involves recognizing the uncertainty in predicting recessions and crises and recognizing the impact of their own proposed policies, including fiscal austerity measures, on macroeconomic variables. Given the significant adverse consequences of decisions based on consistently overly optimistic forecasts, it is prudent to prioritize timely debt restructuring. Delaying necessary debt restructuring can exacerbate economic challenges and increase debt distress.

It is also essential to address the incentive structures of the IMF staff that might contribute to overoptimism in growth forecasting. This could entail fostering a culture that encourages staff to challenge prevailing views and consensus while ensuring that forecasts are not influenced by external pressures, particularly from lenders.

The IMF employs distinct frameworks for assessing debt sustainability, with separate criteria for LICs and MACs. However, the current MAC framework overlooks critical factors, particularly regarding external debt vulnerabilities and currency hierarchies, leading to ineffective policy responses and exacerbating debt crises. It is therefore crucial to revise the MAC framework to incorporate a more comprehensive analysis of external debt vulnerabilities and ensure that policy responses address the specific challenges posed by external debt accumulation.

The IMF often adopts a textbook one-size-fits-all approach, implementing austerity measures and, in some cases, regressive tax increases as the primary means of addressing debt

sustainability. This approach is founded on the assumption that it will enhance the debt-servicing capacity of the country under investigation. However, a more nuanced approach is needed—one that considers the underlying causes of debt distress, including external borrowing dynamics. For instance, in cases where external debt is the primary concern, prioritizing debt restructuring and negotiations with external creditors to achieve sustainable debt levels should be emphasized.

The IMF frameworks could also be improved by explicitly considering the stock-flow consistency of their analyses and using stock-flow consistent models in the analysis for robustness. This is crucial for understanding the implications of policy proposals addressing debt sustainability issues. If the primary macroeconomic outcomes react differently to policy proposals under various modeling approaches, it is prudent to exercise caution when pushing receiving countries to implement specific policies.

In tandem with developing alternative stock-flow consistent models, the IMF should also modify their internal models that are currently based on neoclassical growth and general equilibrium models. As previously mentioned, despite the IMF's adoption of more sophisticated risk assessment techniques, its policy analysis and macro projections still rely mostly on neoclassical modeling practices. These models have strong assumptions, such as the neutrality of monetary policy/interest rate policy in the long run. However, in a world where at least productive investment could be affected by monetary policy, even within mainstream models, there would be room for the arguments that monetary policy may have long-term impacts.

The need for external debt in developing countries is intricately intertwined with the concepts of “original sin” and the hierarchy of money, both of which underscore the unequal nature of the international financial system and the power asymmetries in global economics and politics. Therefore, the challenges of debt sustainability are directly and indirectly linked to the shortcomings of the current international financial architecture. Reimagining the international architecture to establish a better international monetary system is not merely a desirable goal; it is a necessity, given the inadequacies and inequalities deeply ingrained in the existing system. Unfortunately, transforming the unequal international financial architecture is complex and difficult. Nevertheless, it is crucial for the international community to consider gradual and fundamental solutions in the short, medium and long term to address the pressing issues developing countries face. In this vein, there is a compelling case for the IMF to collaborate

with other international institutions and regional development banks to enhance the role of Special Drawing Rights (SDRs) in the global trade and financial system. This evolution can be seen as a step toward establishing a better international financial order, which can address some of the underlying structural issues behind why developing countries need external debt. In the short run, expanding access to low-cost official liquidity facilities and other allocation means of Special Drawing Rights (SDRs) for the specific needs of developing countries would be in the right direction.

5 Conclusion

In conclusion, the current analysis underscores the critical shortcomings and biases related to the IMF's Debt Sustainability Frameworks (DSFs), which are crucial in shaping policy recommendations and interventions in developing countries. While evolving over time, these frameworks continue to suffer from foundational problems, methodological flaws, and an inherent bias towards fiscal austerity. Moreover, the over-optimistic growth forecasting by the IMF, coupled with the neglect of structural factors underlying debt vulnerabilities, further exacerbates the challenges faced by developing nations. There is an urgent need to reform the DSFs to ensure a more transparent, comprehensive, and equitable debt sustainability assessment.

To address these deficiencies, several policy recommendations emerge. First, there is a pressing need to enhance the transparency and accessibility of DSAs, allowing for scrutiny and input from diverse stakeholders. Simplifying the guidelines and incorporating realistic forecasts, particularly during economic downturns, is essential to avoid misguided policy prescriptions. Moreover, revising the DSFs to incorporate a more comprehensive analysis of external debt vulnerabilities and adopting stock-flow consistent models can lead to more robust assessments and policy recommendations tailored to the specific needs of developing economies. Additionally, efforts should be made to reform the international financial architecture, including enhancing the role of Special Drawing Rights (SDRs) and promoting more equitable access to liquidity facilities. In the face of increasing debt challenges and the inequities inherent in the current international financial system, more efforts are needed to redefine the approach to debt sustainability.

APPENDIX 1

Main Tools for Risk and Sustainability Assessments in MAC DSF

1. Near Term Risk Assessment Tools

The near-term risk assessment module uses a logit model to predict stress events based on existing data and does not rely on any projection³². Stress events are defined based on a set of criteria with regard to the existence of large IMF-supported programs and exceptional financing, default, debt restructuring, chronic excessive inflation, and/or based on market indicators with regard to spreads, loss of market access, and financial repression³³.

Near term risk analysis is not meaningful if there is already a sovereign stress event. The IMF suggests that it can be carried out, nevertheless, when there is an emergency financing request from the Fund even though stress criteria are not met or when there is a non-drawn precautionary arrangement with the Fund. The results of near-term risk assessments are communicated through the categorization of fitted probabilities into low, moderate and high-risk signals depending upon thresholds associated with 10 percent missed crisis and false alarm ratios³⁴.

2. Medium Term Risk and Sustainability Assessment Tools

The first component of the medium-term risk and sustainability assessments is debt fan chart module (DFM), which mainly compares the baseline scenario with simulations based on historical data since 2000. Stock-flow adjustment variable of debt dynamics equation is usually ignored in simulations, whereas the realizations of all other components of the equation produce the simulated projections.

The information in the debt fan chart (the graph of 10,000 simulations) is summarized into three metrics: (i) fan chart width, calculated as the difference between the 95th and 5th percentiles of terminal debt levels in simulations; (ii) the probability of debt non-stabilization, calculated as the ratio of the count of debt non-stabilizing primary balances among simulations to the number of simulations; (iii) the median terminal debt level adjusted by an institutional

³² Explanatory variables include an index of institutional quality, track record of stress history, current account to GDP, three-year change in REER, credit-to-GDP gap, change in debt-to-GDP ratio, public debt to revenues, FX public debt-to-GDP, international reserves to GDP, change in VIX and stress events in currency union members.

³³ See IMF (2022, p. 40) for the details of these criteria.

³⁴ Note that after carrying out any analysis based on a model, the IMF staff is allowed to upgrade or degrade the result in certain cases that require judgment.

quality index. These three metrics are aggregated into a single index, called the debt fan chart index (DFI), by using the weights derived from their explanatory power in the prediction of past stress events. The final DFI index is compared to two threshold levels (associated with 10 percent missed crisis and false alarm ratios) that categorize it into low, moderate or high-risk group³⁵.

The GFN module is the second main component that focuses on liquidity risks in the medium-term. The GFN is defined as the sum of the primary deficit, debt service and realization of any contingent liabilities, minus any interest revenue. The GFN tool assesses the debt sustainability under a generalized macro-fiscal stress scenario; specifically, the size of financing needs, vulnerabilities related to sudden capital flow reversals, and domestic banking sector capacity as a shock absorber. The standardized stress scenario worsens growth, interest rate, exchange rate, inflation and primary balance variables, in line with the country's historical experience of stress cases. In the last MAC framework, this set is enlarged, first, with a maturity shortening shock. Secondly, a debt holder shock is introduced, assuming that foreign private creditors reduce their rollover rate and provide no new financing so that domestic banking sector absorbs any shortfall in public finance^{36,37}.

The results of the GFN tool are summarized into three metrics: (i) average GFN-to-GDP ratio for the baseline projections (no shock scenario); (ii) initial domestic banking sector exposure to the public debt; (iii) change in bank claims on the government under standardized stress test. The results are aggregated into GFN financeability index (GFI) and the weights are, again, based on the explanatory power of the components in predicting sovereign stress. Additionally, a medium-term index (MTI) combines the results of solvency and liquidity risk analyses into a single signal. Since both the DFI and GFI are found to have similar explanatory power in predicting stress events, they have equal weights in the resulting MTI. Threshold calibrations for both GFI and MTI are carried out in a similar fashion to previous tools.

³⁵ The DFM allows the inclusion of government financial assets into medium term analysis only in the cases those assets exceed 75 percent of GDP and 100 percent of public debt, and in such cases, regardless of the level of DFI, the mechanical signal of the DFM will be low.

³⁶ In general, standardized stress scenario assumptions are justified by referring to influential empirical papers. For references, see (IMF, 2013a). Details of scenarios and parameters change over time (see Table 3, IMF 2013a; see Table 4, IMF 2022).

³⁷ This tool also involves the addition of liquid, reserve-like assets as a buffer, and if there is any, undrawn Fund arrangements that can be tapped during a stress.

In addition to those main tools, there is a conditional or optional tool to assess risks due to extraordinary events, called as “triggered stress tests”. This follows the same practices of medium-term analyses for five different scenarios: banking sector instability, commodity price shocks, realization of contingent liabilities, large corrections of misaligned exchange rates, and natural disasters. The scenario analyses involve country specific, tailor-made scenario construction layered on the original baseline scenario and the application of two medium term tools. The triggers for each scenario are defined by relying on several risk metrics and a relevant threshold, justified generally by referring to relevant empirical literature. For example, credit-to-GDP gap exceeding 10 percent triggers the banking sector instability scenario; then, the default scenario updates (based on calibrations justified by relevant literature) the projections; and finally, the user is expected to customize the scenario for the country. The results of triggered stress tests may change the overall medium-term risk and sustainability assessment based on the MTI, when the IMF staff judgment for the triggered scenario is highly likely and/or high impact³⁸.

APPENDIX 2

Country Classifications in LIC DSF

LIC DSF places a particular emphasis on country classifications. Building on the work of Kraay and Nehru (2006), which identifies the likelihood of debt distress in LICs depends on the quality of institutions and policies among others, LIC DSFs aimed to capture the effect of country qualities by incorporating the Country Policy and Institutional Assessment (CPIA) score into the threshold-setting process. These thresholds depended solely on the CPIA score in the previous LIC DSF (IMF, 2013b). The latest version enhances the classification procedure by introducing a composite indicator (CI), which aims to measure the “debt carrying capacity” of a country. The CI is constructed using the following formula:

$$CI = 0.385 \times CPIA + 2.719 \times growth + 2.022 \times \frac{Remittances}{GDP} + 4.052 \times \frac{Reserves}{Imports} - 3.990 \times \left(\frac{Reserves}{Imports} \right)^2 + 13.52 \times world\ growth$$

³⁸ SRDSF also include long-term module consisting of 5 to 10 years assessments. However, these are more qualitative exercises about long term risks and rely mostly on the evolution of debt trajectories that are strongly influenced by the user assumptions. The evaluation does not involve any mechanical signal in the end, but only the judgment and do not significantly affect final judgments on the country.

The weights are derived by averaging the coefficients of four probit estimations by which the likelihood of debt distress (measured by four main debt ratios) is regressed on the variables in the formula above. Countries are assigned to one of the three groups (weak, medium, strong), depending on CI thresholds derived from the distribution of CI values. Any upgrade or downgrade for a country requires two consecutive signals of change, aligning with consecutive IMF WEO updates.

Setting Thresholds and Rules in LIC DSF

Once the country group is determined, the external risk rating of the country is found by comparing the key debt ratios from both the baseline scenario and stress scenarios at the end of a 10-year projection period to the indicative thresholds for four key debt ratios specific to each country group. The indicative thresholds are jointly determined according to their explanatory power in predicting debt distress episodes³⁹.

The assignment of the rating relies on the following rule: (i) If all four indicators remain below thresholds for all scenarios, a low-risk rating is assigned. (ii) If there is any breach under stress scenarios, but not in the baseline scenario, a moderate-risk rating is assigned. (iii) If there is any breach under the baseline scenario, a high-risk rating is assigned.

In a similar fashion, the mechanical signal of “the overall risk of public debt distress” is determined by comparing the total public debt (i.e., PPG external debt plus public domestic debt) with its own thresholds. The rules for this mechanical signal are as follows: (i) If the external risk rating is low and the total public debt-to-GDP ratio is below its threshold in both the baseline and stress scenarios, the overall risk is classified as low. (ii) If the external risk rating is low but the total public debt breaches its threshold under stress scenarios, or if the external rating is moderate, the overall risk rating is defined as moderate. (iii) If the external rating is high or the total public debt breaches its threshold under the baseline scenario, the overall risk rating is set as high.

Stress Tests in LIC DSF

³⁹ The number of key debt ratios, corresponding threshold levels, and the methodology for determining these levels have been recently updated (IMF, 2017). Also, the end-year to be compared to thresholds is reduced to 10 years from 20 years. The latest modifications resulted in maintained or increased thresholds for debt stock variables within each group, while thresholds for debt service variables are generally reduced compared to previous LIC DSFs.

The IMF and World Bank (2017) streamlined the stress test scenarios in the latest LIC DSF. The standardized stress test framework is applicable to both external PPG debt and total public debt and includes six tests that introduce shocks to five variables individually and simultaneously: growth, primary balance, exports, other flows (transfers and FDI flows), and the exchange rate. These tests include one standard deviation shocks to individual variables, and for the combined shock scenario, one-half standard deviation shocks to all the variables.

Typically, the stress tests are conducted as partial equilibrium analyses, meaning only a small number of variables are affected by each shock while others remain unchanged. Any shock that results in additional financing needs is assumed to be absorbed through additional public borrowing under the average terms of financing or the terms specified by the user for residual finance.

In addition, LIC DSAs offer two other stress test frameworks: tailored and fully customized. Among the tailored stress tests, the contingent liability stress scenario is applied to all countries and assumes a one-off increase in the debt-to-GDP ratio in the second year of the projection period. Other tailored stress tests are exclusively applicable to countries that are exposed to specific risks, such as natural disasters, commodity price shocks, and financial market shocks. While these tests have triggers and a predefined rule set, the stress scenarios are expected to be customized based on historical experiences and inputs provided by the country authorities. Finally, fully customized stress tests are optional and suggested to encompass additional scenarios in LIC DSAs.

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