Making the Low-Income Country Debt Sustainability Framework Fit for Purpose

Indermit Gill
Brian Pinto

Abstract

The World Bank and the International Monetary Fund use the *Low-Income Country Debt Sustainability Framework* to assess the sustainability of sovereign debt in about 75 low- and middle-income developing countries. It is overdue for a review, and this paper recommends that it be replaced for three reasons. First, it was designed when official concessional external debt was virtually synonymous with public debt. Over the past decade, however, the marginal cost of borrowing for Low-Income Country Debt Sustainability Framework countries has been defined increasingly by domestic and external debt markets. This has rendered the framework largely obsolete. Second, the framework focuses mainly on external debt, but development outcomes in the framework countries are more closely related to overall public debt. The mission of the World Bank—and, increasingly, the International Monetary Fund—is to improve growth, stability and living standards. So public debt ought to be the principal focus of the revised Low-Income Country Debt Sustainability Framework. Third, causality in the framework countries flows from fiscal deficits to current account deficits rather than the other way around, and the public component constitutes the lion's share of total external debt. To focus on external debt distress in these circumstances is tantamount to tackling the symptom—accumulated current-account deficits—instead of the fundamental cause: fiscal deficits, or the gap between government investment and saving. The experiences of Ethiopia, Ghana and Zambia illustrate the arguments. The paper recommends a framework based on nominal public debt and its dynamics, supplemented with a thorough analysis of international liquidity. Discarding the Low-Income Country Debt Sustainability Framework could well be disruptive in the short run. However, the alternative would be worse: retaining an obsolete framework that has failed to anticipate public debt crises and is poorly aligned with the Sustainable Development Goals.

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Indermit Gill and Brian Pinto[1]

1. Introduction

We examine the 'why' and 'how' of reforming the Low-Income Country Debt Sustainability Framework (henceforth LIC DSF), the analytical construct used by the World Bank Group and the International Monetary Fund for assessing debt sustainability in about 75 low- and middle-income developing countries. The LIC DSF also plays a crucial role in informing non-concessional borrowing limits in the Bank and Fund, and in aid allocation through IDA's Performance-Based Allocation System (PBAS).

The LIC DSF was reviewed in 2017 to secure a better understanding of new debt vulnerabilities in the rapidly changing financing landscape for LIC DSF countries. But its overwhelming focus on debt distress in relation to public and publicly guaranteed (PPG) external debt and its present value (PV) were kept intact—four of the five distress indicators pertain to PPG external debt.

This single fact has rendered the LIC DSF largely obsolete. When it was originally implemented around 2005, private external debt was virtually nonexistent and public debt was more or less synonymous with PPG external debt. The latter in turn coincided with concessional external borrowing from official creditors because commercial public borrowing was minuscule, justifying the focus on PPG external debt and its PV. However, the public sector in many LIC DSF countries has now had access to commercial borrowing from the international and domestic capital markets for several years. As a result, the marginal cost of borrowing has been increasingly determined by the market or by new lenders like China, not by the traditional official creditors. Even the poorer countries, which do not issue bonds internationally, borrow domestically in local currency on commercial terms.

In addition to the changed financing landscape, there are two other reasons for replacing the current LIC DSF. First, it is not well-aligned with the Sustainable Development Goals (SDGs). Development outcomes are related to overall public debt, not just to the PPG external debt, in two respects: (i) via the quality, quantity and composition of public spending and how it is financed, whether by taxes, (external/ domestic) debt or inflation; and (ii) the need to avoid public debt crises that set progress back for years, because of the absence of a well-functioning arrangement for sovereign debt restructuring. The second reason is macroeconomic logic. In most LIC DSF countries, the fiscal or public sector deficit is the main determinant of the current account deficit, which in turn is the main determinant of external debt dynamics. The fiscal deficit is the main determinant of public debt dynamics. With fiscal imbalances spilling over into CADs, public debt dynamics drive external debt dynamics, not the other way around. *The 'why' of reform, then, is straightforward: The changed financing landscape, macroeconomic logic, and the need for a debt sustainability framework that is better aligned with the SDGs all call for an overhaul of the LIC DSF.*

On the 'how', we argue for a shift in focus to nominal public debt (as opposed to its present value) and its dynamics based on the standard framework of the ratio of the primary fiscal deficit-to-GDP (pd) and the difference between the real interest rate and the real growth rate of GDP (r-g). Such an approach provides clear warnings about potential crises, something the LIC DSF has not done well, by alerting us when the ratio of public debt to GDP is on an unsustainable course. For example, if a LIC DSF country's government debt-to-GDP ratio (d) is 40 percent with pd at 5 percent and (r-g) at 5 percentage points, this tells us that d will grow by at least 7 percentage points a year and hence the debt dynamics are unsustainable.[2] *This does not guarantee that the debt level will become unsustainable or that a crisis will result, but cautions that both are distinct possibilities in the absence of decisive corrective action.* In the current financial landscape, this point is critical: the LIC DSF needs to provide timely warning about an

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[2] For the technically minded, the equation giving the path of d in continuous time is $\dot{d} = pd + (r - g)d$.

impending crisis based on an assessment of public debt dynamics because prevention is far less costly than cure.

The numbers in the paragraph are based on data from the debt sustainability analysis (DSA) for Zambia in IMF (2015), which rated Zambia at moderate risk of external debt distress but overall public debt dynamics as sustainable. Recasting the data to focus on d, pd and (r-g), ADF Lab (2016) described public debt dynamics as "definitely unsustainable", confirmed by market signals: the secondary market yield on Zambia's 10-year 8.625 percent Eurobond issued in April 2014 was close to 16% at that time.

Experience also shows that the seeds of crises get sown over several years, notwithstanding the image of a sharp discontinuity that a debt default may convey. This makes early warning essential. With the debt structure of LIC DSF countries now resembling that in emerging market countries (EMs), the examination of public debt dynamics needs to be complemented with a thorough analysis of international liquidity (foreign exchange reserve adequacy), an assessment of market signals on devaluation and default risks, and the monitoring of risks from private sector balance sheets.

We illustrate the obsolescence of the LIC DSF and the desirable direction of reform with the experiences of Ghana, Ethiopia and Zambia, which are now in public debt crises. In addition, a growing number of LIC DSF countries have been grappling with a big deterioration in public debt sustainability that predates the COVID-19 pandemic, but which has been poorly anticipated by the LIC DSF.

The next section shows that the LIC DSF is a *specific analytical framework* that was appropriate in the pre-HIPC-MDRI and immediate post-HIPC-MDRI eras. A specific framework risks becoming obsolete when the purpose for which it was designed no longer applies. In principle, the solution is to scrap the framework and adopt a new one. In practice, the framework may get entrenched in a bigger context institutionally, resulting in the framework outliving its original purpose. To paraphrase John Maynard Keynes, the problem may lie not in developing a new framework, but in escaping the old one. Getting rid of the current LIC DSF will be neither simple nor costless. But sticking with it is costlier, because it helps neither with assessing debt sustainability nor in supporting economic development.

The rest of the paper is organized as follows. Section 2 provides a brief history of the LIC DSF. Section 3 discusses its obsolescence and sketches out an alternative with desirable properties. Section 4 discusses the 2017 revision of the LIC DSF, while section 5 argues it fell far short of the "significant overhaul" that was claimed. Section 6 demonstrates that one needs to give primacy to public debt and its dynamics even if one is simply an external creditor who does not care about development. Section 7 appraises the LIC DSF templates for the external and public sector DSAs. It illustrates the idea that debt sustainability should not be an end in itself but a platform for development with the experience of Ethiopia. It also discusses Zambia where a high level of private external debt was "discovered" in 2017 and concludes that the Zambian case only reinforces the need for a new LIC DSF. Section 8 concludes with a summary of recommendations.

2. A Brief History of the LIC DSF

The LIC DSF was introduced in April 2005 to carry out public and external debt sustainability analyses in LICs. This was the same year in which the Multilateral Debt Relief Initiative (MDRI) was adopted, under which the IMF, IDA, the African Development Fund (AfDF) and Inter-American Development Bank (IADB) agreed to write off 100 percent of their claims on countries that had reached or would eventually reach completion point under the enhanced Initiative for Heavily Indebted Poor Countries (HIPC).

The IMF's website, updated after the 2017 revision of the LIC DSF (IMF 2017), notes that the goal of the LIC DSF is "to guide borrowing decisions of low-income countries in a way that matches their need for funds with their current and prospective ability to service debt, tailored to their specific circumstances." It defines the twin challenges of LICs as "meeting their development objectives, including the Sustainable Development Goals (SDGs), while at the same time ensuring that their *external debt* remains sustainable."[3]

This raises two questions: First, who are the main borrowers in LIC DSF countries and, second, what is the connection between borrowed resources and the SDGs? The answer is that the government and state corporations are the main borrowers and that the connection to development is through public spending on human development—education, health, and social welfare—and infrastructure with the goals of poverty reduction and private sector led growth. Since the public sector is the main borrower and the objective is economic development, the main variable should be *public* debt and not *external* debt.

External debt is the stock of borrowings from non-residents and is mainly the integral of past current account deficits.[4] Before HIPC-MDRI and soon after it, the public sector in LICs borrowed almost exclusively from official creditors, multilateral and bilateral, with little domestic borrowing. So it made sense to focus on external debt sustainability, especially as the private sector was unlikely to borrow externally—something that remains largely true today (Zambia, discussed below, is an exception). Thus, external and public debt were more or less synonymous, with the bulk of the external debt owed to official creditors. But this started changing dramatically well before 2017, which the IMF website acknowledges. It notes that the 2017 revision was to "ensure that the DSF remains appropriate for the rapidly changing financing landscape facing LICs and to further improve the insights provided into debt vulnerabilities".

Yet, the website persists: "Given the *central role of official creditors and donors in providing new development resources* to these countries, the framework simultaneously provides guidance for their lending and grant-allocation decisions to ensure that resources to LICs are provided on terms that are consistent with their long-term debt sustainability and progress towards achieving the SDGs." The website further notes: "Given that concessionality is an important element in financing LICs, the debt concept used in the template focuses on the present value (PV) of debt."

Concessionality is important because LIC DSF countries are poor with insufficient domestic saving, necessitating external funds to enable critical investments at home. Borrowing from official sources means savings relative to the market, justifying the use of the PV of debt. Calculating the level of concessionality of debt, or its "grant element", is a way of recognizing the efforts of official donors. But this "financing landscape" began changing well 2017, with borrowing by the public sector from both external and domestic markets growing in importance. Markets began increasingly to define the marginal cost of borrowing for LIC DSF countries.

Problems with the Discount Rate

The profusion of borrowing sources at different interest rates and in different currencies for the government and large state-owned enterprises has implications for the choice of discount rate used to compute the PV of external debt. In 2004, when the LIC DSF was being launched, the discount rate

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[3] The quotes are from the IMF's LIC DSF website https://www.imf.org/external/pubs/ft/dsa/lic.htm. Italics added.
[4] Factors such as FDI, a non-debt financing source, and valuation changes result in the change in external debt being less (FDI) or more than the current account deficit CAD.

varied by currency, and was based on the OECD's CIRRs (commercial interest reference rates).[5] In 2004, a six-month moving average of the US dollar CIRR was used to calculate the PV of debt while grant elements were determined by using currency-specific CIRRs plus a mark-up. But with interest rates in advanced economies falling to historically low levels after the Great Recession, the PV of debt tended to be inflated, compressing borrowing space. The LIC DSF discount rate (DR) dropped to 3%, pushing up the PV of debt and restricting new borrowing. Large discrepancies arose between the DR for calculating the PV of debt and grant element calculations because of the variation in CIRRs across currencies.

These developments prompted a change in the discount rate in 2013. A 10-year average of the 10-year USD CIRR was adopted both for calculating the PV of debt and its grant element. The then-average CIRR plus a margin of 1.15% implied a rate of 5.26%, which was rounded down to 5%. This would be used for all debt related calculations irrespective of currency. This rate has stayed in force ever since and is, coincidentally, the DR used at the inception of the LIC DSF in 2004.

Summing up, in the pre- and immediate post-HIPC-MDRI era, the LIC DSF was fit for purpose because external debt was both concessional—because it was predominantly from official sources—and virtually synonymous with total public debt. Focusing on the PV of external debt made sense, even though the choice of an appropriate DR presented difficult conceptual and computational problems (to which we return below). But the debt configuration changed rapidly after HIPC-MDRI.

3. The Obsolescence of the 2005 LIC DSF

In 2007 Ghana became the first beneficiary of HIPC-MDRI to issue a Eurobond, marking the start of the obsolescence of the LIC DSF. HIPC-MDRI cut Ghana's government debt from 78 percent of GDP in 2005 to 42 percent in 2006. In September 2007, the government issued a 10-year $750 million Eurobond—about 5 percent of Ghana's GDP—at an interest rate of 8.5 percent.

The Eurobond issue seemed logical. The IMF's April 2008 Regional Outlook for Africa applauded Ghana for a "...gradual, well sequenced opening" of the capital account following "...considerable debt reduction from HIPC and MDRI debt relief" (IMF 2008). Ghana's IDA Resource Allocation Index of 4.0 for 2007 was well above the average of 3.3 for all IDA borrowers for that year (the IDA Resource Allocation Index runs from a low of 1 to a high of 6 and is an important input into how much money LICs receive from IDA). It had also discovered oil, with revenues expected to start in 2011. The Eurobond could have been seen as borrowing against these revenues in line with the Permanent Income Hypothesis, which posits that consumption should be determined not by current income but by the present value of lifetime income. In the Ghanaian government's case, the latter would be increased by the oil discovery.

But then things went wrong. First, political realities reared their head. The 2008 elections contributed to the fiscal deficit ballooning to 14.5 percent of GDP in 2008 from 9 percent the previous year, while the current account deficit shot up to 19 percent of GDP from 12 percent. Second, it was not clear how the proceeds from the 2007 Eurobond and from the privatization of Ghana Telecom, a total of over 10 percent of GDP, had been spent. Third, the debt reduction via HIPC-MDRI was rapidly reversed and the situation became even worse when arrears and contingent liabilities from state-owned enterprises were included. A June 2010 IMF report expected public debt to peak at 65 percent of GDP at end-2010, an increase of 20 percentage points of GDP in four years. Not included in the calculations were "domestic

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[5] The CIRRs are linked to secondary market yields on advanced economy (AE) government bonds and constitute the minimum interest rates to be charged on fixed-interest rate export credits; floating rates have different rules.

expenditure arrears projected at 5 percent of GDP and state-owned enterprise (SOE) liabilities to banks from past underpricing of energy products amounting to about 6 percentage points of GDP" (IMF 2010).

Eventually, the 2010 public debt-to-GDP ratio came in at just 41 percent instead of the projected 65 percent because Ghana revised its GDP upwards by 70 percent. This alone would have lowered debt from 65 percent to 38 percent of GDP. Then Ghana's real GDP increased by close to 14 percent in 2011 as oil production came on stream. This too should have contributed to the containment of the government's debt-to-GDP ratio. But the recalculated government debt-to-GDP ratio rose from 34 percent of GDP in 2008 to 45 percent in 2011. Thus, one-off factors like the upward GDP revision and new oil production raised GDP and reined in the debt ratio, obscuring the effects of poor fiscal policy and public spending composition.

In 2011, Ghana passed the Petroleum Revenue Management Act, which established a "strong legal framework for the collection, allocation, and management of petroleum revenue in a transparent and accountable manner". The IMF program allowed Ghana to increase its stock of non-concessional borrowing ceiling from $800 million to $3.4 billion to accommodate a loan agreement negotiated with the China Development Bank. But the IMF also said that a stronger framework for prioritizing public investments would be needed, and the public sector wage bill had to be kept under control (IMF 2012).

In 2013, 2014 and 2015, Ghana issued three more Eurobonds for $1 billion each. By the end of 2015, its public debt had risen to an estimated 78% of GDP, compared with 41% at end-2011. Public debt dynamics were clearly unsustainable with real interest rates much higher than real growth rates. The primary surplus needed to stabilize the debt-to-GDP ratio in 2015 was over 7% of GDP compared to an actual primary deficit that had already been lowered from more than 3% of GDP in 2014 to a tiny surplus of 0.1% of GDP in 2015. The additional fiscal effort was both huge and unlikely to occur.

Against this background, the DSA in IMF Country Report 16/16, January 2016 (IMF 2016) assessed Ghana at high risk of debt distress because two of the PPG external debt burden indicators exceeded their policy-based thresholds in the baseline scenario: the PV of PPG external debt exceeded 40% of GDP and PPG external debt service exceeded 20% of revenue. The DSA devoted two paragraphs to public debt sustainability, reproduced below:

> "8. Strong fiscal adjustments and an adequate financing package should be able to bring Ghana's total public debt back to a sustainable path ... Fiscal adjustment has been gradually reducing fiscal dominance, including less reliance on central bank's financing. As confidence in economic policy improves, and accordingly the exchange rate and inflation stabilize, borrowing conditions on the domestic market– which accounts for a large share of financing – would also gradually improve. The relevant debt indicators are expected to improve with PV of public debt declining to around 40 percent of GDP by the end of the projection period.
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> 9. PV of debt-to-GDP ratio would breach the public debt benchmark as a result of the lowering of the policy-dependent threshold in the initial years. The public debt benchmark was also lowered by the changes in CPIA, leading to breaches of the threshold in the baseline. Though all indicators show sustainable paths under the baseline scenario, they could be on an explosive path under the historical and the most extreme shock scenario (with abrupt real exchange rate depreciation)."

Paragraph 8 above from the 2016 DSA mentions the PV of public debt declining to 40 percent of GDP by the end of the projection period, that is, by 2035, or some 20 years later. Paragraph 9 asserts that the PV of debt-to-GDP ratio would breach the public debt benchmark. In general, the tone is sanguine, with sustainable paths in the baseline scenario even though the public debt benchmark is breached.

We consider an alternative approach to assessing debt sustainability using the same data as in IMF (2016) based on giving nominal public debt-to-GDP and its dynamics primacy over the PV of PPG external debt-to-GDP. We do five exercises:

- First, we demonstrate that current account deficits are driven mainly by the public sector or fiscal deficit, depending upon the coverage. If this is the case, then it is reasonable to assume that public debt dynamics, which are driven by fiscal deficits, exchange rates and GDP growth, spill over into external debt dynamics. This would be particularly true if the bulk of external debt is accounted for by PPG debt.

- Second, we go back to the basics on the PV of debt and what this means conceptually as public borrowing sources expand to include commercial borrowing from sources such as domestic Treasury Bills (T-bills) and Eurobonds, with the share of official, concessional financing diminishing. We look at the PV of public debt versus nominal public debt.

- Third, we examine nominal public debt and its dynamics in conjunction with market signals, drawing sharply different conclusions about sustainability from those in IMF (2016) *using the same data*.

- Fourth, we stress the need for an adequate analysis of international liquidity based on the measures used for EMs.

- Finally, we look at the early warning in IMF (2016) versus the alternative presented here.

Links between Fiscal and Current Account Deficits

Table 1 presents data on fiscal and current account deficits as well as nominal external debt and its PPG share for the years 2013-15.

Table 1: Ghana's Fiscal and Current Account Deficits 2013-15
(% of GDP unless otherwise noted)

	2013	**2014** (Est.)	**2015** (Prog.)
1. Fiscal deficit	10.5	10.2	7.2
2. Current account deficit	11.9	9.6	8.2
3. Nominal external debt	35.2	48.5	56.0
4. PPG share (% of 3.)	*87.2*	*88.5*	*92.9*

Source: Lines 1 and 2 are from Table 1, p.25, of IMF (2016), while 3 and 4 are from the external DSA table.

The table shows that the current account deficit (CAD)—which equals the fiscal deficit plus the gap between private investment and saving—is substantially accounted for by the fiscal deficit. Hence, it is not a surprise that PPG external debt accounts for the bulk of total nominal external debt. For LICs, the idea that the CAD is largely explained by the fiscal deficit is not surprising because it is usually difficult for the domestic private sector to borrow from abroad, either because lenders consider it too risky or because of legal restrictions (once again, Zambia is an exception). In this case, the private sector is restricted to borrowing at home and could be "crowded out" even in this space by the government if large deficits push up real interest rates or if banks are statutorily required to hold government securities.

Since the fiscal deficit is the outcome of spending and revenue decisions by the government, it can be thought of as causing the CAD. The government is constrained by the need for balance in its intertemporal budget constraint and the need to avoid disruptive debt crises. Not surprisingly, corrective policies for unsustainable CADs center around changes in fiscal and exchange rate policy.

A reasonable conclusion from Table 1 is that current account deficits and hence the dynamics of external debt in Ghana are driven by fiscal deficits and the dynamics of public (government) debt. Thus, shifting attention from external to public debt would amount to focusing on the fundamental cause—public debt—instead of the symptom—external debt—that is the central concern of the LIC DSF.

Present Value (PV) of Debt versus Nominal Debt

While IMF (2016) does not contain a table showing the composition of Ghana's government debt by creditor, either in the main text or in the DSA annex, it is a safe bet that much of the government's debt was owed to private, commercial creditors. This means that the marginal cost of borrowing was determined by the market, not the official sector. This poses a problem. If governments are borrowing from different sources, which interest rate does one choose as the discount rate for calculating the PV of debt? Indeed, what is the rationale for calculating a PV when much of the debt is non-concessional?

Most LICs today borrow at the margin from commercial sources. Even Chad and Zambia, two of the countries that have applied for debt treatment under the Common Framework, have significant commercial debt—Chad from Glencore and Zambia from several Eurobond issues. Many LICs have loans from China or from commercial banks. And local currency debt is significant and typically at market rates. This has rendered the 5% DR arbitrary. If a country gets official USD loans at 2% but the market rate is 12% on a Eurobond of equivalent maturity, then the extent of concessionality is captured by the 10 percentage-point difference, and a 2% loan should be discounted at 12% to obtain its PV, not at 5%.

Apart from the arbitrary choice of the discount rate, another problem is that the LIC DSF discounts official concessional debt to obtain its PV but takes market debt at face value. This asymmetry has no analytical justification. The simplest solution is to eliminate the use of the PV of debt and use nominal public debt-to-GDP instead in debt sustainability assessments. This will make public debt dynamics transparent, based on the standard parameters, pd and (r-g). As shown below, it will also provide more reliable early warning.

If even more persuasion is needed that the PV of debt for sustainability analysis is an outmoded concept, revisiting the original 2004 LIC DSF paper (International Monetary Fund and International Development Association 2004) is useful. Essentially, the PV of debt as a concept *linked to a reliance on predominantly official financing* is inseparable from the need for a separate LIC DSF: if one goes, so should the other, as paragraph 12 from IMF and IDA (2004) demonstrates (boldface added):

> "**The concept of debt sustainability in low-income countries is different from that in middle-income countries that rely primarily on private financing.** While low-income countries are a diverse group—ranging from poor countries with weak policy records and histories of war and civil strife to relatively advanced economies that have some access to private capital inflows and are on the verge of becoming emerging markets—**most countries in this group rely predominantly on official financing**. **As a result, the sustainability of their debt**—i.e., the condition that this debt can be serviced without resort to exceptional financing or a major future correction in the balance of income and expenditure—**is largely de-linked from the sentiments of the market, as embodied in spreads on market interest rates.** Indeed, to the extent that donors and creditors base the allocation of new aid flows on the implied net

transfers to recipient countries—effectively providing more gross transfers to those countries with higher debt-service payments—debt sustainability is a particularly blurred concept in these countries. Debt can be serviced for long periods, or suddenly become unsustainable, depending on the willingness of official creditors and donors to provide positive net transfers through concessional loans and grants."

We recognize an important qualification. Discounting remains of crucial importance for two purposes:

1. Discounting concessional loans from donors to calculate their grant element.
2. Assessing fair burden sharing across creditors when a country defaults and the net present value of debt is being reduced, in line with the 'comparability of treatment' principle.

But in the assessment of debt sustainability which, by its nature, attempts to provide early warning and is aimed at *crisis prevention* rather than *debt restructuring*, discounting only obscures the picture, as we shall demonstrate. In the case of debt restructuring, the choice of an appropriate discount rate remains a complex topic (see, for example, Kozack (2005) and Lazard (2022)).

Nominal Public Debt and Its Dynamics, Plus Market Signals

Table 2 presents data on Ghana's nominal public (government) debt levels and the variables determining its dynamics during 2013-15 using the data available in IMF (2016).

Table 2: Ghana's Public Debt Dynamics 2013-15

	2013	2014	2015 (estimate)
1. Public Debt (% of GDP) **d**	56.7	70.7	77.9
2. Foreign currency share (%)	*54.1*	*60.0*	*67.0*
3. Primary deficit (% of GDP) **pd**	5.6	3.3	-0.1
4. Real interest rate **r** (%)	6.0	19.3	8.1
5. Real growth rate **g** (%)	7.3	4.0	3.0

Source: Table 2 in the DSA annex in IMF (2016). Real interest rates computed by authors based on Annex 1.

Table 2 gives the ratio of public debt to GDP and the standard variables that describes its expected path: pd, r and g. The real interest, r, shown is a composite of the interest rates on local currency (cedi) and foreign currency (fx) debt. It includes the capital gain or loss on fx debt resulting from currency depreciation/appreciation. Hence, there is no separate real exchange rate effect as in the LIC DSF. Thus, r is the equivalent of the real interest rate that would prevail in a single-currency environment. Box 1 uses a numerical example to illustrate exactly what this means, while Annex 1 derives the formula for r using information already available in the LIC DSF.

Box 1: Public Debt Dynamics in LIC DSF Countries: What does (r-g) mean in a multicurrency context?

When the government borrows only in local currency, (r-g) is easy to understand. For example, in continuous time, the trajectory of the government or public debt-to-GDP ratio d is given by

(a) $\dot{d} = pd + (r - g)d.$

In this case, if d exceeds some market-determined threshold (as signaled by interest rates and bond spreads), pd>0 and r>g, the debt trajectory will be considered to be on an explosive path absent decisive reform to raise primary

surpluses and bring r down; in the short-run, such fiscal consolidation is likely to hurt g, but the improved macroeconomic climate will give private sector investment and growth a boost over the medium run. (We rule out default and inflating away local currency debt.)

Most EM and LIC DSF country governments borrow both in local currency, typically at market terms, and in foreign exchange, say, the US dollar ($) at concessional and market terms. In order to apply the framework embodied in equation (a) above, one would need to mimic a single-currency environment. The challenge is presented by $ borrowing, as illustrated with a numerical example:

	Time 0	Time 1
	$100	$104
1. Exchange rate (local currency per $)	1.0	1.1
2. Local currency-equivalent debt	100	114.4
3. Interest payment in $		4.0
4. Interest payment in local currency		4.4

The government borrows $100 at time 0 at $i^\$$=4% per period. The exchange rate (local currency price of $) at time 0 is 1.0 but depreciates to 1.1 by time 1. As a result, the interest due of $4 becomes 4.4 in local currency terms, shown in lines 3 and 4 of the table. This 4.4 will show up in the *fiscal balance*. But the impact on the government's *balance sheet* is much bigger, as shown in line 2 at Time 1. The effective interest rate is 14.4%, of which 4.4 will show up in the fiscal accounts and the remaining 10 on the balance sheet and in the headline debt number. In other words, the true local currency equivalent interest rate of $ borrowing is 14.4%. Formally, if x denotes the end-year exchange rate expressed as local currency per $ and $\hat{x} = \frac{x_t - x_{t-1}}{x_{t-1}}$, its growth rate or the rate of depreciation, then the local currency equivalent of $i^\$$=4% is given by $i^\$(1 + \hat{x}) + \hat{x}$ = 0.04 X1.1+0.1=0.044 + 0.10=0.144=14.4%. This is simply *ex post* interest rate parity.

Now suppose the government had also borrowed 200 in local currency at time 0 at 7%. Then its accounts would show interest payments of (4.4+14)=18.4 in local currency units. The LIC DSF calculates the effective interest rate i as interest payments divided by the local currency-equivalent debt stock at the end of the previous period, giving i=18.4/300 = 6.13%, which can be converted into real terms using the GDP deflator. This interest rate of 6.13 = (2/3)x7 + (1/3)X4.4, where 2/3 and 1/3 are the respective weights of local currency and dollar debt at the end of the previous period.

What about the balance of 10, the capital loss on $ debt? This goes into the exchange rate contribution to the change in the headline debt number in the LIC DSF template, and is given by (currency depreciation x share of $ debt in total debt at the end of the previous period x total debt at the end of the previous period) = 0.1X(1/3)x300=10.

However, to mimic a single-currency environment for assessing debt sustainability based on (r-g), this capital loss needs to be merged with the interest payment of 18.4 to give a composite nominal interest rate of (18.4+10)/300 = 9.47%. This can in turn be written as a weighted average of the interest rates on local currency and $ debt as 9.47 = (2/3)x7 + (1/3)x14.4, and the real equivalents can be obtained by deflating 9.47, 7 and 14.4 by the GDP deflator. For example, if inflation measured by the GDP deflator were 6%, then the composite real interest rate r = (1.0947/1.06) – 1 = 3.27%. This r captures the impact of currency depreciation on the $ component of debt and is the r that should be used for (r-g). It is useful to break it down into its local currency and $ components, 0.94% and 7.92% respectively, to gauge what is driving r, in this case $ debt, clearly.

There are two advantages to merging the capital loss on foreign currency debt with its interest cost. First, it gives a more accurate picture of the cost of $ borrowing. For example, if the government were to simply compare 7% on local currency debt with 4.4% on $ debt, it might wrongly conclude that dollars are cheaper to borrow. Based on the second author's conversations with investment banks in Ghana in early 2017, this was the argument they used to persuade the Government to issue $-denominated debt in the domestic market. Second, it enables a clear picture of debt dynamics by amalgamating currency depreciation with the interest rate, making it comparable to r in a single-currency environment. In contrast, there is little insight to be gained analytically or for borrowing purposes by treating currency depreciation as a separate effect.

Suppose the elaborate tables and graphs of the LIC DSF did not exist and all we had were Table 2 and market signals on Ghana's perceived credit standing. The first telling observation would be the more than 20 percentage points of GDP increase in public debt with a rising share of $ debt in just two years. Second, we would see a big drop in the primary fiscal deficit-to-GDP ratio, pd, indicating a commendable fiscal effort but also raising the question of how sustainable it is, given political economy and the quality of fiscal institutions. Third, we would see that r is highly volatile and high. It jumps from 6% in 2013 to 19% in 2014 and one might guess that the high share of $ debt has something to do with this. Indeed, the public DSA table in IMF (2016) indicates that the real exchange rate depreciated by 26% in 2014. Fourth, real GDP growth, g, is on a downward trend, with (r-g) swinging from negative to highly positive.

A safe bet is that economists acquainted with debt crises in EMs would be alarmed by the results in Table 2. It depicts the public debt-to-GDP ratio, d, on an explosive path with d far above levels at which major crises occurred in EMs (for example, the Russian Federation 1998, Argentina 2001).

In keeping with the quote above from IMF and IDA (2004) that Ghana's debt sustainability cannot be "de-linked from the sentiments of the market, as embodied in spreads on market interest rates," let's take a look at market signals prevalent at the time. The secondary market yields on Ghana's Eurobonds were above 15% in January 2016, signaling high default risk. Its credit rating had been lowered by Moody's from B2 to B3 (equivalent to B-, six levels below investment grade) in March 2015, with a negative outlook.

The combination of Ghana's debt fundamentals with market signals should have triggered urgency for a draconian fiscal consolidation on the argument that preventing a debt crisis is less costly than curing an economy after one. To be fair, IMF (2016) and the related LIC DSF took pains to note Ghana's financing challenges given bond spreads and the global macroeconomic environment. But this was not reflected in any sense of urgency about remedying the situation, as evidenced by the two paragraphs devoted to public debt sustainability reproduced above. Instead, attention focused on debt burden indicators related to the PV of PPG external debt and PV of public debt.

Indeed, the public sector DSA in IMF (2016) relied on a continued rise in primary surpluses, and a return to r<g (implicit in the sign of "automatic debt dynamics", ADD—see Annex 1 for the algebraic interpretation). The growth rate was projected to pick up considerably from the estimated 3% for 2015, something that should have been questioned given the then bleak outlook for commodity prices and slowing global growth.

International Liquidity

The DSA in IMF (2016) noted the deteriorating terms under which Ghana was issuing new Eurobonds and its high public gross financing needs (fiscal deficit plus maturing debt), of the order of 25% of GDP, of which 60% was accounted for by domestic debt rollovers. A systematic analysis of international liquidity over the medium term would have helped. For example, as shown in Table 1 of this paper, the CAD was of the order of 10% of GDP. Table 4 on the balance of payments in IMF (2016) shows that gross international reserves were projected at around 13% of GDP for 2015, meaning that Ghana was on the edge of breaching the Guidotti-Greenspan rule. It would have been helpful to have computed measures like the ratio of the CAD plus short-term external debt to reserves, a measure that was used by Wall Street to identify the so-called "Fragile Five" emerging market economies in mid-2013 when Fed Chair Bernanke first mentioned the possibility of hiking US policy rates. In Ghana's case, domestic debt

rollovers were 15% of GDP (60% of 25%) and it would have been useful to know the share held by non-residents, in addition to the other long-term external debts maturing during the next few years.

Early Warning

The LIC DSF in IMF (2016) classifies Ghana at high risk of external debt distress based on the crossing of policy-based thresholds for two indicators: the PV of PPG external debt-to-GDP ratio and the debt service on PPG external debt to revenue ratio. The summary notes that this assessment, which pertains to PPG external debt, is "reinforced by vulnerabilities related to domestic debt". As noted above, it also points out the financing risks, with bond spreads rising and high public gross financing needs.

However, there is no explicit analysis of public debt dynamics or international liquidity using the standard frameworks for EMs. As a result, the overall tone is reassuring. The last sentence of paragraph 9 concludes: "Though all indicators show sustainable paths under the baseline scenario, they could be on an explosive path under the historical and the most extreme shock scenario (with abrupt real exchange rate depreciation)." This flies in the face of the data and commentary presented above in the context of Tables 1 and 2, which show quite clearly that public debt was on an explosive path over 2013-15 and, in any reasonable definition of baseline, this should have been expected to continue given the difficult global macroeconomic environment at that time.

Lest we are accused of exploiting the wisdom of hindsight, similar conclusions on Ghana were drawn in ADF Lab (2016), which was written in early 2016. This paper covered seven other Sub-Saharan African countries including Ethiopia and Zambia, with more pessimistic conclusions about public debt sustainability than then-current IMF-World Bank LIC DSAs using the same data.

4. The 2017 "Overhaul" of the LIC DSF

The debt dynamics of Ghana and other LICs over 2013-15 provided compelling cause for revisiting the LIC DSF and shifting the focus to nominal public debt-to-GDP and its dynamics and international liquidity. The time was ripe for an overhaul of the LIC DSF.

Such an overhaul appeared to be imminent. A consultation seminar was held during the 2016 Spring Meetings at IMF HQ in Washington DC to discuss the motivation for a review of the LIC DSF:[6]

- Allowing for a changed financing landscape with more market debt from domestic and external sources and a shift away from official financing sources;
- Strengthening the analysis of public debt by incorporating domestic debt (which, absent financial repression, is typically issued on commercial terms);
- Reflecting market risks better (debt rollovers, yield spreads relative to benchmarks, international liquidity);
- Generating better early warning and more robust risk ratings.

The review was carried out by a joint IMF-World Bank team. It culminated in an IMF Staff Report that was approved by the IMF's Board in September 2017 (IMF 2017). The new LIC DSF was rolled out by the World Bank and IMF on July 1, 2018.

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[6] The second author of this paper was present during this consultation seminar.

The IMF's LIC DSF website highlights the revisions which "introduced reforms to ensure that the DSF remains appropriate for the rapidly changing financing landscape facing LICs and to further improve the insights provided into debt vulnerabilities." In like mode, IMF (2017) provided rationale for reforming the LIC DSF based on:

1. The need to pay more attention to market-based financing risks from domestic and foreign (Eurobond) sources (mentioned throughout IMF 2017);

2. The recognition that debt projections have tended to underestimate debt burdens for both external and total public debt with unexpected changes in debt ratios driven primarily by "fiscal deviations and balance of payments (BoP) shocks" (IMF 2017 p. 9);

3. Underestimation of shocks from the primary fiscal deficit (IMF 2017 p.11) ;

4. Poor performance in identifying external debt distress (XDD) episodes out of sample. Performance deteriorated sharply when 7 extra years of data were included (IMF 2017 p. 18);

5. Limited use of staff judgment, which had been applied in only 25% of the DSAs since the inception of the DSF (IMF 2017 p 15). The feature introduced in the 2012 review to allow for a deeper assessment of total public debt and its impact on the overall risk rating had been "only sporadically used". This needed to change to enable "attempts to disentangle risks".

Drawing upon Annex III to IMF (2017), the main steps in implementing the 2017 DSF reforms were:

Step 1: Identifying a series of XDD episodes over the period 1970-2015 based on arrears or defaults on PPG external debt, Paris Club debt restructurings, large IMF programs or commercial debt restructuring. 98 episodes were identified based on the new methodology shown in in Figure AIII.1 (versus 76 under the old methodology).

Step 2: Running a probit model for each of 4 debt burden indicators, all pertaining to PPG XD and including: PV of XD to GDP or exports; and debt service (interest plus maturing principal on PPG XD) to revenue or exports. The probit model, which estimates the probability of XDD for a particular country in a particular year, used the following control or explanatory variables:

1. Debt burden indicator
2. World Bank Country Policy and Institutional Assessment (CPIA)
3. Country growth rate
4. Reserves (scaled by imports)
5. Reserves squared
6. Remittances (scaled by nominal GDP)
7. World growth rate (proxy for external shocks)

Step 3: Classifying countries as weak, strong, or medium based not just on the CPIA (as earlier) but on a new, composite indicator CI based on variables 2 to 7 in the list in Step 2 and using the coefficient for each variable averaged over the four probit regressions (one for each debt burden indicator). The classification is based on evenly spaced percentiles for the CI.

Step 4: Obtaining a threshold for each debt burden indicator by first choosing a cutoff probability of debt distress. This cutoff probability is chosen to strike a desired balance between Type 1 (missed crises) and Type 2 (false alarms) errors. The estimated probit regression equation is then inverted to obtain the debt burden threshold corresponding to the cutoff probability as a function of the CI (as shown on p 26 of Annex III, IMF 2017) and to value these thresholds at the same percentiles for the CI which define the country classification so as to obtain a numerical debt threshold for each country classification.

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Step 5: Defining a prediction rule for predicting XDD based on a breach of the debt burden thresholds (the DSF would signal high risk of XDD if any of the thresholds is breached in the baseline projections).

Step 6: Setting benchmarks for the PV of total public debt (TPD=PV of PPG external debt plus domestic public debt.) A rule is defined for domestic debt default episodes, explicit (rare) or implicit (more common, e.g., based on high inflation or financial repression). The results are shown Table AIII.7, which contains 18 definitions of domestic debt distress. The results are combined with the four XD thresholds to ensure consistency and obtain benchmarks for TPD for each of the three country classifications; the approach is described in section D of Annex III.

5. The 2017 LIC DSF "Overhaul": Not an overhaul at all

The main problem with the 2017 LIC DSF revision is that the issues identified during the 2016 Spring Consultation were addressed at best tangentially. The basic structure of the LIC DSF with its heavy emphasis on *external debt distress* was left intact. Despite the resources devoted to the review, there was no consideration of an alternative framework with a shift in focus to public debt and its dynamics.[7]

Even if there was no appetite for a radical overhaul, other changes might have usefully been explored. For example, in the control variables for the probit model, variables pertaining to unsustainable public debt dynamics that feed into XDD could have been included. These could include (r-g) and the difference between the actual primary surplus and that needed to stabilize the public debt-to-GDP ratio. Also, the rationale for including remittances was not clear. IMF (2017) claims that this enhances repayment capacity. Remittances enhance international liquidity but, unless they can be taxed, they do not increase the government's repayment capacity. Likewise, there is no discussion of endogeneity: is the CPIA high because XDD has been avoided or has XDD been avoided because the CPIA is high? Similarly, the inclusion of world growth is not clearly justified. Why not include terms of trade shocks?

Also puzzling is the replacement of the CPIA with the new Composite Indicator. It is not clear why a country with higher remittances should be classified as "strong" if remittances result from a diaspora that has left the country because of lack of opportunities (witness the present exodus of workers from Sri Lanka); or because world growth is high. The virtue of the CPIA is that its policy and institutional implications are easy to grasp.

Ghana's 2021 DSA based on the 2017 LIC DSF: Same Old Same Old

The best way of critiquing the 2017 LIC DSF is to apply it to a country and see if there is a change in the diagnostics or early warning compared to reports using the old LIC DSF. We continue our narrative on Ghana, this time using the DSA based on the "overhauled" 2017 LIC DSF presented in IMF Country Report Country Report No. 21/165 dated July 2021 (IMF 2021).

To set the stage, recall that, by early 2016, Ghana's public debt was on an explosive path. The estimate for d at the end of 2015 was 78% with a primary surplus of 0.1% of GDP, r=8% and g=3%; see Table 2 above. This meant that a primary surplus of close to 4% of GDP would have been needed just to keep d at 78%. As noted, the 2016 DSA placed Ghana at high risk of external debt distress but expressed confidence that "strong fiscal adjustments and an adequate financing package should be able to bring

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[7] For an early critique of the 2017 review of the LIC DSF, see Pinto (2019).

Ghana's total public debt back to a sustainable path [.......] with PV of public debt declining to around 40 percent of GDP by the end of the projection period". That meant reattaining sustainability by 2035.

For economists acquainted with public debt crises in EMs, this leisurely time frame for reattaining public debt sustainability without a crisis would have been considered unrealistically long given the level of public debt, its dynamics and market sentiment. Alarm bells for drastic fiscal consolidation should have been ringing loudly in early 2016.

As it turns out, the debt data shown in the public sector DSA in IMF (2021) contain a surprise. Public debt was estimated at 78% for 2015 in the 2016 DSA and shown in Table 2 above. Yet the DSA in IMF (2021) shows the public debt-to-GDP ratio (d) for 2018 at just 58%, a decline of 20 percentage points of GDP in three years.[8] Given the adverse public debt dynamics that prevailed in 2016, two possible explanations for the sizable drop in d are first, a commendable fiscal effort; and second, large revisions. As it turns out, Ghana was "bailed out" by another rebasing of GDP in 2017 that increased GDP by 26%. Without this boost to GDP, d for 2018 would have been a significantly higher 73%.[9] In addition to the GDP rebasing, two other idiosyncrasies are worth mentioning.

1. Ghana's GDP level has been periodically boosted by new oil discoveries. These raise GDP significantly in the year when they become operational, and therefore lower d, but without a sustained increase in the growth rate. Box 1 in the DSA in IMF (2021) notes the key role of oil discoveries in supporting growth, containing the current account deficit and boosting FDI.

2. Oil discoveries would also raise primary fiscal surpluses and increase foreign exchange reserves, causing the exchange rate to strengthen but, once again, on a one-off basis.

Controlling for such idiosyncrasies by running "with" and "without" scenarios is important to get a clear idea of underlying public debt dynamics and is something the LIC DSF should be required to do. Indeed, d returned to an explosive path, rising from 58% in 2018 to 79% in 2020 and was projected to rise further to 87% in 2026 in the DSA in IMF (2021). The temporary salutary effects of GDP rebasing and new oil discoveries had worn off and the underlying explosive dynamics took hold again.

Nevertheless, as in 2016, the 2021 DSA rates Ghana at high risk of both external and overall debt distress but qualifies this by noting that "public debt is sustainable provided that the authorities' medium-term consolidation plan (reflected in the baseline) is rigorously and credibly implemented to improve the primary balance, put debt on a declining trajectory, and ensure continued market access".

Applying the alternative approach using data from the 2021 DSA

We now repeat the steps gone through in the context of IMF (2016) to see what information and early warning can be gauged from the alternative approach set out above. We first make the case that public deficits drive the CAD and then examine public debt dynamics. This time, we calculate three interest rates: the composite real interest rate and its domestic and foreign currency components along the lines of the numerical example in Box 1. Annex 1 derives the formulas based on the first-order difference equation for the ratio of public debt to GDP, which forms the basis for the public sector DSA in the LIC

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[8] An explanation for this sizable drop in d would be helpful, but such disconnects across IMF-WB DSAs are not uncommon. A 5-year lookback period tracking changes in d and the underlying contributory factors (pd, r, g, with r broken down into its local currency and fx components) would be a useful addition to the DSA.

[9] If δ is the rebasing coefficient, d_1 is the nominal debt-to-GDP ratio before rebasing and d_2 after rebasing, then $d_2 = d_1/(1 + \delta)$. For the 2017 rebasing, see Oxford Business Group "GDP rebasing improves Ghana's economic outlook" 16 November 2018.

DSF. But in contrast to the 2017 LIC DSF, which, like its earlier incarnation, decomposes the change in the ratio of nominal public debt to GDP, d, during a given year into contributions attributable to primary fiscal deficits, growth rates, interest rates and exchange rates, the calculations here focus directly on pd, r and g as driving the trajectory of d and providing early warning about its sustainability.

Table 3 uses the identity that the current account deficit is the difference between national investment and national saving. It breaks this identity down into a public and private component, demonstrating that public deficits—the difference between public investment and saving—drive the current account deficit and hence external debt dynamics. In Ghana's case, the central government deficit in line 1 of the table is the main driver of the CAD and therefore of external debt dynamics. Indeed, as the external DSA table in IMF (2021) shows, the rise in external debt-to-GDP between 2019 and 2020 of 5.9 percentage points is almost entirely due to its PPG component, which went up by 5.7 percentage points.

Table 3: Government Deficit Drives Ghana's Current Account Deficit 2019-20

Percent of GDP	2019	2020
1. Government deficit	7.2	15.7
2. Private deficit	-4.4	-12.6
3. Current Account Deficit	2.8	3.1
4. PPG % of external debt	*89*	*90*

Notes: Data from Table 1 and the External DSA in IMF (2021). "Deficit" is defined as investment minus savings. A positive (negative) number in the table refers to a deficit (surplus). Footnote 3 for Table 1 in the IMF report notes that private saving includes public enterprises. But this table shows that the central government deficit is driving public and external debt dynamics.

Table 4 revisits public debt dynamics using the alternative framework. It shows that (r-g) rose to 4 percentage points in 2019 and then widened further in 2020, with the primary deficit ballooning from about 1.5 percent of GDP to 8.8 percent in 2020, indicating Ghana's public debt was again on an unsustainable trajectory by 2020. The public debt level of 79 percent of GDP in 2020 should have been cause for concern: Ghana had been a market access country for more than a decade by then, financing 66 percent of its public debt from commercial sources. Recall that Russia (1998) and Argentina (2001) suffered major crises when public debt was about 50 percent of GDP.

Table 4 also shows that the primary balance projections in IMF (2016), which showed sizeable surpluses and projected d at 60% in 2020 *prior to the 2017 GDP rebasing* were unrealistically optimistic. Of course the COVID-19 pandemic contributed to the outsized primary deficit in 2020, but Ghana's fiscal problems predated this pandemic as evidenced by the discussion of the 2016 DSA above. Based on meetings with policymakers and the private sector with the African Development Bank in February 2017 in which one of the authors participated, Ghana's strategy for lowering the public debt-to-GDP ratio relied upon revenues from new oil fields and issuing Eurobonds to avoid soaring interest costs in the domestic market, then about 25%, seemingly unmindful of the problems that currency mismatches on the government's balance sheet would cause. New oil production, the argument went, would increase growth rates, primary surpluses, and forex reserves, and reduce the cedi/dollar exchange rate.

Table 4: Ghana's Public Debt Dynamics 2018-20

	2018	2019	2020
Public debt/GDP %	57.9	62.9	78.9
Primary deficit/GDP %	1.4	1.7	8.8
Real interest rate % (r^c)	6.4	10.5	6.3
- Local currency (r^d)	8.0	8.6	9.1
- Foreign currency (r^f)	4.8	12.5	3.6
Real growth rate % (g)	6.2	6.5	0.4

Notes: 1. Own calculations based on Table 2 of the Debt Sustainability Analysis in IMF (2021). The real interest rate is a composite of that on local currency and forex debt and includes the impact of currency depreciation on the forex debt stock. See Annex 1.
2. The public sector DSA in IMF (2021) gives public debt on a residency rather than currency basis. For debt dynamics, we need the latter, which was inferred from the contribution of the real exchange rate to the change in the public debt-to-GDP ratio, which by definition, applies only to foreign currency denominated debt.

A month earlier, in January 2017, a "fiscal hole" of 4% of GDP had been discovered following the installation of a new government, attesting to a weak track record on using public resources well. In particular, large fiscal deficits did not seem to be associated with investments that would spur future growth and taxes. The IMF attributed the "fiscal hole" to "significant public spending commitments that bypassed Public Financial Management (PFM) systems". Improving matters would require implementing "the new government's intentions to reduce tax exemptions, improve tax compliance and review the widespread earmarking of revenues" (IMF's February 10, 2017, Press Release 17/43); in short, ensuring the integrity of PFM systems and selecting and executing public investments carefully. Ghana, a star of the post HIPC-MDRI era, had not implemented basic PFM systems even though 10 years had passed since the issuance of its first Eurobond. This was despite discovering oil, with its well-known risks for the political economy.

Ghana's experience also underlines the limited leverage of the IFIs when sovereign countries have access to other sources of money with few questions asked. This points to the importance of shifting the onus on re-attaining public debt sustainability to the country's leaders themselves. But it also places a premium on appropriate analytical frameworks that can form the basis for a deeper and more urgent policy dialogue aimed at preventing crises and increasing the chances of better development outcomes.

As noted earlier, Ghana defaulted on its debt in December 2022. The Ghana experience, similar developments in other LIC DSF countries, and the recognition that the financing landscape had changed dramatically should have encouraged the IMF and the World Bank to take a much bolder approach to the 2017 Review. This should have included a more serious discussion of the underlying causes of external debt distress that emanate from fiscal imbalances and total public debt. Treating unsustainable public debt as both a fundamental cause of debt distress and the focus of corrective policy would then have been logical. That opportunity was missed. We explore this question in greater depth, so it is not missed again.

6. Public and External Debt Dynamics and Debt Distress

We lay out the macroeconomic logic connecting public and external debt dynamics in order to establish cause versus symptom. We start with external debt since this remains the focus of the LIC DSF.

First, external borrowing, or foreign saving, is tapped when aggregate demand at home exceeds aggregate supply, or equivalently, when total investment exceeds national saving, spilling over into a current account deficit, CAD. Since the fiscal deficit is equal to the difference between government investment and government saving, the CAD can also be written as the sum of the fiscal deficit and private investment minus private saving. In LIC DSF countries, as in other countries, external debt is all the debt issued by the government/public sector and the private sector that is held by nonresidents in local or foreign currencies. When expressed in local currency as a ratio of GDP, the dynamics of external debt are driven primarily by the CAD as well as by exchange rate depreciation transmitted via the dollar-denominated component of external debt, and the nominal growth rate of GDP.

Second, in most LIC DSF countries, the lion's share of external debt is issued by the government and SOEs. This shows up in PPG external debt accounting for the bulk of total external debt, hardly surprising since fiscal/public sector deficits account for the bulk of the CAD. Moreover, it could be hard for the private sector to issue dollar-denominated external debt either because of credit risk or prudential regulations—Zambia is an exception discussed in section 7.

Third, external debt in most LICs also has a local currency component, as when nonresidents take positions in local currency T-bills issued by the government. Once again, for liquidity and risk reasons or possibly because of capital controls, nonresidents are extremely unlikely to buy local currency debt issued by any entity other than the government. So we will assume that the local currency share of external debt is a subset of the local currency debt issued by the government in the form of T-bills.

Fourth, one would hope for a large share of domestic private credit to go to the private sector, as this is essential for growth. But high real interest rates on Treasury bills and their lower perceived risk may persuade banks to lend to the government rather than private firms, leading to crowding out. This is another factor reinforcing the public sector as a major borrower in LIC DSF countries. It is not uncommon to observe that private investment is less than private saving in these countries.

Based on this borrowing structure, Annex 2 contains a simplified derivation in continuous time to bring out the links between public and external debt dynamics. It reaches the following conclusions:

1. In a situation where (i) private investment exceeds private saving by a small margin or is less than it (not uncommon in LIC DSF countries), (ii) private debt issued externally is small and (iii) the government borrows only externally, we are essentially in the pre- and immediate post-HIPC-MDRI era, when public debt was essentially the same as external debt.

2. Subsequently, so long as the government and state enterprises are the major borrowers externally, external debt becomes in effect a subset of public debt. As a logical proposition, it then becomes hard to think of external debt distress coexisting with sustainable public debt dynamics—a conclusion frequently drawn by the LIC DSF. Unsustainable public finance situations spill over into current account deficits and external debt dynamics, causing external debt distress.

Two exceptions are worth noting. When there are exogenous economic shocks, such as a terms-of-trade (ToT) shock or a jump in world interest rates such as that caused by US Fed monetary tightening, instability in the external accounts would be transmitted to public finances. But, for many LICs, in the case of a ToT shock, a drop in export prices of commodities, such as oil and gas or minerals and metals,

has its first impact on the public finances because natural resources tend to be state-owned. Therefore, a simultaneous widening of the fiscal and current account deficits would result. These shocks are common and need proper countercyclical fiscal policy to address (saving during booms and dissaving during busts). Moreover, the natural resource curse continues to be a serious problem, with well-connected political elites benefiting the most from natural resource exports. Corruption, poor fiscal policy and lack of diversification may be more important than the ToT shock. Similarly, the effects of Fed tightening can be mitigated by governments that manage public resources well and have credible monetary policy.

Another set of exogenous shocks pertains to the COVID pandemic and climate change. How to address these is a more complicated matter, as these are non-economic shocks impacting LICs as innocent bystanders, for which suitable compensation via donor grants may need to be made.

Development and Debt Distress

The World Bank's primary goals are development and poverty reduction. The IMF's primary goal is the avoidance of balance of payments (BoP) crises, although its LIC DSF website emphasizes the importance of meeting the SDGs while keeping external debt sustainable. It is fair to say that both institutions care deeply about development.

For organizations that care about development, is it sufficient to pay attention only to external debt distress? The answer is "No", because the prime responsibility for achieving the SDGs is that of the government, making sustainable public finances and high-quality public spending essential. Unsustainable public finances have well-known and broad ramifications: macroeconomic collapse, a rise in country risk, higher uncertainty and an impaired climate for private investment. Public debt sustainability is the bedrock for economic growth and development.

Now suppose that you are an external creditor who cares only about being paid back. You would then care only about external debt distress. Can you assess external debt sustainability without paying attention to fiscal deficits and public debt sustainability and the related political economy? The answer is no, because these factors are prime determinants of country risk ratings, and the government and public sector are the main issuers of external debt. Besides, as outlined above, the logic flows from public debt dynamics ("cause") to external debt dynamics ("symptom").

To pursue this point further, could there be an instance of government domestic debt distress that has no impact on external debt? This is extremely unlikely because external creditors are likely to be holding some share of local currency government debt, such as T-bills, in addition to dollar-denominated external debt. But suppose they held only dollar-denominated debt and that the government, facing debt problems, decides to inflate away its local currency debt to preserve external borrowing access. Consider what might happen. First, the currency is likely to collapse and unless local revenues rise substantially, servicing dollar-denominated external debt will become difficult. Second, local currency debt is often short-term and, as the government seeks to roll it over, it will face much higher real interest rates. Third, domestic banks and pension funds which typically hold government local currency debt could go bust, forcing costly bailouts.

All this would feed into higher country risk and signal a fundamental fiscal problem that could lead to a collapse in the prices of externally issued, dollar-denominated debt in the secondary market, raising borrowing spreads and making rollovers difficult.

The bottom line is that it is nearly impossible to compartmentalize the risks from local currency domestic debt and dollar-denominated external debt. Even external creditors who do not care about development will be forced to pay attention to public debt and its dynamics out of self-interest.

Given this, for the LIC DSF to continue focusing on external debt distress, the IMF and World Bank must demonstrate that causality in LICs flows from external debt to public debt—that an unsustainable public debt trajectory is *caused* by an unsustainable external debt trajectory—and then spell out the corrective policies. This is a tall order. Alternatively, one would need to make the case that instability in external debt dynamics is being driven by the private sector rather than the public sector, once again unlikely because of the small amounts of private external borrowing in LICs.

This points to giving nominal public debt and its dynamics primacy in the LIC DSF. It also points to the need for a consistent analysis across public debt and external debt. As we shall see in the next section, this is not the case. Further, the formulas in the external DSA template are riddled with conceptual problems, making the output hard to interpret.

7. A Technical Appraisal of the LIC DSF Template

Two main tables are included in DSAs using the LIC DSF: one presenting the DSA for total external debt, public plus private; and a table presenting the DSA for total public debt. We start with the latter.

Public Sector DSA Template

The DSA for public debt breaks down the annual change in the public debt-to-GDP ratio into components attributable to primary fiscal deficits, interest rates, growth rates and exchange rates, as well as factors such as privatization receipts (debt is reduced) and contingent liabilities (debt is increased). There is also a residual term: the difference between the actual increase in the debt-to-GDP ratio and that "predicted" by the above factors.

This is a useful framework, but it should be improved in four ways.

- First, *the public sector DSA should report debt on a currency, and not residency, basis*. Public sector DSAs using the 2017 framework report debt on a residency basis (domestic lenders versus nonresident lenders) rather than by currency on the argument that this enables a better understanding of vulnerability to a crisis. This is a step backwards because it impedes a clear picture of debt dynamics, in particular the transmission of currency depreciation via foreign currency-denominated debt. Vulnerability to a BoP crisis is a valid concern, based on the idea that nonresidents holding local currency debt, such as T-bills, may be the first to head to the exits and cause a currency collapse. But this vulnerability should be assessed as a separate exercise in foreign exchange reserve adequacy given current account deficits and total short-term external debt, which would include nonresident holdings of local currency T-bills. This step backwards in the 2017 revision needs to be reversed and the public sector DSA should report debt on a currency basis.[10]

- Second, *in addition to the decomposition of the annual change in the public debt-to-GDP ratio into the components listed above, an assessment of debt dynamics based on the primary deficit and (r-g) is necessary for timely warnings about impending unsustainability.* Further,

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[10] Recall Note 2 to Table 4 above on Ghana, where the foreign currency share of public debt had to be reverse-engineered to decompose the real interest rate into its local and foreign currency components.

decomposing the composite real interest rate into its local currency and foreign currency parts provides a clearer idea of vulnerabilities stemming from currency mismatches on the public sector balance sheet. But to be meaningful, this analysis has to be done using nominal debt rather than the discounted present value of debt. The PV of debt obscures a clear picture of debt dynamics because it creates confusion about which r to use. Using nominal debt and actual r to look at dynamics is also applicable to LICs that rely primarily on official, concessional external funding; absent financial repression, domestic funding is likely to be at market terms. In this case, concessionality will show up simply as a low r, and the dynamics will still be meaningful in gauging whether public debt is on a sustainable trajectory.

- Third, *a five-year look back period plus a five-year projection period should be adequate for assessing debt sustainability*. Identifying country idiosyncrasies—such as the intermittent growth spurts in Ghana on account of new oil discoveries or the rebasing of GDP—and controlling for these to isolate the underlying dynamics is essential for an accurate picture of sustainability.

- Finally, *developing relevant counterfactuals are of the utmost importance*. Country-specific counterfactuals are not easily dealt with by the current LIC DSF; such an exploration is not part of the "realism tools" added to LIC DSF by the 2017 overhaul. We illustrate this with Ethiopia, the second most populous nation in Africa after Nigeria, based on IMF Country Report 20/150 issued in May 2020 (IMF 2020).

In Ethiopia as with Ghana, the public sector deficit—equal to investment minus the sum of saving and official transfers—has been driving the current account deficit. In fact, over the three years 2017/18 to 2019/20, the private sector ran a significant surplus—private saving plus transfers exceeded private investment—as seen in Tables 1 and 4b of IMF (2020).

The public sector DSA in IMF (2020) uses the 2017 LIC DSF to update the assessment in the 2019 Article IV report done a few months earlier. It concludes that the risk of external and overall debt distress is high; but public debt is "deemed sustainable", albeit with higher downside risks on account of the then-nascent COVID-19 pandemic. The high risk of debt distress is mainly on account of external sector vulnerabilities related to "an overvalued exchange rate and a small export base".

Pre-COVID, Ethiopia was among the fastest growing economies in the world, with growth driven by large debt-financed large infrastructure projects such as Addis light rail, the Ethiopia-Djibouti railway line and ambitious power projects.[11] It was recognized that public sector-led growth would pave the way for private sector growth. For this to happen, financial repression (that has enabled the public sector to issue local currency debt at highly negative real interest rates) and the parallel market for foreign exchange (leading to a market rate more depreciated than the official rate) would have to be eliminated by adopting market-determined interest and exchange rates.

Table 5 outlines Ethiopia's public debt dynamics for the three years 2017 to 2019 using data from IMF (2020) prior to the onset of COVID-19 and the 2020 civil war. The DSA's conclusion that public debt is sustainable is borne out at first glance by the numbers in Table 5. But a useful counterfactual would be to ask what impact a move to market interest rates and exchange rates would have on debt levels and dynamics. Take 2019 as an example. The public debt-to-GDP ratio d was 56.9%. But r was -5.0% while g

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[11] NB: The analysis here is based on data before Ethiopia's civil war which began in November 2020, worsening the macroeconomic and debt outlook further and dimming the prospects for private sector-led growth.

was +9.0%. Now consider what d would have been with a r=3.0%, modest by African standards and still well below g. It would have been 61.4% of GDP instead of the 56.9% shown in Table 5.[12]

Table 5: Ethiopia's Public Debt Dynamics 2017-19

	2017	2018	2019
Public debt/GDP %	56.5	60.8	56.9
Primary deficit/GDP %	4.5	4.00	3.3
Real interest rate % (r^c)	-0.74	1.22	-4.98
---Local currency (r^d)	-2.40	-5.20	-6.70
---Foreign currency (r^f)	3.21	7.74	-3.40
Real growth rate % (g)	10.20	7.70	9.00

Notes: Own calculations based on Table 2 of the Debt Sustainability Analysis in IMF Country Report 20/150 (IMF 2020). See Annex 1 for the derivation of the formulas for the interest rate calculations. For 2017, the shares of birr and fx debt at the end of 2016 (not provided in the DSA table) were inferred from the real exchange rate contribution to "automatic debt dynamics".

Consider now the impact of moving to market determined exchange rates. IMF (2020) reports the parallel market premium dropped from 35% in November 2019 to 27.5% on April 22, 2020 (IMF 2020, p. 4). We conservatively take the premium as 20% at the end of 2019. In this case, moving to a market-determined exchange rate would raise the $-component of public debt from 28.3% of GDP in 2019 to 34% of GDP, so the new d would be 67.1% of GDP.[13] Thus adopting market interest and exchange rates as part of a strategy to attract FDI and give the domestic private sector a boost could have a large adverse effect on debt levels and dynamics. *Alternatively, adverse debt dynamics have been masked by financial repression and overvalued exchange rates, fueling complacency.*

Integrating Ethiopia's public debt sustainability with its development agenda raises questions:

1. What additional development spending does the Ethiopian Government need to make?

2. How will the loss of two implicit tax instruments—the interest savings from financial repression and the implicit tax on exports via the parallel market premium—be compensated?

3. Will the large debt financed infrastructure projects pay off in terms of exports, economic growth and taxes? IMF (2020) identifies weak exports as a key source of vulnerability, calling for a hard assessment of export potential. Past IMF country reports mentioned electricity exports of $250 million by 2019 and of $1 billion by 2023 as the country becomes a "regional energy superpower". The question is whether this is realistic. Besides, boosting exports would require eliminating the tax on exporters imposed by mispricing foreign exchange. A 20% parallel market premium amounts to a 17% implicit tax on exports.

One way of bringing the interrelationships between debt sustainability and development to the forefront is to make the public sector DSA the centerpiece of country reports instead of relegating it to an annex.

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[12] This number is obtained by recomputing "automatic debt dynamics" (ADD) for 2019 assuming r=3.0%, giving it as -3.3 instead of the -7.8 shown in the public sector DSA table in IMF (2020). All other numbers remain the same, raising d by 4.5 percentage points of GDP.

[13] We assume that the parallel market exchange rate is the marginal cost of foreign exchange and the rate that would emerge if the birr were floated. This is an empirical question, so we take a low premium, but there is evidence from Sub-Saharan Africa from the 1980s that the equilibrium exchange rate is close to the parallel rate. See Pinto (1991).

External sector DSA Template

Annex 3 provides a tour of the external DSA template. It points out several conceptual flaws in the formulas used to decompose the annual change in the external debt-to-GDP ratio into components attributable to the noninterest current account deficit, interest rates, growth rates and exchange rates. These flaws impede a clear understanding of debt dynamics. But even if these flaws are corrected, the added value of the external DSA to policy insight is close to zero because with limited private external borrowing, external debt in most LIC DSF countries is largely a subset of public debt.

Even if the LIC DSF is retained in its present form, three improvements should be made:

1. Make the external and public sector DSAs consistent by using nominal local currency GDP as the denominator in both cases and converting foreign currency-denominated debt into local currency using end-of-year exchange rates (see Annex 3).

2. Re-derive the difference equation for the ratio of external debt to GDP using the same framework as for public debt. This would make it easier to interpret the different components of "endogenous debt dynamics" while ensuring consistency with the components of "automatic debt dynamics" in the public sector DSA (see Annex 3).

3. In both DSA tables, external and public, include the currency composition of debt in addition to information now given on the PPG component of total external debt and the external component of public debt based on residency. This will make debt dynamics—in particular, the impact of exchange rate changes which are usually sizable in LICs—easier to assess.

The better alternative would be to radically overhaul the LIC DSF by focusing on the risks posed by the level and dynamics of nominal public debt using the standard framework of the primary deficit and (r-g), and moving away from the benchmarks for PPG external debt. The external DSA does not add additional insights from a policy perspective given the stylized fact: in LIC DSF countries the public sector is the main borrower externally with fiscal deficits driving current account deficits and therefore, external debt dynamics. The external DSA should be dropped and be replaced by a thorough analysis of international liquidity as outlined above.

Is Zambia an Exception?

We now discuss briefly the case of Zambia. The September 2017 DSA using the old LIC DSF (IMF 2017a) rated external debt distress high, warned about public debt vulnerabilities and highlighted the need for urgent fiscal consolidation. A key factor was a massive increase in external debt of 63 percentage points of GDP in 2015 over 2014, *two-thirds of which was attributed to newly discovered private external borrowing*.

The July 2019 DSA using the 2017 revision of the LIC DSF (IMF 2019) rated external and overall debt at high risk of debt distress and said explicitly that public debt was on an unsustainable path. It included non-guaranteed state-owned enterprise liabilities in the debt perimeter.

Can we therefore conclude that all is well with the 2017 LIC DSF? The answer is no, because by July 2019, unsustainability of public debt was painfully obvious. For 2019, d was projected at 94%, r (calculated by the formula in Annex 1) was 8.9% and g was 2%, with a primary surplus of 1.1%—well below the debt stabilizing primary surplus of more than 6% of GDP.

The World Bank-IMF team doing the DSA deserve credit for discovering the large amount of private external debt in 2017 and widening the debt perimeter in 2019. But the team would have done better

using the approach recommended in this paper. To see this, we revisited the May 2015 DSA (IMF 2015), which rated Zambia at moderate risk of external debt distress but judged public debt dynamics sustainable. However, using the data from the May 2015 DSA, ADF Lab (2016) concluded in March 2016 that public debt dynamics were "definitely unsustainable" with a primary deficit of 5% of GDP and r close to 5 percentage points above g. Public debt had been projected at 40% of GDP for end-2015, but full-year data indicated that d was above 50%.

What about the high level of private external debt? Would its impact have been ignored if the focus had been on public debt dynamics combined with market signals and a thorough analysis of international liquidity? No, because this vulnerability would have been picked up in the assessment of foreign exchange reserve adequacy and measures like the CAD plus short-term external debt divided by foreign exchange reserves. Indeed, the column for 2015 in the external DSA in IMF (2017a) has a large residual of 57 percentage points of GDP, which probably indicates massive under-reporting of the CAD. The fact that the private sector was borrowing large sums abroad means that private investment greatly exceeded private saving.

Zambia's experience underlines that LIC DSF world has changed dramatically and that LIC DSF countries can no longer ignore the lessons from EM crises. If we combine the results from the three generations of crisis models, LIC DSF countries need to go beyond the narrow confines of PPG external debt.[14] They need to broaden their macroeconomic monitoring to include:

- Fiscal and growth fundamentals as reflected in the sustainability of public debt dynamics
- International liquidity
- Market signals on devaluation and default risks
- Vulnerabilities posed by private external borrowing and currency mismatches on private sector balance sheets.

It makes obvious sense to have a DSF that reflects the above monitoring list instead of the present overwhelming emphasis on PPG external debt. Box 2 summarizes the lessons from Zambia.

Box 2: Lessons from Zambia

Early warning is essential. ADF Lab (2016) warned in March 2016 that Zambia's public debt-to-GDP ratio was on an unsustainable path based on d, pd and (r-g). 18 months later, the LIC DSF DSA (IMF 2017a) urged fiscal consolidation. After another 22 months, it concluded d was on an unsustainable path (IMF 2019). After another 16 months, Zambia defaulted on its Eurobonds in November 2020. *The DSF should be simple enough to be quickly updated between IMF Article IV consultations because of the volatile macroeconomic environment which characterizes most LIC DSF countries.*

The LIC DSF cannot ignore lessons from EM crises. It needs to be reformulated to reflect these lessons by taking into account fiscal and growth fundamentals, international liquidity, market signals and private balance sheets.

The market is an unreliable source of development finance. Zambia was issuing Eurobonds to finance infrastructure investments (for the case of market access countries, see Gill and Pinto (2005)). Designing instruments to frontload official development assistance (ODA) could help with public debt sustainability. Frontloading ODA and better collaboration across the donor community would also enhance the leverage of donors in the policy dialogue with LIC DSF countries, which has been diluted by easy market access.

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[14] For a summary of the lessons from EM crises and the main features of the three generations of crisis models, see chapter 8, table 8.2 and Annex 4 in Pinto (2014).

8. The Case for a Brand New LIC DSF

First, since the World Bank and IMF both care about development and the SDGs, they should use a DSF that makes public debt its centerpiece. This is for three reasons: (i) the dictates of macroeconomic logic in LIC DSF countries, whereby fiscal deficits spill over into current account deficits and drive external debt dynamics; (ii) the fact that the management of the public finances and the composition and quality of public spending have a direct impact on the attainment of the SDGs; and (iii) the recognition that public debt crises are major sources of volatility that can set growth, poverty reduction and private investment back for years. These are good reasons for scrapping the present form of the LIC DSF, with its overwhelming focus on external debt distress.

Second, focusing on the PV of debt harkens back to a bygone era when concessional external debt from official creditors was more or less synonymous with public debt. This is no longer a good approximation. Eurobonds, loans from China and other developing economies, and domestic local currency commercial borrowing have grown in importance. This change in the "financing landscape" has not been given sufficient attention; witness the retention of the PV of debt at an arbitrary 5% discount rate. Insisting on the PV of debt amounts to willful obfuscation because it obscures debt dynamics, which a simple framework based on primary deficits and (r-g) would bring out.

Shifting to a more transparent framework requires focusing on nominal public debt and its dynamics. Such an approach would work even for LIC DSF countries that still predominantly borrow from concessional sources, which would show up in a low r—although currency depreciation would still play a big role in r properly computed, as shown in Annex 1.

But while discounting is unhelpful in assessing public debt sustainability, it is crucial in computing the grant element of concessional loans and in ensuring comparability of treatment across creditors when a default occurs. These topics are beyond the scope of this paper, which has focused on a debt sustainability framework that can provide early warning aimed at crisis *prevention*, rather than the *cure* that debt restructuring and net present value debt reduction hope to achieve.

Third, country idiosyncrasies, such as those discussed in the context of Ghana and Ethiopia, matter a great deal for debt sustainability but do not fit into the LIC DSF. Its "realism tools" focus on whether primary fiscal balance and growth rate projections are realistic. While these are undeniably important, they are only half the story. The other half is to develop a good understanding of underlying public debt dynamics by developing appropriate counterfactual scenarios, as sketched out above for Ethiopia. Doing so would require a deeper understanding of the country's economy and how it works. Such an understanding should be part of the bread-and-butter for World Bank and IMF staff, especially with the profusion of field offices.

Fourth, DSAs using the LIC DSF have frequently failed to provide early warning about debt crises. It was evident both in the financial press and in analytical work that the public debt of several LIC DSF countries was on an unsustainable trajectory in early 2016. The output of the LIC DSF needs to become a central element in the policy dialogue with the countries under its purview, with a hard-hitting assessment of public debt sustainability, its links to development and early warning based on simple approaches. The fact that the World Bank and IMF cannot lend to countries with unsustainable debt situations should not be allowed to generate an optimistic bias that pronounces countries to be on a sustainable path when even a casual look at the dynamics suggests otherwise.

Fifth, replacing the LIC DSF in its present form with a framework that accords primary importance to nominal public debt and its dynamics supplemented with an analysis of international liquidity would be disruptive, but it is necessary. LIC DSF risk assessments now play a central role in non-concessional

borrowing limits and the allocation of funds, as through IDA's PBAS. But this is not a good excuse for perpetuating an obsolete framework. Indeed, a proper reform of the LIC DSF would have implications for all donors and providers of international finance. An example is provided by the High-Level Panel report on reinvigorating African concessional finance (HLP 2017), which based its recommendations on three facts about LIC DSF countries in Sub-Saharan Africa:

> *Fact 1:* By 2017, the market was determining the marginal cost of public borrowing for a significant set of Sub-Saharan African LIC DSF countries.

> *Fact 2:* Public debt sustainability problems had returned just ten years after HIPC-MDRI and were showing no sign of abating.

> *Fact 3:* The system of ODA was not adequate either for public debt sustainability nor for providing a foundation for economic development, necessitating alternative approaches to reconcile dwindling ODA with the large upfront development financing needs of ADF countries.

The High Level Panel recommended a "triple package" to address the combination of development and debt sustainability challenges: (i) devising mechanisms to frontload development finance by securitizing a portion of grants going to LIC DSF countries; (ii) except for the most fragile countries, abandoning grants and highly concessional funds and shifting to moderately concessional loans of longer maturity and lower cost than market borrowing; and (iii) a robust policy dialogue coordinated across IFIs to address debt sustainability concerns and ensure public funds are used in support of long-run growth and development. Elements (i) and (ii) aim to ensure that ODA can be front-loaded without making additional claims on donors; in fact, total claims would decline as a portion of grants is converted into loans. Element (iii) tries to raise the bar for gaining access to front-loaded finance and strengthen the incentives for the leaders of countries to improve governance.

Sixth, while the leaders of LIC DSF countries should be held accountable for good governance and transparent management of the public finances and debt, developed countries have to do their part. As discussed above, LIC DSF countries are coping with the effects of two exogenous non-economic shocks that have impacted them as innocent bystanders: climate change and the coronavirus pandemic. The G-20 DSSI and Common Framework were helpful interim measures, but effectively addressing these issues needs a completely new framework for debt sustainability. The only thing we know for certain is that making LIC DSF countries borrow even more to deal with these problems is not the answer.

The World Bank and IMF should recognize that the LIC DSF has been obsolete for more than a decade. The two organizations should carry out a comprehensive reform of the framework to recognize the primacy of public—not external—debt in the assessment of debt sustainability. It is never too late to do the right thing.

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Annex 1: Calculation of Interest Rates for Public Debt Dynamics in a Multicurrency Environment

This annex contains the derivations for the three interest rates included in Table 4 on Ghana's public debt dynamics over 2018-20 using information from the DSA in IMF (2021). A similar approach applies to Table 5 for Ethiopia. These are (i) the composite real interest rate, (ii) the real interest rate on domestic (local currency) debt and (iii) the real interest rate on forex (foreign currency) debt.

As the name suggests, the composite nominal real rate on public debt is a weighted average of the other two rates, after converting the interest rate on forex debt into a local currency-equivalent using ex post interest parity, that is, by taking into account the impact of exchange rate movements; recall the numerical example in Box 1. A depreciation means a capital loss on foreign currency ($) debt, increasing its burden in local currency terms, while an appreciation means a capital gain, lowering the burden of $ debt in local currency terms. The weights used are the shares of domestic, or local, currency and $ debt at the end of the previous year.[15]

The preceding description suggests that the interest rate on domestic and the local currency-equivalent interest rate on $ debt need to be computed before the composite rate. To do so, one would need the precise currency composition of forex debt: how much in USD, how much in EUR, JPY etcetera. This currency breakdown is typically not available as part of the LIC DSF. The procedure developed here sidesteps this problem by reversing the order: it first calculates the composite real rate on public debt based on the information in the public DSA based on the LIC DSF. It then obtains the local currency-equivalent rate on $ debt using the information provided on the interest rate on local currency debt and the weights of $ and local currency debt in total public debt at the end of the previous year.

Composite Real Interest Rate on Public Debt

The public sector DSA table in the LIC DSF has, for each year, the "identified debt-creating flows" during that year. This has two components: the primary deficit; and the so-called "Automatic Debt Dynamics" or ADD. Together, the primary deficit plus ADD capture the impact of the fiscal deficit (primary deficit plus interest payments on debt), GDP growth and the impact of exchange rate movements on the $ component of the public debt.

By itself, ADD captures the impact of interest rates, exchange rates and growth rates on debt dynamics. In the LIC DSF public DSA table, ADD is given by the equation:

ADD= Contribution from interest rate/growth rate differential + Contribution from real exchange rate depreciation.

In turn, the first term on the right-hand side (RHS) of the above equation is given by:

Contribution from interest rate/growth rate differential=contribution from average real interest rate + contribution from real GDP growth.[16]

In discrete time, the decomposition of the annual increase in the debt-to-GDP ratio into various components is given by the equation:

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[15] The derivations follow from the discrete-time difference equation for public debt expressed as a ratio of GDP. The change in the debt-to-GDP ratio relative to the previous year is determined by the primary deficit, the GDP growth rate, interest rates and exchange rate movements during the year in question. The interest rate calculation implicitly assumes one-year debt as a simplification.

[16] Note that the contribution from real GDP growth to the change in the debt-to-GDP ratio during year t is given by $-[g/(1+g)]d_{t-1}$, where g is real GDP growth in year t and d_{t-1} is the public debt-to-GDP ratio at the end of year (t-1).

(1) $\quad d_t - d_{t-1} = pd_t + \frac{(r_t - g_t)}{(1 + g_t)} d_{t-1}$, where:

d denotes the public debt-to-GDP ratio, pd is the ratio of the primary fiscal deficit to GDP, r is the composite real interest on domestic and \$ debt, including the impact of real exchange rate changes transmitted via the \$-denominated component of public debt, and g is the real growth rate. The second term on the RHS of equation (1) equals ADD.

Now the real growth rate, g, as well as inflation measured by the GDP deflator, π, are given in the "Key macroeconomic and fiscal assumptions" at the bottom of the IMF-WB's DSA table for public debt. This enables us to work either with real interest rates and real growth rates or nominal interest rates and nominal growth rates. For example, the nominal growth rate, G, is given by the equation: $(1 + G) = (1 + g)(1 + \pi)$. And the second term on the RHS of equation (1), (which equals ADD), can be written equivalently as:

(2) $\quad \frac{(i_t - G_t)}{(1 + G_t)} d_{t-1} = ADD.$

In equation (2), i_t is the composite nominal interest rate on domestic and \$ debt and, by construction, captures the impact of currency depreciation/appreciation on the \$-denominated component of public debt. We shall stick to the real versions of these variables. The formula used to calculate r for Ghana in Table 2 is obtained by rearranging the second term on the RHS of equation (1), which equals ADD, to get:

(3) $\quad r_t = g_t + \frac{ADD}{d_{t-1}}(1 + g_t).$

For example, for 2019, with ADD = 2.2% of GDP, g=6.5% and d_{t-1}=57.9% of GDP, r was obtained as:

r=0.065 + (2.2/57.9)(1.065) = 0.1054 = 10.54%.

Real Interest Rates on Local Currency and FX Debt

The "Key macroeconomic and fiscal assumptions" at the bottom of the IMF-WB's DSA table for public debt also include the real interest rate on domestic debt, which we denote r^d in Table 2. It can be seen that this is 8.6% for 2019. The formula for r^f, which is the local-currency equivalent of the real interest rate on \$ debt including the capital loss/gain from currency depreciation, is given implicitly by the equation:

(4) $\quad r = wr^d + (1 - w)r^f.$

In (4), w is the weight of local currency debt in total public debt at the end of the previous year. The only unknown is r^f, and it can be solved for using (4). Note that r^f incorporates the "contribution from real exchange rate depreciation" shown in the LIC DSF's public DSA table and the reason for doing this is explained in Box 1 in the main text of our paper.

In older versions of the LIC DSF, public debt was broken down by currency but more recent DSAs (as part of the 2017 revamp) break public debt down by residency. This "improvement" is a step backwards because it impedes a clear understanding of the trajectory of public debt, which depends upon the currency in which debt is denominated rather than on whether domestic or nonresident investors hold it. So we now have to calculate w and (1-w).

For 2019, we see that the "contribution from real exchange rate depreciation" was 2.2% of GDP. Let's call this RERC. A full derivation of equation (1) above would show that

(5) $\quad RERC = \frac{RERD}{1 + g_t} d^f_{t-1},$

where RERD is the real exchange rate depreciation (given under "Key macroeconomic and fiscal assumptions") and d_{t-1}^f is foreign currency denominated debt as a share of GDP at the end of the previous year. Given RERC for 2019 as 2.2% of GDP, RERD for 2019 as 7.7% and g for 2019 as 6.5%, we can calculate d_{t-1}^f to be 29.05% of GDP at the end of 2018. Since total public debt at the end of 2018 was 57.9% of GDP, we now get (1-w) = 29.05/57.9 = 0.5017 and w = 0.4983.

The last step is to use equation (4) to get r^f = [0.1054 – 0.4983X0.086]/0.5017 = 0.125 or 12.5%.

Annex 2: Links between Public and External Debt Dynamics

External debt dynamics

To understand the dynamics of external debt, a simple derivation is illustrative. Let D^E represent total external debt in local currency terms. By definition,

(1) $D^E = D^\$ x + \gamma \alpha D$,

where $D^\$$ is the amount of external debt denominated in \$, x is the exchange rate expressed as the local currency price of the \$, and γ is the non-resident share of total public debt in local currency terms, αD, where D is total public debt in local currency terms and α is the share of D denominated in local currency. This enables us to write, with a suitable grouping of terms:

(2) $\dot{D}^E = [\dot{D}^\$ x + \gamma \alpha \dot{D}] + D^\$ \dot{x}$,

where the term in square brackets on the RHS of (2) captures new borrowing and is simply the CAD expressed in local currency terms.[17] The remaining term is the capital gain/loss on \$-denominated external debt.

We now use the identity $CAD = FD + \Delta$, that is, the current account deficit equals the fiscal deficit, FD, plus the difference between private investment and private saving, Δ. Expressing these variables as a share of nominal GDP gives $c = f + \delta$. Further, we express external debt shown in equation (1) as a ratio of GDP, Y, to get:

(3) $d^E = d^\$ + \gamma \alpha d$,

where $d^E \equiv \dfrac{D^E}{Y}$ is the ratio of total external debt to GDP, Y, $d^\$$ is the ratio of \$-denominated external debt expressed in local currency to GDP, Y, and d is the ratio of total public debt to GDP. Putting all the information above together gives us the following dynamic equation for the external debt-to-GDP ratio:

(4) $\dot{d}^E = f + \delta + (d_p^\$ + d_*^\$)(\hat{x} - G) - (\gamma \alpha d)G$,

where $d_p^\$ + d_*^\$ = d^\$$, the LHS being the PPG and private amounts respectively of \$-denominated external debt as a ratio of GDP, $\hat{x} \equiv \dot{x}/x$, is currency depreciation (rise in the price of the \$) and $G \equiv \dfrac{\dot{Y}}{Y}$ is the growth rate of nominal GDP ("nominal growth rate").

Public Debt Dynamics

We now turn to public debt dynamics. In this case, we have total nominal public debt given by the equation $D = D^L + D_p^\$ x$, with the first term on the RHS of the equation being the local currency component and the second term the \$ component converted into local currency, which we assume is

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[17] We assume, as does the LIC DSF, that there is no depletion of gross foreign assets. In the LIC DSF, such depletion would show up in the residual. Most LICs do not have big foreign exchange reserve or foreign asset cushions so that both fiscal and current account deficits result in new borrowing, adding to debt.

held entirely by nonresidents.[18] Let α and $(1 - \alpha)$ be the respective shares of local currency and \$ in total public debt, D. In this case, we end up with the dynamic equation:[19]

(5) $\dot{d} = f + [(1 - \alpha)\hat{x} - G]d.$

This equation shows the continuous-time trajectory of the public debt-to-GDP ratio, d, as driven by the ratio of the fiscal deficit to GDP, f, currency depreciation transmitted via the share of \$-denominated public debt, $(1 - \alpha)$, and the growth rate of nominal GDP. As expected, public debt dynamics are driven by the fiscal deficit, exchange rates in conjunction with the share of public debt in \$, and growth rates.

Since $(1 - \alpha)d = d_p^\$$ and $d = d^L + d_p^\$$, we can rewrite (5) as:

(6) $\dot{d} = f + d_p^\$(\hat{x} - G) - (\alpha d)G.$

Comparing equations (4) and (6), (i) the smaller the gap between private investment and saving ($\delta \approx 0$) (ii) the smaller is private debt issued externally in \$ ($d_*^\$ \approx 0$), and (iii) the closer γ is to one (the government borrows only externally), the more completely do public debt dynamics determine external debt dynamics. This configuration of parameters would replicate the pre- and immediate post-HIPC-MDRI era, when public debt was essentially synonymous with external debt. Subsequently, so long as the government and state enterprises are the major borrowers externally, external debt becomes in effect a subset of public debt. As a logical proposition, it then becomes hard to think of external debt distress coexisting with sustainable public debt dynamics—a conclusion frequently drawn by the LIC DSF. **Unsustainable public finance situations spill over into current account deficits and external debt dynamics.**

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[18] Although there have been instances of governments issuing dollar-denominated debt in the domestic market, for example, in Ghana.

[19] Notice that if $\alpha = 1$, that is, all public debt is denominated in local currency, we end up with $\dot{d} = f - Gd$. Using the identity $f = pd + id$, where the first term on the RHS is the primary deficit and the second term captures interest payments, both as a ratio of Y, we get the standard continuous-time form: $\dot{d} = pd + (i - G)d$, or by subtracting inflation from both i and G, $\dot{d} = pd + (r - g)d$, where r is the real interest rate and g is the growth rate of real GDP ("real growth rate").

Annex 3: A Tour of the External DSA Template

For concreteness, let us take a look at the external DSA Table 1 in the Ghana 2021 Article IV Consultation IMF Country Report no. 21/165 (IMF 2021), where the numbers are "in percent of GDP unless otherwise indicated", although there is confusion about whether the denominator is nominal GDP in local currency or nominal GDP in US dollars. The first three lines give the country's total nominal external debt, the amount of PPG external debt and the change in the headline debt number.

Identified net debt creating flows

The next line gives "Identified net debt-creating flows", let's call it x for convenience, which are the sum of three components: (i) the non-interest current account deficit or NICAD; (ii) net FDI flows; and (iii) endogenous debt dynamics. For example, for 2019, x = -3.8 = 0.3-4.8+0.7. Let us take each of the three components in turn.

> *(i) NICAD = 0.3*

NICAD=0.3 is broken down into three main items: (a) the "deficit in balance of goods and services" =1.9 plus (b) "net current transfers" =-5.0 plus (c) "other current account flows" =3.4.

The first two numbers, (a) and (b) stack up with the numbers from Table 4, page 36, of IMF (2021) on the Balance of Payments (BoP) and the reader can ensure this as an exercise. But (c), which is given as 3.4 in the DSA table, does not have an obvious correlate in the BoP table. Indeed, the only item left in the BoP table is "Income (net)", which can be calculated as -5.8 (NB: the sign conventions are different in the DSA table and the BoP table—in the first, a negative number refers to a surplus that reduces external debt while in the second, a negative number is a deficit that worsens the BoP). So should (c) have been +5.8 instead of +3.4? Is there a mistake? No, as we shall see.

A guess is that "income (net)" in the BoP table includes interest payments, which are treated as part of "endogenous debt dynamics" in the DSA table. We need to verify then if the difference 2.4 = 5.8-3.4 equals interest payments.

This can be done two ways. First, notice that "contribution from nominal interest rate" is given as 2.4 in the DSA table, so this cross checks. Second, the "effective interest rate" under "key macroeconomic assumptions" for 2019 in the DSA table is given as 6.0 percent and footnote 4 defines this as "current-year interest payments divided by previous period debt stock". The external debt number for 2018 = 43.6-2.9 = 40.7 and 2.4/40.7 is about 5.9 percent, which is close to the given 6 percent.

> *(ii) Net FDI = -4.8*

It is easy to check that net FDI is indeed 4.8 percent of GDP from the BoP table in IMF (2021). Notice that net FDI is part of the "capital and financial account" in the BoP table. So why is FDI being singled out, and what about the other items in the capital and financial account?

The reason FDI is singled out is that it is a *non-debt financing sour*ce and therefore reduces external debt accumulation. The other capital account elements are various forms of debt and are reflected implicitly in the current account deficit, which equals the change in external debt net of FDI. So the change in external debt = CAD minus FDI. The intuition is that the CAD is like the income statement. It gets

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reflected in the capital account, which can be thought of as changes in the balance sheet (remember, the balance sheet contains *stocks* of assets and liabilities, while the capital account reports *flows*, or changes in these stocks).

By analogy, the fiscal deficit is the change in public debt, which is captured on the government's balance sheet (which also reflects capital gains/losses as a result of currency appreciation/depreciation on the $ component of public debt, something that is not reflected in the fiscal deficit). But privatization gets netted out because it is a non-debt financing source.

   (iii) Endogenous Debt Dynamics = 0.7

This component of the External DSA table isolates the contributions of the nominal interest rate, real GDP growth rate and "price and exchange rate changes" to the annual change in the external debt-to-GDP ratio. Unfortunately, this subsection has an "inside baseball" flavor to it, but is necessary because of the prominence given to external debt distress in the LIC DSF. It makes two main points.

1. There are conceptual flaws in the formulas used to decompose the annual change in the external debt-to-GDP ratio, d^E, into components attributable to the noninterest current account deficit (NICAD), interest rates, growth rates and exchange rates. This impedes a clear understanding of debt dynamics and compromises early warning while obscuring policy implications.
2. Nominal GDP in US dollars ($) is used as the denominator in contrast to the public sector DSA, which has nominal GDP in local currency in the denominator. Yet, as we show below, it manages to come up with identical numbers for the ratio of PPG external debt to GDP, leaving the World Bank and IMF LIC DSF team some explaining to do.

These imprecisions have probably been inherited from the past without any attempt at rectification during the 2017 revision of the LIC DSF.

The change in total external debt, PPG plus private, in local currency terms during a given year is the CAD (net of FDI) plus the loss from currency depreciation (or minus the gain from currency appreciation) in relation to the $-component of external debt. The CAD can be written as NICAD plus interest payments. Expressing the sum of these components of the change in external debt (NICAD + interest + capital loss from depreciation) as a ratio of GDP enables us to focus attention on the ratio of the NICAD to GDP (discussed above) and the contributions from interest rates, growth rates and exchange rates. We concentrate on the latter three, whose impact is captured under "Endogenous debt dynamics" in the external DSA table.

The formula for the sum of these three contributions, which add up to "endogenous debt dynamics", or EDD, is given in footnote 2 of the DSA table as:

(7) $EDD = [r - g - \rho(1 + g) + \varepsilon\alpha(1 + r)]/(1 + g + \rho + g\rho),$

where:
   r = nominal interest rate, given by "current year interest payments divided by previous period debt stock" in footnote 4 and denoted the "effective interest rate" in the "Key macroeconomic assumptions" block below the DSA table. **NB:** r would typically denote a real interest rate.
   g = real GDP growth rate

ρ = growth rate of GDP deflator in US dollar terms

ε = nominal appreciation of the local currency. **NB:** More precisely, ε is the growth rate of the local currency price of the US dollar. If this is positive, it is a depreciation and if negative, an appreciation.

α = share of local currency-denominated external debt in total external debt. **NB:** Two imprecisions here. First, α should be the share of $-denominated, not local currency-denominated, external debt. This is a typo. Second, this share is measured as of the end of the previous year.

Before providing the formulas for the individual contributions, it is worthwhile to figure out what ρ is. A little experimentation shows that the formula for ρ is:

(8) $\rho = \left(\frac{1+G^{USD}}{1+g}\right) - 1$, where G^{USD} is nominal dollar GDP growth.

As an example, for Ghana for 2019 in the DSA in IMF (2021), we have ρ = -4.6%, G^{USD} = 1.6% and g = 6.5% and it can be checked that the above formula holds. If we look at the denominator in equation (7), this can be rewritten as $(1 + \rho)(1 + g)$, and comparing this with (8), we see that the denominator in (7) is simply $(1+G^{USD})$.

By definition, the PPG component of external debt should be identically equal to the external component of PPG (public) debt. For example, for Ghana in 2019, as shown in IMF (2021), the PPG component of external debt was 39% of GDP (Table 1 of the DSA) and the external debt component of public sector debt (or total PPG debt) was also 39% (Table 2 of the DSA).

But the denominators in the two tables are different. As discussed above, the denominator for "endogenous debt dynamics" in Table 1 is $(1 + g)(1 + \rho)$, which equals $(1 + G^{USD})$. So the denominator for the external debt ratios in Table 1 is nominal dollar GDP instead of nominal local currency GDP. And nominal dollar GDP for a given year is usually obtained by dividing local currency GDP by the average exchange rate for that year because GDP is a flow.

For the public sector DSA in Table 2, the standard rule is to get the total PPG debt-to-GDP ratio as follows: (EOY local currency debt + EOY $ debt x EOY exchange rate)/GDP in local currency, where EOY is end-of-year and the exchange rate is defined as the local currency price of the $; this would be consistent with the derivation of the difference equation underlying the public sector DSA in the LIC DSF and the related assumptions. So it is not surprising that the denominator underlying the debt ratios in Table 2 of the DSA is just nominal local currency GDP and the formulas for calculating the different contributions to "automatic debt dynamics"—the counterpart of "endogenous debt dynamics" in Table 1 of the DSA—have the expression $(1 + g)(1 + \pi)$ in the denominator, where g is the real GDP growth rate and π is the GDP deflator, which is equal to (1+G), where G is the nominal growth rate of GDP.

This difference in denominators presents the first problem with the external DSA template, which can be illustrated with an example. Suppose PPG external debt is denominated in $, with debt at the end of the year at $50. Nominal GDP for the year in local currency is 200. The exchange rate has been depreciating during the year so that the average exchange rate is 1.25 local currency per USD whereas the end-of-year exchange rate is 1.5. Then the external debt DSA would give the debt ratio as 50/(200/1.25)=31.25%% whereas the public sector DSA would give the debt ratio as (50X1.5)/200=37.5%.

The two sets of numbers cannot be the same in Tables 1 and 2, although they are. The logical step would be to convert external $-denominated debt into local currency at end-of-year exchange rates for

consistency with the formulas underlying the debt dynamics for the public sector DSA and derive similar formulas for the external DSA with nominal local currency GDP in the denominator.

We now take up in turn the contributions from the nominal interest rate (CNIR), real GDP growth rate (CRGR) and "price and exchange rate changes" (CPER), illustrated with the same Ghana External DSA table. The formula for CNIR is given in (9):

(9) $\quad CNIR = \frac{r}{(1+g)(1+\rho)} d^E{}_{t-1}$,

where $d^E{}_{t-1}$ is the external debt ratio at the end of the previous year. CNIR for 2019 is given as 2.4. It can be checked that 2.4 = [0.06/{(1+0.065)(1-0.046)}]X40.7, where the numbers for the RHS of (9) are obtained from the External DSA table in IMF (2021). *This formula for the contribution from the nominal interest rate is hard to interpret because the numerator is the nominal interest rate in local currency equivalent terms while the denominator is the growth rate of nominal of $ GDP.*

The formula for the contribution from real GDP growth (CRGR) is given in (10):

(10) $\quad CRGR = \frac{-g}{(1+g)(1+\rho)} d^E{}_{t-1}$

CRGR for 2019 is given as -2.6 and it can be verified that -2.6 = -[0.065/{(1+0.065)(1-0.046)})]X40.7. *This formula mixes real and nominal across two different currencies and makes no sense.*

In contrast, the formula for "contribution from real GDP growth" in the public sector DSA is $\frac{-g}{(1+g)} d_{t-1}$, where d_{t-1} is the ratio of public debt to GDP at the end of the previous year, which is in line with standard derivations. Thus it can be checked for 2019 in Table 2 in the DSA in IMF (2021) that -3.5 = -(0.065/1.065)X57.9.

The formula for the contribution from price and exchange rate changes (CPER) is whatever is left over in footnote 2 to the External DSA table and this gives:

(11) $\quad CPER = \frac{-\rho(1+g)+\varepsilon\alpha(1+r)}{(1+g)(1+\rho)} d^E{}_{t-1}$

Since ε and α are not provided in the External DSA table, we cannot cross check the value of 0.9 for the CPER for Ghana in 2019. However, the economic significance of formula (11) for the "contribution from price and exchange rate changes" is hard to interpret, in contrast to the contribution from the real exchange rate, as in the public sector DSA, for example.

The "Residual"

The next item in the external DSA table is the "Residual", which is obtained by the "change in external debt" minus "identified net debt creating flows". The latter equals NICAD plus net FDI plus endogenous debt dynamics, which have been discussed above. For example, the residual for 2019 = 6.7, given by 2.9 - -3.8 = 6.7. This means that while external debt *increased* by 2.9, we would have expected a *decrease* of 3.8 based on the underlying factors driving external debt/GDP, namely, the current account (NICAD plus interest), FDI and growth and exchange rates. The 2020 residual is also large and positive at 5.4.

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Footnote 3 says that the residual "includes exceptional financing (i.e., changes in arrears and debt relief); changes in gross foreign assets; and valuation adjustments. For projections, also includes contribution from price and exchange rate changes." The residuals for 2019 and 2020 are based on actual data and therefore exclude the contribution from price and exchange rate changes. So these residuals are explicable by either increases in arrears (maturing principal and interest are not fully paid and get added to the headline debt number) or increases in gross foreign assets (for example, the government frontloads future borrowing via Eurobonds and deposits the money in the central bank). Both these would show up as an increase in external debt over and above that explained by the current account, FDI and growth and exchange rates and contribute to a positive residual. But debt relief by itself cannot explain a positive residual as this would lower the headline debt number.

The question for Ghana then is: what happened in 2019 and 2020? In addition to the two possibilities mentioned, there is a third one: that current account deficits are being under-reported. For example, in January 2017, a 4% of GDP "fiscal hole" was discovered following elections. This meant that the fiscal deficit and therefore the current account deficit was underreported by 4% of GDP and, other things being equal, would increase the residual by 4% of GDP.