Public Debt Accumulation in SSA: A Looming Debt Crisis

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Abstract

This paper discusses recent debt trends and evaluates performance of debt sustainability analysis (DSA) conducted in a sample of Sub-Saharan African (SSA) countries over the period 2008–16. Based on qualitative and quantitative analyses, the findings suggest the existence of systematic optimism bias in past DSA vintages resulting from optimistic macro-economic projections that underpin the DSAs. As a result, the DSAs for the sample countries analysed projected higher debt carrying capacities, which in most cases led to a faster pace of debt accumulation during this period. Moreover, this was not helped by the fact that average interest rates on new debt commitments were rising faster relative to gross domestic product growth rates, while the necessary fiscal adjustment to counter this development remained insufficient. Countercyclical policies supported by fiscal buffers that were used to address the impact of the 2008 global financial crisis have largely not been reversed despite the erosion of the buffers and a pick-up in growth in some countries. As a result, the overall risk of debt distress in the region has deteriorated in the past decade. Going forward, strengthening analytical/research work on country macroeconomic projections underlying their DSAs, relationship between investment and growth, impact of natural disasters on DSA frameworks and quantifying and monitoring fiscal risks would be important pieces of work in leveraging DSA results for financing and policy decisions. Other supporting issues to embrace include capacity building to enhance quality of policies, transparency and accountability at institutional level; managing roll over risk; developing and implementing sound debt management strategies.

Keywords: Debt Sustainability Analysis, Debt Crisis, Sub Saharan Africa, optimism bias

JEL classification: E62, H63, H68, H81
1. Introduction

The pace of sovereign debt accumulation has increased substantially in Sub-Saharan African (SSA) countries in recent years, raising concerns among observers that this could bring back the spectre of debt crises. Following significant debt cancellation provided to some thirty SSA countries in the context of the heavily indebted poor countries (HIPCs) and the multilateral debt relief initiative (MDRI) in the early to mid-2000s, the median public debt-to-gross domestic product (GDP) ratio fell from 85.3% in 2001, to 34.3% in 2011. These initiatives, together with buoyant growth and improved countries’ solvency, provided an additional space for new borrowing (IMF, 2014a). However, despite these developments, recent trends show that countries have taken up more debt, driving the median public debt-to-GDP ratio to about 53.5% by end of 2017.

The key drivers of debt build-up vary across countries and include exogenous shocks (such as commodity price volatility that hit budget revenues of commodity exporters); weak fiscal management and macroeconomic policy frameworks to support growth; changing composition of debt towards more expensive sources of financing; high levels of public spending; and, in few cases, natural disasters (Ebola epidemic) and discovery of previously undisclosed debt were also contributing factors (World Bank, 2018).

While external debt burden indicators are still below the levels that triggered debt distress in most countries, risks of a renewed cycle of debt crises and economic disruption are growing, with several countries’ risk of external debt distress deteriorating. Of the thirty-six Poverty Reduction and Growth Trust-eligible SSA countries for which debt sustainability analyses (DSAs) were conducted between 2008 and 2018, some 44% (or 16) of the countries were classified as either ‘in debt distress’ or facing ‘high risk’ of debt distress in 2018, up from 31% (or 11 countries) in such categories at end 2011 (Table 1). For details, see Appendix B.

This contrasts with the period between 2008 and 2011 when risk of debt distress improved, reflecting the impact of debt relief. Table 2 shows that while the increase in debt vulnerabilities between 2011 and 2018 were broad-based, downgrades were more prevalent in post-HIPCs. Of the eight countries downgraded from ‘low risk’ category between 2011 and 2018, seven are post-HIPCs. In addition, four of the five countries that moved into ‘high risk’ category during the same period are post-HIPCs.

For countries classified as facing low or moderate risk of debt distress, safety margins have eroded. Should debt continue to build up or in the event of shocks, the likelihood of future risk rating downgrades increases, posing significant challenges to the achievement of Sustainable Development Goals (United Nations, 2019) and (World Bank, 2018).

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1 See, for example, Jubilee Debt Campaign (2017), UNCTAD (2018), Financial Times (2017) and (IMF, 2018a, b)
2 General government debt will be used interchangeably with public debt in this paper
3 Benin, Burkina Faso, Burundi, Cameroon, Cabo Verde, Central Africa Republic (CAR), Chad, Comoros, Democratic Republic of Congo (DRC), Congo Republic, Cote d’Ivoire, Djibouti, Ethiopia, Gambia, Ghana, Guinea, Guinea Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Sudan, Tanzania, Togo, Uganda, Zambia and Zimbabwe.
4 A country is in debt distress when it is struggling to service its debt, as demonstrated by accumulation of arrears or the restructuring of its debt.
### Table 1: Risk of Debt Distress in Poverty Reduction and Growth Trust-Eligible SSA Countries (2008, 2011 and 2018)

| Risk of debt distress rating | 2008 | 2011 | 2018 |
|-----------------------------|------|------|------|
| No. of countries            | % of total | No. of countries | % of total | No. of countries | % of total |
| Low                         | 10   | 28%  | 13   | 36%  | 5    | 14%  |
| Moderate                    | 10   | 28%  | 12   | 33%  | 15   | 42%  |
| High                        | 8    | 22%  | 6    | 17%  | 11   | 31%  |
| Distress                    | 8    | 22%  | 5    | 14%  | 5    | 14%  |
| Total                       | 36   | 100% | 36   | 100% | 36   | 100% |

*Source: Calculations based on information drawn from IMF/World Bank DSA Reports.*

### Table 2: Risk of Debt Distress for Poverty Reduction and Growth Trust-eligible SSA HIPC and Non-HIPC

| Risk of debt distress | 2008 | 2011 | 2018 |
|-----------------------|------|------|------|
| Post-HIPCs            | Non-HIPCs | Post-HIPCs | Non-HIPCs | Post-HIPCs | Non-HIPCs |
| Low                   | 8    | 2    | 11   | 2    | 4    | 1    |
| Moderate              | 9    | 1    | 11   | 1    | 14   | 1    |
| High                  | 7    | 1    | 5    | 1    | 9    | 2    |
| Distress              | 6    | 2    | 3    | 2    | 3    | 2    |
| Total                 | 30   | 6    | 30   | 6    | 30   | 6    |

*Source: Calculations based on information drawn from IMF/World Bank DSA Reports.*

Consistent with this broader trend, several SSA frontier markets, including upper middle-income countries with sovereign credit ratings have been downgraded to non-investment grade. Some low-income countries (LICs), on the other hand, have also engaged creditors recently on debt restructuring or rescheduling operations.

It is in this context that key questions emerge in the narrative literature and in debates centred on debt dynamics: is a debt crisis looming in SSA (Ndung’u & Simbanegavi, 2018) and have DSAs conducted for these countries been useful in detecting evolving debt vulnerabilities (Guzmán and Heymann, 2015; Baduel and Price, 2012; Mooney and de Soyres, 2017)? It is anticipated that answers to these questions will help flag potential debt vulnerabilities and provide insight into the plausibility of macroeconomic frameworks used to underpin DSAs. The findings will also provide guidance on whether there is a need for a thorough scrutiny of the process leading to elaboration of assumptions underlying DSAs. For MEFMI and its technical cooperating partners, the findings will highlight areas in which

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5 Upper-middle income countries in the sample are Botswana, Eswatini, Gabon, Mauritius and South Africa. Debt sustainability for these countries is assessed using the Market Access Countries Debt Sustainability Framework.
further capacity building may be needed and perhaps inform realignment of capacity building priorities going forward.

This paper attempts to answer these questions by reviewing recent DSAs to assess potential risks to the medium-term debt sustainability outlook of countries in the SSA region. It also evaluates performance of past DSA vintages in flagging debt vulnerabilities as they emerge. The analysis relies on data drawn from IMF and World Bank DSA reports for countries in SSA.

The rest of the paper is structured as follows. Section 2 and Section 3 discuss stylised facts around the key drivers of recent debt dynamics and debt sustainability outlook, respectively. The methodology and data used for analysis are presented in Appendix A, while the findings are given in Section 4. Section 5 concludes and gives policy implications, while Section 6 gives direction for future research.

2. Stylized facts: Recent debt accumulation in SSA

This section presents stylised facts on recent debt build-up in SSA. The discussion is based on cross-country unweighted averages at annual frequency.

2.1 Evolution and drivers of debt accumulation

Public debt as a ratio of GDP declined substantially from early 2000s through end-2011. The median general government debt-to-GDP ratio for some 44 SSA countries declined from a high of 85.3% in 2001 to about 34.3% by end-2011 (Figure 1, Panel 1). Over three quarters of countries had debt-to-GDP ratios below 50%. Panel 2 shows that while external debt-to-GDP ratio followed a similar trend, the decline was much steeper.

These trends largely reflect the impact of debt relief initiatives, particularly the HIPC and MDRI, which alleviated the external debt burden of some thirty recipient LICs in the region. The trends also coincided with the period when the ‘Africa rising’ narrative took hold.

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6 Angola, Benin, Botswana, Burkina Faso, Burundi, Cabo Verde, Cameroon, CAR, Chad, Comoros, DRC, Congo Republic, Cote d’Ivoire, Djibouti, Eritrea, Eswatini, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Niger, Nigeria, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, South Africa, Sudan, Tanzania, Togo, Uganda, Zambia and Zimbabwe.

7 Benin, Burkina Faso, Burundi, Cameroon, CAR, Chad, Comoros, DRC, Congo Republic, Cote d’Ivoire, Ethiopia, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Madagascar, Malawi, Mali, Mauritania,
when several SSA countries registered fairly healthy annual GDP growth rates (averaging over 6% per annum) sustained by sound policy reforms, easing external financing conditions and rising commodity prices. This substantially improved the region’s debt sustainability outlook.

Figure 2 shows that strong economic growth rate and net foreign direct investment (FDI) played a key role in partially offsetting the impact of debt, creating flows and hence reducing the pace of debt build-up over the period 2008–11. A strongly negative interest—growth rate differential has been a key benign force for debt sustainability, showing predominance of concessional borrowing by a majority of LICs and a low (by historical standards) interest rate environment faced by frontier and upper-middle income countries post-global financial crisis. On the other hand, the non-interest current account (NICA) and primary deficits exerted considerable upward pressure on debt accumulation.

Trends in primary balance reflect several factors, notably a conscious effort to use the newly created fiscal space for countercyclical policy in the area of infrastructure following the global financial crisis. The external position of many countries remained weakened somewhat as the current account deficits of oil importers widened and reserves declined. Despite declining oil prices, towards the end of 2008, their current account deficits deteriorated, driven by a still-high food import bill and, in some cases, declining remittances and tourism receipts as global growth weakened.

Looking beyond 2012, the dynamics and composition of public debt changed significantly. The confluence of supportive conditions that helped stabilise debt ratios since 2008 (notably easy global financing conditions), the deepening of domestic financial markets for some countries and the growing lending activities of non-Paris Club countries created new opportunities for countries to sustain higher deficits. In addition, more flexible guidelines on external debt limits introduced in IMF and World Bank-supported programmes allowed countries to take on more debt to support substantial investment in potentially high-return critical infrastructure (IMF, 2014; World Bank, 2010). As a result, the median general government debt-to-GDP ratio increased from 36.2% to 53.5% between 2012 and 2017. This saw the number of sample countries with debt-to-GDP ratios above 50% increasing to Mozambique, Niger, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Tanzania, Togo Uganda and Zambia.
almost two-thirds by end-2017, compared with less than one-fifth in 2012. Similar trends were also observed on external debt.

A country-specific look shows the full heterogeneity in shifting debt burdens, and Figure 3 provides more granular insights. Panels 1 and 3 show that between 2007 and 2011, no country recorded a debt-to-GDP increase of more than 20 percentage points. In contrast, Panels 2 and 4 show that the ratio of general government debt-to-GDP rose by more than 20 percentage points in 40% of the countries between 2012 and 2017. While the narrative of borrowing for public investment is cited as justification for running higher fiscal deficits, IMF showed that in only a minority of cases was fiscal deficit and incremental borrowing used entirely for public investment (IMF, 2018a, b). Rising deficits were largely accounted for by higher public investment in Djibouti, Guinea-Bissau, Mali, Cameroon, Cote d’Ivoire, Kenya, Madagascar and Rwanda. Fiscal balances played a key role in debt accumulation across all country groups (Figure 4).

The factors at play varied markedly across countries and range from declining revenues in non-fuel commodity exporters to higher spending in diversified exporters. While fiscal balances declined among fuel exporters, driven by a decline of revenues, financing constraints forced fiscal tightening in most countries. Lower grants and higher interest expenditures contributed to the fiscal pressures among post-HIPCs. For frontier economies and upper-middle income countries, higher interest expenditures contributed to the fiscal pressures, reflecting higher debt stocks and increased reliance on a more expensive commercially placed debt. But experiences varied markedly within country groups, reflecting both the specifics of tax and export structures and policy efforts to boost domestic revenue mobilisation.

The key driver of external debt accumulation has been the persistent NICA deficit (Figure 2, Panel 2), which pushed the ratio of external debt-to-GDP up by an average of 3.3% between and 2012 and 2017. The impact has however been partially offset by high net
FDI inflows sustained over the period. One stimulus to the expansion of external debt was the international commodity boom and bust, particularly for commodity dependent exporters. As shown in Figure 5, there were sizeable price increases in energy, food and metals in 2002–07 and 2009–12, followed by sharp declines.
Price increases were accompanied by increased revenues, and higher revenues made it difficult for countries to resist expenditure increases for both consumption and investment. Expectations of sustained favourable export and revenue performance, and hence repayment capacity, led to external borrowing arrangements to complement current revenues in financing government budgets. This failure to adopt countercyclical policies during boom times, thus partly contributed to the increase in external debt. In the face of large terms-of-trade shocks and strong appreciation pressures on the US dollar, most countries experienced nominal exchange rate depreciations in 2015 and 2016. This had adverse impact on macroeconomic variables, including debt repayment obligations.

The differential between average real interest rate paid on debt and the real growth rate of the economy (interest-growth rate differential, (IGRD)) is a key parameter in defining the direction of future burden. Negative IGRDs constituted a powerful debt-stabilising force in many SSA countries, driving down debt ratios or keeping them stable even where primary deficits persisted. Conceptually, IGRD is the rate at which the debt-to-GDP ratio would grow if the primary balance were zero and debt service (principal and interest) were financed by issuing more debt. When the IGRD is positive (the interest rate exceeds the growth rate), policies that rely on rolling over debt and interest will result in explosive debt ratios and eventually a debt crisis, as government cannot run a successful Ponzi scheme (Olivier and Philippe, 1992). Stabilising the debt ratio requires a surplus in the primary balance. The higher the IGRD, the larger the fiscal effort necessary to nip the debt-to-GDP ratio onto a downward path or stabilise it. On the other hand, if the IGRD is negative for an extended period, the debt ratio can decline even if government runs a primary deficit less than the absolute IGRD, thus servicing existing debt with new borrowing (Bartolini and Cottarelli, 1994).

Figure 6 shows that initially real GDP growth rate essentially outpaced the snowballing effect of real interest rates mainly due to the concessional nature of sample countries’ borrowing. With lower growth and increasingly high interest rates observed in recent years, the favourable IGRD dynamics is gradually narrowing, and the reversal has been vivid in frontier economies due to increased recourse to market-based funding sources.

We conclude this discussion with some broad patterns of relative importance of primary deficit and IGRD in explaining debt dynamics in selected SSA countries. Figure 7 scatterplots in the IGRD/primary deficit space some SSA countries in the sample.

The scatterplots show elevated primary balance positions and/or movement towards stronger positive IGRD during the period 2012–16. Without appropriate fiscal responses, this could result in explosive debt dynamics, a signal for a looming debt crisis.

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8 Much of the impact of exchange rate depreciation on external debt was vivid in 2015, and more pronounced in Gabon (8% of GDP), Angola (10.6% of GDP), Mozambique (20.2% of GDP), Senegal (13.8% of GDP) and Zambia (8.4% of GDP), further compounding debt situation.

9 The IGRD is computed as the differential between the effective interest rate (actual interest payments divided by the debt stock at the end of the previous year) and growth rate of nominal GDP, divided by the latter plus 1.

10 Frontier markets in this sample include Angola, Nigeria, Mozambique, Zambia, Cote d’Ivoire, Ghana, Kenya, Senegal, Tanzania and Uganda. They are countries with more developed financial systems and closer linkages to international financial markets.
2.2 Debt service trends
Debt servicing costs have also been rising, not only due to rising debt stocks but also because of increased recourse to higher-cost commercial loans. The median interest outlay as a share of budgetary revenue went up to 9% in 2016, before declining to 8% in 2017, from 3.5 percentage points in 2012 (Figure 8, Panel 1).
The increase has been most pronounced for frontier countries (Angola, Kenya, Zambia and Ghana), where external borrowing on commercial terms has contributed to higher interest outlay, while elevated inflation and domestic currency depreciation have played a key role in some cases (Figure 8, Panel 2).

2.3 Increase in commercial debt
The composition of public external debt portfolios has changed from traditional official concessional sources towards a broader range of private financing instruments. This has been more pronounced for frontier and non-HIPC countries, reflecting their increased access to market-based funding mechanisms such as the international capital markets (Figure 9).

While certain commercial borrowing was used for general budgetary support, most of the financial credits were directly linked to major public investment projects that spanned across various sectors in the economy (IMF, 2018). The question remains whether these projects are sufficiently productive to repay the loans.

2.4 Increase in the share of debt owed to non-Paris Club creditors
The composition of bilateral lending has changed significantly, as some countries shifted from Paris Club to non-Paris Club creditors, notably China, and to a lesser extent Brazil and India. Between 2008 and 2017, non-Paris Club creditors accounted for more than 50% increase in new bilateral loan commitments to some countries, and as a result accounting for over half of external debt stock by 2017. The increase in non-Paris Club debt implies countries are
unlocking new financing sources, but often on less concessional terms, as the bulk of these flows is not ODA-equivalent.

The diversified creditor base may pose challenges for future debt resolution, as most are not integrated into existing frameworks for creditor coordination like the Paris Club, which has long-standing principles to govern official sector involvement in debt restructurings.

2.5 Increasing recourse to domestic debt markets
For the whole region, the median domestic currency debt-to-GDP increased from 10% in 2008 to around 18% by 2017. Figure 10 shows that the ratio surpassed the 10% mark for several countries after 2008, implying recourse to domestic debt markets has increased as governments sought alternative sources of finance.

For Kenya, Mauritius, South Africa and Nigeria, domestic borrowing has been supported by relatively deeper and developed domestic debt markets, while in some countries like Malawi and Zimbabwe, the increase was due to limited external sources of financing. While domestic debt reduces exchange rate mismatches and is welcome from a financial market development perspective, it often carries higher interest costs.

A few countries in the region have been able to issue medium- and long-term debt maturities, but issuance for the most part has been confined to short-term maturities (mainly treasury bills).

Refinancing risk is therefore a key concern, especially where the investor base has limited capacity (predominantly commercial banks in many cases). It also tends to exert pressure on the exchange rate if the domestic debt is issued to finance imports.

2.6 Evolution of debt vulnerabilities
This section examines the evolution of debt vulnerabilities in SSA, drawing from outputs of joint IMF/World Bank debt sustainability assessments for LICs. Figure 11 and Table 3 show increased debt vulnerabilities reflected by a series of debt sustainability rating downgrades between 2012 and 2018 for thirty-six SSA countries assessed under the LIC DSF. As of end-2018, sixteen countries were classified as either in high risk of debt distress or in debt distress.
The remaining twenty had low to moderate debt vulnerabilities, although safety margins had eroded in many cases since 2012.

Risk of debt distress ratings reached their most favourable level in 2013, with 25% of DSAs showing high risk or debt distress, down from 44% in 2008. After 2014, however, there has been deterioration in risk ratings in line with the pace of debt accumulation. Between 2014 and 2018, three countries moved into debt distress, while five countries were downgraded to high risk of debt distress.

Nevertheless, there were two upgrades with Lesotho moving to low risk rating from moderate due to rebasing of the country’s GDP while Comoros moved from high risk to moderate risk rating on account of the full inclusion of remittances in the analysis. Tanzania, Uganda, Nigeria and Senegal have maintained a low risk of distress rating since 2008. However, their debt levels have risen significantly, often reflecting a renewed investment push financed through commercial borrowing, including from domestic markets.

As a consequence, the safety margins (distances of debt burden ratios from threshold levels that flag elevated risk) have narrowed but not closer to thresholds to trigger downgrades.

For most upper middle-income countries, debt remains sustainable under the baseline macroeconomic scenario, although debt ratios are close to or exceed risk thresholds in a few countries (Namibia and Seychelles). Consistent with the broader trend, several frontier markets or other countries with sovereign credit ratings have been downgraded to non-investment grade by major credit rating agencies (Figure 12).

3. Debt sustainability outlook

This section assesses the evolution of the main risks to medium-term debt sustainability as projected by the most recent vintages of LIC DSAs. The analysis will help inform discussions in Section 4 and shape conclusions deriving therefrom. The period of analysis is 6 years from the first year of projection. Since not every country has had a fresh DSA each year, trends are based on the most recent DSA, with the cut-off date being limited to those conducted no
| Country       | 2008 | 2009 | 2010 | 2011 | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 |
|--------------|------|------|------|------|------|------|------|------|------|------|------|
| Burundi      | High | High | High | High | High | High | High | High | High | High | HIPC |
| Kenya        | Low  | Low  | Low  | High | High | High | High | High | High | Moderate | Non-HIPC |
| Lesotho      | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Low | Low | Non-HIPC |
| Malawi       | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate |
| Mozambique   | Low  | Moderate | Moderate | Moderate | Low  | Moderate | Moderate | Moderate | Low  | Low | HIPC |
| Rwanda       | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Low  | Low  | Low  | Low  | HIPC |
| Tanzania     | Low  | Low  | Low  | Low  | Low  | Low  | Low  | Low  | Low  | Low  | Low  | HIPC |
| Uganda       | Low  | Low  | Low  | Low  | Low  | Low  | Low  | Low  | Low  | Low  | Low  | HIPC |
| Zambia       | Low  | Low  | Low  | Moderate | Moderate | Moderate | High | High | HIPC |
| Zimbabwe     | Distress | Distress | Distress | Distress | Distress | Distress | Distress | Distress | Distress | Distress | Distress | Non-HIPC |
| Ghana        | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | High | High | HIPC |
| Cameroon     | Low  | Low  | Low  | Low  | Low  | Moderate | Low  | Moderate | High | High | HIPC |
| DRC          | Distress | Distress | Distress | Distress | Distress | Moderate | Moderate | Moderate | Moderate | Moderate | HIPC |
| Cote d'Ivoire | High | High | High | Distress | Distress | Moderate | Moderate | Moderate | Moderate | Moderate | HIPC |
| Ethiopia     | Moderate | Moderate | Moderate | Moderate | Low  | Low  | Low  | Moderate | Moderate | High | HIPC |
| Senegal      | Low  | Low  | Low  | Low  | Low  | Low  | Low  | Moderate | Moderate | Low  | Low  | HIPC |
| Sudan        | Distress | Distress | Distress | Distress | Distress | Distress | Distress | Distress | Distress | Distress | Distress | Non-HIPC |
| Benin        | Moderate | Moderate | Moderate | Low  | Low  | Low  | Moderate | Moderate | Moderate | Moderate | Moderate | HIPC |
| Burkina Faso | High | High | High | High | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate |
| Cabo Verde   | Low  | Low  | Low  | Low  | Low  | Low  | Moderate | Moderate | Moderate | Moderate | High | Non-HIPC |
| CAR          | High | Moderate | Moderate | Moderate | Moderate | Moderate | High | High | High | High | HIPC |
| Chad         | Moderate | Moderate | Moderate | High | High | Moderate | Moderate | Moderate | Moderate | High | High | HIPC |
| Comoros      | Distress | Distress | Distress | Distress | Distress | High | High | Moderate | Moderate | Moderate | Moderate | HIPC |
| Congo Republic | High | High | Low  | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | HIPC |
| Djibouti     | High | High | High | High | High | High | High | High | High | High | Non-HIPC |
| Gabon        | High | High | Distress | Distress | Distress | Moderate | Moderate | Moderate | Distress | Distress | HIPC |
| Guinea       | Distress | Distress | Distress | Distress | Distress | Moderate | Moderate | Moderate | Moderate | Moderate | HIPC |
| Guinea Bissau | Distress | Distress | Distress | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | HIPC |
| Liberia      | Distress | Distress | Distress | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | HIPC |
| Madagascar   | Low  | Low  | Low  | Low  | Low  | Low  | Moderate | Moderate | Moderate | Moderate | HIPC |
| Mali         | Low  | Low  | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | HIPC |
| Mauritania   | Moderate | Moderate | Moderate | Moderate | Moderate | High | High | High | High | High | High | HIPC |
| Niger        | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | HIPC |
| Sao Tome     | High | High | High | High | High | High | High | High | High | Distress | HIPC |
| Sierra Leone | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | HIPC |
| Togo         | Distress | Distress | Distress | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | Moderate | HIPC |

Source: IMF/World Bank DSA Reports.
earlier than 2017. As a result, debt vulnerabilities reported using this approach may tend to slightly lag actual debt market conditions.

3.1 Projected debt sustainability indicators

3.1.1 Solvency indicators

Projections up to 6 years show that the broad-based rapid pace of debt accumulation observed during the period 2012–16 is easing, with the primary balance and GDP growth as the main drivers of these dynamics (Figure 13, Panel 3). Overall, the median PV of public debt-to-GDP is expected to reduce significantly from 44.2% in the first year of projection to 34% by end of the sixth-year projection horizon, while external debt ratios are expected to improve gradually (Figure 13, Panel 2).

The broad trends mask significant heterogeneity across countries. Some countries at high risk of debt distress and those already in distress are expected to continue accumulating more debt.

Due to limited scope for borrowing from concessional windows of traditional multilateral and bilateral creditors, these countries are expected to continue to borrow from commercial sources and mortgage their natural resources, a situation likely to worsen their risk of debt distress. Their debt burden ratios are expected to breach applicable sustainability thresholds, as defined based on their debt carrying capacity (Figure 14).

Increases in debt ratios are also expected for countries in the low and moderate risk of debt distress categories. For some of these countries, this reflects continued rapid scaling.

12 Solvency indicators are present value (PV) of debt-to-GDP, PV of debt-to-exports and PV debt-to-revenue.

13 The first year of projection differ depending on the latest IMF/World Bank DSAs available; this ranges between 2017 and 2019, while the sixth year of projection ranges between 2022 and 2024.

14 The idea behind the debt carrying capacity is that countries with different policy and institutional strengths, macroeconomic performance and buffers to absorb shocks have different abilities to handle debt. Such abilities are also influenced by the global environment through demand for countries’ exports and remittance inflows.
up in infrastructure spending, resulting in large fiscal deficits, financed by non-concessional debt. For others, the debt indicators worsen owing to expenditure run-ups and weak export growth. Nevertheless, safety margins for countries in low and moderate risk of debt distress categories are expected to remain substantial, with no breaches.

For the rest of the sample countries, debt burden indicators are projected to remain below the thresholds under the baseline scenario; in some cases, drifting down below applicable sustainability thresholds.

The broad-based slowdown in public debt ratios in the rest of the countries is predicated on sustained and strong GDP growth and improved primary balances. The change in public debt turns negative over the medium term as the effect from real GDP growth outweighs the significant but declining size of the average primary deficit. On the external front, the trends reflect the balance between growth and FDI inflows on one hand, and current account deficit and real interest rates on the other hand, which stabilises the median external debt-to-GDP ratio around 25%. The contribution of both real GDP growth (negative) and the average real interest rate (positive) are projected to remain stable, with the favourable impact of GDP growth offsetting the adverse impact of interest obligations.

3.1.2 Liquidity indicators

Solvency is by essence a medium-to-long-run concept, and largely ignores constraints that may bind only in the short-term and that may jeopardise a country’s ability to honour financial obligations. In analysing the magnitude of the SSA debt problem, it is also important to focus on scheduled service profile relative to the capability of the economy or the government to meet that schedule. Some countries have experienced debt servicing difficulties.

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15 As past projections have been optimistic, these results are treated cautiously.
16 Liquidity indicators are debt service-to-exports and debt service-to-revenue.
in recent years, as evidenced by the accumulation of arrears and debt rescheduling. The question is whether performance can be expected to improve to a level adequate for projected level of debt service.

Despite wide differences across countries, Figure 15 (Panels 1 and 2) shows that some countries are projected to face challenges in this respect over the next few years. The median external debt service to budgetary revenues ranges between 14% and 47% and expected to exceed applicable risk thresholds in some medium performers (Figure 15, Panel 2). On the other hand, external debt service-to-exports ratios are expected to breach applicable
Debt service levels have risen sharply partly due to amortisation schedules of nonconcessional borrowings, particularly Eurobond’s maturation.

Since the pace of debt accumulation accelerated from 2012, it is important to compare debt burden indicators before and after this year to gauge whether projected ratios tend to revert or deviate from 2012 and 2017 ratios. On average, results show that projected solvency indicators tend to revert as end of medium-term projected solvency indicators are below the 2012 and 2017 actuals for most countries (Figure 16). In less than 10% of the countries are the solvency indicators remaining above their 2012 and 2017 levels.

See Appendix C for a list of frontier countries.
However, as Figure 17 shows, scheduled debt service (debt service in relation to exports and budgetary revenue) remains above those in recent years for slightly more than 40% of the sample countries. External debt service to revenue is expected to remain elevated compared with 2012 and 2017 particularly in countries that issued Eurobonds. These countries would need to build export capacity to enhance their ability to service external debt obligations. For some countries, adjustment alone may not be sufficient, as debt service represent multiples of exports and revenues. An alternative is building cash reserves in the run-up to the redemption date through sinking funds or use liability management operations such as buybacks to manage the redemption profile.

The sharply rising debt service profiles for most SSA countries reflect the continuing difficulties that are expected to preoccupy several governments in the coming years. Elevated liquidity indicators are suggestive of a much more difficult period ahead for the region in general. While debt vulnerabilities, as reflected by solvency indicators, show signs of receding in the medium term, risks to the outlook are much more tilted to the downside due to elevated liquidity indicators.

3.2 Risks to the outlook
While the debt-burden indicators are projected to improve considerably under the baseline, the positive outlook is contingent on optimistic assumptions about growth and fiscal
adjustments. The size and pace of the projected fiscal adjustments range between 3.3 percentage of GDP over 5 years for non-resource-intensive countries and 5.3 percentage points of GDP over the same period for resource intensive countries (IMF, 2017a, b). This will pose a challenge, as governments simultaneously attempt to reallocate the budget towards poverty-reducing activities and fill infrastructure gaps. Hence, the baseline public debt trajectories are subject to several significant uncertainties.

First, medium-term GDP growth projections underpinning DSAs incorporate and critically depend on an appropriate degree of planned fiscal consolidation being undertaken. While most countries reflect planned fiscal consolidation measures in their medium-term economic strategies; in most cases, they tend to be continuously kicked down the road or limited in scope than initially planned (IMF, 2017a, b). In addition, past episodes of fiscal
consolidation has mainly been affected through cuts in capital expenditures resulting in negative growth effects. Cuts in capital expenditure are associated with the highest negative output impact\footnote{Changing government investment by 1 percentage point of GDP changes output in the same direction by about 0.1\% in the year of implementation and by about 0.7\% after 3 years. On the other hand, changing public consumption has a smaller effect on output compared with public investment: after 3 years, a 1 percentage point of GDP change in government consumption results in a 0.5\% change in output in the same direction.}, unless it is unproductive or cannot be efficiently implemented, or if level of debt and consolidation needs is so large that cutting investment spending is unavoidable to ensure debt sustainability (IMF, 2017a, b).

Second, recurrence of exogenous shocks (commodity price shocks and natural disasters) remains a critical source of vulnerability in many SSA countries, partly because of their magnitude and the limited fiscal space to respond quickly and effectively to them. When they occur, the negative impact on growth, exports and fiscal deficits is substantial. Climatic variations in rainfall (including droughts and cyclone-induced floods) are a particular concern due to continued dependence on rain-fed agriculture as well as other weather sensitive activities such as electricity production (especially in east and central Africa, where hydropower accounts for more than 50\% of electricity generation) (IMF, 2017a, b). Other important risk factors include epidemics (Ebola in west and central Africa), resurgence in socioeconomic tensions in post conflict countries and terrorist operations.

Third, instilling fiscal discipline and putting debt on a sustainable path will in most cases require strong structural fiscal reforms, including adherence to fiscal responsibility laws. Important is domestic revenue mobilisation to address the worrying revenue to public debt service ratios discussed above and its crowding-out effect on social and infrastructure expenditures. Recurrent lax commitment controls result in persistent build-up of domestic arrears, which not only compromise achievement of budget targets but negatively affect the private sector and hence growth prospects. In this regard, the region has much to do to improve governance and the quality of institutions and policies as they are key in determining debt carrying capacity and likelihood of debt distress.

Fourth, there are fiscal uncertainties related to contingent liabilities; this sometimes arises when the coverage of fiscal accounts is narrowly defined to include central government and only a few state-owned enterprises (SOEs). In some recent cases, the pace of arrears accumulation and debt contraction by the rest of the SOE’s has reached alarming levels posing a threat to the measurement accuracy of debt vulnerabilities of a country.

Another emerging trend has been the increasing use of loans whose repayments are linked to commodity revenues (commodity-linked loans). Independent analysts have tried to put together information on commodity-linked loans of some SSA countries (Brautigam and Hwang, 2016; Brautigam and Gallagher, 2014)—see for example Appendix D. Other creditors such as the Africa Export Import Bank, Glencore and Trafigura also link the servicing of loans to commodity revenues. This presents challenges for DSAs, as assessments do not usually reflect the encumbered portion of exports. As a result, the export metrics used in DSAs will present an inaccurate picture of countries’ actual debt service capacity.

Fifth, global financial market disruptions could trigger reversal in capital flows, higher financing costs and rapid exchange rate depreciations. Sharper than anticipated, currency...
depreciations would render the servicing of external debt more challenging in countries that have experienced a significant increase in debt levels. Tighter financing conditions will heighten refinancing risk, particularly for countries that have accessed market-based financing.

Sixth, elevated liquidity indicators are suggestive of a much more difficult period ahead for the region in general. While debt vulnerabilities, as reflected by solvency indicators, show signs of receding in the medium term, risks to the outlook are much more tilted to the downside due to elevated liquidity indicators. External buffers remain low, with countries maintaining international reserves barely at or below the traditional 3 months of imports in recent years.

4. Results

This section presents findings of an assessment of accuracy of baseline projections of debt-to-GDP ratios and other macro-fiscal variables that underpin DSAs. Variables considered are real GDP growth rate, primary balance, government revenues, exports, NICA balance and FDI. The analysis involves evaluating the evolution of projections from past DSA vintages for which actual outturns are available, that is, DSAs conducted between 2008 and 2016.

Of course, these variables are only a subset of variables in the debt dynamics. They are examined in detail because they are the only variables in which sufficient data are publicly available to carry out this analysis. Despite the limited scope, these variables provide some insights on whether debt sustainability projections are reasonably accurate.

4.1 Debt-to-GDP ratios

As shown in Figure 18, DSAs on average underestimated the pace of public and external debt accumulation and the magnitude of underestimation has been high for public debt. On average, errors increased in magnitude as the forecast horizon extends.

The optimism bias was prevalent for commodity exporters, frontier economies, non-HIPCs and those in high risk or already in distress, although there is a high degree of heterogeneity (Table 4). For commodity exporting countries, volatility in commodity prices...
Table 4: Median Projection Errors for External DSA

|                         | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|-------------------------|--------|--------|--------|--------|--------|--------|
| Export structure        |        |        |        |        |        |        |
| Commodity exporters     | 0.69   | 1.25   | 2.26   | 3.76   | 4.55   | 7.90   |
| Diversified economies   | −0.91  | −4.51  | −1.57  | 1.62   | 1.47   | 0.44   |
| Market access           |        |        |        |        |        |        |
| Frontiers               | −0.42  | −3.11  | 0.94   | 1.75   | 1.92   | 5.76   |
| HIPC status             |        |        |        |        |        |        |
| Post-HIPCs              | −0.58  | −1.32  | 0.82   | 2.33   | 2.85   | 2.97   |
| Non-HIPCs               | −1.13  | −3.27  | −2.58  | 0.15   | 1.87   | 3.96   |
| Risk of debt            |        |        |        |        |        |        |
| Low risk                | −1.59  | −7.54  | −1.23  | −0.50  | 1.56   | 3.18   |
| Distress rating         |        |        |        |        |        |        |
| Moderate risk           | −0.27  | 0.62   | 0.19   | 1.15   | 1.82   | 0.90   |
| High risk               | −0.55  | −3.88  | 2.33   | 3.67   | 2.37   | 2.75   |
| In distress             | 2.76   | −0.98  | 5.02   | 7.40   | 10.63  | 16.67  |

Source: Author’s calculations.

Table 5: Median Projection Errors for Public DSA

|                         | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|-------------------------|--------|--------|--------|--------|--------|--------|
| Export structure        |        |        |        |        |        |        |
| Commodity exporters     | 0.89   | 3.07   | 5.59   | 13.00  | 17.08  | 19.40  |
| Diversified economies   | −0.35  | −0.43  | −0.58  | 5.40   | 4.73   | 4.77   |
| Market access           |        |        |        |        |        |        |
| Frontiers               | −0.25  | 0.76   | 1.33   | 5.16   | 3.73   | 3.17   |
| HIPC status             |        |        |        |        |        |        |
| Post-HIPCs              | −0.35  | 0.14   | 2.43   | 6.23   | 7.83   | 9.73   |
| Non-HIPCs               | 1.02   | 2.55   | 5.88   | 6.50   | 4.73   | 3.17   |
| Risk of debt            |        |        |        |        |        |        |
| Low risk                | −3.07  | −0.43  | −0.58  | −1.60  | 3.73   | 3.15   |
| Distress rating         |        |        |        |        |        |        |
| Moderate risk           | −0.12  | 0.19   | 2.11   | 6.36   | 7.78   | 0.32   |
| High risk               | 0.05   | 0.36   | 4.68   | 5.50   | 4.18   | 9.73   |
| In distress             | 2.89   | 7.80   | 10.95  | 14.54  | 18.55  | 25.97  |

Source: Author’s calculations.

plays a key role, due to its impact on export revenues, government revenues and hence real GDP growth rate. A key question is how projections of commodity prices be improved.

On the other hand, pessimistic projections have been more prevalent for some diversified exporters, post-HIPCs and those in low and moderate risks of debt distress. The small forecast errors for countries in the low risk of debt distress could be linked to the structure of their economies, as most are not resource intense, and hence less vulnerable to commodity price volatilities.

Further work is needed to provide insight on whether the quality of institutions may help to influence the direction of fiscal policy during booms and recessions (that is, whether fiscal policy will be counter-cyclical or pro-cyclical).

Similar to external DSA, the public DSA projections underestimated the pace of debt accumulation for all country groupings and the magnitude has generally been larger (Table 5).
Table 6: Analysis of Biases in Real GDP Forecasts

| Mean bias  | Median bias |
|------------|-------------|
| Total optimistic bias (% of countries) | 78% | 70% |
| Statistically significant (% of countries) | 57% | 51% |
| Total pessimistic bias (% of countries) | 22% | 30% |
| Statistically significant (% of countries) | 8% | 14% |

Source: Author’s calculations.

As with external debt, the magnitude of bias has been high for commodity exporters, frontier economies, post-HIPCs and countries in high risk or already in distress.

There are key observations from these findings. First, past DSA vintages tended to underestimate the trajectory of debt burden indicators and the quality of projections deteriorated as the forecast horizon lengthens. Second, optimism bias is prevalent in countries that accumulated debt faster and projections tend to underestimate distressed countries’ capacity to access new funding. Third, looking across the region, it is striking to note that DSAs predicted debt ratios would flatten out and nearly always decrease relative to the initial projection years. Yet, in reality, debt ratios have been increasing.

4.2 Drivers of DSA projection errors

This section evaluates forecast track record of some of the main macro-fiscal determinants of debt dynamics, namely real GDP growth rate, the primary balance and exports. The evaluation is meant to provide some indication of the drivers of forecast errors in baseline debt projections. The future path of debt dynamics is defined by the macroeconomic framework underpinning the DSA. Thus, projected debt dynamics are only as good as the assumptions underlying the macroeconomic framework.

4.2.1 Real GDP growth rate

Overall, baseline projections of real GDP growth rate exhibit optimism bias. The cross-country average of mean forecast error ranges from −1 percentage point to −1.9 percentage points, while the median bias varied between −0.1 and −2.1 percentage points. Table 6 shows that between 70% and 78% of countries showed optimism bias in their projections, of which most (57% and 51%, respectively) have been found statistically significant. Optimism bias is more prevalent in commodity exporters, non-HIPCs and countries in high risk or already debt distressed (Table 7). For commodity exporters, this could be due to volatility in commodity prices.

Countries rated as high risk or in debt distress share a number of vulnerabilities. These include a higher concentration of key raw commodities in total exports relative to other countries; a poor or deteriorating quality of policies and institutions, as measured by the CPIA index; and, in some cases, a lower export base, which renders them highly susceptible and sensitive to shocks such as droughts and price volatility.

On the other hand, projection errors have been appreciably moderate for countries in low and moderate risks of debt distress. This could be a result of strong institutions in these countries, which tend to improve the quality of projections.
Table 7: Analysis of Biases in Real GDP Forecasts by Country Groupings

|                      | Year 1 | Year 2 | Year 3 | Year 4 | Year 5 | Year 6 |
|----------------------|--------|--------|--------|--------|--------|--------|
| Export structure     |        |        |        |        |        |        |
| Commodity exporters  | −0.02  | −0.98  | −1.54  | −1.52  | −1.74  | −2.13  |
| Diversified economies| −0.10  | −0.28  | −0.02  | −0.65  | −1.05  | −0.80  |
| Market access        |        |        |        |        |        |        |
| Frontier economies   | 0.02   | −0.40  | −0.37  | −1.15  | −1.10  | −0.90  |
| HIPC status          |        |        |        |        |        |        |
| Post-HIPCs           | −0.18  | −0.48  | −0.34  | −1.03  | −0.75  | −0.85  |
| Non-HIPCs            | −0.10  | −0.82  | −1.08  | −1.48  | −2.08  | −2.65  |
| Risk of debt         |        |        |        |        |        |        |
| Low risk             | 0.02   | −0.07  | −0.30  | −0.63  | −0.75  | −0.90  |
| Distress rating      |        |        |        |        |        |        |
| Moderate risk        | 0.01   | −0.56  | −0.12  | −0.94  | −0.93  | −0.74  |
| High risk            | −0.18  | −1.24  | −1.80  | −1.04  | 0.77   | −1.87  |
| In distress          | −0.43  | −0.23  | −0.37  | −0.75  | −2.25  | −2.20  |

Source: Author’s calculations.

Figure 19: Projection Errors for real GDP growth and Debt-to-GDP ratios

Further evidence (Figure 19)\(^9\) shows a negative correlation between projection errors in real GDP growth rate and projected path of debt-to-GDP, suggesting debt is more likely to accumulate fast in countries where past GDP growth expectations have been overly optimistic. This is corroborated in Table 8, which shows that the pace of debt accumulation has been high in countries for which forecasts of GDP growth rates have been optimistic.

These findings are consistent with the view that GDP growth optimism feeds over-borrowing\(^20\), as borrowing decisions tend to be based on growth expectations (Easterly, 2013; Beaudry and Willems, 2018; de Resende, 2014). Optimistic growth projections typically induce countries to accumulate more debt, and negative debt dynamics set in when expected growth rates subsequently fail to materialise. This is because, if past borrowing decisions

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\(^9\) Positive numbers on the vertical axis indicate optimistic biases.

\(^20\) Beaudry and Willems (2018) investigate the link between growth (over-)optimism and (over-)borrowing more systematically.
Table 8: Country-by-Country Analysis of Biases in Real GDP Forecasts

|                  | Median optimism bias | Change in external debt (percentage points) | Change in public debt (percentage points) |
|------------------|----------------------|--------------------------------------------|------------------------------------------|
| Angola           | −2.5%                | 15.7%                                      | 37.2%                                    |
| Cabo Verde       | −4.6%                | 64.2%                                      | 67.2%                                    |
| Cameroon         | −0.2%                | 15.9%                                      | 25.3%                                    |
| Gambia           | −2.8%                | 14.1%                                      | 49.6%                                    |
| Ghana            | −3.2%                | 18.7%                                      | 32.3%                                    |
| Senegal          | −0.3%                | 2.6%                                       | 30.1%                                    |
| Sao Tome         | −0.8%                | 25.6%                                      | 41.7%                                    |
| Sudan            | −2.2%                | 14.5%                                      | 66.2%                                    |
| Zambia           | −1.8%                | 27.9%                                      | 43.5%                                    |

Source: Author’s own calculations.

are based on optimistic growth expectations, debt servicing becomes burdensome since the increase in debt is not correspondingly matched by the increase in repayment capacity (as measured by GDP).

A number of factors could explain optimism bias in growth projections.

First, given that growth forecasts are predicated on full implementation of authorities’ intended policies, and often reflect a mix of quantitative analysis and judgement reached during discussions between country authorities and IFIs, some optimistic bias could be expected (Musso & Phillips, 2001).

Second, investment in infrastructure is critical to support long-term growth. However, the link between higher investment and growth are difficult to quantify, especially as economic growth and debt sustainability depend on many other factors, such as the strength of macroeconomic and structural policies, the quality of institutions and decision-making processes and the management of exogenous shocks (Buffie, Berg, Pattillo, Portillo, and Zanna, 2012). Further work in this area, which goes well beyond the DSAs themselves, may be needed.

4.2.2 Primary balance

Figure 20 highlights the tendency of greater optimism in the primary balances used in DSAs. An obvious source of bias towards optimism is that fiscal projections start with the assumption that medium-term fiscal plans are fully implemented. Hence, fiscal projections become conditional expectations, representing only the expected outcome if economic policies in the medium-term fiscal framework are implemented (Musso and Phillips, 2001). To be useful, such frameworks need to be based on a realistic set of assumptions, taking into account the social and political limits to planned fiscal adjustments.

In addition, authorities rely on forecasts of GDP growth to set the level of government spending according to the expected revenue from taxes. Biassed GDP forecasts mislead them in their expectations about the evolution of public finances, as actual revenues grow by a smaller margin than forecasted. If actual spending is allowed to grow at the same pace as the forecast path of tax revenues, the path of debt-to-GDP ratio would become explosive, rather than declining as under the biassed forecast. As borrowing decisions are often based on medium- to long-term forecasts, errors can be substantial and the consequences for debt
dynamics serious. The strength of GDP growth prospects pulls down the debt-to-GDP ratio, lessening the need for tighter primary balances needed to stabilise the ratio consistent with Bohn’s fiscal reaction function (Bohn, 2005), given the improved IGRD. The path of debt-to-GDP ratio would be explosive, rather than declining as under the biased forecast. Hence, it is important that GDP growth assumptions do not underplay the need for the primary balance to close the IGRD to stabilise the debt ratios and bring it down to a declining trajectory.

4.2.3 Exports

Figure 21 highlights the tendency of optimism bias in the export projections used in DSAs. Past episodes of commodity booms created optimistic expectations that future export revenues would continue to rise.

Even where commodity prices collapsed, sizeable borrowings were sustained on assumption of a recovery in export earnings. In addition, large increases in commodity prices may
have given rise to an inappropriate assessment of countries’ permanent capacity to generate income and thus to excessive borrowing. This underlies the need for the projections on debt service capacity to be based on cautious assumptions with regard to future export growth.

4.3 Key messages from the study findings
There are two key messages emerging from this study.

First, the findings suggest that past DSA vintages tend to underestimate the trajectory of debt burden indicators. Debt ratios are predicted to flatten out and nearly always decrease relative to initial projection years. Yet, in reality, debt ratios have been increasing.

Second, the pace of debt accumulation has been high in countries for which forecasts of GDP growth rates have been optimistic. This is because borrowing decisions are often based upon medium- to long-run growth projections. In addition, optimism bias on GDP growth may have underplayed the need for fiscal consolidation to stabilise or bring debt on a firm downward trajectory. Transitory increases in commodity prices may have given rise to an inappropriate assessment of countries’ permanent capacity to generate revenues (both export and budgetary revenues). As a result, DSAs projected higher debt carrying capacities than was realised, which in most cases led to a faster pace of debt accumulation, which subsequently transformed into negative debt dynamics.

These findings underline the importance of basing debt sustainability assessments upon realistic medium-term macroeconomic forecasts. Inconsistencies in the macroeconomic framework affect the realism of projected debt dynamics and the basis for drawing compelling policy conclusions from them.

5. Conclusion and policy considerations
5.1 Conclusion
This paper discussed recent debt trends and evaluated performance of DSAs conducted in a sample of SSA countries over the period 2008–16. Based on qualitative and quantitative analyses, the findings suggest existence of systematic optimism bias in past DSA vintages resulting from optimistic macro-economic projections that underpin DSAs. As a result, the DSAs for the sample countries analysed projected higher debt carrying capacities, which in most cases led to a faster pace of debt accumulation during this period. Moreover, this was not helped by the fact that average interest rates on new debt commitments were rising faster relative to GDP growth rates while the necessary fiscal adjustment to counter this development remained insufficient. Countercyclical policies supported by fiscal buffers that were used to address the impact of the 2008 global financial crisis have largely not been reversed despite the erosion of the buffers and a pick-up in growth in some countries. As a result, the overall risk of debt distress in the region has deteriorated in the past decade.

5.2 Policy considerations
The following are key policy considerations drawn from this study.

First, the findings underscore the need for countries to adequately resource and strengthen capacity of key research departments and institutions for macroeconomic modelling and forecasting. Countries should review capacity needs and secure appropriate technical assis-
tance and training from a range of relevant technical assistance providers, including MEFMI, AERC, IMF and the World Bank.

Second, countries need to continue reforming in terms of governance and the quality of institutions and policies as these are key to strengthening debt carrying capacity. Key considerations include putting measures such as fiscal responsibility rules and institutions that constrain policy discretion to promote sound fiscal policies.

Third, recourse to market-based financing has increased countries’ exposure to market (fluctuations in exchange rate and interest rate risk) as well as refinancing risk and sudden shifts in market sentiment. Therefore, countries should consider use of active public debt management techniques such as liability management operations, including use of techniques such as buy backs from secondary market whenever opportunities arise, to manage these risks.

Lastly, countries should create an environment conducive to diversifying export growth. A diversified export base, with limited reliance on commodities that are subject to large price swings, is important in reducing the vulnerability of export receipts to commodity price shocks.

6. Direction for future research

The discussions in this paper suggest a number of priorities for future research:

- GDP growth projections tended to be overly optimistic. Hence, a greater understanding of what drives growth is critical to reduce systematic bias in medium-term growth projections;
- In the context of public investment scaling-ups, further insight into the macroeconomic effects of debt-induced public investment scale-ups is required. Key research questions around this include (i) how to quantify the effects of public investment increases on growth and debt accumulation; (ii) what is the appropriate pace of public investment scale-up (moderate and gradualist versus aggressive and front-loaded approach), given private sector crowding-in/out effects, absorptive capacity of the economy, public investment management capacity constraints and risks to debt sustainability; (iii) what reforms are necessary to improve investment efficiency and the rate of return of public investment projects while maximising the growth pay-offs and lowering risks associated with debt accumulation; and (iv) sustainable funding of public investments.
- The link between investment and growth is difficult to quantify, especially as economic growth and debt sustainability depend on many other factors, such as the strength of macroeconomic and structural policies, the quality of institutions and decision-making processes and the management of exogenous shocks. Studies that have attempted to analyse investment growth nexus mostly calibrates key parameters due to lack of specific country data.
- There has been a significant shift in the financing sources for frontier countries from concessional to market-based sources of finance a key question for future research is whether the Debt Sustainability Framework for LICs is still a relevant framework for assessing debt sustainability for these countries.
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Appendix A. Methodology

In this appendix, the methodology for evaluating performance of DSAs is presented. The methodology includes assessing forecast bias in debt burden indicators and other macro-fiscal variables critical for debt sustainability, particularly real GDP growth rate; primary balance; government revenues; NICA balance; exports; and FDI. Bias in this study, indicates the tendency of a set of forecasts to err in a certain direction (that is, a persistent tendency towards errors in the direction of either optimism or pessimism). The assessment of this bias follows a two-pronged approach: (i) a country-by-country analysis of forecast errors and (ii) an aggregate analysis that relies on pooling forecast errors across countries and over time.

The errors are aggregated across DSA vintages and time, and summary statistics such as the median and mean calculated for each country. These country-by-country average forecast errors are then pooled based on unweighted average to form a view at the regional level.

Some caveats should be noted about this methodology. First, as argued by IMF (2014), simple measures of central tendency may be a poor assessment of the quality of forecasts for economies in which there are relatively frequent structural changes.

Second, our analysis was based on point forecasts. Looking at the entire distribution of possible outcomes (alternative and risk scenarios) may be more appropriate in some cases, especially for medium-term forecasts.

Third, results from the methodology may not be robust to generalisations; they vary with the measure of bias (mean or median) and are affected by considerations related to sample size and forecast horizon.

A.1 Summary statistics

As in Baduel and Price (2012), Mooney and de Soyres (2017), Timmermann (2006) and Blaskowitz and Herwartz (2011), forecast error \( e \) for each macro-fiscal variable is modelled according to equation (1). It is defined as the difference between outturn \( d \) in year \( t + h \), and its projection \( \hat{d} \), made in year \( t \), according to DSA vintage \( j \):

\[
ed_{t,t+h} = d_{t+h} - \hat{d}_{t,t+h}, \tag{1}\]

where \( h \) denotes the horizon.

Negative values for real GDP growth rate and FDI are associated with optimism bias, while on the other hand, indicative of pessimism bias with regards to debt-to-GDP ratios, primary balance and NICA balance.

Three measures of forecast bias are considered in the descriptive analysis: mean error \( \mu \), median \( m \) absolute error and root mean square error \( \text{RMSE} \). All SSA\textsuperscript{21} countries for which there are more than two DSAs conducted are included in the analysis. In some cases, the sample is trimmed to account for outliers and other potential problems with the data.

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\textsuperscript{21} Thirty-seven countries are included in the analyses. Comoros, DRC, Eritrea, Liberia, Madagascar, Mauritania, Niger, Seychelles, South Sudan and Somalia were excluded due to unavailability of key data on a consistent basis.
A.1.1 Mean forecast error
For a sample size $n$, the mean forecast error is calculated as

$$u = \frac{1}{n} \sum_{t=1}^{t-h} e_{t,t+h}.$$  \hspace{1cm} (2)

Values close to zero indicate unbiased projections. One key drawback in using this statistic is its sensitivity to outliers.

A.1.2 Median absolute error
The median ($m$) provides a more robust measure of the centre of the errors’ distribution, less sensitive to outliers. Values close to zero indicate accurate predictions, and in cases where the mean and the median are equal, the distribution of errors is closer to normal.

A.1.3 Root mean squared error
The RMSE is calculated by squaring individual country errors, then averaging these over the time period and taking the square root of the result.

$$\text{RMSE} = \sqrt{\frac{1}{n} \sum_{i=1}^{n} e_{i.t,t+h}^2}.$$ \hspace{1cm} (3)

The RMSE is an alternative measure of the relative size of the forecast error, which takes into account the fact that large forecast errors are usually considered more harmful than small differences, thus consistent with a notional quadratic loss function. Typically, the policymaker assumes a quadratic loss function, since it is more costly to make one large error than many small mistakes. Significant deviations from the expected path of key macroeconomic variables are more likely to lead to policy mistakes (Binette and Tchebotarev, 2017).

A.2 Data and data sources
The study uses annual macroeconomic data for the SSA region over the period 2007–18. The data is then categorised based on countries’ economic structure, market access, income levels and debt experiences as presented in Annex 3. These data are sourced from IMF’s World Economic Outlook and Global Debt Database and the World Bank’s International Debt Statistics and World Development Indicators, joint World Bank/IMF DSAs. They comprise real GDP growth rate, primary balance, NICA balance and FDI and are expressed in percentages. Where there are data gaps, the study supplements this with other official publications by governments and central banks.
## Appendix B: Risk of debt distress ratings by country classification

| Country               | Risk of debt distress ratings | Post HIPC? |
|-----------------------|------------------------------|-----------|
|                       | 2011                         | 2018      |           |
| Benin                 | Low                          | Moderate  | Yes       |
| Burkina Faso          | High                         | Moderate  | Yes       |
| Burundi               | High                         | High      | Yes       |
| Cameroon              | Low                          | High      | Yes       |
| Cabo Verde            | Low                          | High      | No        |
| CAR                   | Moderate                     | High      | Yes       |
| Chad                  | Moderate                     | High      | Yes       |
| Comoros               | Distress                     | Moderate  | Yes       |
| DRC                   | High                         | Moderate  | Yes       |
| Congo Republic        | High                         | Moderate  | Yes       |
| Cote d’Ivoire         | Distress                     | Moderate  | Yes       |
| Djibouti              | High                         | High      | No        |
| Ethiopia              | Low                          | High      | Yes       |
| Gambia                | Moderate                     | Distress  | Yes       |
| Ghana                 | Low                          | High      | Yes       |
| Guinea                | Distress                     | Moderate  | Yes       |
| Guinea Bissau         | Distress                     | Moderate  | Yes       |
| Kenya                 | Low                          | Moderate  | No        |
| Lesotho               | Moderate                     | Low       | No        |
| Liberia               | Low                          | Moderate  | Yes       |
| Madagascar            | Low                          | Moderate  | Yes       |
| Malawi                | Moderate                     | Moderate  | Yes       |
| Mali                  | Moderate                     | Moderate  | Yes       |
| Mauritania            | Moderate                     | High      | Yes       |
| Mozambique            | Low                          | Distress  | Yes       |
| Niger                 | Moderate                     | Moderate  | Yes       |
| Rwanda                | Moderate                     | Low       | Yes       |
| Sao Tome and Principe | High                         | Distress  | Yes       |
| Senegal               | Low                          | Low       | Yes       |
| Sierra Leone          | Moderate                     | High      | Yes       |
| South Sudan           | Moderate                     | Distress  | No        |
| Sudan                 | Distress                     | Distress  | No        |
| Tanzania              | Low                          | Low       | Yes       |
| Togo                  | Moderate                     | Moderate  | Yes       |
| Uganda                | Low                          | Low       | Yes       |
| Zambia                | Low                          | High      | Yes       |
| Zimbabwe              | Distress                     | Distress  | No        |

Source: IMF/World Bank DSA Reports.
## Appendix C: Country classifications

| Category               | Sub-category | Countries                                                                 | Definition                                                                 |
|------------------------|--------------|---------------------------------------------------------------------------|----------------------------------------------------------------------------|
| Export structure       | Commodity    | Mozambique, Burkina Faso, Burundi, Mauritania, Zambia, Central African Rep., Republic of Congo, Guinea, Guinea-Bissau, Malawi, Mali, Sierra Leone, Sudan and Zimbabwe | More than 50% of exports revenue come from primary commodities             |
|                        | Diversified  | Cameroon, Benin, Cote d’Ivoire, Ghana, Kenya, Djibouti, Ethiopia, Senegal, Gambia, Tanzania, Uganda, Liberia, Lesotho, Sao Tome and Principe, Rwanda and Togo |                                                                           |
| HIPC status            | Post-completion | Benin, Burkina Faso, Burundi, Cameroon, CAR, Chad, DRC, Congo Republic, Cote d’Ivoire, Ethiopia, Gambia, Ghana, Guinea, Guinea Bissau, Malawi, Mali, Mozambique, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Tanzania, Togo Uganda and Zambia | Non-HIPCs Carbo Verde, Djibouti, Kenya, Lesotho, Sudan, Zimbabwe, South Africa, Botswana, Mauritius and Namibia |
|                        | HIPC         | Benin, Burkina Faso, Burundi, Cameroon, CAR, Chad, DRC, Congo Republic, Cote d’Ivoire, Ethiopia, Gambia, Ghana, Guinea, Guinea Bissau, Malawi, Mali, Mozambique, Rwanda, Sao Tome and Principe, Senegal, Sierra Leone, Tanzania, Togo Uganda and Zambia | Non-HIPCs Carbo Verde, Djibouti, Kenya, Lesotho, Sudan, Zimbabwe, South Africa, Botswana, Mauritius and Namibia |
|                        | Non-HIPCs    | Carbo Verde, Djibouti, Kenya, Lesotho, Sudan, Zimbabwe, South Africa, Botswana, Mauritius and Namibia |                                                                           |
| Frontier markets       | Frontier     | Zambia, Nigeria, Rwanda, Uganda, Tanzania and Cote d’Ivoire |                                                                           |
| Upper middle-income    | UMIC         | South Africa, Botswana, Mauritius and Namibia |                                                                           |
| countries              |              |                                                                           |                                                                           |
### Appendix D: Chinese resource-backed loans in Africa, 2000–2014

| Status      | Year | Recipient | Financier                          | Actual implemented amount (US$'M) | Purpose                                                                 | Resource backing the transaction |
|-------------|------|-----------|------------------------------------|-----------------------------------|------------------------------------------------------------------------|----------------------------------|
| Completed   | 2010 | Angola    | Industrial and Commercial Bank of China | 2,500                              | Resource-backed structured financing (Kilamba Kiaxi New Town) | Oil                              |
| Implementation | 2011 | Angola    | China Development Bank             | 2,000                              | Sonangol development                                                   | Oil                              |
| Implementation | 2012 | Angola    | China Development Bank             | 1,000                              | Sonangol development                                                   | Oil                              |
| Implementation | 2013 | Angola    | China Development Bank             | 2,500                              | Sonangol development                                                   | Oil                              |
| Signed      | 2014 | Angola    | China Development Bank             | 2,000                              | Sonangol development                                                   | Oil                              |
| Implementation | 2008 | DRC       | Eximbank                           | 1,300                              | Mining. Disbursed as at end-2014                                       | Profits from copper               |
| Completed   | 2008 | Gabon     | Eximbank                           | 300                                | Grand Poubara Hydropower Project                                      | Iron-ore                        |
| Completed   | 2007 | Ghana     | Eximbank                           | 292                                | Bui Hydropower Project (CommL part)                                   | 38000 ton Cocoa/year & electricity offtake |
| Completed   | 2002 | Nigeria   | China Machinery Engineering Corporation | 115                                | Omotosho Gas Power Plant in Ondo State                                 | Oil                              |
| Completed   | 2006 | Nigeria   | Eximbank                           | 200                                | NICOMSAT satellite                                                     | Oil                              |
| Completed   | 2003 | Congo     | China Machinery Engineering Corporation | 238                                | Imboulou Hydropower Station, new, 120 MW                               | Oil                              |
| Completed   | 2001 | Sudan     | Harbin Power Equipment Company      | 128                                | El-Jaili (Garri) Gas Power Station Phase I 212 MW                     | Oil                              |
| Implementation | 2009 | Sudan     | Eximbank                           | 119                                | Al Rank - Malakal Road (Peace Road)                                    | Oil                              |
| Completed   | 2009 | Sudan     | Eximbank                           | 86                                 | Aum Kadada - Alfashir Road (Salvation Road/Aum-Fa Road)                | Oil                              |
| Status          | Year | Recipient | Financier | Actual implemented amount (US$'M) | Purpose                                                                                  | Resource backing the transaction |
|-----------------|------|-----------|-----------|----------------------------------|------------------------------------------------------------------------------------------|----------------------------------|
| Implementation  | 2009 | Sudan     | Eximbank  | 680                              | Al Fulah GasPower Plant                                                                   | Oil                              |
| Implementation  | 2009 | Sudan     | Eximbank  | 100                              | Al Dibabat - Abou Zayd—El Fula Road (Dubeibat—Abu Zabad—El Fula Road)                    | Oil                              |
| Completed       | 2009 | Sudan     | Eximbank  | 120                              | El Nahood—Aum Kadada Road (En Nahud—Um Kadada Road)                                       | Oil                              |
| Inactive        | 2010 | Sudan     | Eximbank  | 118                              | Social housing in Khartoum and other area                                                 | Oil                              |
| Implementation  | 2010 | Sudan     | Eximbank  | 233                              | South Kordofan Transmission Lines (Al Fulah Thermal Plant’s Transmission Line?)           | Oil                              |
| Inactive        | 2010 | Sudan     | Eximbank  | 30                               | Agricultural improvement/electricification in Blue Nile                                    | Oil                              |
| Signed          | 2010 | Sudan     | Eximbank  | 24                               | Dali water project                                                                       | Oil                              |
| Completed       | 2010 | Sudan     | Eximbank  | 66                               | Sennar Bridge                                                                            | Oil                              |
| Implementation  | 2004 | Zimbabwe  | Catic China | 110                            | Purchase of Rural Electrification Agency Equipmen                                         | Tobacco                          |
| Completed       | 2006 | Zimbabwe  | Eximbank  | 200                              | Agricultural equipment, pesticides, fertiliser, etc.                                      | Platinum                         |
| Completed       | 2011 | Zimbabwe  | Eximbank  | 105                              | National Defense College                                                                 | Diamond (Zim side of Anjin JV income in an escrow account) |
### Appendix D: Continued

| Status         | Year   | Recipient   | Financier  | Actual implemented amount (US$'M) | Purpose                          | Resource backing the transaction |
|----------------|--------|-------------|------------|----------------------------------|----------------------------------|----------------------------------|
| Completed      | 2004   | Angola      | Eximbank   | 2,000                            | Multisector infrastructure       | Oil                              |
| Completed      | 2007   | Angola      | Eximbank   | 2,000                            | Multisector infrastructure       | Oil                              |
| Completed      | 2007   | Angola      | Eximbank   | 500                              | Multisector infrastructure       | Oil                              |
| Implementation | 2009   | Angola      | Eximbank   | 2,000                            | Multisector infrastructure       | Oil                              |
| Finance canceled | 2012   | Chad        | Eximbank   | 2,000                            | Multisector infrastructure       | Oil                              |
| Implementation | 2008   | DRC         | Eximbank   | 3,000                            | Multisector infrastructure       | Oil                              |
| Implementation | 2005   | Equatorial Guinea | Eximbank | 2,000                            | Multisector infrastructure       | Oil                              |
| Completed      | 2006   | Congo       | Eximbank   | 2,000                            | Multisector infrastructure       | Oil                              |
| Implementation | 2012   | Congo       | Eximbank   | 1,000                            | Multisector infrastructure       | Oil                              |
| Completed      | 2007   | Sudan       | Eximbank   | 3,000                            | Multisector infrastructure       | Oil                              |
| Completed      | 2011   | Ghana       | China Development Bank | 3,000                      | Multisector infrastructure       | Oil                              |
| Signed         | 2013   | Niger       | Eximbank   | 1,000                            | Unknown                          | Oil                              |

*Source: Brautigam and Hwang (2016)*