Fiscal Consolidation and Asymmetric Macroeconomic Effects: Evidence from Sub-Saharan African Countries

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Abstract

This study investigates the macroeconomic implications of fiscal consolidation in Sub-Saharan Africa (SSA) using an annual dataset from 1995 to 2019 for 37 countries in the region. Employing the local projection approach, we analyze the short- and medium-term effects of fiscal consolidation on output and debt reduction. Our findings reveal that fiscal consolidation measures exert an expansionary effect on output, and the debt reduction effect reaches its peak after three years. Notably, heavily indebted poor countries exhibit a more pronounced response to fiscal consolidation, while the impact is independent of resource endowment levels. During economic upturns, the debt reduction effect is rapid but transitory. Conversely, during downturns, the effect is gradual, more substantial, and persistent. Furthermore, we find that expenditure-based and revenue-based consolidation have similar effects on debt and output during expansionary phases. However, during recessions, their effects differ considerably. Overall, our findings indicate that expenditure-based fiscal consolidation enhances fiscal sustainability but may come at the cost of reduced consumption welfare. Moreover, prioritizing expenditure-based fiscal consolidation offers a promising pathway for enhancing fiscal sustainability in the region. These findings offer important implications for policymakers seeking to address the challenges of public finance and debt distress in SSA.

1. Introduction

The recent rise in government debt across Sub-Saharan Africa (SSA) countries has renewed debate about increased debt burden and weakened fiscal sustainability in the region. As of February 2023, about 51% of the 35 Poverty Reduction and Growth Trust-eligible SSA countries are classified as being in *debt distress* or at *high risk of debt distress*, compared to 45% in 2018 and only 31% in 2011.[1] This shows that the efforts of the early 2000s debt relief initiatives and the initial fiscal adjustment regimes designed to reduce public debt in the region at the turn of the last decade have begun to fade (Arizala et al., 2021). Moreover, the median debt-to-GDP ratio for the region has risen from 30.9% in 2010 to 60.1% in 2020. Resource-abundant countries exhibit relatively higher debt levels compared to non-resource-abundant countries, especially countries in the high-debt category (Ndoricimpa, 2020).

Several factors have been identified in the literature as key drivers of rising debt level in the region, including poor revenue mobilization capabilities, high and rising public expenditure, external shocks (e.g., commodity price shocks), poor macroeconomic policies, weak public finance management frameworks, natural disasters, public health emergencies, and increased reliance on external debts and expensive sources of financing (World Bank, 2018). These institutional and infrastructural factors were further aggravated following the recent COVID-19 pandemic and the ongoing global food and energy crisis due to the Russian war in Ukraine. As highlighted in a recent report by the International Monetary Fund, public debt growth in the SSA region is expected to worsen significantly in the post-COVID era due to increased health spending and government support targeted at households, businesses, and other vulnerable groups during the pandemic (IMF, 2021a).[2] Such unplanned discretionary spending exacerbates the existing challenges facing the region, including rising debt levels, widening government deficits, revenue mobilization problems, and depreciating currencies (IMF, 2021b; Fjeldstad et al., 2021; Madden, 2021).[3]

[1] See the full list of PGRT-eligible countries here: https://www.imf.org/external/pubs/ft/dsa/dsalist.pdf.

[2] While much of Sub-Saharan Africa may not have been as largely hit by the health crisis – in terms of death rates – as many developed economies, the economic effects were largely felt partly due to high external markets dependence on trade, remittances and FDI (Evenett and Baldwin, 2021).

[3] In describing Fiscal space, we employ the definition by Heller (2005, p.1) which describes fiscal space as "The room in a government's budget that allows it to provide resources for a desired

Against this background, fiscal adjustments are necessary for SSA economies to improve their debt positions, mitigate against default risks, and promote macroeconomic stability and long-term growth. To do this, fiscal consolidation measures aimed at reducing government deficit and debt accumulation may be necessary and are at the centre of macroeconomic policy debates in the post-pandemic era. However, there is no consensus on how to achieve this without harming the economy (Nair, et al., 2021).

In this paper, we examine the SSA debt profile and analyse the impact of fiscal consolidation on the sustainability of public finance – government debt levels and fiscal balances – and macroeconomic performance in the region. The primary objective of the study is to analyze the effects of fiscal consolidation on macroeconomic performance in SSA. The paper contributes to the burgeoning literature on the effect of fiscal consolidation using the local projection method. Specifically, we construct a measure of fiscal consolidation shock that directly matches fiscal adjustments in primary balance with actual debt reduction in the spirit of Devries et al. (2011) action-based approach. We then project the effect of this shock on selected fiscal and macro variables using Jorda's (2005) local projection method. We further analyse whether the macroeconomic effects of fiscal consolidation vary across the state of the business cycle (expansionary versus contractionary phases), different quantiles of debt level, World Bank classification of countries' indebtedness (heavily indebted poor countries (HIPCs) versus non-HIPCs) and IMF classification of countries' resource endowments (resource-rich versus non-resource rich countries). We also analyse the heterogeneous effect of revenue-based and expenditure-based fiscal adjustments.

Our results show that fiscal consolidation has an expansionary effect on output and significantly reduces the debt-GDP ratio which peaks after five three. The effect of fiscal consolidation on debt is sharp and lasts for just a few years in a boom period, but gradual and very persistent in a contractionary period. Output response to fiscal consolidation is positive and relatively stable in an expansion but is initially weak during a recession before gradually improving over time. The debt reduction effects of expenditure- and revenue-based fiscal consolidation are starker, with the debt-GDP ratio falling strongly and persistently with a spending cut than with a revenue increase. Also, while output response is very similar under both measures in the short run, the effect is persistent under a spending cut. This suggests that expenditure-based

purpose without jeopardizing the sustainability of its financial position or the stability of the economy." While fiscal space is intuitively not defined in terms of stated financial ratios (such as a public debt ratio), we attempt, further into this analysis, to provide a comparative measure of fiscal space within the confines of our theoretical framework.

consolidation improved fiscal sustainability. In terms of both debt reduction and output growth, expenditure-based consolidation has a stronger effect in a recession than in expansion. Both output and debt responses are very similar in an expansion, though the initial gain in debt consolidation under revenue-based consolidation is reversed in the medium to long run. Furthermore, the output growth and debt reduction effect of fiscal consolidation are stronger for HIPCs compared to non-HIPCs. As countries transition from low to high debt-GDP ratio thresholds, fiscal consolidation effects become stronger. Finally, the path of fiscal consolidation of resource-rich countries is not statistically different from that of resource-poor countries, suggesting that different distributions of natural resources play a limited role in the context of fiscal consolidation.

The rest of the paper is arranged as follows: Section 2 presents the evolution and dynamics of public debt in SSA, relying on recent debt statistics obtained by the authors. Section 3 describes the existing literature and the gaps this study seeks to fill. The theoretical framework, methodology, and data are the focus of Section 4. The results are presented and discussed in Section 5, including some robustness checks. Section 6 concludes the study and provides policy recommendations.

2. Dynamics and Evolution of Public Debt in Sub-Saharan Africa

Public debt management has evolved in SSA over the years. Since the HIPC initiative of 1996 and the Multilateral Debt Relief Initiative (MDRI) of 2005, the dynamics of government debt in the region have changed significantly. As Figure 1 shows, the government debt-GDP ratio has been rising in many SSA countries even before the pandemic, except in Congo DR where debt-GDP has remained below the pre-global financial crisis levels. There is also a strong co-movement between the total government debt and external government debt levels, which suggests strong reliance on external debt financing in the region. The proportion of external debt to the overall debt portfolio also appears to be excessively high in almost all countries, thereby exposing the region's economies to volatile external shocks.

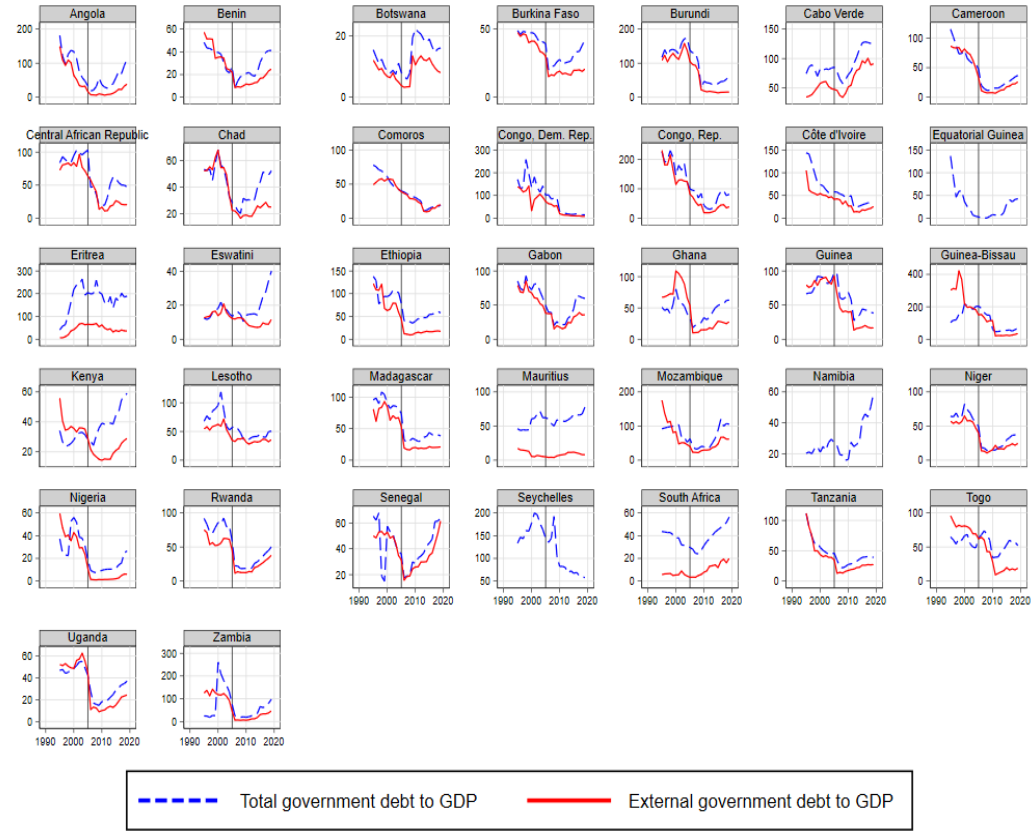
Table 1 provides a cross-country comparative view of solvency and liquidity indicators and other fiscal sustainability measures in SSA for the 1995-2019 period.[4] The average government total debt-GDP ratio, a measure of

[4] See Atingi-Ego et al. (2021) for discussions on government solvency and liquidity indications.

government debt burden, across selected 37 SSA countries is 59.9%, while the average government external debt-GDP ratio is 43.3%. This suggests that, on average, external debt finance accounts for almost three-quarters of overall public debt in the region. At the top of the table, Eritrea, Seychelles, Guinea-Bissau, and the Republic of Congo have the most depressing debt burden, with government debt levels exceeding 100% of annual GDP over the period. Whereas, at the bottom of the table, Botswana, Eswatini, and Nigeria have an average debt-GDP ratio of less than 25%. Of the 37 SSA countries in our sample, 14 of them have a debt-GDP ratio above the region's average and most of these countries also have a very high share of external debt-GDP ratio. Countries on the bottom spectrum of the table have lower external debt-GDP ratios and considerably smaller proportion of external debt to overall government debt (e.g., Mauritius, South Africa and Botswana).

According to the World Bank/International Monetary Fund, 33 of the 39 countries currently categorized as Heavily Indebted Poor Countries (HIPCs) are in Africa with 30 in the SSA sub-region. From Table 1, the average debt-GDP ratio in HIPCs is about 66%, compared to about 50% in non-HIPCs. Also, 4 of the top 5 countries on the table (average debt-GDP of about 127%) are classified as HIPCs while all the bottom 5 countries on the table (average debt-GDP of about 22%) are non-HIPCs. Furthermore, according to IMF (2022), 23 of the 45 countries in the SSA region are classified as resource-rich (8 as oil-rich and 15 as other resource-rich) countries. From Table 1, the average debt-GDP ratio in resource-rich countries is about 51%, compared to about 68% in non-resource-rich countries. In our sample, 11 of the HIPCs are categorized as resource-rich with an average debt-GDP of about 60%.

Figure 1: Government Debt-GDP in SSA Countries



NOTE: Vertical line indicates Multilateral Debt Relief Initiative (MDRI) initiated in 2005

Source: International Debt Statistics and World Economic Outlook database

Table 1: Government Debt Burden and Fiscal Sustainability Indicators in SSA Countries (1995-2019)

Country	Total Govt Debt-to-GDP	External Govt Debt-to-GDP	External Debt Service-to-Revenue	Interest Payment-to-Revenue	Primary Balance-to-GDP
Eritrea†	177.3	44.5	4.1	8.4	-15.7
Seychelles	123.2			15.1	3.5
Guinea-Bissau†	121.9	147.9	13.7	13.3	-1.3
Congo, Rep.†*	115.7	88.4	10.2	12.1	5.5
Burundi†	96.2	71.6	7.5	7.8	-4.8
Congo, Dem. Rep.†*	90.8	59.5	10.4	18.4	0.2
Cabo Verde	90.2	60.0	8.9	6.0	-5.2
*Angola**	73.1	40.2	20.0	10.3	3.0
Mozambique†	73.1	60.2	6.1	5.3	-2.1
Ethiopia†	70.9	44.9	4.1	5.5	-2.4
Zambia†*	68.8	60.4	12.9	18.1	-1.2
Central African Rep.†*	65.1	48.8	5.3	8.0	0.0
Guinea†*	64.3	53.2	21.2	11.3	-1.3
Côte d'Ivoire†	60.5	38.9	17.3	13.4	0.4
Madagascar†	59.8	43.2	7.7	13.0	-1.3
Lesotho	59.1	43.2	6.0	1.4	-0.8
Mauritius	58.8	8.9	6.2	11.3	0.4
Togo†	55.9	49.7	10.2	10.6	-1.0
*Gabon**	54.5	43.5	19.9	13.0	6.6
Rwanda†	51.0	37.4	3.8	4.3	-0.9
Ghana†*	45.9	45.7	26.3	27.1	-2.4
Tanzania†*	45.8	36.3	6.7	9.1	-0.8
Cameroon†*	44.6	39.2	12.7	9.4	1.8
Chad†*	42.1	34.7	7.6	5.3	-1.5
Senegal†	41.9	38.7	11.9	6.8	-0.8
Niger†*	41.7	34.0	4.9	6.0	-0.6
Comoros†	39.1	34.8	5.0	3.0	-0.2
*South Africa**	38.1	9.0	4.7	13.3	0.4
Burkina Faso†*	35.8	27.8	5.1	3.8	-2.0
Kenya	35.8	27.4	17.8	13.2	-1.2
Uganda†	35.0	31.7	5.6	8.7	-0.6
Benin†	29.9	24.9	7.1	5.6	-0.6
*Equatorial Guinea**	29.2			4.0	-1.9
*Namibia**	28.2			6.3	-1.0
*Nigeria**	22.9	17.3	7.2	12.3	1.4
Eswatini	17.9	11.9	5.0	3.2	-1.3
*Botswana**	13.5	8.8	2.1	0.8	1.8
Average	**59.9**	**43.1**	**9.6**	**9.3**	**-0.8**

Source: Author's computations. Note: ′ † ′ heavily indebted poor countries (HIPCs) and ′ ∗ ′ implies resource-rich countries according to IMF (2022) categorization.

Table 1 further shows that SSA governments expend about 9.3% of their total revenue on debt interest payments during the sample period and use about 9.6% of revenue to service external debt on average over the sample period. These ratios vary significantly across countries, with highly indebted countries using a larger proportion of government revenue to service debt, thereby leaving fewer resources to fund critical public infrastructures. For instance, countries like Ghana (where external debt makes up almost 100% of total government debt), Guinea, and Angola use at least 20% of government revenue to service external debt, while Botswana (which has the lowest debt-GDP and external debt-GDP ratios) services its external debt with only 2.1% of government revenue. This implies that countries with large debt burdens and/or a high proportion of external debt in overall government debt are likely to face higher short-term debt obligations in terms of interest payments and principal repayment.

The last column of Table 1 reports the primary balance-GDP ratio, a measure of government fiscal stance. The average primary balance-GDP ratio in the region is -0.8% over the sample period, suggesting a primary budget deficit (primary government expenditure excluding interest payments exceeds total government revenue). The spread of the primary balance ratio is very wide across the region, ranging from a very large deficit of -15.7% in Eritrea (with the highest debt-GDP ratio) to a large surplus of 6.6% in Gabon. On average, the 10 countries with the highest debt-GDP ratio have a deficit-GDP of 2%, while the 10 countries with the lowest debt-GDP ratio have a deficit-GDP of 0.5%. This shows that the government's fiscal stance depends on its initial debt position. Overall, out of the 37 SSA countries in our sample, three exhibit large primary deficits of about 5% or more, 22 have a small primary deficit of 2.5% or less, and 11 countries have a primary surplus over the sample period.

To further understand how SSA government debt has evolved over time and across countries, we compare the average debt-GDP ratio for the period before, during, and after the Multilateral Debt Relief Initiative (MDRI) which was initiated in 2005.[5] Table 2 shows that the government debt burden in the region was significantly high in the decade before the 2005 debt relief initiative, with an average debt-GDP ratio of 79.1%. Following different rounds of debt forgiveness packages to some countries in the region, the average debt-GDP ratio fell to 43.3% in the 2005-2014 period. However, in recent years, there has been a resurgence in the growth of government debt as a percentage

[5] The MDRI was agreed by the G8 countries in July 2005, and it offers up to 100% debt forgiveness on multilateral debts owed by HIPC countries to the World Bank, IMF and African Development Bank (see IMF, 2009).

of GDP, with an increase of over 10 percentage points to reach 53.6% during the 2015-2019 period. Following a period of debt relief initiatives, the debt-GDP ratio declined in some countries, such as the Republic of Congo, experiencing a substantial reduction from 184.8% to 62.6%. However, certain countries such as Eritrea, Seychelles, and Guinea-Bissau have maintained persistently high debt-GDP ratios despite these initiatives, exceeding 100% throughout the 1995-2004 and 2005-2014 periods. However, during the 2015-2019 period, Seychelles and Guinea-Bissau witnessed substantial declines in their debt-GDP ratios, averaging 63% and 57.2% respectively. Conversely, Eritrea's debt-GDP ratio remains stubbornly high at 185.1%. Overall, among the 37 countries in our sample, 33 countries demonstrated some improvement in their debt positions during the Multilateral Debt Relief Initiative (MDRI) period. More recently, 29 countries experienced a deterioration in their debt positions compared to the MDRI period. Only seven countries, including Burundi, Comoros, Congo DR, Gabon, Guinea, Guinea-Bissau, and Seychelles, consistently improved their debt positions across all three sub-periods.

Table 2: The Changing Patterns of Government Debt Burden in SSA Countries

Country	*Full Sample* 1995-2019	*Pre-MDRI Period* 1995-2004	*MDRI Period* 2005-2014	*Post-MDRI Period* 2015-2019
Eritrea	177.3	159.7	191.0	185.1
Seychelles	123.2	165.8	110.7	63.0
Guinea-Bissau	121.9	164.2	111.9	57.2
Congo, Rep.	115.7	184.8	62.6	83.7
Burundi	96.2	142.6	73.2	49.2
Congo, Dem. Rep.	90.8	160.1	58.2	17.2
Cabo Verde	90.2	81.2	81.0	126.5
Angola	73.1	109.0	32.7	81.7
Mozambique	73.1	87.1	43.7	103.9
Ethiopia	70.9	103.0	45.7	57.2
Zambia	68.8	106.0	29.1	74.2
Central African Rep.	65.1	92.7	43.9	52.2
Guinea	64.3	80.3	59.7	41.4
Côte d'Ivoire	60.5	90.5	43.9	33.9
Madagascar	59.8	92.4	36.7	40.7
Lesotho	59.1	80.4	44.8	45.2
Mauritius	58.8	54.6	57.8	69.0
Togo	55.9	59.1	52.7	55.9
Gabon	54.5	76.7	30.4	58.5
Rwanda	51.0	81.9	25.1	41.1
Ghana	45.9	53.6	32.1	58.3
Tanzania	45.8	64.2	30.5	39.9
Cameroon	44.6	76.9	19.1	31.0
Chad	42.1	51.9	28.8	49.4
Senegal	41.9	47.3	29.7	55.7
Niger	41.7	66.2	20.5	35.2
Comoros	39.1	60.8	28.4	16.9
South Africa	38.1	38.3	32.0	49.8
Burkina Faso	35.8	45.5	26.1	35.7
Kenya	35.8	29.0	34.1	52.4
Uganda	35.0	49.0	22.0	33.0
Benin	29.9	36.9	19.0	37.7
Equatorial Guinea	29.2	48.7	5.1	38.6
Namibia	28.2	23.4	22.9	48.3
Nigeria	22.9	37.5	10.4	18.6
Eswatini	17.9	15.8	14.2	29.5
Botswana	13.5	10.6	14.9	16.4
Average	**59.9**	**79.1**	**43.9**	**53.6**
Median	46.6	67.1	32.2	46.7
Lower Quartile	28.2	44.5	20.6	36.5
Upper Quartile	74.3	97.3	50.1	60.9

Source: Author's computation

Figure 2: Distribution of Government Debt Burden in SSA Countries across Time

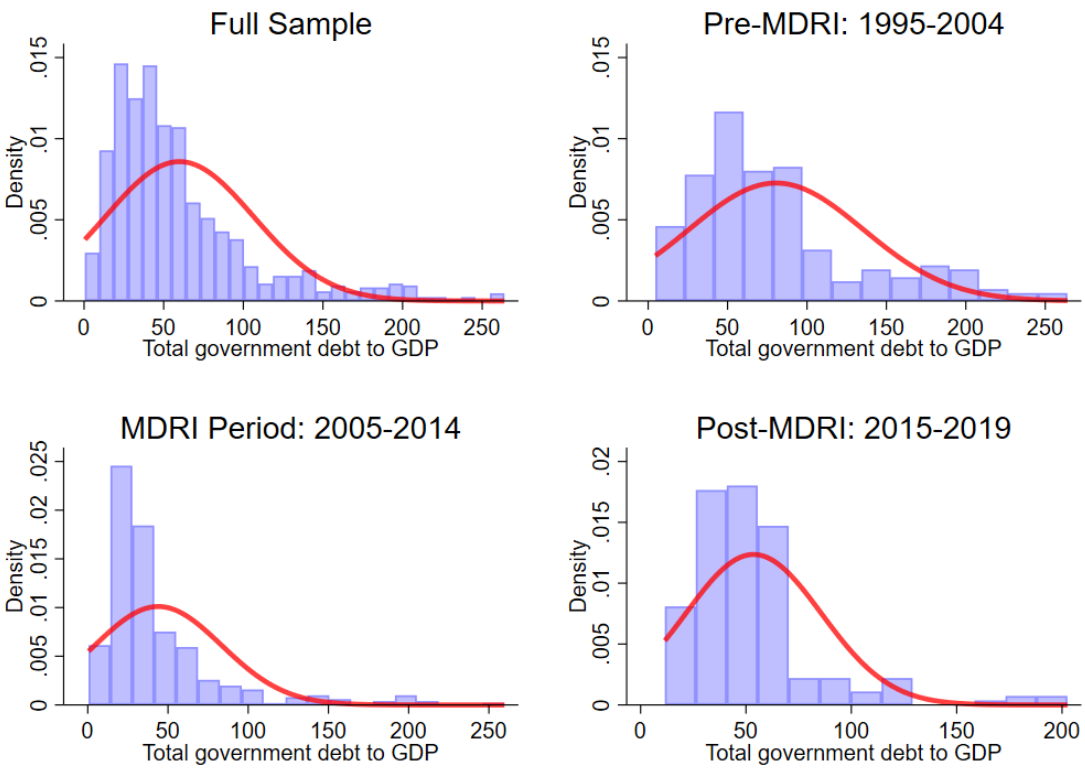


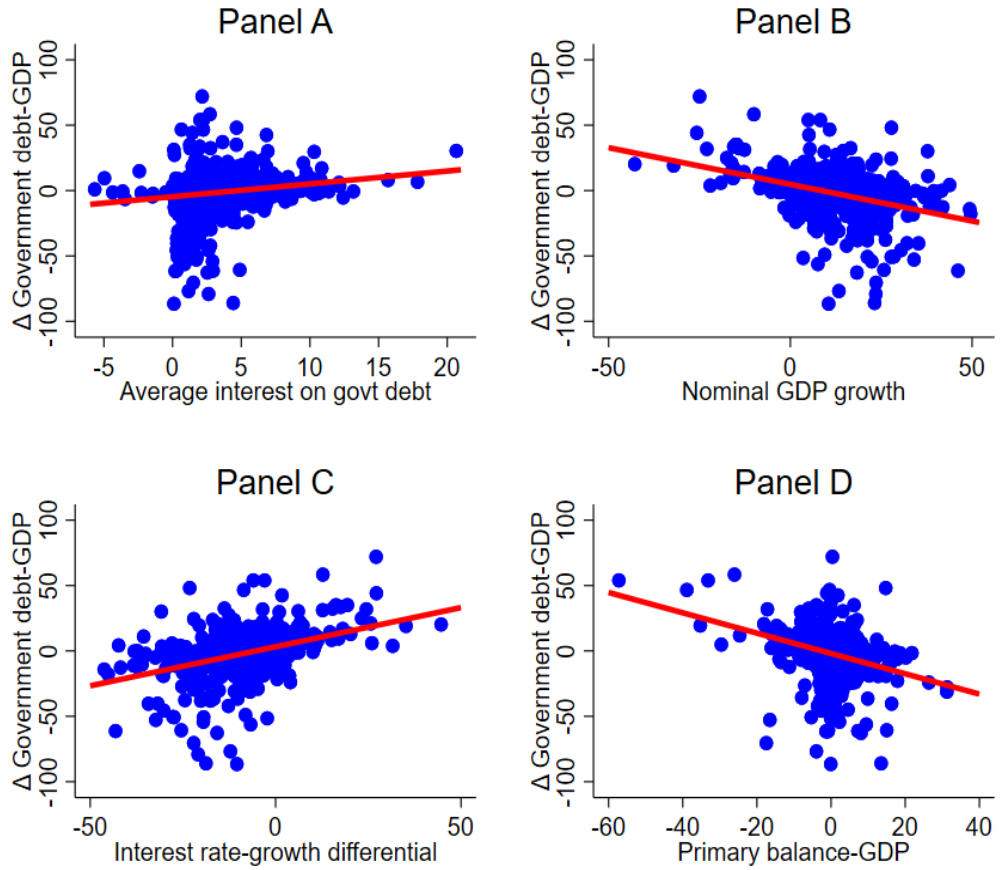
Table 2 also reports the median, lower, and upper quartile of government debt-GDP ratio for the selected SSA countries across the sample periods. The median debt-GDP ratio is about 13 percentage points smaller than the mean, and its dynamics across the subsample periods follow a similar pattern as that of the mean. Furthermore, the inter-quartile range (the difference between the upper and lower quartiles) has narrowed significantly from about 53% in the 1995-2004 period to 29.5% to about 24% in the 2015-2019 period. These statistics suggest that the distribution of the SSA debt-GDP ratio is skewed to the right and the variance has diminished over time. Figure 2 provides a visual plot of this observation.

Several studies have examined the drivers of SSA debt. According to Atingi-Ego et al. (2021), public debt accumulation in Africa is driven by the primary deficit, foreign direct investment, non-interest current accounts, and real GDP growth. While primary deficit and non-interest current accounts facilitate the build-up of debt, real GDP growth and foreign direct investment offset the

impact of debt. Deficits and debt can be reduced by increasing economic growth (OECD, 2011). Moreover, the interest rate-growth spread is a critical determinant of future fiscal sustainability. A negative interest rate-growth spread is necessary to reduce the debt-GDP ratio, while a positive interest rate-growth spread could lead to a debt crisis.

Figure 3 provides some insight into the drivers of government debt accumulation in SSA countries. The figure plots annual changes in the government debt-GDP ratio relative to the key drivers discussed above. The figure shows that while debt interest drives debt levels up (Panel A), an increase in output growth rate helps to reduce debt (Panel B) and the growth effect outweighs the interest cost effect as exemplified in the steepness of the slopes of the plots. This fact is further buttressed in Panel C with a much stronger slope of interest rate-growth differential relative to debt, suggesting that a small increase in output growth relative to the debt interest has a stronger impact in reducing debt ratio than the first-order effect of growth alone. The relationship between the interest rate-growth differential and government debt ratio is close to unity, suggesting almost a 1-to-1 relationship between interest rate-growth spread and debt growth. Also, Panel D shows that there is a strong negative association between primary balance and debt growth, suggesting that improvement in public finance through primary surplus is a credible way to reduce the growth of debt. Given the strength of the slopes of interest rate-growth differential and primary balance relative to debt growth, SSA governments can improve debt sustainability by committing to improving their budget finance while also growing the economy.

Figure 3: Drivers of Government Debt Accumulation in SSA Countries



Source: Author's computation

Furthermore, there is a plausible association between primary balance and interest rate-growth differential. A higher primary surplus is associated with an improved short-term fiscal position, which the market takes as a signal of commitment to debt repayment. Therefore, a country with a higher primary surplus may face a relatively cheaper market interest rate, which lowers the interest rate-growth differential and improves debt position. On the other hand, a primary deficit worsens debt position and increases debt interest cost. This, in turn, raises the interest rate-growth differential which worsens debt sustainability. These relationships imply that the level of debt itself is not a major driver of sustainability; rather it is the growth of debt (via the primary balance) that affects sustainability.

Finally, an important feature of African debt in recent years is the increasing attention to domestic debt markets. As documented by Atingi-Ego et al. (2021), the median domestic debt-GDP ratio has increased to 18% in recent times from 10% in 2008. The transition to domestic debt markets is driven by several unrelated factors. In the case of Nigeria, South Africa, Mauritius, and Kenya, the focus has been largely driven by the rapid development of the domestic credit market. Whereas, in countries like Zimbabwe, restrictive access to the international credit market due to political and economic crises makes increased domestic debt financing inevitable.

3. Literature Review

Research on fiscal consolidation has gained considerable attention in academic literature (Blanchard and Perotti, 2002; Guichard, et al. 2007; Auerbach and Gorodnichenko, 2013a; Blanchard and Leigh, 2013; Arizala et al., 2021; Philippopoulos et al., 2017; Ilori, 2018). The analysis of the economic effects of fiscal consolidation received renewed attention in the aftermath of the 2010 Euro crisis (Molnar, 2012) and, more recently, in the context of the African debt crisis after the COVID-19 pandemic. For instance, Heimberger (2016), using the structural budget balance approach proposed by Blanchard and Leigh (2013), shows that fiscal consolidation hurts economic growth in the Euro area. Also, Ilori (2018) shows that fiscal consolidation tends to hurt asset-poor rule-of-thumb consumers more, as they work more while consuming less.

But the economic effects of fiscal consolidation cannot be generalized (Camuri et al., 2015), as various studies have shown that the size of the fiscal multiplier varies depending on the fiscal consolidation instruments, initial level of debt, exchange rate regime, level of economic openness, link with other economies, the financial system, level of output, economic cycles, and the international economic environment (Barrell et al., 2012; Ilzetzki et al., 2013; Gechert and Rannenberg, 2014). Following these studies, Linnemann and Winkler (2016) investigate the non-linear effects of government spending on the US economy using the quantile Vector Autoregression (VAR) model and local projections. They find that the effect is larger for lower quantiles and increases in government spending led to lower unemployment only at the highest deciles.

Given the history of debt and fiscal crisis in SSA, several studies have examined the effect of fiscal consolidation in the region. Notably, Arizala et al. (2021) examine the effects of changes in revenue and public expenditure on output during 1990-2016 using the local projections method (LPM). They find that the output effect of fiscal consolidation is negative in the short and medium term and the effects are more severe when the consolidation is associated with cuts

in public investment than with an increase in tax or a reduction in public consumption. Lakuma et al. (2018) examine the distributional impacts of fiscal consolidation in Uganda within a dynamic stochastic general equilibrium (DSGE) framework and show that a 5-percentage point increase in consumption tax rate reduces consumption, especially those of poor households, and has a temporary negative effect on growth. Mupunga and Ngundu (2020) examine the degree of fiscal consolidation in SSA by estimating a fiscal response function using the GMM technique. They find that primary balance responds to changes in the debt levels and changes in the output gap have a negative but insignificant effect on the fiscal balance.

Fiscal space in SSA countries has been affected severely by the COVID-19 pandemic (Ndung'u and Shimeles, 2021). Several studies have analyzed the economic effects of the pandemic shock and the resulting policy measures. For example, Gondwe (2020) investigated the impact of the COVID-19 pandemic on African nations and estimated an average revenue loss of 5% as a result of the pandemic. Fjeldstad et al. (2021), examining the long-term effects of COVID-19 on domestic resource mobilization in SSA, posited that an aggressive domestic revenue mobilization via taxation will hurt the local population. A World Bank (2020) study, which analyzed the effects of the pandemic on fiscal performance and consolidation plans in Kenya, found that policy measures employed to combat the potential negative effects of the pandemic resulted in a considerable fiscal gap in Kenyan government finances. The pandemic-induced fiscal gap was estimated at 1.5% of the GDP in the 2019/2020 fiscal year, while public debt as a percentage of GDP increased from 62.1% in 2018/2019 to 63.2% in 2019/2020 (World Bank, 2020).

Assessing fiscal consolidation tools and outcomes in SSA in the aftermath of the COVID-19 crisis, Nair et al. (2021) find that the impacts of the COVID-19 crisis on fiscal performance and consolidation efforts vary from one country to another. They recommend that a successful fiscal consolidation should be pursued to lower debt and debt-servicing costs and minimize the adverse effects on the economy. Okumu (2021), investigating the macroeconomic effects of the COVID-19 crisis in East African countries using pre- and post-pandemic data, finds that the crisis led to significant decreases in tax revenue, increased government expenditure and, resultantly, a higher budget deficit, and debt incidence in Kenya, Uganda, Burundi and Rwanda. Burger and Calitz (2020) use Markov switching models to estimate a fiscal reaction function based on SSA historical data and find an inverted U-shaped relationship between expenditure and growth in the post-pandemic period. They also find a positive relationship between the debt-GDP ratio and the primary balance, concluding that the current expenditure-to-GDP ratio is higher than the level

necessary to stimulate growth such that increases in government expenditure may impede growth. These studies conclude that the COVID-19 crisis worsened the fiscal position of the region.

Our study builds on the existing literature on fiscal consolidation in SSA by examining the heterogeneity in the relationship between fiscal consolidation and economic performance. In contrast to earlier studies, we emphasize a potential non-linear effect of fiscal consolidation on growth in the SSA region (following Linnemann and Winkler, 2016), as the linear methods used in previous literature do not sufficiently capture these dynamics and asymmetries. This implies that the economic effects of fiscal consolidation may vary across the distribution of the variables of interest. Addressing this limitation is one of the gaps this study seeks to fill. This study also contributes to the literature by recommending feasible fiscal consolidation pathways in the aftermath of recent crises. In summary, our paper analyzes the impacts of fiscal consolidation on economic performance in SSA economies in the context of promoting a post-COVID economic recovery and fiscal sustainability.

4. Method and Data

Theoretical framework

To the impact of fiscal consolidation on macroeconomic variables and establish guidelines for achieving sustainable fiscal policy, we adopt the theoretical model framework by Agénor and Montiel (2015). This framework is based on a canonical endogenous growth model that captures the dynamics of government debt. In this model, the government finances its fiscal spending through three primary channels: (i) taxation of the private sector, (ii) domestic and foreign borrowing, and (iii) expansion of the central bank's balance sheet through seigniorage or quantitative easing.

For many SSA countries, a substantial proportion of government revenue also comes from the sale or licensing of rights of the nation's natural endowment (e.g., crude oil in Nigeria or diamond mining in South Africa), which are priced and traded internationally. Therefore, the government's consolidated budget constraint for SSA countries can be described as follows:

$$\begin{aligned}\left(P_t G_t^c + P_t G_t^i\right) + i_{t-1} D_{t-1} + i_{t-1}^* e_t (\gamma_t D_{t-1}^* - F_{t-1}^*) \\ = \left(P_t R_t^{Tax} + P_t^f R_t^{Non-Tax}\right) + (D_t - D_{t-1}) + e_t (D_t^* - D_{t-1}^*) - \\ e_t (F_t^* - F_{t-1}^*) + (M_t - M_{t-1})\end{aligned} \quad (1)$$

Where:

G_t^c = Government consumption spending

G_t^i = Government investment spending

R_t^{Tax} = Government tax revenue

$R_t^{Non-Tax}$ = non-tax revenue

D_t = stock of domestic currency-denominated public debt

D_t^* = stock of foreign currency-denominated public debt

F_t^* = stock of foreign exchange reserves

M_t = stock of base money

i_t = domestic interest rate

i_t^* = foreign interest rate

e_t = nominal exchange rate

P_t = domestic price level

P_t^f = international price level in domestic currency

The left-hand side of equation (1) shows that the government budget outflow comprises the total spending on government consumption and investment plus interest payments on domestic debt and official foreign debt (that is, foreign debt less foreign reserves) denominated in domestic currency using the home exchange rate.[6] Given the low rating of African government debt, γ_t captures the external debt premium on government debt compared to the low-risk return on foreign reserves. The right-hand side of the equation shows that the government budget inflow consists of government tax and non-tax revenues, net borrowings (domestic and foreign), and seigniorage revenue due to an increase in the stock of money. The government's non-tax revenue is exposed to global price shocks, as natural endowments are internationally priced. Thus, equation (1) can be reduced to:

$$\Delta d_t^G = -b_t' + \left[\frac{\left(1 + i_{t-1}^G\right)}{(1 + g_t)} - 1\right] d_{t-1}^G$$

$$\therefore \Delta d_t^G \approx -b_t' + \left[i_{t-1}^G - g_t\right] d_{t-1}^G \qquad (2)$$

Equation (2) shows that changes in total government debt-GDP ratio (d_t^G) depends on the initial level of debt-GDP ratio, the primary balance ratio adjusted for seignorage (b_t'), and the difference between the average nominal

[6] The home exchange rate is the domestic currency per unit of foreign currency. Thus, an increase in the exchange rate implies a home currency depreciation.

interest rate on debt $\left(i_{t-1}^{G}\right)$ and the nominal GDP growth (g_t). The necessary condition required to ensure the stability of government debt is that the nominal interest rate should be less than the nominal GDP growth. Even if the government runs a moderate primary surplus, while the interest rate exceeds GDP growth, the debt-GDP ratio will continue to rise. According to Blanchard et al. (1991), a fiscal policy is sustainable when the policy achieves a debt-to-GDP ratio that eventually converges back to its initial level. Iterating equation (2) forward perpetually, we get:

$$d_0^G = \sum_{i=0}^{\infty} E_t \prod_{j=0}^{i} \frac{1}{(1+\rho_{t+j})} [-b'_{t+i}] \qquad (3)$$

Equation (3) is the sufficient condition for fiscal sustainability. It states that for a fiscal policy to be sustainable, a government that has an outstanding debt must expect to match it with a future stream of primary budget surpluses.

Identifying Fiscal Consolidation Shock

Fiscal consolidation, as defined by the OECD (2011), encompasses targeted government policies that aim to curtail government debt accumulation and enhance the fiscal position. A fiscal consolidation shock denotes abrupt and substantial fiscal adjustments designed to reduce government deficits and curb debt accumulation. These shocks emerge as critical episodes characterized by sizeable and unforeseen fiscal changes that seek to restore fiscal sustainability and enhance the credibility of public finance management. In this strand of literature, fiscal consolidation shocks have been identified through three primary methodologies, which vary based on data availability and the definition of fiscal policy. These methodologies include the quantitative budget measure approach, the action-based approach, and the theoretical modeling approach within a Dynamic Stochastic General Equilibrium (DSGE) framework.

The quantitative budget measure approach identifies fiscal consolidation shocks as specific large adjustments in quantifiable government budget measures, such as changes in cyclically adjusted primary balance (CAPB) (as in Alesina and Ardagna, 2010; Arizala et al., 2021), the structural balance (SB) (as in Blanchard and Leigh, 2013; Fatas and Summers, 2018) or the overall

fiscal balance (FB) (as in Gupta et al., 2005).[7] This approach has been used by many international policy institutions, such as the International Monetary Fund (e.g., see IMF, 2013a and 2013b) and the Organisation for Economic Co-operation and Development (e.g., see OECD, 2011), and in academic literature to analyze both country-specific and cross-country effect of fiscal consolidation as it is easier to obtain and compare data across countries.

Using this method, Alesina and Ardagna (2010) identify fiscal consolidation shocks as periods when the CAPB deteriorates by at least 1.5% of GDP in a panel study of 21 OECD economies. Baldacci et al. (2015) conducted a larger study of 107 advanced and developing economies, defining shocks as episodes of consecutive years with reductions in public debt-to-GDP ratio and annual increases in CAPB of at least 0.5% of GDP, sustained for two years or more. Eichengreen and Panizza (2016) focused on 54 advanced and emerging economies, defining shocks as episodes with large average primary balances of 3-5% of GDP, lasting 5-10 years to indicate persistence. Georgantas et al. (2023) recently identified shocks as positive innovations to changes in CAPB using an estimated fiscal policy rule, accounting for endogenous interactions. Empirical evidence based on these methodologies yields mixed results. Some studies, such as Alesina and Ardagna (2010), Eichengreen and Panizza (2016), and Afonso et al. (2022), suggest that fiscal consolidation can have expansionary effects on the economy. In contrast, studies such as Baldacci et al. (2015), Fatas and Summers (2018), and Arizala et al. (2021) find strong contractionary effects in the short and long run.

However, critiques of these approaches highlight potential issues, such as correlation with asset price swings, cyclical fluctuations, and measurement bias. Devries et al. (2011) propose an action-based approach that identifies consolidation episodes through historical policy actions of tax hikes and government spending reductions, aiming to put public finance on a sustainable path[8] This approach, similar to Romer and Romer (2010) and Ramey (2011), relies on historical records from national budgets, IMF staff reports, and OECD reports. Nonetheless, the availability of this consolidation shock series is limited to 17 OECD advanced economies up to 2009.

[7] The CAPB is often used as a proxy for discretionary fiscal policy, as it controls for automatic fiscal stabilizers that co-move with state of the business cycle and interest payments that depend on past debt levels.

[8] Rather than avoiding the issues with the standard budget measure approach, several other studies have control for the issues using quantifiable measures. For instance, Yang et al (2015) account of fluctuations in asset prices and idiosyncratic features of fiscal policy in individual countries.

Using the Devries shock, or the IMF shock, as it is commonly known, Guajardo et al. (2010, 2014), Alesina et al. (2015a; 2015b), and Jorda and Taylor (2016) find that fiscal consolidations have a strong short-term contractionary effect, but the effect in terms of output loss is smaller for expenditure-based consolidation than revenue-based consolidation. Alesina et al. (2017) decompose Devries et al. (2011) consolidations shock into a much-disaggregated level for spending, taxes, and transfers and extend the data to 2014 while dropping the Netherlands from the observation. They find that cuts in government spending and transfers have a much less contractionary effect on output than tax hikes. Alesina et al. (2018) further show that fiscal consolidation during a recession is more costly in output terms than during expansion. Agca and Igan (2019) also extend the Devries shock to 2014 and use it to analyze the effect of fiscal consolidation on credit cost. They find that the cost of credit shoots up with fiscal consolidation, but the effect is smaller with larger consolidation defined as more than 1.5% of GDP. Carriere-Swallow et al. (2018; 2021) extend the action-based approach to construct a narrative fiscal consolidation shock for 14 Latin America and the Caribbean countries. They find that fiscal consolidation has a strong negative effect on output and concurrently triggers fiscal and current account deficits – the twin deficit – in the region. Despite the plausibility of this approach, it has been criticized for being subjectively based on individual assessment. Furthermore, as of April 2023, no such narrative consolidation series has been constructed for African or Asian countries (except for Japan).

In this paper, constrained by limited access to reliable fiscal data for the SSA region, we employ the budgetary measure method to construct action-based fiscal adjustments, capturing the authentic intent of the government in implementing fiscal adjustments in a particular period. This construct, while advantageous, has inherent limitations such as the potential conflation of improvements in public finances, and debt positions derived from intentional fiscal adjustments and international debt relief programmes. This is particularly pertinent for fiscal consolidation identification within the African context, where fiscal discipline enhancement frequently serves as a prerequisite for foreign debt relief. Consequently, an optimal measure of fiscal consolidation in SSA countries necessitates the clear differentiation of government debt position advancements resulting from genuine fiscal actions and those originating from debt relief.

Informed by these considerations, we construct a measure of fiscal consolidation shock for a panel of 37 SSA countries for the 1995-2019 period using changes in primary balance that are directly matched with changes in government debt following the Baldacci et al. (2015) approach. Following

Arizala et al. (2021) and Baldacci et al. (2015), we define fiscal consolidation episodes as periods when government debt-GDP falls, and that fall is associated with at least a 1% increase in primary balance as a ratio of GDP or an increase of 0.5% in government revenue as a ratio of GDP or a decrease of 0.5% in government spending as a ratio of GDP. Following existing literature, the fiscal consolidation shock series is binary, assuming a value of 1 if the aforementioned criteria are satisfied - and 0 otherwise, thereby ensuring that only intentional fiscal actions conducive to amelioration in debt position are taken into account.

By construction, our fiscal consolidation measure rules out any improvement in debt position driven primarily by international debt forgiveness that is not followed by a sizeable fiscal adjustment. Furthermore, our measure diverges from Arizala et al. (2021) by establishing a direct correspondence with contemporaneous alterations in debt positions, thereby addressing the intent to consolidate debt. [9] By aligning with Eichengreen and Panizza (2016) through the utilization of the actual primary balance, we avoid any measurement error associated with computing CAPB or SB. Finally, since stock markets are generally underdeveloped in many African economies and rarely reflect the state of the economy (Mlachila et al., 2016), we posit that our fiscal consolidation shock metric is orthogonal to stock market performance in the Sub-Saharan African countries in our sample.

Empirical Strategy

The above theoretical framework motivates the empirical strategy in this paper. To address the research objectives, we provide empirical estimates based on local projection (LP) developed by Jorda (2005). Impulse response functions (IRFs) can be computed using the LP method as follows:

$$y_{t+h} = \gamma_i^h + \mathrm{B}_1^h shock_t + \theta_i^h \Sigma_{i=1}^k z_{t-i} + \alpha_t^h T_t + u_{t+h} \quad \sim \; h = 0, \dots, m, \qquad (4)$$

where y_t is the variable of interest at time t, γ_i are the country-fixed effects, $shock_t$ is the identified fiscal consolidation shock as described in the previous section, while B_1^h is are the estimated impulse responses at the horizon h. z_t is a set of control variables (including lags of y_t) included in the equation at lag

[9] Arizala et al. (2021) constructed their fiscal consolidation shock from the forecast errors of fiscal variables using October vintages of WEO database, following Auerbach and Gorodnichenko (2013b). Then, they restrict movements in the forecast errors based on the size of CAPB, government spending or revenue. In constructing their CAPB, they assume that the output gap elasticity of government revenue is 1 and that of government primary expenditure is 0. There are two potential issues with this shock construction: first, forecast error of fiscal variables may not reflect actual desire to improve debt position and may be driven by the state of the economy. Second, there is no empirical evidence to show that the output gap elasticities used are appropriate for African economies.

k. T is a time dummy, with only $T-1$ dummies included in each regression, while α_t is the time-fixed effect. u_t is a matrix of reduced form disturbances for time *t* and horizon *h*.

The LP method is a flexible framework that can accommodate a panel structure and does not constrain the shape of the impulse response functions. This makes it less sensitive to misspecification. The LP method has been used by several studies to analyze fiscal policy, including its effects on economic activity (see, for instance, Guajardo et al. (2014) for OECD countries, Arizala et al. (2021) for SSA countries, and Carriere-Swallow et al. (2021) for Latin American and Caribbean countries). An advantage of the LP method in estimating the effects of fiscal consolidations is its flexibility in dealing with non-linearities and state dependency. This allows for the exploration of our baseline specifications that are conditioned on various scenarios, such as the level of debt or the state of the business cycle when the consolidation takes place.

Data

Based on the theoretical model, our baseline LP model consists of the following variables: government debt as a share of GDP, government primary balance as a share of GDP, interest rate-growth differential and the log of real GDP. The interest rate-growth differential is the difference between the average effective interest rate on government debt, computed as the ratio of debt interest payment to debt level in the previous, and the nominal GDP growth. The real GDP variable is converted to a chained index with 2015=1 and transformed to log level so that all countries have the same scale. All the variables are multiplied by 100 so that the estimated impulse response can be interpreted as percentage changes for logged variables or percentage point changes in the case of ratios and rates.

Our analysis relies on annual time-series data for selected sub-Saharan African (SSA) countries. The data is obtained primarily from the World Economic Outlook Database and the International Debt Statistics, though other sources were explored. The estimation sample covers a panel of 37 SSA countries for the 1995-2019 period. The choice of this period is based on the availability of adequate time series data for the analysis. One major problem with the LP method relative to the VAR approach is that it requires more data because it involves running a separate regression at each horizon. This can be a limitation in small samples. So, to avoid the issue, we include only countries with at least 25 annual observations for the key variables.

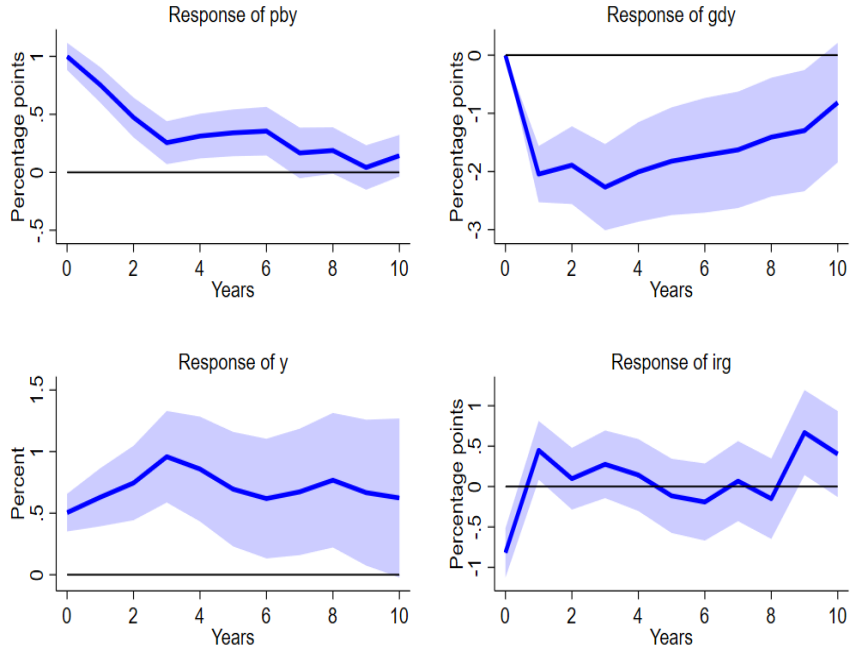
5. Results and Discussion

In this section, we report the results of the estimation procedure discussed above using the constructed fiscal consolidation shocks and linear projection method. We control for both country and time effects in the LP estimation of the IRFs, and the estimated IRFs are normalized to a 1% change in the chosen fiscal variable.

Effect of fiscal consolidation shock on the macroeconomy

Figure 4 shows the impact of fiscal consolidation on the primary balance-GDP ratio (pby), government debt-GDP ratio (gdy), logged real GDP (y), and interest rate-growth differential (irg) over a ten-year horizon. For this baseline analysis, we use the fiscal consolidation shock defined as changes in the debt-GDP ratio that are matched with at least a 1% increase in the primary balance relative to GDP. The shock is normalized to a 1% increase in the primary balance-to-GDP ratio and the shaded areas are the 90% confidence bands.

Figure 4: Impulse Responses to a Fiscal Consolidation Shock: Baseline Estimation

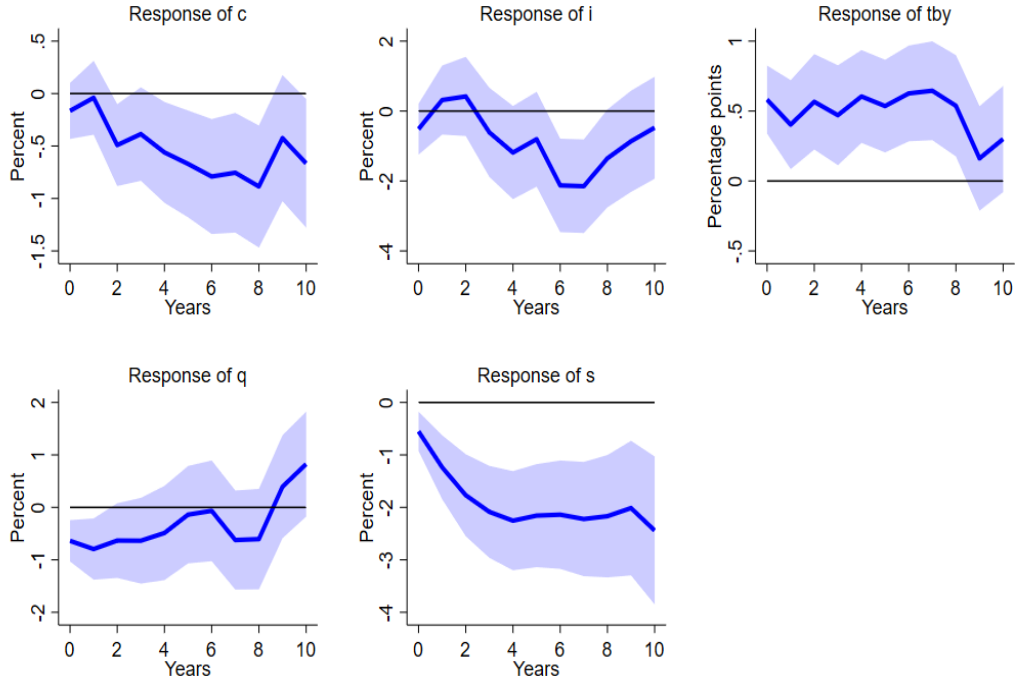


Notes: pby = primary balance-to-GDP, gdy = total government debt-to-GDP, y = log Real GDP (2015=1), and irg = interest rate - growth differential
The shock is normalised to a 1% increase in pby. Shaded area is 90% confidence bands.

The result shows that the effect of the fiscal consolidation shock on primary balance-to-GDP falls sharply within the first three years after the shock. Government debt-GDP falls sharply after one year with a peak effect of about 2.5 percentage points relative to the preshock level after 3 years. The initial delayed response of the government debt ratio is by design, as our LP estimation assumes that debt level responds with a lag to fiscal adjustments. In cumulative terms, government debt-to-GDP falls by around 6.5 percentage points after 3 years and by almost 10 percentage points after 5 years. The result also shows that fiscal consolidation has an expansionary effect on output with a peak of 1% after 3 years relative to the preshock level. Given the increase in output and reduction in interest costs due to debt reduction, the interest-rate growth differential falls significantly in the short run, which implies an improvement in fiscal sustainability. Our finding of an expansionary output effect of fiscal consolidation is in line with the findings of Alesina and Ardagna (2010), Eichengreen and Panizza (2016), and Afonso et al. (2022), but at odds with other recent studies (e.g., see Baldacci et al., 2015; Fatas and Summers, 2018; Arizala et al. 2021).

To understand the source of this expansionary effect, we estimate the local projection impulse responses for each component of GDP – consumption (c), investment (i), and trade balance ratio (by) – as well as the terms of trade (q) and the domestic nominal exchange rate in dollar terms (s). We also include lags of each of these variables as controls in the LP specification while estimating the IRFs of each variable. The consumption and investment variables are deflated using the GDP price deflator and defined in log terms. Both the terms of trade and the currency exchange rate are defined such that an increase implies a deterioration/depreciation. All the variables are multiplied by 100 so that their impulse responses can be interpreted as percentage changes. The result of this empirical analysis is presented in Figure 5.

Figure 5: Impulse Responses to a Fiscal Consolidation Shock: Components and Relative Prices



Notes: c = Private Consumption, i = Total Investment, tby = Trade-to-GDP, q = Terms of Trade, and s = Bilateral US Dollar Exchange Rate.
All variables are in log levels (2015=1), except tby which tby which is in percentage ratio.
The shock is normalised to a 1% increase in primary balance-to-GDP. Shaded area is 90% confidence bands.

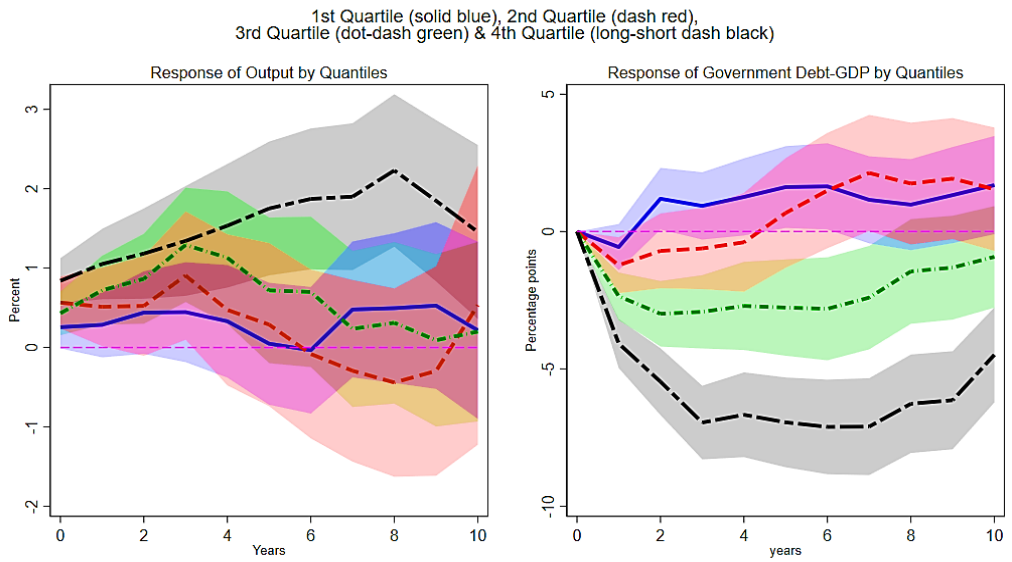
Figure 5 shows that both consumption and investment levels fall by about 1-2% at the peak in the medium run, though the effect is weak. Carriere-Swallow et al. (2018) find similar effects in their study of Latin American and Caribbean countries. A further decomposition of this negative effect shows that it is driven mainly by cuts in government spending (see Figure A1 in Appendix A). A possible explanation for this is that there is a strong complementarity between public and private spending, such that a fall in public spending also drives down private spending. This is a plausible reasoning for developing countries such as the SSA regions, as several studies have shown that developing countries have a relatively large share of non-Ricardian households, many of which are hand-to-mouth households that depend on government social transfers, both in cash and in-kind (e.g., see Gali et al., 2007; Joste et al., 2013; Anand et al., 2015; Shen et al., 2018). Therefore, the relatively large size of this group of non-Ricardian households amplifies the effect of the fiscal consolidation shock, thereby driving down private consumption. This supposition is corroborated by the World Bank's Global Findex database which

shows the proportion of people with limited access to financial accounts, savings, and credit is relatively high in Sub-Saharan Africa (50-70%) compared to high-income countries (5-25%) (see Demirgüç-Kunt et al., 2022). This result implies that fiscal consolidation tends to worsen household welfare by reducing consumption. Moreover, in terms of investment, fiscal consolidation can have a crowding-out effect on public and private investment, particularly in crucial sectors such as infrastructure, education, and healthcare. This could create an expectation of adverse economic conditions among businesses, prompting them to decrease their investment.

Trade balance-GDP improves significantly, averaging about 0.5 percentage points relative to its pre-shock level in the first 8 years. This effect is even much stronger for spending-based consolidation as shown in Figure A1 in Appendix A. Ali Abbas et al. (2011) highlight a similar relationship for a panel of 88 non-oil-exporting economies, finding that the impact of a fiscal shock on the current accounts for emerging markets and low-income countries is slightly larger than what was observed for advanced economies. The improvement in the trade balance ratio appears to be driven by an appreciation (a fall) in the home exchange rate and the terms of trade following a fiscal consolidation shock. While the terms of trade appreciation weaken after two years, the home exchange rate appreciation is persistent, averaging about 2% relative to the pre-shock level after 4 years.[10] Following Dadush and Brahmbhatt (1995), one possible explanation for this result is that deliberate fiscal actions to reduce government debt stock (which is largely made up of external debt in the SSA region) are interpreted by the international credit market as a sign of improved fiscal discipline and commitment which attracts increased capital inflows and lead to domestic currency appreciation in the short term. Another way to interpret the result is through the balance of payment approach. The improvement in trade balance (hence, the current account) reflects the opposite balancing adjustment of capital outflows on the capital account as a result of international debt repayment. Improved trade balance enhances international competitiveness and, hence, the terms of trade and the domestic currency.

[10] It is worth noting that the weak effect of the consolidation shock on the terms of trade is due to the fact that the revenue shock component cancels out the expenditure shock component. See Figure A1 in Appendix A.

Figure 6: Effect of Fiscal Consolidation Shock across Debt Quantiles



Notes: The shock is normalised to a 1% increase in primary balance-to-GDP.

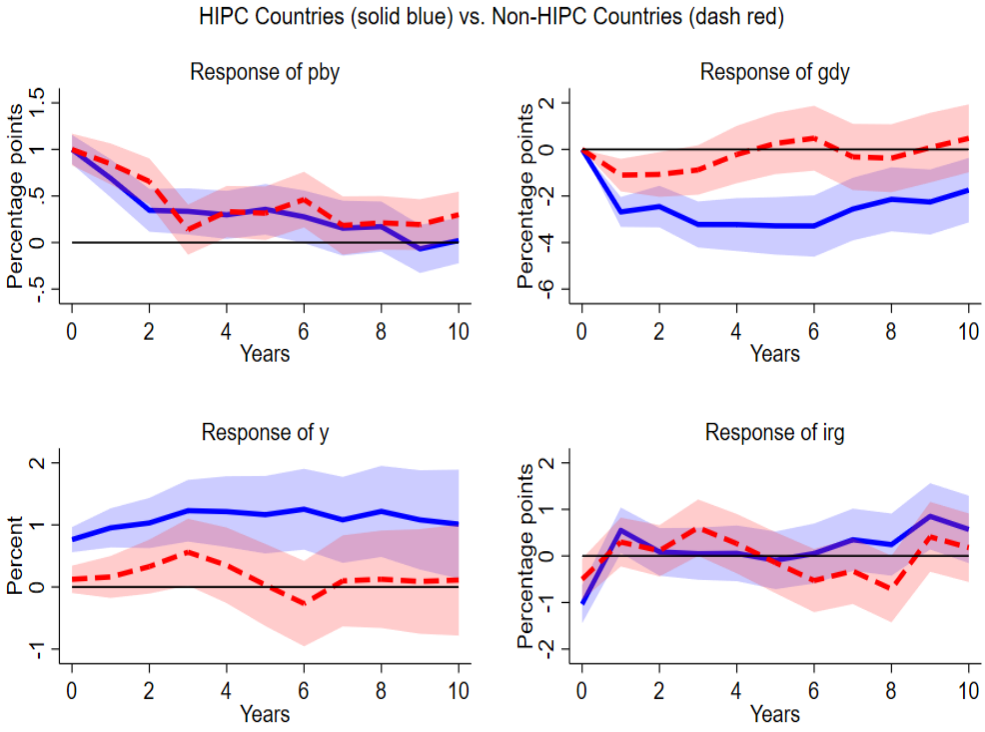
Fiscal consolidation across varying levels of debt

As discussed in Section 2, SSA government debt levels vary across time and countries, moving from one threshold to another over time. To gain further insight into our baseline analysis, we consider how SSA countries in our sample respond to fiscal consolidation shock at different thresholds of debt. To do this, we divide the debt ratio of all countries across the sample period into quartiles, such that a country can transition from one debt-GDP threshold to another over time. The cluster of debt-GDP ratio in the first, second, third and fourth quartiles are 0-28%, 28-47%, 47-74%, and above 74% (see the bottom panel of Table 2). Interestingly, the average debt-GDP ratio in the third quartile is about 59%, which is almost the same as the 60% threshold stimulated by the European Stability Pact. The outcome of quantile-based estimation is reported in Figure 6.

Figure 6 shows the impulse response to a fiscal consolidation shock normalized to a 1% increase in the primary balance-GDP ratio at different quantiles of debt. The result shows that, at lower debt-GDP thresholds (that is, first and second quartiles), fiscal consolidation provides no economic gain in terms of both debt reduction and output growth. However, as the country transitions from a lower to a higher debt-GDP threshold, economic gains from fiscal consolidation become much stronger, both in lowering the debt level

and raising output growth. The strong effect of fiscal consolidation in a high-debt regime aligns with the findings of Georgantas, et al. (2023). Debt-GDP falls by about 3.5% at the peak after 2 years when the initial level of debt is in the third quartile, and at about 7% after 3 years when the initial debt level is in the fourth quartile. Likewise, output gain is much stronger for a consolidating country with an initial debt level in the 3rd and 4th quartile. Output rises persistently and peaks at 2% after 8 years in the 4th quartile but peaks at 1% after 3 years in the 3rd quartile. This result implies that the effect of fiscal consolidation is highly heterogeneous, depending on the initial debt level in the country. Therefore, a one-cap-fits-all consolidation policy is not ideal for SSA countries.

Figure 7: Effect of Fiscal Consolidation Shock in HIPCs and non-HIPCs



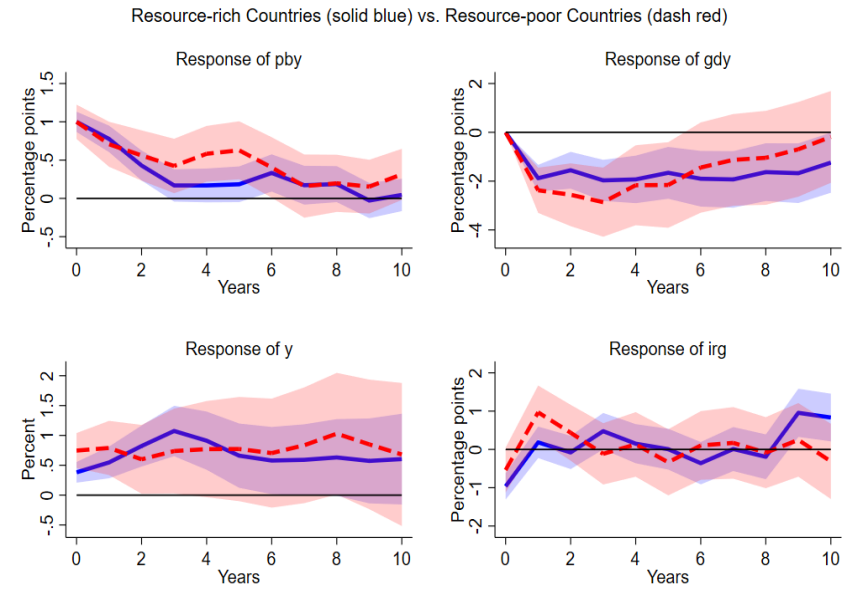
Notes: The shock is normalised to a 1% increase in primary balance-GDP (pby). Shaded area is 90% confidence bands. The World Bank's definition of heavily indebted poor countries (HIPC) is used

To further understand how a country's initial debt level affects its consolidation plan, we use the latest World Bank categorization of Heavily Indebted Poor Countries (HIPCs) to divide the countries in our samples into HIPCs and non-HIPCs (see Table 1). About two-thirds (24 out of 37) of the countries included in our sample are considered as HIPCs. As earlier discussed,

the average debt-GDP ratio for HIPCs in our sample is 65.5%, which is about 16 percentage points higher than for non-HIPCs (49.6%). So, given the large difference in the initial debt ratio of HIPCs relative to non-HIPCs, it is worth considering the differential effects of fiscal consolidation shock on debt dynamics and macroeconomic outcomes in these countries.

Figure 7 shows that fiscal consolidation strongly benefits HIPCs more compared to non-HIPCs, both in terms of debt reduction and output growth. This is because fiscal consolidation reduces debt burden and improves debt sustainability, at least in the short run. In HIPCs, the debt-GDP ratio falls sharply in the first year and peaks at about -4 percentage points relative to its pre-shock level after 6 years while output rises persistently at an average of 1%. Whereas, in non-HIPCs with considerably lower initial debt levels, the debt-GDP ratio marginally declines in the short run and there is no significant effect on output. This result confirms our findings above that fiscal consolidation has a heterogeneous effect across countries, depending on the current state of indebtedness. Highly indebted countries benefit more from fiscal consolidation, both in debt reduction and output growth. This conclusion is supported by the findings of Rother et al. (2010) and Sutherland et al. (2012) which posit that gains to fiscal sustainability and growth are better maximized when fiscal consolidation efforts are combined with structural reforms.

Figure 8: Effect of Fiscal Consolidation Shock in Resource-rich and Resource-poor Countries



Notes: The shock is normalised to a 1% increase in primary balance-GDP (pby). Shaded area is 90% confidence bands.

Again, following the International Monetary Fund categorization of resource wealth in SSA (see IMF, 2022), we also categorize the countries in our sample into resource-rich and resource-poor countries since the latter group has a considerably higher debt-GDP ratio than the former (see Table 1). More importantly, resource endowment can be a key factor in accessing the global credit market, as creditors may consider resource abundance or the discovery of large resource deposits as a form of guaranteed future financial stream to meet future debt obligations. Therefore, with better market access, resource-rich countries are likely to face lower debt costs and slower debt growth. Eighteen of the 37 countries in our sample are categorized as resource-rich and 9 of them (excluding Sudan) are included in the list of top 10 resource-rich countries in SSA according to a World Bank study (see Izvorski et al., 2018).[11] As earlier discussed, resource-rich countries have an average debt-GDP of about 51%, compared to 68% for resource-poor countries. The top 10 resource-rich countries in our sample have an average debt-GDP of about 51%, while it is about 76% for the top 10 resource-poor countries.

Figure 8 shows that the effect of fiscal consolidation shock is quite similar in both resource-rich and resource-poor SSA countries. Although debt-GDP response marginally peaks higher in resource-poor countries while output response is relatively stronger and more persistent in resource-rich countries, the estimated effects are not significantly different as they lie within the 90% confidence bands of the other group. Overall, this result suggests that resource endowment has a limited effect on fiscal sustainability in the SSA region. This is not surprising as African countries generally have limited market access irrespective of resource endowments. Therefore, news of new resource discovery or increased resource extraction rarely translates to improved market access or a lowering of interest rate on debt.

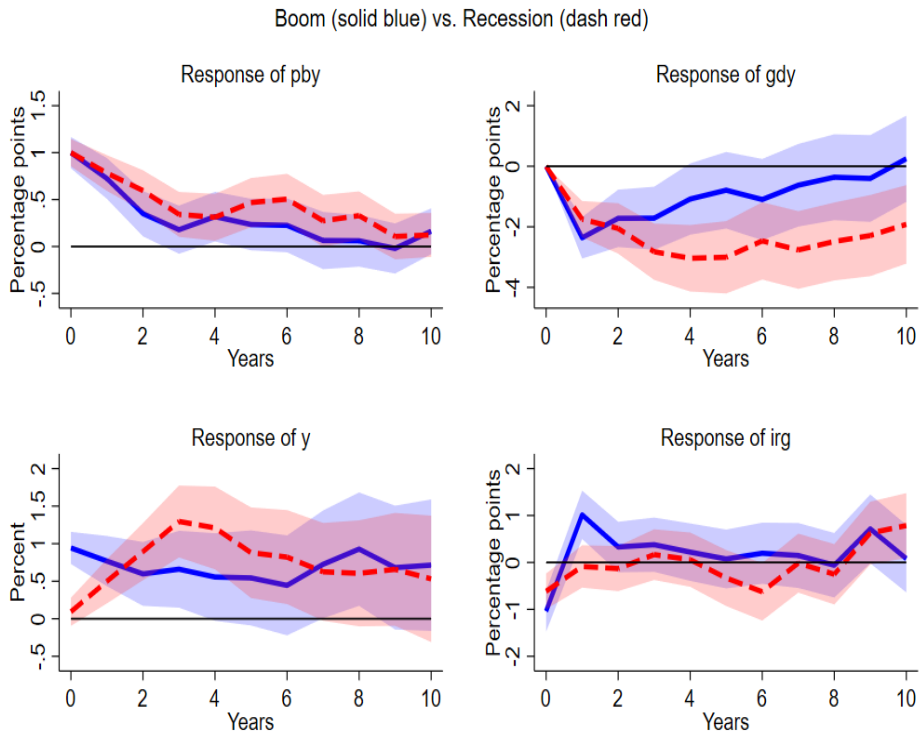
Fiscal consolidation across the business cycle

Another way to view the effect of fiscal consolidation is to examine its effect across the business cycle. To do this, we divide economic activity into a boom-bust business cycle using the Hodrick Prescott (HP) filter which is the smoothing parameter (λ) set to 6.25 as in Ravn and Uhlig (2002). We then categorize an episode as a boom if the cyclical component is positive or a recession if the cyclical component is negative.

[11] According to Izvorski et al. (2018), the top 10 resource-rich countries in SSA are: Nigeria, South Africa, Angola, Equatorial Guinea, Gabon, Sudan, Tanzania, Zambia, Botswana, and Republic of Congo. Also, the top 10 resource-poor countries are: Seychelles, Saô Tomé and Príncipe, Cabo Verde, Comoros, Gambia, Mauritius, Lesotho, Guinea-Bissau, Swaziland and Burundi.

The result of this analysis is reported in Figure 9. The result shows that fiscal consolidation shock has heterogeneous effects on government debt and output across the business cycle. During economic expansion (boom), fiscal consolidation leads to a sharp fall in debt ratio in the first year with a peak effect of -2.5% and then gradually converge to its pre-shock level (cold-turkey approach). But in economic contraction (recession), the response of the debt-GDP ratio is relatively gradual but highly persistent, with a peak effect of -3% after 5 years (gradualist approach).

Figure 9: Effect of Fiscal Consolidation Shock across Business Cycle



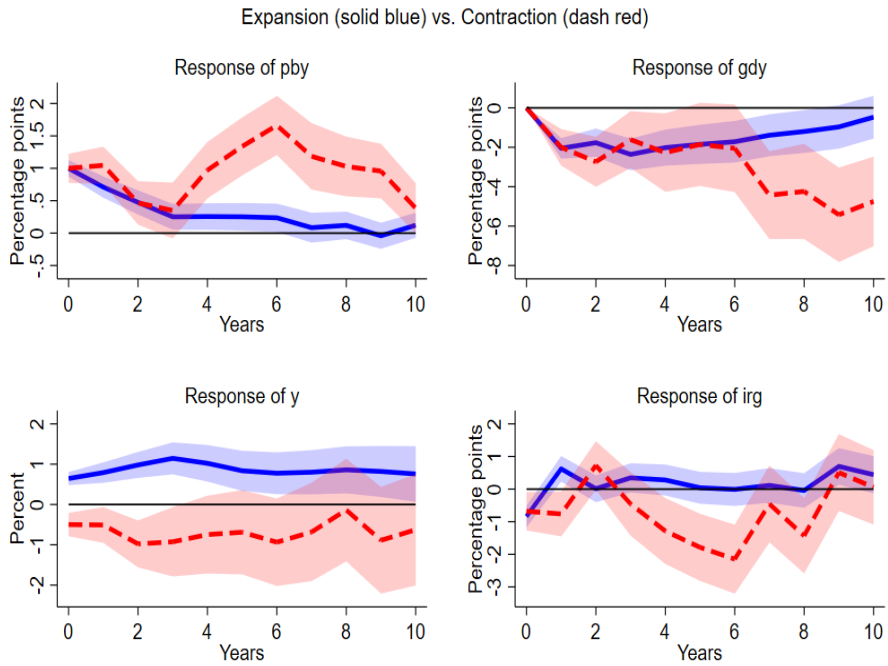
Notes: The shock is normalised to a 1% increase in primary balance-GDP (pby). Shaded area is 90% confidence bands.
Boom(Recession) is defined as periods of positive(negative) output gap extracted from real GDP using HP-filter with λ=6.25

Fiscal consolidation has an expansionary effect on output in both boom and recession periods, although the effect is significantly stronger during a recession than during a boom. This finding aligns with Alesina et al. (2018), which shows that fiscal consolidation has a stronger effect during a recession compared to an expansion. It also corroborates the findings of Auerbach and Gorodnichenko (2012) and Jordà and Taylor (2015) that fiscal consolidation has stronger effects if they are preceded by recessions. This is possible

because fiscal consolidation leads to an anticipated fall in interest rates, which then feeds into increased output growth through higher investment.

Some studies also characterize an economic cycle across states of real GDP growth with episodes of positive growth characterized as expansionary and negative growth characterized as contractionary (see, for instance, Georgantas et al., 2023). Figure 10 reports the result of our analysis based on this categorization. Compared to expansionary episodes, the response of the debt-GDP ratio to a fiscal consolidation shock during contractionary episodes is gradual and heavily frontloaded possibly due to limited fiscal capacity during an economic downturn. More specifically, while the debt-GDP ratio peaks at about -2 percentage points relative to its preshock level after 3 years during an expansion and then converges to its equilibrium level, the peak response during a contractionary period is at about -6 percentage points after 9 years. Moreover, while output response is positive in an expansion, peaking at about 1.2% after 3 years, the effect of fiscal consolidation on output is negative and relatively weak in a contraction and peaks at -1% after 2 years.

Figure 10: Effect of Fiscal Consolidation during Expansionary and Contractionary Growths



Notes: The shock is normalised to a 1% increase in primary balance-GDP (pby). Shaded area is 90% confidence bands. Expansion(contraction) is defined as periods of positive(negative) growth of the real GDP

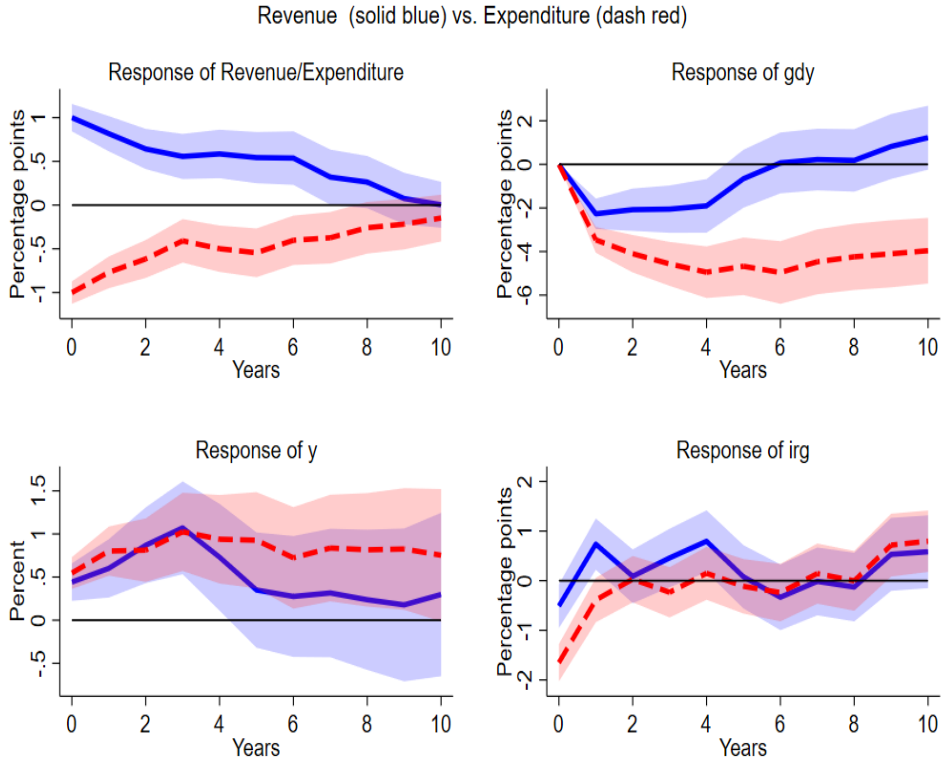
During economic downturns, private sector demand is already weak, therefore a potential explanation for the negative output response during contractionary episodes is that fiscal consolidation can further reduce overall demand contemporaneously. This effect can be exacerbated in economies with a significant proportion of non-Ricardian or "hand-to-mouth" consumers, who react more directly to changes in current income rather than future expectations.

The effect of fiscal consolidation during a contractionary period in this result is at odds with the one reported in Figure 9. There are some possible explanations for this: first, the number of episodes of negative real GDP growth in this analysis is relatively small compared to episodes of negative output gap in the earlier analysis. Second, by construction, all episodes of negative growth are categorized as contractionary periods in Figure 10, while only 82% of the negative growth episodes are identified as recessionary periods in Figure 9; a further implication of this is that while the HP filter (HPF) approach may be capturing medium-term cycles in the data, the simple characterization based on real GDP growth more precisely captures short-term fluctuations. This could imply that the initial HPF approach might be smoothing out some of the fluctuations (capturing more persistent shocks to the economy) than are captured when using simple real GDP growth rates (which might be more related to short-term demand fluctuations) leading to different segments of the data being classified as booms or recessions, thereby affecting the consistency of both results. Finally, the two categorizations of booms and recessions may highlight the timing and nature of the economic cycle, as well as the time horizon considered, which can have significant effects on how fiscal policy impacts the economy.

Revenue vs. Expenditure-Based Consolidation

So far, our analysis of fiscal consolidation shock has focused on adjustments in the primary balance. However, recent empirical studies have shown that there are significant differences when comparing the effects of spending-based fiscal adjustments to revenue- or tax-based consolidation (see, for instance, Alesina et al., 2015a; 2015b). In light of this, we re-estimated the LP impulse responses again but using the constructed fiscal consolidation shocks that impose restrictions on changes in government revenue and primary expenditure ratios as discussed in Section 2.

Figure 11: Effects of Revenue and Expenditure-Based Consolidation Shocks



Notes: The shock is normalised to a 1% increase(decrease) in revenue(primary expenditure) to GDP ratio. Shaded area is 90% confidence bands

Figure 11 reports the impulse responses of expenditure- and revenue-based fiscal consolidation shocks. The fiscal consolidation shock is normalized to a 1% cut in government primary expenditure or a 1% increase in government revenue in GDP terms. The result shows stark differences between revenue- and expenditure-based fiscal adjustments, both in the short and long run. For instance, in response to an expenditure-based fiscal consolidation shock, government debt-GDP falls sharply by about 3.5 percentage points in the first year and continues to fall gradually, but persistently, till it peaks at about 5 percentage points below its pre-shock level after 6 years. Whereas, under revenue-based fiscal consolidation, the response of government debt-GDP ratio peaks at about -2 percentage points relative to its pre-shock level after just one year and then starts to rise, exceeding its pre-shock level after 6 years, albeit insignificantly. Also, while output response to both fiscal adjustment measures is very similar in the short run (rising by about 0.5% on impact and

peaking at about 1% after 3 years), the response remains persistently high in the medium to long run under expenditure-based consolidation but becomes insignificant after four years under revenue-based consolidation. This result shows that expenditure-based consolidation is superior to revenue-based consolidation, both in terms of reducing debt and raising output, which is consistent with many recent empirical findings (see, for instance, Alesina et al., 2019; Arizala et al., 2021).

Furthermore, the interest rate-growth differential (a measure of fiscal sustainability) falls sharply in the short run under expenditure-based consolidation but rises marginally under revenue-based consolidation. Since the output response is similar under both fiscal adjustment measures in the short run, this result implies that spending-based consolidation leads to lower debt interest than revenue-based consolidation in the short run, thereby lowering the interest rate-growth differential. Therefore, this result implies that the market considers spending cuts as a more credible fiscal action in managing public finance and improving fiscal sustainability than raising additional revenue of the same amount in GDP terms. Cecchetti et al. (2010) further explain that these dissimilar effects of revenue- vs expenditure-based consolidation may be due to the countercyclical effects of taxes which may deteriorate resource allocation and lead to slower growth without significant additional revenue generation. This point is especially salient for SSAs where tax collection and administration remain a cause for concern (e.g., see Okunogbe and Santoro, 2023).

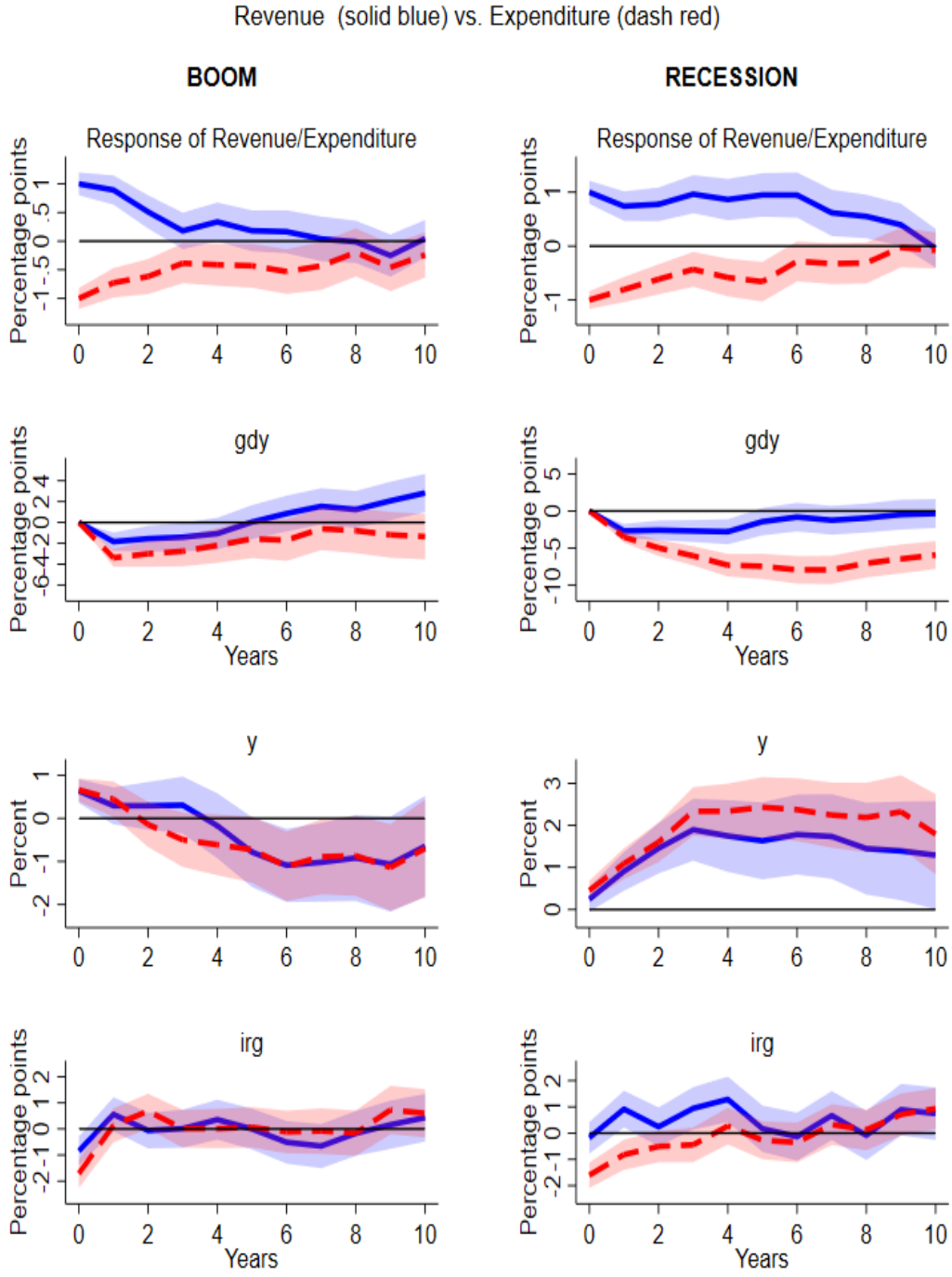
We further explore the differential effects of spending- and revenue-based consolidation measures across different states of the business cycle as discussed in Section 5.3. The result of this analysis is presented in Figure 12. The figure shows that, while output response is similar across fiscal measures but starkly different across different states of the business cycle, the response of government debt differs not only across fiscal measures but also across the state of the economy. In expansionary periods, output responds by about 0.5% on impact and then falls below its pre-shock level by about 1% in the medium to long run, though the speed of reversion is faster under expenditure-based consolidation. Whereas, in a recession, output response is positive throughout but marginally stronger under expenditure-based consolidation. These results are at odds with the findings of Georgantas, et al. (2023).

In a boom, the debt-GDP ratio falls sharply and peaks at about -2 and -4 percentage points relative to its pre-shock level in the first year under revenue-based and expenditure-based consolidation respectively. However, while the debt-GDP response converges to its equilibrium level in the long run under spending-based consolidation, it overshoots its pre-shock level after 5 years

under revenue-based consolidation in a boom. In a recession, the response of debt-GDP ratio peaks at about -2.5% in the first year and returns to its pre-shock level after 6 years under revenue-based consolidation, but gradually declines and peaks at about -7% after 6 years under expenditure-based consolidation. In addition, while there is no significant difference in the response of interest rate-growth spread across fiscal adjustment measures in a boom, the spread falls sharply in the short run under expenditure-based consolidation (implying a significant improvement in fiscal sustainability) but insignificant under revenue-based consolidation (no improvement) in a recession.

Overall, the results show that financial markets primarily reward expenditure-based consolidation during a recession, as a spending cut is considered a more prudent fiscal measure. With improved sustainability, debt reduction is stronger under expenditure-based consolidation during a recession. In a boom, debt-GDP and output response exhibit similar patterns in the short- to medium-run irrespective of the fiscal adjustment measure used.

Figure 12: Revenue vs expenditure-based fiscal consolidation shocks across the business cycle

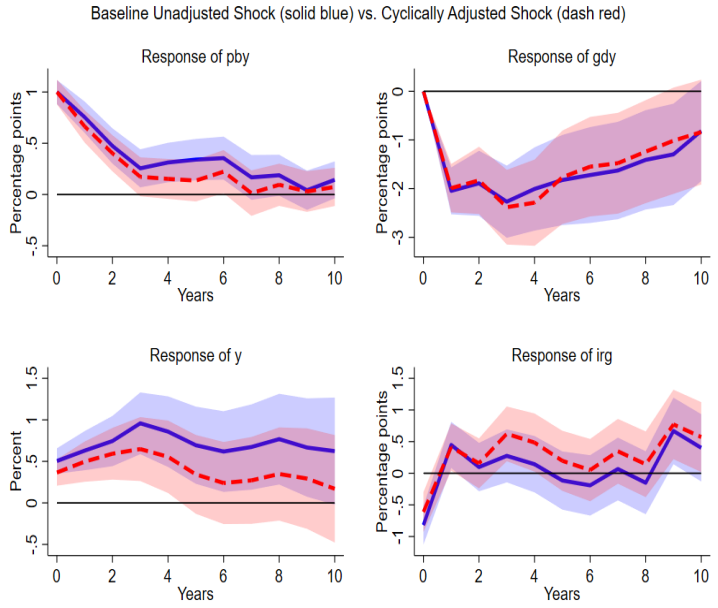


Robustness checks

In this section, we consider some robustness checks to validate our local projection estimation of the effects of fiscal consolidation. First, we examine how the construction of the baseline shock affects the estimated local projection IRFs when the fiscal consolidation shock is defined based on restrictions on the cyclically adjusted primary balance instead of the unadjusted primary balance. Second, we examine the importance of country and time-fixed effects on the estimations. And, third, we examine the sensitivity of the model lag structure on the estimated IRFs.

Our baseline fiscal consolidation shock is constructed such that changes in unadjusted primary balance are directly matched with reductions in government debt. However, as earlier noted, the preferred fiscal measure in the literature to quantify fiscal actions aimed at reducing government debt is simply changes in cyclically adjusted primary balance, which controls for cyclical states of the economy. Given our methodological approach to constructing the fiscal consolidation shock by matching adjustments in fiscal measures with an actual reduction in government debt, does it matter if we employ the cyclically adjusted primary balance rather unadjusted primary balance? The result is shown in Figure 13.

Figure 13: Effect of Fiscal Consolidation Shock: Sensitivity to Cyclical Treatment of the Shock

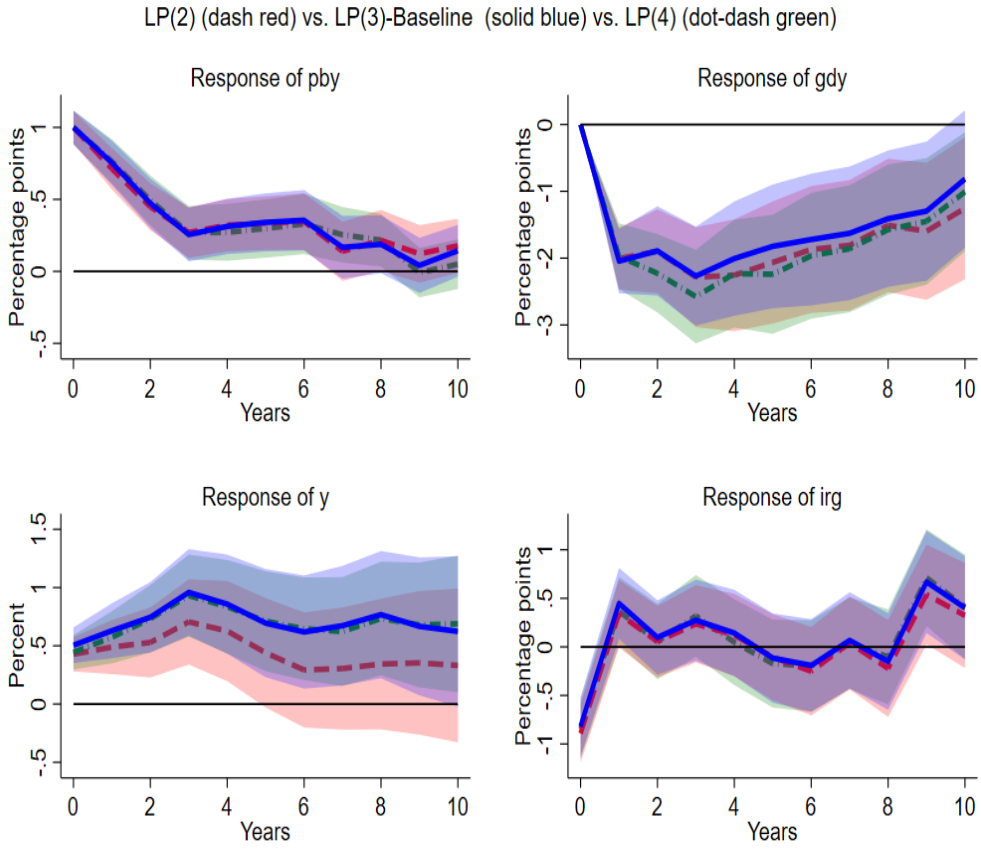


Notes: The shock is normalised to a 1% increase in primary balance-GDP (pby). Shaded area is 90% confidence bands.

Figure 13 compares our baseline fiscal consolidation shock (solid lines) relative to an alternative consolidation shock defined with restrictions on changes in cyclically adjusted primary balance (dash lines). Both shocks are normalized to a 1% increase in the primary balance-GDP ratio. The figure shows that our approach to constructing fiscal consolidation shock is robust to cyclical movements in the business cycle, as there is no significant difference in the response of the main macro-variables to unadjusted and cyclically adjusted fiscal consolidation shocks. Although the output effect of unadjusted shock peaks higher across the horizon, the effect lies within the 90% confidence bands of the cyclically adjusted shock. This result confirms that our identification strategy is robust and the identified fiscal consolidation episodes reflect actual intentions and actions of SSA governments to reduce debt, thereby aligning with the action-based approach of Devries et al. (2011), Guajardo et al. (2014) and Carrière-Swallow et al. (2021).

Turning our attention to some empirical issues, we examine the sensitivity of our baseline estimation to our lag choice. While the LP method is less sensitive to misspecification compared to the VAR model based on the lag structure, lag choices may influence the dynamics of the IRFs and their interpretations to a great extent. Shorter lags may lead to misspecification while longer lags reduce the degree of freedom, as longer horizons of local projection IRFs are estimated with reduced observations. Empirical studies on fiscal consolidation that employ the LP method with annual data often select 2 to 3 lags of the covariates. In the next robustness check, we compare our baseline specification with three lags of covariates, LP(3), to alternative specifications with two lags, LP(2), and four lags, LP(4). The results are presented in Figure 14.

Figure 14: Effect of Fiscal Consolidation Shock: Sensitivity to Lag Structure



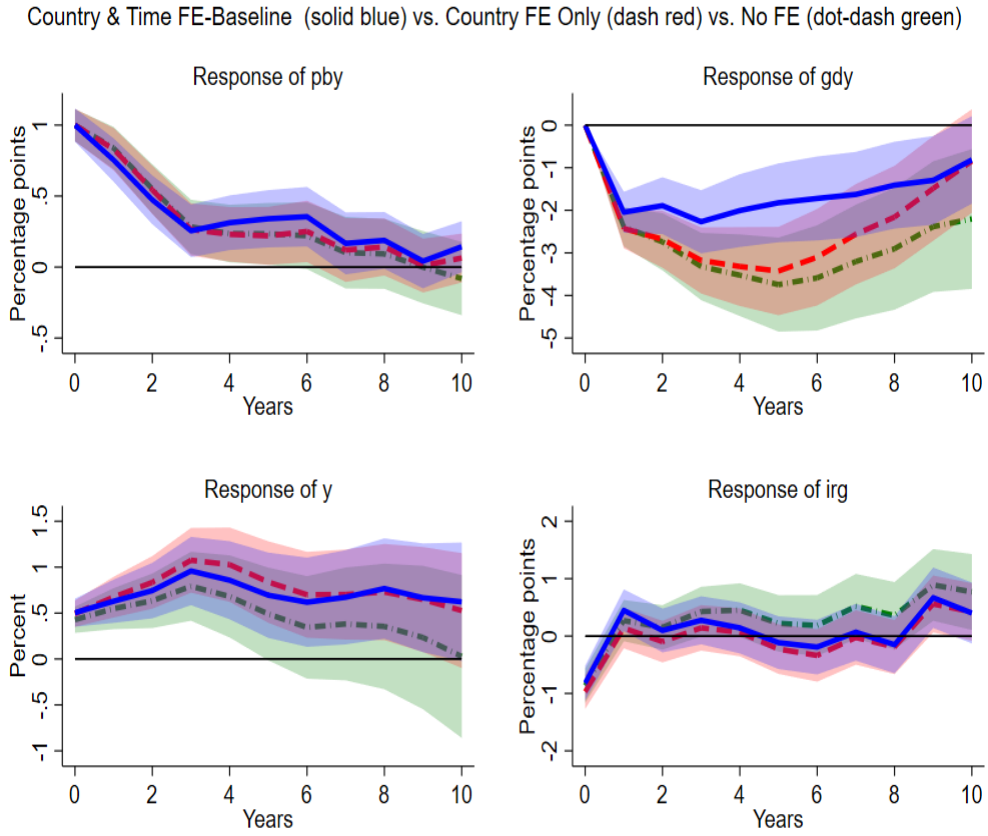
Notes: The shock is normalised to a 1% increase in primary balance-GDP (pby). Shaded area is 90% confidence bands.

Figure 14 shows that our baseline LP(3) specification is robust, as the estimated impulse responses are almost identical to those obtained from both LP(2) and LP(4) specifications. Although the output effect of fiscal consolidation peaks higher in the baseline LP(3) and the alternative LP(4) specifications, the effect is not statistically different from that of the LP(2) specification as they all lie within 90% confidence bands of each other.

Finally, another key empirical issue that may arise in estimating panel data regressions involving many units (countries) across a relatively long period is whether there are sufficient heterogeneities across the units and time that should be accounted for. Not accounting for heterogeneity leads to model misspecification, while controlling for heterogeneity when it is not substantial may lead to biased estimates. In the next sensitivity analysis, we examine the

robustness of our baseline estimation which accounts for both country and time-fixed effects in comparison to alternative specifications with only country-fixed effect and pooled estimations with no fixed effect. The results are presented in Figure 15.

Figure 15: Effect of Fiscal Consolidation Shock: Sensitivity to Fixed Effect Components



Notes: The shock is normalised to a 1% increase in primary balance-GDP (pby). Shaded area is 90% confidence bands.

Figure 15 shows that the response of the government debt-GDP ratio is highly sensitive to time effect. The estimated IRF when the time effect is accounted for lies completely outside the 90% confidence bands of specifications with no time effect between 2 to 7 years after the shock. Also, the debt reduction effect of fiscal consolidation peaks earlier at about -2.25% relative to its pre-shock level after 3 years when the model is estimated with a time-fixed effect, compared to a peak of about -4% after 5 years with no time-fixed effect. Debt

response is much stronger in the medium to long run under pooled estimation, though the effect is not statistically different when compared to a model with only a country-fixed effect. This result reflects the descriptive evidence presented in Table 2 and Figure 2 which show that the distribution of government debt-GDP ratio in the SSA region varies considerably across periods, especially in the periods before, during, and after the 2005 debt relief initiative. The response of other macro variables in our model appears to be less sensitive to both country and time-fixed effects, though the output response is relatively weaker and the response of interest rate-growth spread is relatively stronger in the model with no fixed effect.

In summary, we show that our identification strategy is insensitive to cyclical adjustments, thereby indicating that the identified fiscal consolidation episodes and measures reflect true government intentions to deleverage. Also, our choice of lag length is robust and parsimonious enough to capture the underlying structural relationship between the model variables. Furthermore, accounting for country and time-fixed effects in our estimation is important for characterizing the dynamic response of government debt to fiscal consolidation.

6. Conclusion

In this paper, we analyze the macroeconomic impacts of fiscal consolidation in SSA countries. Despite the debt relief initiative of the 2000s, SSA countries have continued to accumulate debts in recent years. Cross-country data evidence shows that the debt-GDP ratio in the sub-region had been rising even before the recent COVID-19-induced economic crisis. However, the economic effects of COVID-19, especially in terms of high and increased expenditure vis-à-vis low and reduced tax revenue, have created concerns about the effects of the pandemic on fiscal sustainability in SSA. Moreover, there is a need to address this emerging debt crisis while mitigating the economic impacts. In this sense, this paper tackles this challenge and provides clear policy recommendations.

Using panel data for 37 SSA countries from 1995 to 2019, the study estimates the effects of fiscal consolidation using the local projection method. The analysis considers the different effects of fiscal consolidation across business cycle states, initial debt positions, resource endowments, and revenue-based versus expenditure-based adjustments. To correctly identify fiscal consolidation episodes, we employ a strategy that matches adjustments in primary balance with an actual debt reduction. Our empirical findings reveal that fiscal consolidation has an expansionary effect on output, with the peak impact on the debt-GDP ratio occurring after three years. The effects differ

across the business cycle, with sharper and shorter-lived debt reductions during boom periods and gradual but deeper and persistent effects during contractions. These results suggest that fiscal consolidation appears to be frontloaded during an economic recession compared to a boom. Expenditure-based consolidation shows stronger and more persistent output effects, suggesting its potential for enhancing fiscal sustainability compared to revenue-based approaches.

We also examine the comparative effects of revenue- and expenditure-based consolidation during different stages of the business cycle. In recessions, expenditure-based consolidation has a greater impact on the debt-GDP ratio, while both approaches yield similar outcomes during expansions, albeit with initial gains from revenue-based consolidation being reversed in the medium run. We find significant effects of fiscal consolidation on Highly Indebted Poor Countries (HIPCs) compared to non-HIPCs, indicating the importance of tailored policy approaches. Our analysis indicates that natural resource abundance does not significantly influence the path of fiscal consolidation in SSA countries. Furthermore, fiscal consolidation has limited effects on consumption and investment but improves the trade balance. While we advocate for expenditure-based fiscal consolidation as a pathway for promoting fiscal sustainability in SSA, the potential welfare implications arising from reduced private consumption should be considered.

Based on the results of the analysis, we conclude that fiscal consolidation may be an effective policy to improve fiscal sustainability while sustaining growth. While we recommend expenditure-based fiscal consolidation as a reform pathway for promoting fiscal sustainability in SSA, policymakers should be aware of the negative welfare implications due to the reduction in private consumption. We also reckon that fiscal adjustments may be more beneficial to highly indebted SSA countries to improve fiscal and macroeconomic performance in the short to long run.

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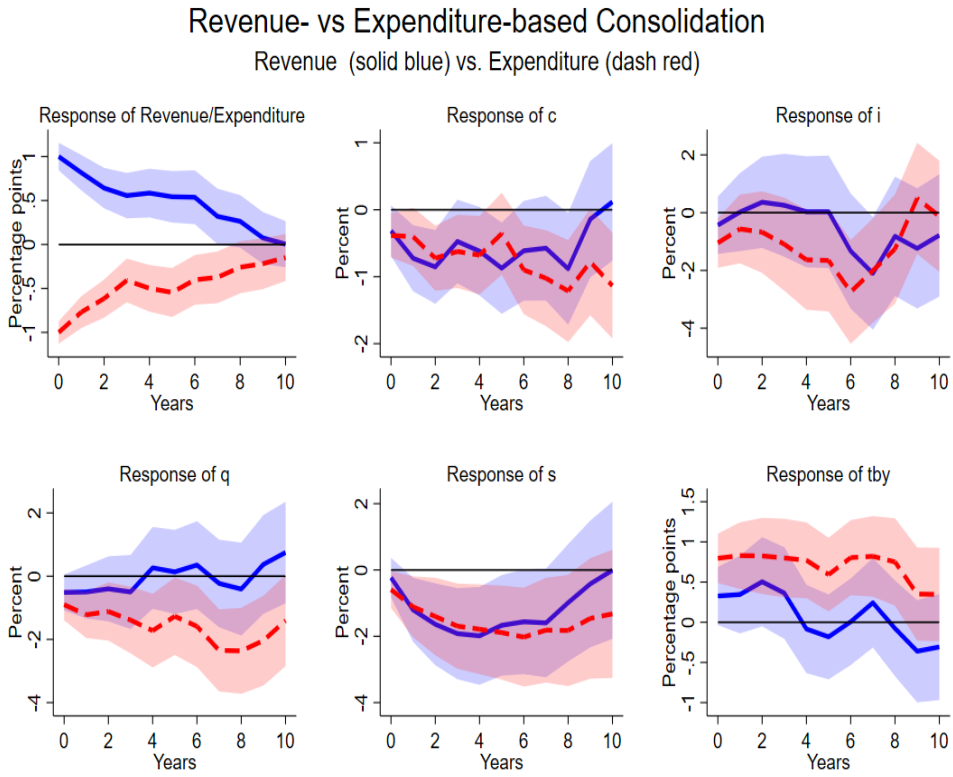
Appendix

Appendix A

Figure 16: Effects of Revenue and Expenditure-Based Consolidation Shocks: Components and Relative Prices



Notes: c = Private Consumption, i = Total Investment, tby = Trade-to-GDP, q = Terms of Trade, and s = Bilateral US Dollar Exchange Rate.
All variables are in log levels (2015=1), except tby which tby which is in percentage ratio.
The shock is normalised to a 1% increase in primary balance-to-GDP. Shaded area is 90% confidence bands.

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