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Government Expenditure and Inflation Vis-À-Vis Trade Balance in Sub-Saharan Africa

Patrick Kagambo John Nahabwe[1,2], *Willy Rwamparagi Kagarura[1]
[1]Mbarara University of Science and Technology, Uganda
[2]Kabale University, Uganda
Email: *wkagarura@kab.ac.ug
Corresponding Author: Willy Rwamparagi Kagarura

Abstract: We investigate the interaction effect of government expenditure and inflation on the trade balance in Sub-Saharan Africa (SSA). We utilize balanced annual panel data for 20 SSA countries over the period 2005 to 2024 sourced from the World Development Indicators. We apply the Generalized Method of Moments (GMM) estimator to control for endogeneity, unobserved heterogeneity, and the dynamic nature of trade balance adjustment. Empirical results indicate a positive and statistically significant interaction between government expenditure and inflation. The estimated coefficient of the interaction term (GEX*INF) is 0.033026, implying that a simultaneous 10 percent increase in government expenditure and inflation improves trade balance by approximately 0.33 percent. This suggests that, in SSA, expansionary fiscal policy combined with moderate inflation can enhance trade balance performance, likely through increased domestic output, improved competitiveness, and reduced import dependence. We recommend coordinated fiscal-monetary policy frameworks that emphasize productive public spending and inflation control to strengthen external sector sustainability.

Keywords: *GMM, Government expenditure, Inflation, Trade Balance, SSA*

1. Introduction

Sub-Saharan Africa (SSA) has historically occupied a central position in global trade, long before the advent of modern capitalism and colonial integration. In ancient times, Africa, particularly North and East Africa, functioned as a major global food and commodity hub. Biblical and historical records indicate that ancient Jewish communities relied on grain imports from Egypt during periods of famine, with Egypt, Sudan, and Ethiopia serving as surplus-producing agrarian economies supplying cereals to the wider Mediterranean and Near Eastern world (Hopkins, 2019; Austin, 2008). These early trade linkages underscore Africa's long-standing productive capacity and integration into global exchange networks.

From the early centuries CE, the Trans-Saharan trade connected West and North Africa, facilitating the exchange of gold, salt, ivory, hides, kola nuts, and textiles, while linking African economies to Europe and the Middle East (Austen, 1987; Lovejoy, 2011). Similarly, the East African long-distance trade anchored along the Swahili Coast connected SSA to Arabia, Persia, India, and China through Indian Ocean trade routes, with exports including spices, ivory, gold, iron tools, and agricultural products (Alpers, 2014). The opening of the Cape routes in the late fifteenth century further integrated SSA into global commerce, intensifying the flow of commodities between Africa, Europe, and Asia (Findlay & O'Rourke, 2007).

However, Africa's trade structure was fundamentally transformed during the Trans-Atlantic trade era, which reoriented production systems toward extractive exports, notably slaves, gold, and raw materials while undermining indigenous manufacturing and agricultural diversification (Rodney, 2002; Acemoglu et al., 2001). Colonial economic systems subsequently entrenched mono-export dependence, import-biased consumption patterns, and weak industrial bases, that is, structural features that continue to shape SSA's trade outcomes today.

In the post-independence period, particularly since the mid-1970s, most SSA economies have experienced a persistent deterioration in trade balance, characterized by rising imports of manufactured goods and capital equipment, volatile export earnings, and chronic current account deficits (UNCTAD, 2019; World Bank, 2024). This deterioration coincided with expansionary fiscal policies, oil price shocks, macroeconomic instability and inflationary pressures, which collectively weakened external competitiveness and import-substitution efforts (Easterly & Levine, 1997; Ndulu et al., 2008).

Despite extensive literature on the determinants of trade balance in developing economies, existing studies largely examine the separate effects of government expenditure and inflation on external sector performance (Edwards, 1989; Frenkel & Razin, 1996; Iyoha, 2000). While government expenditure can stimulate domestic production and export capacity through infrastructure and industrial support, it may also exacerbate import demand if biased toward consumption. Similarly, inflation can either improve trade balance via real exchange rate depreciation or worsen it through cost-push effects and loss of competitiveness (Kamin & Rogers, 2000). However, empirical evidence on the interaction between government expenditure and inflation remains remarkably sparse, particularly in the SSA context.

Our study addresses this critical gap by examining the interaction effect of government expenditure and inflation on trade balance in SSA. Unlike prior studies that treat fiscal and price dynamics independently, this research recognizes that fiscal expansion often operates within inflationary environments in SSA, and that their combined effect may be fundamentally different from their isolated impacts. Understanding this interaction is essential for explaining why large public spending programs have not consistently translated into improved trade outcomes across the region.

The rationale for our study is therefore threefold. Firstly, it responds to the persistent and unresolved problem of SSA's trade balance deterioration since the 1970s. Secondly, it contributes to the literature by providing an integrated fiscal-price framework for analyzing trade balance dynamics. Thirdly, it offers policy-relevant insights for designing coordinated fiscal and monetary strategies capable of restoring Africa's historical role as a competitive and productive participant in global trade.

2. Literature Review

The relationship between government expenditure, inflation, and trade balance is rooted in classical, Keynesian, and structuralist macroeconomic theories. Classical economists, notably Adam Smith, emphasized trade openness, specialization, and fiscal restraint as engines of national wealth. In The Wealth of Nations, Smith (1776) argued that nations prosper by expanding markets, minimizing distortions, and efficiently allocating public resources. While Smith did not explicitly advocate colonization, his emphasis on securing raw materials, expanding markets, and reducing production costs profoundly influenced European mercantilist and later capitalist expansion. These ideas were subsequently invoked often selectively to justify the scramble and partition of Africa, as European powers sought colonies to supply cheap raw materials and absorb manufactured exports, reshaping Africa's trade structure into a primary-commodity-dependent system (Rodney, 2002; Chang, 2002; Acemoglu et al., 2001).

Keynesian theory, by contrast, emphasizes the role of government expenditure in stimulating aggregate demand and productive capacity, particularly during periods of underutilized resources. Expansionary fiscal policy can improve the trade balance if public spending is directed toward infrastructure, industrialization, and export-enhancing sectors (Keynes, 1936; Thirlwall, 1979). However, Keynesian models also recognize that excessive government expenditure may fuel inflation, which can either improve trade balance through real exchange rate depreciation or worsen it by eroding competitiveness, depending on structural conditions.

Monetarist and structuralist theories further refine this nexus. Monetarists argue that inflation primarily reflects excess money supply growth, often exacerbated by fiscal deficits, with adverse implications for external balance (Friedman, 1968). Structuralists, particularly in developing country contexts, emphasize supply rigidities, import dependence, and weak industrial bases, suggesting that inflation and fiscal expansion interact in complex ways that shape trade outcomes (Prebisch, 1950; Frenkel & Taylor, 2006). These perspectives underscore the need to examine government expenditure and inflation jointly, rather than in isolation.

At the global level, empirical studies provide mixed evidence on the effects of government expenditure and inflation on trade balance. Edwards (1989) finds that fiscal expansions in developing economies tend to worsen trade balance when spending is consumption-oriented, but improve it when targeted toward tradable sectors. Similarly, Frenkel & Razin (1996) show that inflation can improve trade balance through real exchange rate adjustments, although persistent inflation undermines export competitiveness in the long run.

Studies employing dynamic panel techniques reveal that the interaction between fiscal policy and inflation is crucial. Bleaney & Greenaway (2001) argue that macroeconomic instability characterized by high inflation and fiscal imbalances significantly weakens trade performance. Afonso & Jalles (2014) demonstrate that productive government expenditure mitigates the negative trade effects of inflation in emerging economies, highlighting the importance of fiscal quality and policy coordination. However, most global studies treat government expenditure and inflation as separate regressors, failing to capture their combined influence on trade balance dynamics, an omission particularly problematic for inflation-prone, fiscally constrained economies.

In developing regions, especially Africa, the literature emphasizes structural vulnerabilities. UNCTAD (2019) and the World Bank (2024) document persistent trade deficits driven by import dependence, commodity price volatility, and limited value addition. Ndulu et al. (2008) argue that post-1970s fiscal expansions in SSA, often financed through deficits and monetary accommodation, contributed to inflationary pressures without commensurate export growth.

Empirical studies specific to SSA yield nuanced findings. Iyoha (2000) finds that government expenditure worsens trade balance in the short run but improves it in the long run when directed toward productive investment. Similarly, Adeniyi et al. (2011) show that macroeconomic policy coordination is critical for improving external sector performance in small open African economies. Kamin & Rogers (2000) note that moderate inflation can enhance trade balance through competitiveness gains, but high inflation reverses these benefits. Despite these insights, empirical evidence on the interaction effect of government expenditure and inflation in SSA remains scarce. Existing studies predominantly focus on exchange rates, export diversification, or terms of trade, leaving a significant gap in understanding how fiscal-price dynamics jointly shape trade balance outcomes.

Country-level studies within SSA further highlight heterogeneity. For example, studies on Nigeria, Ghana, Kenya, and South Africa indicate that expansionary fiscal policy often increases imports due to weak domestic manufacturing capacity (Alege & Ogundipe, 2015; Ssekuma, 2011). Inflationary environments exacerbate this effect by increasing production costs and reducing export competitiveness. However, when government expenditure targets infrastructure and agriculture, some countries experience improvements in trade balance through import substitution and export expansion (Fosu, 2017). These localized findings reinforce the argument that context matters, and that the interaction between government expenditure and inflation is conditioned by structural characteristics common across SSA economies.

The conceptual framework underpinning this study posits that government expenditure and inflation jointly influence trade balance through multiple transmission channels. Government expenditure affects the trade balance directly by stimulating domestic production, infrastructure development, and export capacity, and indirectly by influencing aggregate demand and import consumption. Inflation moderates this relationship by altering relative prices, real exchange rates, and production costs. The interaction between government expenditure and inflation, therefore, determines whether fiscal expansion translates into improved competitiveness or heightened external imbalances.

3. Data and Method

We adopt a quantitative, longitudinal panel research design, appropriate for examining dynamic macroeconomic relationships across countries and over time. The panel framework enables the analysis to exploit both cross-sectional and time-series dimensions of the data, thereby improving estimation efficiency and controlling for unobserved country-specific heterogeneity that may bias results in purely cross-sectional or time-series analyses (Hsiao, 2014; Baltagi, 2021). Given the persistence and potential endogeneity inherent in trade balance dynamics, a dynamic specification is employed, allowing past trade balance outcomes to influence current performance.

We utilize balanced annual panel data for 20 SSA countries (Appendix 12) covering the period 2005 to 2024. Countries are selected based on data availability, consistency, and completeness across all variables of interest, ensuring a balanced panel and minimizing sample selection bias (Wooldridge, 2010). The selected sample

represents diverse SSA sub-regions and income groups, enhancing the generalizability of the findings within the region.

The sampling approach is purposive and criterion-based, justified by the macroeconomic nature of the study and the need for reliable, comparable data across countries and time. This approach is consistent with prior empirical studies on SSA macroeconomic performance that prioritize data quality over sample size (Ndulu et al., 2008; Adeniyi et al., 2011).

Data for all variables are obtained from the World Development Indicators (WDI) of the World Bank, a widely used and credible source for cross-country macroeconomic analysis (World Bank, 2023). The dependent variable is trade balance (TB), measured as exports minus imports in absolute terms (TB = |X - M|), reflects the difference between a country's exports (X) and imports (M) and is a key indicator of a nation's economic health and external sector performance (Krugman et al., 2018; Salvatore, 2016).

The key explanatory variables are government expenditure (GEX), measured as general government final consumption expenditure as a percentage of GDP, and Inflation, consumer prices (annual %) (INF). To capture the joint fiscal-price effect, an interaction term (GEX*INF) is constructed, allowing the study to assess whether the impact of government spending on trade balance is conditional on inflationary pressures.

The core equation for trade balance is specified as:

$$TB_{it} = \alpha_0 + \alpha_1 TB_{it-1} + \beta_1 GEX_{it} * INF_{it} + \varepsilon_{it} \quad \text{.....(1)}$$

Where:
TB_{it} : Trade balance in country *i* at time *t*
TB_{it-1} : Lagged dependent variable capturing trade balance persistence
GEX_{it} : Government expenditure in country *i* at time *t*
INF_{it} : Inflation in country *i* at time *t*
ε_{it} : Error term.

TB and GEX are first transformed using natural logarithms to enhance econometric reliability and interpretability. INF, measured in percentage terms and therefore not log-transformed. Logarithmic transformation compresses large numerical scales and reduces the influence of extreme values, which are common in cross-country macroeconomic data. For instance, while the absolute distance between 10 and 10^{10} is enormous, their logarithmic values differ modestly (from 1 to 10), making relationships more stable and comparable. This transformation also helps linearize potentially nonlinear relationships, mitigate heteroskedasticity, and allows estimated coefficients to be interpreted as elasticities, which is particularly useful for policy analysis in international trade and investment studies (Wooldridge, 2010; Baltagi, 2021).

We employ the Generalized Method of Moments (GMM) estimator developed by Arellano & Bond (1991) difference GMM approach, to estimate the dynamic panel model. GMM is particularly suitable for this analysis for several reasons. Firstly, it effectively addresses endogeneity arising from reverse causality between trade balance and macroeconomic policy variables. Secondly, it controls for unobserved heterogeneity and dynamic panel bias associated with the inclusion of a lagged dependent variable. Thirdly, it is well-suited for panels with small cross-sections and relatively long-time dimensions, a common feature in SSA macroeconomic studies (Roodman, 2009).

Lagged levels of the endogenous variables are used as internal instruments, consistent with standard practice in dynamic panel estimation. The validity of the instruments is assessed using the Hansen test of over-identifying restrictions, while the Arellano–Bond test for serial correlation is employed to ensure the absence of second-order autocorrelation in the differenced residuals.

Data analysis proceeds in several stages. Firstly, descriptive statistics are computed to summarize the distribution and variability of the variables. Secondly, the GMM estimator is applied to estimate the baseline and augmented models. Robust standard errors are reported to account for heteroskedasticity and autocorrelation. Finally, sensitivity analyses are conducted to assess the robustness of the results to alternative specifications and instrument sets.

GMM estimator is expressed as:

$\hat{\theta}_{GMM} = \underset{\theta}{\operatorname{argmin}}[\frac{1}{n}\sum_{i=1}^{n} g(X_i,\theta)]' W_n [\frac{1}{n}\sum_{i=1}^{n} g(X_i,\theta)]$ …….…….. (2)

Where:

$g(X_i,\theta) = \frac{1}{n}\sum_{i=1}^{n} Z_i' \, \varepsilon_i(\theta)$ is the vector of moment conditions,

W_n : A consistent estimate of the weighting matrix,

θ: Vector of structural parameters (Arellano & Bond 1991; Blundell & Bond 1998).

The GMM framework is preferred due to its capacity in handling potential bias from endogenous regressors while accounting for heteroskedasticity and autocorrelation of unknown form (Baltagi, 2021).

4. Results and Discussion

Appendix 1 presents descriptive statistics for the key variables, log of government expenditure (LNGEX) and inflation (INF), based on 400 observations across SSA. The mean value of LNGEX is 21.31, with a relatively low standard deviation of 1.40, indicating moderate dispersion of government expenditure across countries and time. This suggests that public spending levels in SSA are relatively clustered, reflecting comparable fiscal structures and expenditure constraints across the region. Inflation, however, exhibits a mean of 7.35 percent with a substantially higher standard deviation of 7.41, highlighting considerable macroeconomic volatility across SSA economies.

Skewness and kurtosis statistics further reveal important distributional properties. LNGEX displays mild positive skewness (0.53) and near-normal kurtosis (3.63), while inflation is highly right-skewed (2.68) and strongly leptokurtic (13.83), reflecting the presence of extreme inflationary episodes in some countries. The Jarque–Bera statistics confirm rejection of normality for both variables ($p < 0.05$), a common feature of macroeconomic panel data in developing regions characterized by structural breaks, policy regime shifts, and external shocks (Baltagi, 2021; Ndulu et al., 2008).

We examine stationarity of trade balance (LNTB), government expenditure (LNGEX), and inflation (INF) using the Augmented Dickey–Fuller (ADF) unit root test (Appendices 2–7). Results indicate that all variables are non-stationary in levels, as the null hypothesis of a unit root cannot be rejected at conventional significance levels ($p > 0.05$). This confirms the presence of stochastic trends in the series. However, after first differencing, the null hypothesis of a unit root is rejected for each variable ($p < 0.05$), implying that all variables become stationary at first difference, that is, integrated of order one, I(1). These findings justify the adoption of a dynamic panel modeling approach and the use of the GMM, which is well-suited for handling non-stationary macroeconomic variables in panel settings (Arellano & Bover, 1995; Blundell & Bond, 1998).

Generalized Method of Moments (GMM) model results (Appendix 8)

$\widehat{\text{LNTB}} = 0.197344 LNTB_{it-1} + 0.033026\text{LNGEX*INF}$ …..... (3)

Hence,

$$\hat{\theta}_{GMM} = \begin{bmatrix} 0.197344 \\ 0.033026 \end{bmatrix}$$

The estimated trade balance model reveals that the lagged dependent variable, $LNTB_{it-1}$, is positive and statistically significant, with a coefficient of 0.197344. This implies that approximately 19.7 percent of past trade balance performance persists into the current period, confirming the dynamic and path-dependent nature of external sector adjustment in SSA economies. This finding aligns with earlier studies that emphasize trade balance inertia arising from structural rigidities, export concentration, and slow adjustment of production and consumption patterns (Edwards, 1989; Iyoha, 2000).

The core finding of the study is the positive and statistically significant interaction effect between government expenditure and inflation (GEX*INF). The estimated coefficient of 0.033026 indicates that a simultaneous 10 percent increase in government expenditure and inflation improves the trade balance by approximately 0.33 percent, ceteris paribus. This suggests that, within SSA, expansionary fiscal policy operating under moderate

inflationary conditions can enhance trade balance performance. A plausible explanation is that increased government expenditure particularly when directed toward infrastructure, agriculture, and productive sectors stimulates domestic output and import substitution, while moderate inflation improves external competitiveness through real exchange rate adjustments (Frenkel & Razin, 1996; Kamin & Rogers, 2000).

Robustness diagnostics reveal that the residuals deviate from normality, as indicated by a kurtosis value of 4.76 and a Jarque–Bera probability of 0.00 (Appendix 9), leading to rejection of the null hypothesis of normality. Residual plots (Appendix 10) further show that some observations lie outside the confidence bands, suggesting leptokurtic behavior. Such non-normality is typical in macro-panel data for developing economies, where structural breaks, commodity price shocks, and policy discontinuities are prevalent (Baltagi, 2021). Importantly, this deviation from normality does not undermine the validity of the GMM estimates. The GMM estimator does not require normally distributed errors but instead relies on moment conditions and orthogonality assumptions for consistency and efficiency (Arellano & Bond, 1991; Roodman, 2009).

The robustness of the model is further supported by the Hansen J-statistic, whose probability value of 0.427 implies failure to reject the null hypothesis that the instruments are valid. This confirms that the instruments used in the GMM estimation are exogenous and correctly excluded from the estimated equation, indicating the absence of instrument proliferation or over-identification bias (Roodman, 2009).

The Arellano–Bond serial correlation test (Appendix 11) indicates the presence of first-order autocorrelation and the absence of second-order autocorrelation in the differenced residuals. Specifically, the AR(1) statistic is negative and statistically significant ($m = -4.415$, $p < 0.05$), which is expected in first-differenced dynamic panel models and does not signal model misspecification. In contrast, the AR(2) statistic is not significant, confirming that the moment conditions are correctly specified and that the model is dynamically stable (Arellano & Bond, 1991).

Our findings are broadly consistent with previous empirical evidence that highlights the importance of fiscal policy and macroeconomic stability in shaping trade balance outcomes (Edwards, 1989; Iyoha, 2000; Adeniyi et al., 2011). However, the present study advances the literature by explicitly modeling the interaction between government expenditure and inflation, rather than treating them as independent determinants.

Unlike earlier studies that often report adverse trade effects of inflation or fiscal expansion in isolation, this study demonstrates that their combined effect can be trade-enhancing in the SSA context when inflation remains within manageable thresholds. This interaction-based insight constitutes a key novelty of the study and provides a more nuanced explanation for the mixed trade balance outcomes observed across SSA since the mid-1970s.

Limitations

Despite the rigorous design and robust econometric techniques employed, our study is subject to several limitations that should be acknowledged when interpreting the findings.

Firstly, we adopt a quantitative macro-panel research design, which, while appropriate for identifying broad regional patterns, inherently abstracts from country-specific institutional, political, and structural nuances. Sub-Saharan Africa is highly heterogeneous in terms of fiscal capacity, monetary frameworks, and trade structures. Consequently, the estimated coefficients represent average effects and may mask important country-level variations that could influence the government expenditure–inflation–trade balance nexus (Hsiao, 2014; Ndulu et al., 2008).

Secondly, the sample selection is constrained to 20 SSA countries over the period 2005 to 2024, primarily due to data availability and completeness. Although this balanced panel enhances econometric reliability, it necessarily excludes countries with weak statistical systems or incomplete reporting. This introduces a potential sample selection bias, as the excluded countries may exhibit more severe macroeconomic instability or trade imbalances, potentially affecting the external validity of the results (Wooldridge, 2010).

Thirdly, our study relies exclusively on secondary data from the World Development Indicators, which, while widely regarded as credible, are subject to measurement errors, revisions, and reporting inconsistencies particularly for inflation and government expenditure in low-income economies. Such data limitations may introduce attenuation bias and reduce the precision of the estimated coefficients (Deaton, 1997).

Fourthly, the measurement of government expenditure as aggregate government final consumption expenditure does not capture differences in the composition and efficiency of public spending. Productive expenditure on infrastructure, agriculture, or industrial support may affect the trade balance differently from recurrent or consumption-oriented spending. Similarly, inflation is measured using headline consumer price indices, which may not fully reflect producer-level price dynamics or sector-specific inflationary pressures relevant for trade competitiveness (Afonso & Jalles, 2014; Easterly, 2005).

Fifthly, although we employ the GMM estimator to address endogeneity, dynamic persistence, and unobserved heterogeneity, the method itself is not without limitations. GMM estimates can be sensitive to instrument choice, lag structure, and instrument proliferation, which may weaken the Hansen test and bias results in finite samples. While this study mitigates these concerns by limiting the instrument count and conducting standard diagnostic tests, some residual risk of instrument-related bias remains (Roodman, 2009; Baltagi, 2021).

Finally, the analysis does not explicitly account for structural breaks arising from major external shocks such as the global financial crisis, commodity price collapses, or the COVID-19 pandemic. These events may have altered fiscal behavior, inflation dynamics, and trade performance in ways not fully captured by the model. Future research could extend the analysis by incorporating regime-switching models, structural break tests, or country-specific case studies to enrich the understanding of these dynamics.

5. Conclusion and Recommendations

We set out to deepen understanding of the persistent trade balance challenges facing Sub-Saharan Africa by examining how fiscal policy and price dynamics jointly shape external sector performance. Anchored in classical, Keynesian, and structuralist perspectives, and motivated by Africa's long-standing integration into global trade followed by sustained post-independence external imbalances, we offer a comprehensive reassessment of the government expenditure–inflation–trade balance nexus within a dynamic macroeconomic framework.

By adopting a regional panel approach and a dynamic estimation strategy suited to endogeneity-prone macroeconomic relationships, we move beyond fragmented analyses that isolate fiscal or inflationary effects. Instead, we demonstrate the importance of policy interactions in explaining trade outcomes in structurally constrained economies. This interaction-based perspective advances the literature by reconciling previously mixed empirical findings and highlighting the conditional nature of fiscal effectiveness in inflationary environments common across Sub-Saharan Africa.

From a policy standpoint, our study underscores that trade balance sustainability in SSA cannot be achieved through isolated fiscal expansion or inflation control alone. Rather, it requires coordinated macroeconomic management in which public expenditure is strategically aligned with productive capacity, competitiveness, and structural transformation objectives. Such coordination is particularly critical in economies characterized by import dependence, narrow export bases, and vulnerability to external shocks (Ndulu et al., 2008; UNCTAD, 2019).

Beyond its immediate policy relevance, our study contributes methodologically by demonstrating the suitability of dynamic panel techniques for analyzing external sector dynamics in developing regions, while also acknowledging the importance of historical and structural contexts in shaping contemporary trade outcomes. In doing so, we bridge empirical macroeconomics with Africa's political economy of development. Overall, our study reaffirms that restoring Sub-Saharan Africa's trade competitiveness and external balance is less a question of fiscal scale than of fiscal quality and macroeconomic coherence.

Recommendations

Drawing from the empirical insights and overarching conclusions of our study, the following recommendations are proposed to guide policymakers, development practitioners, and researchers toward improving trade balance sustainability in Sub-Saharan Africa (SSA).

Firstly, governments in SSA should pursue coordinated fiscal-monetary policy frameworks that explicitly recognize the interaction between government expenditure and inflation in shaping external sector outcomes. Rather than treating fiscal expansion and inflation control as independent policy domains, macroeconomic authorities should adopt integrated policy stances that align public spending decisions with price stability objectives to enhance trade competitiveness (Frenkel & Razin, 1996; Ndulu et al., 2008).

Secondly, fiscal policy should prioritize productive and trade-enhancing expenditure. Public spending should be strategically directed toward infrastructure, agriculture, agro-processing, manufacturing, and logistics—sectors with strong potential for export expansion and import substitution. Such expenditure improves domestic supply capacity and reduces the inflationary import dependence that undermines trade balance performance (Afonso & Jalles, 2014; UNCTAD, 2019).

Thirdly, monetary authorities should aim to maintain moderate and predictable inflation rather than excessively contractionary policies that suppress productive investment. Moderate inflation, when accompanied by productive government expenditure, can support real exchange rate competitiveness and stimulate domestic production without eroding external balance sustainability (Kamin & Rogers, 2000; Blanchard, 2017).

Fourthly, SSA countries should strengthen fiscal discipline and public expenditure efficiency through improved budgetary institutions, medium-term expenditure frameworks, and performance-based budgeting. Enhancing spending efficiency ensures that fiscal expansion translates into real sector productivity gains rather than consumption-driven import surges (Easterly, 2005; World Bank, 2023).

At the program level, governments should design and scale up sector-specific public investment programs that directly target trade-related constraints. Priority programs include transport and energy infrastructure development, agricultural value-chain upgrading, export-oriented industrial parks, and trade facilitation initiatives. These programs enhance the transmission of fiscal spending into improved trade outcomes (Rodrik, 2008; UNIDO, 2020).

Additionally, regional economic communities in SSA should intensify regional trade integration programs that leverage coordinated public spending to reduce trade costs and expand intra-African trade. Harmonized fiscal and inflation management frameworks under initiatives such as the African Continental Free Trade Area (AfCFTA) can amplify the trade-enhancing effects of government expenditure across borders (UNECA, 2021).

Furthermore, capacity-building programs for fiscal and monetary institutions should be strengthened to improve macroeconomic policy coordination, data quality, and analytical capabilities. Such institutional investments are critical for translating macroeconomic policy interactions into sustained improvements in trade balance performance (IMF, 2018).

Future research could extend the present analysis by disaggregating government expenditure by functional and economic classification to examine how different types of spending such as capital versus recurrent, social versus economic interact with inflation to influence trade balance dynamics. This would provide more granular policy guidance on expenditure prioritization (Afonso & Jalles, 2014).

Further studies may also explore country-specific and sub-regional heterogeneity using panel-threshold models, regime-switching approaches, or case-study methodologies. Such analyses would help identify inflation thresholds beyond which fiscal expansion becomes trade-distorting rather than trade-enhancing (Hansen, 1999; Kremer et al., 2013).

Finally, future research could incorporate structural breaks and external shocks, such as commodity price cycles, financial crises, and pandemics, to better understand how the fiscal–inflation–trade balance relationship evolves under changing global and domestic conditions. Integrating political economy and institutional variables would further enrich the understanding of SSA's external sector dynamics.

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APPENDICES

Appendix 1: Descriptive statistics

	LNGEX	INF
Mean	21.30859	7.352015
Median	21.34483	5.692725
Maximum	25.14656	57.87695
Minimum	18.25531	0.040486
Std. Dev.	1.400755	7.41004
Skewness	0.527748	2.684718
Kurtosis	3.631006	13.82972
Jarque-Bera	25.20401	2435.227
Probability	0.000003	0
Sum	8523.436	2940.806
Sum Sq. Dev.	782.8835	21908.57
Observations	400	400

Appendix 2: Unit root test, LNTB (in Level)

Panel unit root test: Summary
Series: LNTB
Date: 12/23/25 Time: 03:14
Sample: 2005 2024
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-3.36325	0.0004	20	360
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-0.78989	0.2148	20	360
ADF - Fisher Chi-square	50.4277	0.1249	20	360
PP - Fisher Chi-square	58.0121	0.0326	20	380

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Appendix 3: Unit root test, LNTB (in first difference)

Panel unit root test: Summary
Series: D(LNTB)
Date: 12/23/25 Time: 03:13
Sample: 2005 2024
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-8.17086	0.0000	20	340

Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-6.35184	0.0000	20	340
ADF - Fisher Chi-square	112.028	0.0000	20	340
PP - Fisher Chi-square	146.681	0.0000	20	360

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Appendix 4: Unit root test, LNGEX (in Level)

Panel unit root test: Summary
Series: LNGEX
Date: 12/27/25 Time: 08:04
Sample: 2005 2024
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-2.74757	0.0030	20	360
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	0.14779	0.5587	20	360
ADF - Fisher Chi-square	48.8793	0.1584	20	360
PP - Fisher Chi-square	69.4819	0.0026	20	380

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Appendix 5: Unit root test, LNGEX (in first difference)

Panel unit root test: Summary
Series: D(LNGEX)
Date: 12/27/25 Time: 08:05
Sample: 2005 2024
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-8.08906	0.0000	20	340
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-6.27348	0.0000	20	340
ADF - Fisher Chi-square	115.028	0.0000	20	340
PP - Fisher Chi-square	203.967	0.0000	20	360

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Appendix 6: Unit root test, INF (in Level)

Panel unit root test: Summary
Series: INF
Date: 12/27/25 Time: 08:06
Sample: 2005 2024
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	6.93810	1.0000	20	360
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	2.07029	0.9808	20	360
ADF - Fisher Chi-square	44.6631	0.2822	20	360
PP - Fisher Chi-square	62.3750	0.0133	20	380

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Appendix 7: Unit root test, INF (in first difference)

Panel unit root test: Summary
Series: D(INF)
Date: 12/27/25 Time: 08:07
Sample: 2005 2024
Exogenous variables: Individual effects
User-specified lags: 1
Newey-West automatic bandwidth selection and Bartlett kernel
Balanced observations for each test

Method	Statistic	Prob.**	Cross-sections	Obs
Null: Unit root (assumes common unit root process)				
Levin, Lin & Chu t*	-6.60452	0.0000	20	340
Null: Unit root (assumes individual unit root process)				
Im, Pesaran and Shin W-stat	-7.56337	0.0000	20	340
ADF - Fisher Chi-square	149.991	0.0000	20	340
PP - Fisher Chi-square	684.903	0.0000	20	360

** Probabilities for Fisher tests are computed using an asymptotic Chi -square distribution. All other tests assume asymptotic normality.

Appendix 8: Generalized Method of Moments (GMM) model results

Dependent Variable: D(LNTB)
Method: Panel Generalized Method of Moments
Transformation: First Differences
Date: 12/27/25 Time: 08:46
Sample (adjusted): 2008 2024
Periods included: 17
Cross-sections included: 20
Total panel (balanced) observations: 340
White period (period correlation) instrument weighting matrix
White period (cross-section cluster) standard errors & covariance (d.f. corrected)

Standard error and t-statistic probabilities adjusted for clustering
Instrument specification: @DYN(D(LNTB),-2) D(LNGEX)*D(INF) (-1)
Constant added to instrument list

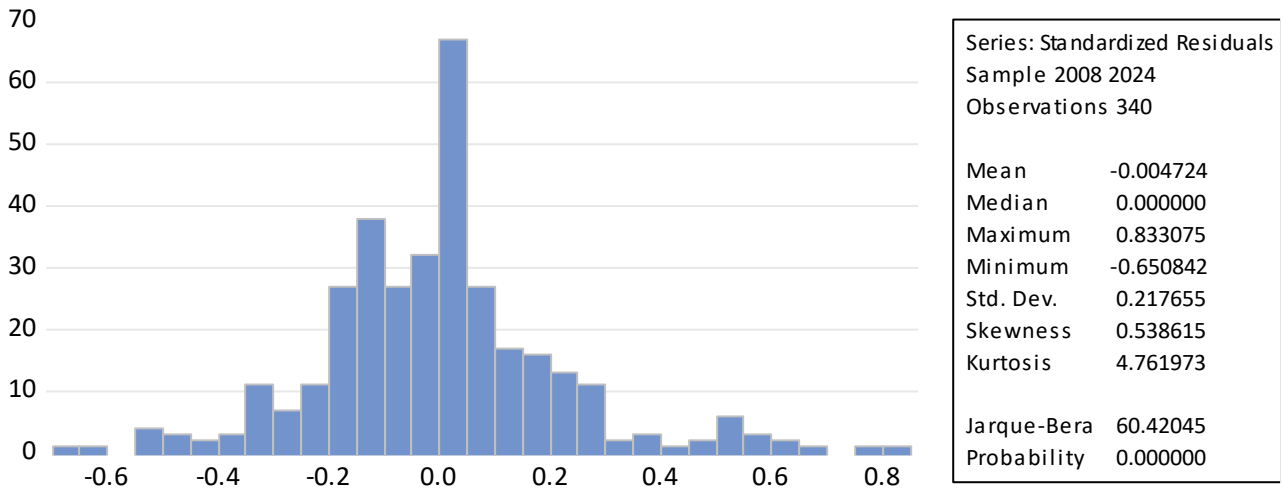
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNTB(-1))	0.197344	0.019376	10.18477	0.0000
D(LNGEX)*D(INF)	0.033026	0.001346	24.54325	0.0000

Effects Specification

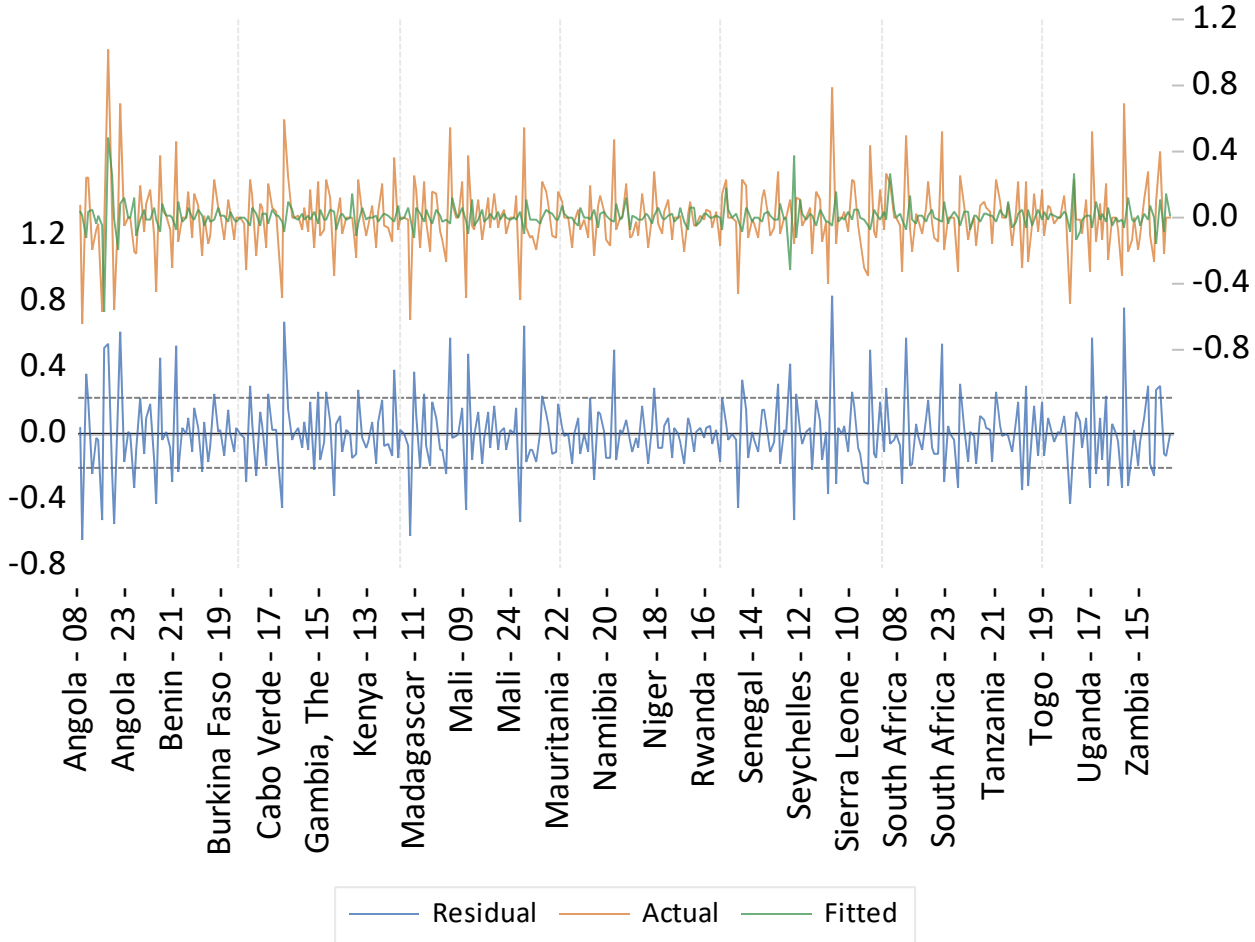
Cross-section fixed (first differences)

Mean dependent var	-0.003348	S.D. dependent var	0.206568
S.E. of regression	0.218028	Sum squared resid	16.06728
J-statistic	18.43366	Instrument rank	20
Prob(J-statistic)	0.427447		

Appendix 9: Normality test



Appendix 10: Graph of residuals



Appendix 11: Serial Correlation Test

Arellano-Bond Serial Correlation Test
Equation: Untitled
Date: 12/27/25 Time: 08:53
Sample: 2005 2024
Included observations: 340

Test order	m-Statistic	rho	SE(rho)	Prob.
AR(1)	-4.415369	-6.310750	1.429269	0.0000
AR(2)	NA	-2.574267	NA	NA

*Standard errors could not be computed. Try different covariance matrix options

Arellano-Bond Serial Correlation Test
Equation: Untitled
Date: 12/27/25 Time: 08:53
Sample: 2005 2024
Included observations: 340

Test order	m-Statistic	rho	SE(rho)	Prob.
AR(1)	-4.415369	-6.310750	1.429269	0.0000
AR(2)	NA	-2.574267	NA	NA

*Standard errors could not be computed. Try different covariance matrix options

Appendix 12: List of Sub-Saharan Africa countries in the study

Angola	Gambia, The	Mauritania	Senegal	Tanzania
Benin	Kenya	Namibia	Seychelles	Togo
Burkina Faso	Madagascar	Niger	Sierra Leone	Uganda
Cabo Verde	Mali	Rwanda	South Africa	Zambia