



Security Spending and Economic Performance in Sub-Saharan Africa: Assessing the Nexus between Defence Allocation and Growth

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Abstract

Original Research Article

Sub-Saharan Africa has seen alarming increases in security issues in recent years, which has imposed significant fiscal strains on governments, and negatively impacted economic stability and sustainable development. The study analyzed the effect of security expenditure on economic growth in 45 Sub-Saharan African countries for the period 2000–2024 with the help of Panel Autoregressive Distributed Lag (Panel ARDL) model. The model reflects the dynamic short-run and long-run characteristics of the security-expenditure/economic-growth relationship and includes control variables, including gross fixed capital formation, institutional quality, and trade openness. The empirical results confirm that both short-term and long-term security spending have a positive and statistically significant impact on economic growth, indicating that improving the security situation leads to political stability, greater investor confidence and enables productive economic activities. The positive and significant long-run impact on economic growth is also supported by the gross fixed capital formation, which illustrates the importance of infrastructure development and capital investment in supporting economic growth. In contrast, the quality of institutions is negatively related to economic growth, suggesting that poor governance remains a major constraint on economic development in the region and will require sustained efforts to address it, particularly by tackling corruption, weak institutions, and poor regulatory systems. Moreover, the positive and significant relationship found between trade openness and economic growth further supports the positive impacts of more openness to the global economy via trade and investment. The study suggests that balanced policy mix of providing adequate security investment along with thorough institutional reforms and improved trade integration is needed to ensure sustainable economic growth in Sub-Saharan Africa. It thus calls for greater governance, greater transparency and accountability in security spending, greater institutional effectiveness, and the greater integration of regional and international trade to ensure long-term economic stability, inclusive growth and sustainable development.

Keywords: Security Expenditure, Economic Growth, Sub-Saharan Africa, Institutional Quality, Trade Openness, Gross Fixed Capital Formation, Panel ARDL Model, Sustainable Development.

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1. INTRODUCTION

In areas with ongoing political unrest and violent conflict, security is now a basic requirement for any sort of economic growth and development. Over the

past few decades, Sub-Saharan Africa (SSA) has faced a myriad of security issues such as terrorism, insurgency, communal violence, armed conflict, political unrest, piracy and transnational organized crime. They have severely hindered the socio-



economic development through production and production-related disruptions, the discouragement of domestic and foreign investments, the damage of infrastructures, and the erosion of institutional capacities. As a result, all governments in the region have significantly raised their defense spending and the cost of internal security to ensure the security of the nation and provide a conducive atmosphere for productive economic activities. Military spending in Sub-Saharan Africa was estimated to be more than US\$23 billion in 2023, with a rise in growth over the past 20 years (Stockholm International Peace Research Institute (SIPRI), 2024). Unarguably, good security spending is necessary to ensure peace and secure productive assets; however, the rising cost of security has led to concerns about the possible defections of public resources to other critical need areas, including education, healthcare, infrastructure and social welfare (Dunne & Tian, 2015).

Despite Sub-Saharan Africa's rich natural resource base and its significant potential for development, the economic growth in the region has seen uneven gains. In a few countries, including Rwanda, Ghana, and Kenya, the institutional changes and investment-friendly policies have allowed for relatively strong economic growth, but in others, including Nigeria, Sudan, the Democratic Republic of Congo, Mali, and Burkina Faso, economic growth remains stagnant in the face of growing insecurity. Ongoing violence affects agricultural and industrial productivity, hinders domestic and foreign trade, decreases tourism income, raises transaction costs, and decreases investor confidence. The negative impacts eventually hampers productivity, capital formation and long-term economic growth. As a result, governments often allocate more funds to security, with the aim of ensuring stability and security for economic activities. But it is unclear how such spending will affect the development process. Increasing security investments can enhance economic performance through a more peaceful environment and the return of investor confidence, yet the allocation of scarce fiscal resources to security may reduce the amount of public investment in productive sectors and limit long-run economic growth (Aizenman & Glick, 2019). This uncertainty still leads to much debate among policymakers and

researchers.

There are conflicting theoretical arguments supporting the connection between spending on security and economic growth. According to the Keynesian expenditure hypothesis, government expenditure (such as defence and security) leads to increases in aggregate demand, employment, and economic growth due to the multiplier effects of spending. There is, from this point of view, a link between security spending and economic performance, as expenditures on security can improve political stability, protect productive assets and provide the encouragement for domestic and foreign investment. The other side of the argument, the crowding-out hypothesis, argues that overfunding public security leads to a substitution of limited financial resources for other government spending on long-term productive areas like education, healthcare, infrastructure and technological development, which will harm long-term economic growth (Dunne, Smith, & Willenbockel, 2005). Such theoretical rivalries are especially relevant in Sub-Saharan Africa where the fiscal resources are limited, levels of public debt have continued to climb, and demands on governments to spend on national security and development have grown. The security threats in Nigeria (Boko Haram insurgency), East Africa (Al-Shabaab), the Democratic Republic of Congo (DRC) and the constant unrest in the Sahel further highlight the significance of the growth implications of spending on security.

Empirical evidence on the security expenditure–economic growth nexus remains inconclusive. There are a number of studies that have found that security spending is a positive contributor to economic growth through enhanced political stability and overall aggregate demand. In the short term, for instance, in countries with a high sense of insecurity, defense spending is found to positively impact economic growth (Abu-Bader and Abu-Qarn, 2018). Others, however, have suggested that continued growth in defense spending can actually lead to a decline in long-run economic growth through crowding out of productive public investment and increasing fiscal holes. For example, Hou and Chen (2021) found that high military spending in the long

term has negative impacts on economic performance, due to investment in human capital and infrastructure. The discrepancies in empirical evidence found in the literature are mainly due to varying models, samples, estimation methods, institutional environments, and the time period analyzed. Most importantly, empirical research on Sub-Saharan Africa is still somewhat limited and frequently uses shorter time series, a smaller number of countries, and econometric models that are not well suited to differentiate between short run and long run dynamics. Thus, there are significant questions about the dynamic effects of security spending on economic growth in Africa's economies that remain unanswered.

In this context, this research examines the effect of security spending on economic growth in 45 Sub-Saharan African nations from 2000 to 2024. The chosen period reflects some major political and economic events such as the escalation of terrorism and insurgency in the early 2000s, rising regional conflict in the 2010s, and economic consequences of the COVID-19 crisis and recovery. It is relevant to conduct this analysis in the context of Sub Saharan Africa due to its varied economies, institutional capacities, security threats and public expenditure patterns. It, therefore, provides valuable insights into whether or not the more an economy invests in security, the longer it can sustain economic growth or the more inefficient it becomes in how it allocates limited public funds.

This paper has three significant contributions to the existing literature. First, it offers one of the most broad-based regional analyses of the link between security spending and economic growth in Sub-Saharan Africa based on an extended panel dataset of security spending data for 45 countries between 2000 and 2024. The study presents recent developments in the security situation, fiscal policy and economic performance in the region when compared with previous studies based on smaller samples or shorter time periods. Second, the study uses the Panel Autoregressive Distributed Lag (Panel ARDL) model developed by Pesaran, Shin, and Smith (1999) which estimates both the short-run and long-run relationships between the variables and allows for the presence of variables with $I(0)$ and $I(1)$ orders of

integration. The Panel ARDL approach also considers country-specific heterogeneities, and has been shown to yield more accurate estimates of the dynamic relationship between security spending and economic growth. Third, the study adds key macroeconomic control variables such as gross fixed capital formation, institutional quality, and trade openness to increase robustness of the study and mitigate omitted variable bias, yielding more robust and policy-relevant results.

Governments, regional organizations, and international development partners looking to support sustainable economic development in Sub-Saharan Africa will have policy implications in light of the findings of this study. Proper security spending is necessary for peace, investment protection, and for facilitating economic activities, but too much or inefficient spending on security could limit fiscal room for investments in infrastructure, education, health care, and other productive sectors and activities. Hence, it is important to find the right balance between the cost of security and cost of developmental investment to ensure that the region can sustain economic growth, macroeconomic stability and inclusive development.

The rest of this paper is structured as follows: In Section 2, the theoretical and empirical literature is reviewed. The data, variables and research methodology are described in Section 3. The empirical findings are presented and discussed in Section 4 and the conclusion and policy recommendations are given in Section 5.

2. LITERATURE REVIEW

The security–economic growth nexus has been explored in both theoretical and empirical studies. Empirical results, however, are not yet conclusive as some studies report positive, others report negative, insignificant, and others report nonlinear results, depending on the institutional environment, the level of economic development, estimation methods, and the type of security threats. In general, the literature can be categorized in two opposing views. The first holds that spending on security contributes to the improvement of economic growth, as it enhances political stability, the protection of productive assets,

the investor's confidence, and the safe environment for investment and economic activity. The latter argues that spending too much on security takes up public resources that could otherwise be invested in education, healthcare, infrastructure, and other areas of the economy that are more productive, hence crowding out economic growth in the long-term. Early empirical research was largely in favor of the crowding-out hypothesis. Abu-Bader and Abu-Qarn (2003) studied the relationship between defense spending and economic growth for Egypt, Israel and Syria and found that defense spending crowded out productive investment thereby reducing long-term economic growth for these three countries. Likewise, using a dynamic heterogeneous panel model for 106 countries from 1988-2010, Dunne and Tian (2015) showed that while military spending had short-term demand stimulating effects, these effects in the long run were mostly negative for developing economies and especially Sub-Saharan Africa. They conclude that fiscal resources devoted to defense are negatively impacted by continuing to expand defense spending and thereby diminishes the fiscal resources available for infrastructure, education, and other growth-enhancing activities.

This is broadly supported by the evidence from the African economies though there is significant variation between economies. Abu and Abdullahi (2013) examined the impact of military spending on economic growth in Nigeria, and their study showed that military spending has a significant negative long-run relationship with economic growth in Nigeria due to the diversion of the government's resources into military spending. Similarly, Oyinlola (2020) found in the case of West African countries that an increase in security spending hurt economic growth, especially among the countries with weak institutions and fiscal problems. Bua and Osei (2020) also came to a similar finding that Military spending crowded out economic growth in twelve West African countries. Kinyua and Thuku (2021) found that there is no significant relationship between defense expenditure and economic growth in Kenya, which is because defense procurement systems are inefficient, corruption and the lack of accountability mechanisms. However, other literature suggests that spending on security can

actually be a catalyst for economic growth, especially in situations where there is a high level of security risk. In a cross country study of 106 countries, Aizenman and Glick (2006) concluded that the growth impact of defence spending is positive only in countries with a high level of external security threats. Likewise, Hou and Chen (2014) found a positive long-term relationship between security spending and economic growth for 55 countries, while a positive short-term relationship in the same direction for the same countries, using a dynamic panel model. This is supported by Yildirim, Sezgin, and Öcal (2005) who identified positive short-term growth impacts in 10 of the African countries, claiming that budget allocations for national security are stabilizing mechanisms that can lure investment from either domestic or foreign sources in politically volatile environments.

A few recent empirical studies indicate that the link between security spending and economic growth is not always a positive or a negative one. Knight, Loayza, and Villanueva (2017) showed that there is a relationship between efficient country governance and security spending and successful economic performance. Similarly, Collier and Hoeffler (2007) maintained that post-conflict economies can gain from a "security dividend," in which more funding of defense can lead to economic activity, institution-building, and economic stabilization. The results suggest that governance quality, institutional effectiveness and public resource management efficiency are important factors that influence the effectiveness of security spending. Recent studies in Africa confirm the significance of institutional quality as a factor. For Sub-Saharan Africa from 1995 to 2019, Adebayo and Ogundipe (2021) estimated the effect of security expenditure on economic growth with a System-GMM estimator and concluded that in the short run, security expenditure had a positive impact on economic growth, while in the long run, it had a negative impact due to fiscal crowding-out. In a similar study, Solomon and Asante 2022 used panel cointegration methodology on 30 African nations to conclude that there was no statistically significant long-run relationship between the two variables, meaning that there are inefficiencies in defense resource

allocation. Additionally, the positive relationship between military spending and economic growth is found only at a certain point of institutional quality, as shown by Gnidehou and Fatou (2025). To the extent that defense spending falls below this level, defense spending becomes growth-draining because of corruption and weak government and public finance management. In line with this finding, using a heterogeneous panel framework, Efayena, Akpotor, and Erhabor (2024) found significant variation across countries in ECOWAS. These findings suggest that, in more stable economies, such as Ghana and Senegal, spending on security was a catalyst for economic growth, while in economies where security concerns and institutional shortcomings are pervasive, like Nigeria and Mali, they were an inhibitor.

The security expenditure–growth relationship is also dynamic, as seen in the country-specific evidence from Nigeria. Based on an ARDL-VECM framework, Odeno and Maduechesi (2024) found that military spending both contracted the economy in the short run and expanded the economy in the long run, noting that the economy benefits from better security in the long run through increased investment and economic growth. Likewise, Raifu (2022) using VAR-ARDL model, determined that military spending first crowded out private investment but had positive long run impacts because of the political stability created by military spending and the investor confidence. The results highlight the need to consider the short-term and long-term effects when examining the security and economic growth nexus. A distinction can be made between the growth impact of defense spending and macroeconomic trends, as evidenced from outside Africa. Raifu and Aminu (2023) analyzed the impact of military spending on economic growth in the Middle East and North Africa (MENA) region using Method of Moments Quantile Regression on 19 countries, and their results indicated that military spending positively affected economic growth only in countries with intermediate and high growth rates, while having no significant effect in countries with low growth rates. Similarly, Iqbal and Shah (2022) examined the relationship between defense expenditure and the long-run growth of the economy

for 20 developing Asian economies by applying the Panel ARDL model and found a positive effect for the long-run growth of the economy through the technological spillovers and then the increase of human capital, while excessive defense spending in the short-run period created fiscal deficit and inflationary pressures.

Overall, the empirical evidence suggests that the impact of security spending on economic growth is very sensitive to the institutional setting, fiscal governance, political stability and management efficiency of public expenditure. Some studies indicate positive relationships, while others show negative or insignificant relationships, due to variations in economic structure, institutional capacity, sample size, and estimation techniques. Inconsistencies in the results indicate that a general statement about the growth impact of security spending cannot be made.

Although a large number of empirical studies have emerged, there are a number of important gaps. Secondly, there are relatively few studies that look at a wide cross-section of Sub Saharan African countries across a longer time period which includes recent events such as the spread of terrorism, regional conflicts, fiscal pressures due to COVID-19 and economic recovery. Second, the previous literature has mainly used estimation techniques like fixed effects, System-GMM, Vector Error Correction Models (VECM), and panel cointegration methods despite the fact that some of these methods are not fully applicable in the context of a heterogeneous panel of variables with different orders of integration, the Panel Autoregressive Distributed Lag (Panel ARDL) model has received little attention. Third, many studies in existence concentrate on direct links between security spending and economic growth and pay less attention to other macroeconomic variables which could affect the impact of security spending, such as institutional quality, trade openness, gross fixed capital formation, etc.

This background, the present study examines the effect of security spending on economic growth of 45 Sub-Saharan African countries for the period 2000-2024 under the framework of Panel Autoregressive

Distributed Lag (Panel ARDL) model. The inclusion of institutional quality, trade openness, and gross fixed capital formation as control variables aids in a more complete analysis of the security expenditure–economic growth relationship, both in the short run and the long run. The study does so, adding new empirical evidence to a debate on the effects of security spending on sustainable economic growth in Sub-Saharan Africa.

3. METHODOLOGY

This study focuses on the effects of security spending on economic growth in 45 countries in Sub-Saharan Africa (SSA) from 2000 to 2024. It also explores the

question of whether institutional quality has an impact on the security growth relationship. The countries selected for the sample were based on availability of data, geographic diversity in West, East, Central and Southern Africa and the level of security concerns such as terrorism, insurgency, armed conflict and political instability. The World Development Indicators (WDI), the World Governance Indicators (WGI) and the Stockholm International Peace Research Institute (SIPRI) Military Expenditure Database provided annual panel data. To achieve complete and consistent observations for all the selected countries over the 25 year study period, a balanced panel data set was created to increase the reliability and robustness of the empirical analysis.

Table 1: Variables Definition

Variable	Definition	Source
Economic Growth (GDP)	Measured as the annual growth rate of real Gross Domestic Product per capita, reflecting the overall performance of an economy.	World Development Indicators (WDI)
Security Expenditure (SEXP)	Refers to total national defense and internal security spending, expressed as a percentage of GDP, capturing government commitment to national security and defense.	SIPRI Military Expenditure Database, WDI
Institutional Quality (IQ)	Composite index of governance effectiveness, rule of law, political stability, and control of corruption.	World Governance Indicators (WGI)
Gross Fixed Capital Formation (GFCF)	Proxy for investment, measured as a percentage of GDP, representing the level of capital accumulation.	World Development Indicators (WDI)
Trade Openness (TRADE)	Sum of exports and imports as a percentage of GDP, capturing the effect of international trade on economic performance.	World Development Indicators (WDI)

3.1 Model Specification

The empirical model used in this study is based on the dynamic growth model proposed by Deger and

Sen (1983) and later extended by Raifu (2022) and Gnidehou and Fatou (2025) who discussed the effect of security expenditure on economic development

using dynamic panel data model. The model is characterized by the economic growth being expressed as a function of security expenditure and some macroeconomic control variables. The functional relationship is given by:

$$GDP_{it} = f(SEX_{it}, IQ_{it}, GFCF_{it}, TRADE_{it}) \dots \dots \dots (equ 1)$$

The empirical model is specified as follows;

$$GDP_{it} = \beta_0 + \beta_1 SEX_{it} + \beta_2 IQ_{it} + \beta_3 GFCF_{it} + \beta_4 TRADE_{it} + u_{it} \dots \dots (equ 2)$$

Where, GDP it is the economic growth rate in country *i* at time *t*, *SEX* is the security expenditure (% of GDP), IQ is the institutional quality, GFCF is the gross fixed capital formation, POP is the population growth rate, TRADE is the trade openness, and *u* is the error term.

3.2 Estimation Technique

This study employs the Panel Autoregressive Distributed Lag (P-ARDL) approach developed by Pesaran, Shin, and Smith (1999) to estimate both the short-run and long-run effects of security expenditure on economic growth across Sub-Saharan African countries. The P-ARDL method is particularly suitable because it accommodates

variables integrated at different levels—I(0) and I(1)—without requiring all series to be stationary at the same order. It also captures country-specific heterogeneity by allowing parameter variations across cross-sections.

Before estimation, the Pesaran (2004) Cross-sectional Dependence (CD) test and Levin-Lin-Chu (LLC) and Im-Pesaran-Shin (IPS) panel unit root tests are conducted to determine the presence of cross-sectional correlation and integration order of the variables.

The long-run cointegration relationship among the variables is verified using the Westerlund (2007) error-correction-based panel cointegration test, which tests for long-run equilibrium even under cross-sectional dependence. Once cointegration is established, the long-run coefficients are estimated using the Pooled Mean Group (PMG) estimator proposed by Pesaran, Shin, and Smith (1999), which assumes homogeneity in long-run parameters but allows for heterogeneity in short-run dynamics.

The error correction term (ECT) derived from the long-run equilibrium equation measures the speed of adjustment to long-run equilibrium following short-run shocks. A negative and statistically significant ECT indicates convergence toward equilibrium.

4. RESULT AND DISCUSSION

4.1 Pre-estimation Test

Table 4.1 Summary of Statistics

	GDP	SEX	GFCF	IQ	TRADE
Median	24.94961	14.19320	299.0737	-0.855754	0.5312797
Maximum	76.60141	68.00090	507.9744	0.619481	0.3611871
Minimum	4.156322	0.356668	0.156283	-1.807464	0.09099
Std. Dev.	17.13981	15.51682	132.1392	0.485020	1.125185
Skewness	0.817532	1.225585	-0.596674	0.999107	0.56788
Kurtosis	2.812472	3.929809	2.415239	3.752500	2.678877

Jarque-Bera	33.74465	85.62341	22.00170	56.79897	12.87888
Probability	0.0000	0.00000	0.0000	0.00000	0.00000
Sum	8624.259	5508.388	81057.70	-227.7512	12.77778
Sum Sq Dev	87544.38	71749.98	520337	70.10282	878.987
Observation	1125	1125	1125	1125	1125

Source: Generated using EVIEWS 13

Table 4.1 presents the descriptive statistics for the main variables used in the analysis: economic growth (GDP), security expenditure (SEX), gross fixed capital formation (GFCF), institutional quality (IQ), and trade openness (TRADE), covering 1,125 observations across 45 Sub-Saharan African countries from 2000 to 2024. There is significant variation in economic performance and security expenditure between the sampled countries as reflected in the mean and median values. The economic growth in the region is very variable, with a median GDP of 24.95 and a broad range of values (4.16–76.60). The median of security expenditure (SEX) is 14.19 with a maximum of 68.00, which means that some countries have large budgets devoted to defense, especially because of internal conflicts and security threats. Gross fixed capital

formation (GFCF) shows a high degree of dispersion with a standard deviation of 132.14 showing some differences in investment capacity between countries. The quality of institutions (IQ) varies between –1.81 and 0.62 (generally low) and trade openness (TRADE) has moderate variations. The positive skewness of most variables suggests that their distributions are skewed towards low values, while the Jarque-Bera statistic is highly significant ($p<0.01$) in most variables, confirming that these variables are not normally distributed. Thus, the statistics demonstrate significant economic, institutional and policy differences between countries in Sub-Saharan Africa, and hence the necessity of employing the Panel ARDL model to capture the cross-country heterogeneity.

Table 4.2 Cross sectional dependence Test

Variables	Test	Statistic	Prob.
GDP	Breusch-pagan LM	609.5719	0.0000
	Pasaran scaled LM	42.55981	0.0000
	Bias-corrected scaled LM	42.26436	0.0000
	Pasaran CD	22.19486	0.0000
SEX	Breusch-pagan LM	456.4762	0.0000
	Pasaran scaled LM	30.30234	0.0000
	Bias-corrected scaled LM	30.00689	0.0000
	Pasaran CD	1.866639	0.0000

GFCF	Breusch-pagan LM	226.6810	0.0000
	Pasaran scaled LM	11.90401	0.0000
	Bias-corrected scaled LM	11.60855	0.0000
	Pasaran CD	-0.629180	0.5292
IQ	Breusch-pagan LM	284.0838	0.0000
	Pasaran scaled LM	16.49991	0.0000
	Bias-corrected scaled LM	16.20445	0.0000
	Pasaran CD	5.428912	0.0000
TRADE	Breusch-pagan LM	36.7667	0.0000
	Pasaran scaled LM	5.76777	0.0000
	Bias-corrected scaled LM	10.8788	0.0000
	Pasaran CD	2.76788	0.0000

Source: Generated using EVIEWS 13

The results of the cross sectional dependence (CD) tests of all the study variables: economic growth (GDP), security expenditure (SEX), gross fixed capital formation (GFCF), institutional quality (IQ), and trade openness (TRADE), are presented in Table 4.2 for all the statistics test based on the Breusch–Pagan LM, scaled LM and scaled LM with bias correction by Pesaran. The results show that for most of the variables the test statistics are statistically significant at the 1 per cent level ($p < 0.01$) and hence the countries in the panel are likely to have strong cross-sectional dependence.

This suggests that economic performance and policy measures are related to developments in other countries, thereby indicating some economic

integration within the region, security issues common to all countries in the region, greater trade interaction, and common impact from external economic and geopolitical shocks. For GDP, SEX, IQ, and TRADE, all four test statistics reject the null hypothesis of cross-sectional independence. However, for GFCF, the Pesaran CD statistic ($p = 0.5292$) fails to reject the null, implying weak cross-sectional dependence for investment levels. The overall findings justify the use of econometric methods that account for cross-country interdependence, such as the Panel ARDL model with robust error correction and common correlated effects, to ensure valid and consistent estimation results across the 45 SSA countries.

Table 4.3: Second generation unit root test table

SECOND GENERATION UNIT ROOT TEST			
Variable	At level	First diff	Order
GDP	-2.41882 (p value <0.05)		I(1)

SEX	-	-1.96990 (p value >0.10)	I(0)
GFCF	-2.82866 (p value <0.01)		I(1)
IQ	-3.62964 (p value <0.01)		I(1)
TRADE	-	-1.47473 (P value > 0.01)	I(1)

Source: Author's computation, 2025 Using Eview 13.

Table 4.3 presents the results of the second-generation unit root test, which accounts for cross-sectional dependence among Sub-Saharan African countries. The results reveal that the variables exhibit mixed orders of integration, indicating that some are stationary at level, while others become stationary after first differencing.

Specifically, GDP, GFCF, and IQ are stationary after first differencing, as indicated by their significant test statistics ($p < 0.05$), suggesting that these variables are integrated of order one, I(1). This implies that their mean and variance become stable only after

differencing once, consistent with economic variables that evolve over time. On the other hand, security expenditure (SEX) is stationary at level, as its p-value exceeds 0.10, implying it is integrated of order zero, I(0). Trade openness (TRADE) is also found to be I(1).

The combination of I(0) and I(1) variables validates the appropriateness of employing a Panel ARDL model, which accommodates mixed integration orders and enables both short- and long-run relationship estimation among the variables.

Table 4.4 Westerlund Panel Co Integration Test table

WESTERLUND PANEL CO INTEGRATION TEST RESULT					
Test type	Number of panel	Number of periods	Panel specific	Statistic	p- value
Variance ratio test	13	299	Yes (panel-specific)	2.3547	0.0893

Source: Author's computation, 2025 Using Stata 17.

The Westerlund panel cointegration test presented in Table 4.4 examines the existence of a long-run equilibrium relationship among the variables. With a test statistic of 2.3547 and a p-value of 0.0893, the result is significant at the 10% level, suggesting evidence of cointegration among the variables across the Sub-Saharan African countries. This implies that

security expenditure, GDP, gross fixed capital formation, institutional quality, and trade openness move together in the long run, despite short-term fluctuations. Therefore, changes in security expenditure are likely to have a sustained long-term impact on economic growth in the region.

4.2 Security spending and Economic Performance in Sub-Saharan Africa

Table 4.5 ARDL Long run coefficient table; Dependent Variable GDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
		Long	Run	
		Equation		
SEX	1.598464	0.065503	24.40307	0.0000
GFCF	4.617193	0.147003	31.40890	0.0000
IQ	-0.55394	0.016151	-8.82344	0.0000
TRADE	0.66788	0.0108	4.9899	0.0005

Source: Author's computation, 2025, Using Eview 13

Table 4.5 presents the long-run results of the ARDL model examining the impact of security expenditure (SEX), gross fixed capital formation (GFCF), and institutional quality (IQ), and trade openness (TRADE) on economic growth (GDP) in Sub-Saharan African countries. The results reveal that all the variables are statistically significant at 1% indicating strong long-term relationships between economic growth and the selected explanatory variables. The coefficient of security expenditure (SEX) is positive (1.598464) and highly significant ($p < 0.01$) indicating that security expenditure has a positive and significant relationship with economic growth. This means that better security conditions boost investors' confidence, ensure the safety of life and property, lower the cost of doing business and promote domestic and foreign investments. This result is important in the Sub-Saharan African context where insecurity and conflict is one of the most significant development challenges as it implies that investments in security are crucial to establishing a secure environment for growth. A positive and significant effect (4.617193, $p < 0.01$) is experienced on GDP by Gross Fixed Capital

Formation (GFCF) which is an indicator of investment in infrastructure and productive assets. This finding is consistent with economics theory which posits that increased capital accumulation increases the production capacity, employment and income generation, thus improving economic growth in the long-term in the region.

Institutional quality (IQ) is however, negatively associated with growth (-0.55394; $p < 0.01$), so weaker institutions, which are marked by corruption, poor governance and weak regulatory frameworks, hamper growth. The outcome reflects the challenges of governance in many countries in Sub Saharan Africa where institutions are inefficient and this poses a problem of effective governance, policy implementation and utilization of resources. Finally, trade openness (TRADE) is positive (0.66788; $p = 0.0005$), which is indicative of the fact that higher levels of openness in the world economy are associated with higher economic performances through better competitiveness, technology transfers and market access.

Table 4.6 ARDL Short run Coefficient

Variables	coefficient	Std Error	t-statistic	prob.*
DGDP(-1)	0.265149	0.179704	1.475472	0.1443
D(SEX)	0.584759	0.018534	3.431360	0.0065
D(GFCF)(-1)	-0.699490	0.044437	-3.828351	0.0001
D(IQ(-2))	-0.820535	0.024521	-5.938268	0.0065
D(TRADE(-1))	0.943019	0.008027	7.908472	0.0005
ECM(-1)	-0.397166	0.046993	-3.60800	0.0020

Source: Author's computation, 2025, Using Eview 13

Table 4.6 presents the short-run dynamics of the ARDL model analyzing the impact of security expenditure, gross fixed capital formation, institutional quality, and trade openness on economic growth in Sub-Saharan Africa. The results highlight both the immediate effects of the explanatory variables on GDP and the speed of adjustment to long-run equilibrium following short-term shocks.

The coefficient of D(SEX) (0.584759; $p = 0.0065$) is positive and significant, implying that in the short run, increased spending on security enhances economic performance. This result suggests that short-term improvements in security, through law enforcement, defense, and protection of economic assets; create a more stable business environment and encourage productive activities. For many Sub-Saharan African countries facing insecurity, this short-term boost indicates that security investments can immediately stimulate confidence and attract investment inflows. Conversely, D(GFCF)(-1) is negative and significant (-0.699490; $p = 0.0001$), suggesting that past levels of capital formation may initially reduce growth. This may occur because investments often take time to yield returns; funds

allocated to infrastructure, machinery, and technology may not produce immediate output gains but contribute more significantly in the long term, as seen in the positive long-run effect in Table 4.5.

The coefficient of D(IQ)(-2) (-0.820535; $p = 0.0065$) is also negative and significant, showing that poor institutional quality undermines growth even in the short term. Weak governance, corruption, and political instability can quickly erode investor confidence, reduce policy effectiveness, and discourage private sector participation. D(TRADE)(-1) is positive and highly significant (0.943019; $p = 0.0005$), confirming that trade openness immediately stimulates economic growth through export expansion, access to inputs, and technology diffusion. Finally, the Error Correction Term (ECM (-1)) is negative (-0.397166) and statistically significant ($p = 0.0020$), indicating a moderate adjustment speed of about 39.7%. This means that approximately 40% of short-run disequilibrium is corrected annually, signifying a stable and convergent long-run relationship among the variables.

4.3 Post Estimation Test

Table 4.7 Test of Heteroscedasticity Table
Null hypothesis: residuals are homoscedastic

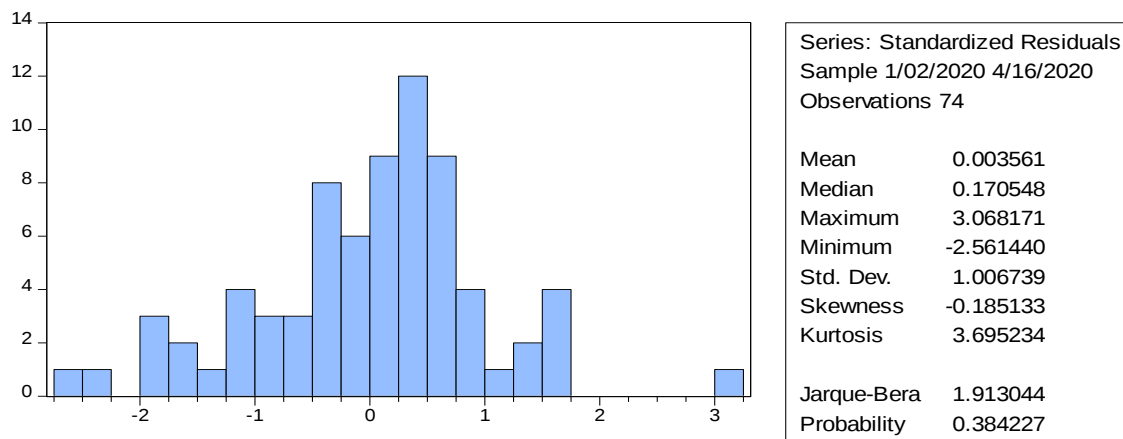
	Value	Df	Probability
Likelihood ratio	18.80346	13	0.1293
LR test summary.			
Restricted LogL	-1891.138	296	
Unrestricted LogL	-1881.736	296	

Source: Author's computation, 2025, Using EVIEW 13

The heteroskedasticity test used to determine whether the variance of the error terms is constant across observations is presented in Table 4.7. The null hypothesis that the residuals are homoscedastic. With a Likelihood Ratio (LR) statistic of 18.80346 and a p-value of 0.1293, which is greater than the 0.05 significance level, the null hypothesis cannot be

rejected. This means that there is no indication of heteroskedasticity on the model and the residuals are homoscedastic. Thus, the estimated parameters are efficient and the model's inferences about the relationships between the variables are statistically sound.

Figure 4.1 Normality Test



The statistical results are compatible with the normal assumption. As expected for standardized residuals, the mean is close to zero, and the standard deviation is around one. More important, the Jarque–Bera test

reports a probability (p-value) of 0.3842. This value is larger than the usual threshold of 0.05 and it is concluded that the null hypothesis (normally distributed residuals) is not rejected, so the residuals

are consistent with the normality assumption.

4.4 Discussion

The results of the long run panel ARDL and short run panel ARDL models present important insights about the relationship between security expenditure and economic growth in Sub-Saharan African countries as well as the roles played by gross fixed capital formation, institutional quality and trade openness. Results show that security spending, capital formation, and trade openness positively affect long-run economic growth, while notwithstanding the fact that institutional quality remains a key constraint to economic performance across the region. A long-run positive and statistically significant relationship between security expenditure (SEX) and economic growth implies that an increase in security expenditure leads to more stable production, investment and commercial activities. This is in line with Okon and Eke (2022), who found that investing in security would boost the growth rate of GDP in West African states by boosting investor confidence and mitigating security threats arising from political instability. Likewise, Adeola and Evans (2023) discovered that security spending is beneficial to economic development if resources are allocated efficiently to the national security and public safety. Nevertheless, this is a contradiction to the arguments of Obi and Eze (2021) that inept military spending can be to the detriment of efficient public investment and the growth of the economy. The effectiveness and quality of security spending is therefore a key factor to its importance in driving economic growth.

The positive long-run gross fixed capital formation (GFCF) value is consistent with the traditional growth theory which postulates that investment in physical capital leads to sustainable growth. The result aligns with the findings of Asongu and Odhiambo (2022), who determined that capital formation boosts productivity, industrialization and economic growth in African economies in the long-term. As a result of investments in infrastructure, technology, and productive assets, production efficiency is enhanced, jobs are created and productive capacity is increased. The negative short-

run coefficient of GFCF in Table 4.6, however, is due to the gestation-lag phenomenon of capital investments: substantial investment of financial resources is required at first that puts strain on available resources, only to produce economic returns later. This adjustment process is a short-run adjustment process, in line with the observation by Nwokoma (2020) that large-scale capital projects typically have a delayed effect on growth in developing economies.

These results also show that in the short and long run, institutional quality (IQ) has a negative impact on economic growth, indicating that the governance quality, corruption, ineffectiveness of institutions and poor policy implementation are important constraints to economic development. This study is in agreement with the study done by Acheampong and Boateng (2023) which found that fiscal and security policy measures were not found to be effective at fostering economic growth in Sub-Saharan Africa due to weak institutional frameworks. Similarly, Rodrik (2021) stated that institutional weaknesses in resource allocation discourage private investment and foster rent-seeking behaviour, which reduce the economic performance. Contrary to this, Kanu and Ogochukwu (2022) established that a greater quality of governance, the effectiveness of the regulatory framework, and the ability to control corruption and corruption level, significantly improve economic growth. Hence, the current results support the notion that further institutional and governance strengthening is crucial for ensuring the impact of public spending on sustainable development.

Trade openness (TRADE) shows positive statistically significant effect both in the short and long run, which infers that the greater the integration into international markets is the more it will contribute to the economic growth of a country through better market access, technology transfer, competition and increase investment opportunities. This is corroborated by Balogun and Adekoya (2023) who observed that trade liberalization helps to spur economic growth through exports and foreign direct investment. In the same vein, Abdullahi and Kallon (2022) noted that open trade is important for regional integration, industrial development and structural

transformation especially in the presence of good industrial policies and stable exchange rate management. However, the development stimulating potential of trade is strongly linked to the quality of infrastructure, institutional capacity and political stability; all of which are relevant challenges in many countries in Sub-Saharan Africa. The negative error correction term (ECT) is statistically significant, further validating the presence of a stable long run relationship between variables. The estimated adjustment coefficient suggests between 39.7% and 40% of all short-run disequilibria are being corrected each year, or that economic shocks lead to a moderate pace of adjustment toward long-run equilibrium. The result is consistent with Adusei and Appiah (2022), who found similar adjustment dynamics in panel data studies of African countries, where the shocks of insecurity, institutional weakness or macroeconomic instability are corrected over time.

The results indicate that there is a need for a combination of a sufficient level of security investment, higher capital accumulation, institutional development, and trade integration to achieve sustainable economic growth in Sub-Saharan Africa. Security spending and trade openness are beneficial for economic performance, but entrenched institutional shortcomings hinder their potential. Thus, policies to improve governance and transparency and accountability, fiscal discipline and public expenditure efficiency are essential to better maximize the development effects of the investment in security and support long-term economic growth in the region.

5. CONCLUSION AND RECOMMENDATIONS

5.1 Conclusion

This study looks at the effect of security expenditure on economic growth of Sub-Saharan Africa taking care of the role of gross fixed capital formation, institutional quality and trade openness in an ARDL framework. The results showed that the short and long-run expenditure on security has a significant and positive relationship with economic growth which emphasize the importance of security in providing a stable environment for investment,

production and development. Infrastructural and productive investments, as evidenced by gross fixed capital formation, were also shown to boost long-term growth, reinforcing the significance of investments in infrastructure and productive capacity for ensuring economic development. On the other hand, institutional quality had a negative effect, suggesting that the negative effects of poor governance and corruption, and weak regulatory frameworks persist and continue to have a negative impact on the developmental effects of fiscal and security investments. The positive impact of trade openness was consistently observed, supporting the positive impacts of economic integration, export diversification and engagement in global markets.

5.2 Recommendations

In light of these results, a number of policy recommendations are proposed.

- i. Governments need to enhance the accountability and systems of financial control in the defense and security sector. This can be done by publishing budgets, having parliamentary checks, and regular auditing to make sure that spending on security is used effectively for peacekeeping, crime prevention and counterterrorism operations instead of corrupt or politically motivated uses.
- ii. The provision of financial support for infrastructure, energy and industrial development should be enhanced. Investment in transport infrastructure, power generation and digital infrastructure can deliver some of these benefits, increasing productivity, drawing private capital and boosting employment throughout the region, given the long-term benefit of gross fixed capital formation for growth.
- iii. Governments should focus on governance improvements that will boost regulatory quality, lower corruption, strengthen the rule of law, and ensure political stability as institutional weakness was identified as a constraint to growth. Effective institutions will improve investor confidence and provide that security and economic policies deliver development results.

iv. The degree of trade openness was found to significantly influence economic growth. There is thus a need for Sub-Saharan African countries to increase their role in regional groupings like the African Continental Free Trade Area (AfCFTA) to boost market access and competitiveness through the elimination of trade barriers, harmonization of tariffs and logistics infrastructure development.

v. Governments need to establish a fiscal framework that equates expenditures on security and developmental activities. Overallocating security funds and neglecting social investment can compromise funding for education, healthcare and innovation, all of which are vital for long-term economic sustainability.

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