

Military Expenditure and Socio-Economic Development in Nigeria: A Guns–Butter Perspective.

ALADEJANA Saheed Aliu. Ph.D¹, OLUWALANA Feyisayo. Abosedo. PhD², SANNI Philip Shakede³, ODERINU Kehinde Hassana⁴

¹Department of Economics, Olusegun Agagu University of Science and Technology (OAUSTECH), Okitipupa, Ondo State, Nigeria.

²Department of Economics, Achiever University Owo, Ondo State, Nigeria.

³Department of Accounting & Finance, Glorious Vision University, Ogwa, Edo State, Nigeria.

⁴Department Accountancy, Federal Polytechnic, Ede, Osun State, Nigeria.

Corresponding email: aladejana26@gmail.com, oluwalana.fa@achievers.edu.ng, favvictor@yahoo.com, kehindehassana@gmail.com
+2347039557346, +2348038703577, +2348033242630, +2348034276642

Abstract

This study examined the relationship between military expenditure and socio-economic development (SED) in Nigeria from 1990 to 2024 using the Autoregressive Distributed Lag (ARDL) framework. Annual time-series data were obtained from the World Bank, the Central Bank of Nigeria, and the National Bureau of Statistics. The ARDL bounds testing approach confirmed a long-run equilibrium relationship among the variables. Short-run results showed that changes in military expenditure exerted a positive and statistically significant effect on socio-economic development, indicating that defence spending improved security conditions, stabilised investment, and supported employment. Social sector spending also positively influenced SED in the short run, reflecting welfare gains from investments in education and healthcare. In contrast, government revenue exerted a negative effect on SED, suggesting inefficiencies in fiscal allocation and resource utilisation. Inflation exhibited a marginal positive effect, implying that moderate price changes stimulated economic activity. In the long run, sustained military expenditure exerted a negative and significant impact on socio-economic development, underscoring the opportunity cost of prolonged defence spending and its tendency to divert resources from productive and human-capital sectors. Conversely, social sector spending remained a strong driver of development, while inflation was insignificant and government revenue continued to impede SED. Interaction effects between military and social spending were insignificant, although lagged interactions indicated possible crowding-out effects. The study concluded that military expenditure supported short-term development but undermined socio-economic progress in the long run. It recommended a fiscal strategy consistent with Guns–Butter framework, emphasising defence efficiency, social sector investment, and institutional governance to achieve development.

Keywords: ARDL Model; Fiscal Policy; Military Expenditure; Social Sector Spending; Socio-Economic Development.

1.0 Background of the Study

Military expenditure has become an increasingly prominent component of public finance in many developing economies, particularly across Sub-Saharan Africa, where persistent insecurity, internal conflicts, and heightened geopolitical pressures have compelled governments to allocate a growing share of limited fiscal resources to defence, Oba, Enoch & Ngozi (2024); Harris (2025). According to Stockholm International Peace Research Institute (SIPRI), (2025), in 2023, total military spending on the African continent was estimated at USD 51.6 billion, reflecting a strengthened regional commitment to security in response to increasingly complex and evolving threats. Of this total, sub-Saharan Africa accounted for approximately USD 23.1 billion, underscoring the scale and significance of defence prioritisation within the region, (Ezeoha, *et al.*, 2023; Okpe, *et al.*, 2024).

Within this broader continental context, Nigeria emerges as the largest military spender in sub-Saharan Africa. The country's defence expenditure increased by approximately 20 per cent to USD 3.2 billion in 2023, ranking Nigeria third on the continent, behind Algeria and Morocco. However, in 2024, Nigeria's military outlay declined sharply to about USD 1.13 billion, highlighting pronounced volatility in defence budgeting and fiscal prioritisation, (Nwidobie *et al.*, 2022). Over the long term, Nigeria's military spending has expanded substantially, rising nearly 48-fold since 1960, thereby signalling a sustained shift in public expenditure towards security-related concerns in response to persistent internal threats, (Ofem *et al.* 2025).

Moreover, this heightened emphasis on defence spending has been driven by a complex and interrelated array of security challenges, including the Boko Haram insurgency in the North-East, widespread banditry and kidnapping in the North-West, recurrent communal conflicts in the Middle Belt, separatist agitations in the South-East, and persistent maritime insecurity in the Niger Delta and the Gulf of Guinea, (Odalonu & Egbogu, 2023; Igiebor, 2024). While military expenditure remains indispensable for safeguarding territorial integrity and maintaining public safety, its continued expansion raises critical concerns regarding the opportunity costs for

socio-economic development, particularly within a context characterised by constrained fiscal space and competing development priorities.

Nigeria remains one of Africa's most resource-rich yet development-stressed economies. World Bank projections indicate that by 2025, approximately 139 million Nigerians—nearly 60 per cent of the population—will be living in poverty, reflecting widespread deprivation despite ongoing macroeconomic reform efforts, (Fagbemi, 2022; Aderounmu, *et al.*, 2021; Aladejare, 2025). This entrenched poverty, coupled with slow improvements in living standards and persistently high unemployment, underscores the urgent need for sustained investment in education, healthcare, infrastructure, and social welfare—sectors that are central to human capital development, inclusive growth, and long-term economic transformation.

From a theoretical standpoint, the Guns–Butter Theory provides a rigorous analytical framework for examining these fiscal trade-offs. The theory posits that governments operating under binding resource constraints must allocate expenditure between defence (“guns”) and civilian or developmental needs (“butter”), with increased military spending potentially crowding out investment in socio-economic sectors, (Isiaka, 2022). Applied to Nigeria, this framework highlights the inherent tension between the imperative to address escalating security threats and the responsibility to promote economic growth and social welfare, thereby offering a robust lens through which to assess the developmental implications of fiscal prioritisation.

Against this backdrop, Nigeria presents a compelling case for empirical investigation, as persistent socio-economic challenges coexist with substantial and volatile military expenditure. This study therefore examines the relationship between military expenditure and socio-economic development in Nigeria from a Guns–Butter perspective, with the aim of generating policy-relevant evidence to support more balanced fiscal decision-making that reconciles national security imperatives with the urgent need for sustainable and inclusive socio-economic progress.

1.1 Statement of the Research Problem

Nigeria's persistent insecurity has profoundly reshaped the structure and priorities of public expenditure, exerting sustained pressure on government finances and fiscal decision-making. As security threats have expanded in both scale and complexity, military spending has increasingly assumed a dominant position within the national budget, thereby limiting the state's capacity to address broader socio-economic challenges effectively, (Nwoye *et al.*, 2024). This shift in expenditure composition raises fundamental concerns regarding the efficiency and developmental implications of public resource allocation, particularly in balancing immediate security imperatives with long-term development objectives.

Notwithstanding the strategic importance of defence expenditure in addressing insecurity, Nigeria continues to record weak socio-economic outcomes, reflected in high unemployment, widespread poverty, and persistent deficits in human capital formation and infrastructure development, (Olajide & Omotosho, 2024; Okafor, 2024). The simultaneous rise in military allocations alongside enduring development shortfalls

suggests a critical policy dilemma: whether increased defence spending enhances overall national welfare or inadvertently constrains socio-economic progress by diverting resources away from productivity-enhancing sectors, (Budhathoki, 2024). This dilemma is further intensified by the reality that prolonged insecurity undermines productive capacity, discourages private investment, and disrupts livelihoods, thereby magnifying the developmental consequences of fiscal choices, (Akusta, 2025).

Despite the significance of this issue, empirical evidence on the development effects of military expenditure in Nigeria remains limited and inconclusive. While defence spending is frequently justified on security grounds, insufficient attention has been devoted to its broader socio-economic implications, particularly with respect to opportunity costs, allocative efficiency, and long-term sustainability. The absence of rigorous, context-specific empirical analysis constrains effective policy formulation and leaves decision-makers with inadequate guidance on how to reconcile security demands with competing development priorities.

Although a substantial body of empirical literature exists—primarily from developed countries and selected emerging economies, often yielding mixed results—its applicability to Nigeria remains questionable. Indigenous studies (Oyerinde & Fagboro, 2020; Laniran & Ajala, 2021; Okeke *et al.*, 2021; Dim *et al.*, 2022; Adekunle & Oyelekan, 2022; Ebenyi *et al.*, 2023; Adebowale & Hassan, 2023; George-Anokwuru & Inimino, 2024; Agbana & Diton, 2025) report similarly mixed and inconclusive findings, largely attributable to differences in variable selection, data sources, estimation techniques, and sampling periods. Moreover, most of these studies adopt a narrow focus on economic growth as a proxy for socio-economic development, frequently lacking sufficient theoretical grounding, which limits their explanatory power. More critically, the temporal coverage of existing research—typically spanning 1981 to 2023—fails to account for the sharp deterioration in Nigeria's security environment between 2023 and 2025. During this period, escalating insecurity triggered large-scale displacement, substantial loss of life, disruptions to economic activity, suppressed output growth, diminished investment confidence, and a renewed surge in military expenditure. These developments have also generated severe humanitarian consequences, including acute food insecurity and deepening social fragmentation, thereby reinforcing cycles of violence and exacerbating economic vulnerability.

In addition, many existing studies lack robust preliminary diagnostics and clear theoretical justification, raising concerns about the reliability and policy relevance of their findings. These methodological and conceptual gaps underscore the need to re-examine the relationship between military expenditure and socio-economic development in Nigeria, particularly with respect to its implications for resilient infrastructure, inclusive and sustainable industrialisation, and technological advancement. Without a clear understanding of these dynamics, fiscal policy risks being driven by short-term security pressures at the expense of long-term development objectives.

Against this backdrop, the central research problem is to determine whether rising military expenditure in Nigeria contributes to or constrains socio-economic development

within a context of persistent insecurity. Addressing this problem is essential for informing evidence-based fiscal and security policies that strengthen national stability while preserving the fiscal space required for inclusive growth, poverty reduction, and sustainable economic transformation.

2.0 Literature Review

2.1 Theoretical Review

This study applies the Guns–Butter Theory, originally proposed by Joseph Goebbels, which posits that governments face trade-offs in allocating scarce fiscal resources between defence (“guns”) and civilian or developmental needs (“butter”), (Carter *et al.*, 2021; Ikegami & Wang, 2023a). In the Nigerian context, this framework underscores the tension between rising military expenditure to combat persistent insecurity and the urgent need to invest in socio-economic development, including infrastructure, education, and healthcare. Excessive allocation to defence can crowd out resources for productivity-enhancing sectors, thereby constraining inclusive growth and limiting human capital formation, (Raifu, 2022a). Thus, the theory offers a robust analytical lens for examining how fiscal prioritisation between security and development shapes Nigeria’s long-term economic and social welfare.

2.2 Empirical Literature

Ebenyi *et al.* (2023) investigated the relationship between military expenditure and economic growth in Nigeria using the Autoregressive Distributed Lag (ARDL) bounds testing approach with time-series data spanning 1981–2021. Their findings indicate that military expenditure had a positive but statistically insignificant effect on economic growth. Gross fixed capital formation and labour force participation were negatively and insignificantly related to growth in both the short and long run, although gross fixed capital formation was significant in the short run. In contrast, trade openness exerted a positive and significant influence in both periods. The study concluded that Nigeria can simultaneously pursue defence and growth objectives, provided military allocations are efficiently utilised to support broader economic activity. Similarly, Susilo *et al.* (2022) examined the relationship between military expenditure and economic growth during the COVID-19 period using cross-sectional data for 40 upper-middle-income countries covering 2010–2019 and 2019–2020. Employing ordinary least squares estimation, they found that military expenditure was positively associated with economic growth across the sampled countries.

In a broader regional context, Hasanov *et al.* (2025) analysed military spending in Azerbaijan, Armenia, and Georgia using Granger causality tests on data from 1996–2022. The results indicate bidirectional causality in Azerbaijan, whereas Armenia and Georgia exhibit unidirectional causality from economic growth to military expenditure. The study further emphasises the broader implications of military budgets on national identity, sovereignty, and regional stability.

Focusing again on Nigeria, Abimbola (2021) explored the joint nexus between military expenditure, oil revenue, and economic growth using OLS with time-series data. Findings show that military expenditure individually positively influences growth, while its interaction with oil revenue is negatively insignificant,

reflecting the limited contribution of oil revenue. Accordingly, the study recommends strategic utilisation of defence spending to bolster economic growth. Similarly, George-Anokwuru and Inimino (2024) analysed government recurrent expenditure on internal security and economic growth in Nigeria (1980–2022) using ARDL. They report that long-run effects of security expenditure are positive but insignificant, whereas short-run effects are negative and significant. Additionally, exchange rates and interest rates significantly influence growth, leading the authors to recommend sustained recurrent expenditure on internal security to generate long-term economic benefits.

Yusuf and Mohd (2022) examined the fiscal and socio-economic consequences of insecurity on Nigerian growth using ARDL bounds testing. Their findings indicate that high unemployment, capital formation, FDI, and government spending on education and security are negatively affected by insecurity, whereas improvements in health services, equitable income distribution, and productive debt usage positively stimulate growth. Similarly, Dim *et al.* (2022) employed an Error Correction Model to analyse public expenditure on education, healthcare, and security (1999–2020), finding that education and security expenditures positively but insignificantly affect per capita income, while healthcare expenditure significantly enhances it. Complementing these findings, Aminu *et al.* (2023) applied SVAR to examine the effect of insecurity on economic development (1996–2021), showing that insecurity accounts for over 50% of variations in economic performance, although its immediate response to shocks is insignificant. Other studies focusing on Nigeria’s military expenditure also report mixed results. Adekunle and Oyelekan (2022) used OLS and causality analysis for data spanning 1981–2020 and found a negative effect of military expenditure on growth, recommending careful budget management to prioritise productive sectors. Likewise, Okeke *et al.* (2021) analysed government expenditure on defence and internal security (1994–2020) using VAR, reporting an insignificant effect on economic growth and human development, while advocating increased investment accompanied by proper monitoring mechanisms. In contrast, Laniran and Ajala (2021) applied ARDL on Nigerian data (1981–2017) and found a significant positive long-run relationship between military expenditure and growth. Similarly, Oyerinde and Fagboro (2020) identified a positive long-run relationship between military expenditure, institutional quality, and growth, though institutional quality negatively impacted growth, emphasising the need for oversight in fund utilisation.

Agbana and Diton (2025) further highlight the risks of overfunding, finding a significant negative long-run effect of military expenditure on GDP (1990–2023), suggesting that excessive defence spending reduces resources for other critical sectors. The study recommends balancing defence allocations with investments in infrastructure, agriculture, and human capital. Finally, Adebowale and Hassan (2023) examined Boko Haram-related insecurity and its impact on Nigerian armed forces’ welfare (2015–2022), revealing that prolonged deployments and security threats impair soldiers’ mental health, morale, and combat effectiveness, highlighting the need for enhanced

investment in mental health support, rest, and equipment. Despite this extensive body of empirical research, studies on Nigeria predominantly emphasise economic growth, often overlooking broader indicators of socio-economic development, including resilient infrastructure, inclusive industrialisation, and technological advancement. Moreover, most investigations do not account for the sharp escalation of insecurity between 2023 and 2025, creating a critical gap in understanding how rising military expenditure interacts with contemporary development challenges.

3.0 Methodology

3.1 Model Specification

In this study, socio-economic development serves as the dependent variable, while military expenditure (as a % of GDP), social sector spending (education and health), inflation, and GDP growth are treated as independent variables. The analysis spans 1990 to 2024, a period selected to capture both historical and contemporary dynamics of Nigeria’s fiscal and security environment. The base year, 1990, reflects a phase of significant structural reforms, economic liberalisation, and the emergence of intensified internal security challenges, whereas 2024 incorporates the most recent data, including heightened military spending and evolving socio-economic trends. This timeframe enables a comprehensive assessment of the fiscal trade-offs between defence and development, providing robust insights within the Guns–Butter analytical framework.

Model 1: Aggregate Guns-butter Model

A general function term:

$$SED = f(ME, SSS, GR, INF, GDPG) \dots\dots\dots (i)$$

The functional form of econometric model can be specified as follows:

$$SED_t = \beta_0 + \beta_1 ME_t + \beta_2 SSS_t + \beta_3 GR_t + \beta_4 INF_t + \beta_5 GDPG_t + \eta_t \dots\dots\dots (ii)$$

Where; SED=Socio-economic development at time *t* (Proxied by Human Development Index HDI); ME= Military expenditure (% of GDP) at time *t*; SSS= Social sector spending at time *t* (edxp+hxp); GR= Government Revenue (% of GDP); INF=Inflation rate at time *t* GDPG = GDP growth rate at time *t*; η = Error term.

$\beta_0, \beta_1, \beta_2, \beta_3, \beta_4, \beta_5$ are the coefficients.

The expected signs (**a-prior expectation**) of the coefficients based on economic theory:

β_1 Ambiguous (0 or +/-); β_2 (+); β_3 (+); β_4 (-); β_5 (+)

(ii) ARDL Econometric Specification

To capture both short-run dynamics and long-run equilibrium relationships, the Autoregressive Distributed Lag (ARDL) model is specified as:

$$\begin{aligned} \Delta SED_t = & \alpha_0 + \sum_{i=1}^p \alpha_1 \Delta SED_{t-i} \\ & + \sum_{i=0}^{q_1} \alpha_2 \Delta ME_{t-i} \\ & + \sum_{i=0}^{q_2} \alpha_3 \Delta SSS_{t-i} \\ & + \sum_{i=0}^{q_3} \alpha_4 \Delta GR_{t-i} \\ & + \sum_{i=0}^{q_4} \alpha_5 \Delta INF_{t-i} + \sum_{i=0}^{q_5} \alpha_6 \Delta GDPG_{t-i} \end{aligned}$$

$$+ \lambda_1 SED_{t-i} + \lambda_2 ME_{t-i} + \lambda_3 SSS_{t-i} + \lambda_4 GR_{t-i} + \lambda_5 INF_{t-i} + \lambda_6 GDPG_{t-i} + \eta_t \dots\dots\dots (i)$$

(iv) Error correction representation (Short-Run Dynamics)

The error correction model (ECM) is specified as:

$$\begin{aligned} \Delta SED_t = & \gamma_0 + \sum_{i=0}^p \gamma_1 \Delta SED_{t-i} + \sum_{i=0}^{q_1} \gamma_2 \Delta ME_{t-i} + \\ & \sum_{i=0}^{q_2} \gamma_3 \Delta SSS_{t-i} + \sum_{i=0}^{q_3} \gamma_4 \Delta GR_{t-i} + \sum_{i=0}^{q_4} \gamma_5 \Delta INF_{t-i} + \\ & \sum_{i=0}^{q_5} \gamma_6 \Delta GDPG_{t-i} + \varphi ECM_{t-i} + \pi_t \dots\dots\dots (ii) \end{aligned}$$

Model 2: Interaction Model

To explicitly capture the Guns–Butter trade-off, an interaction term between military expenditure and social sector spending is incorporated into the model, specified as:

$$SED_t = \beta_0 + \beta_1 ME_t + \beta_2 SSS_t + \beta_3 (ME_t * SSS_t) + \beta_4 GR_t + \beta_5 INF_t + \beta_6 GDPG_t + \eta_t \dots\dots\dots (iii)$$

Here, β_3 measures whether social sector spending moderate the effects of military expenditure on socio-economic development.

Expected Signs (A Priori Expectations)

Variable	Expected Sign	Justification
ME	±	Security may support development or crowd out welfare
SSS	+	Direct human capital improvement
GR	+	Higher fiscal capacity supports development
INF	-	Erodes purchasing power and welfare
GDPG	+	Growth enhances living standards

Source: Researcher’s Compilation (2026)

3.2 Data and Sources:

The study utilises annual national-level data sourced from the World Bank, the National Bureau of Statistics (NBS), and the Central Bank of Nigeria, covering the period from 1990 to 2024. The analysis is capped at 2024 to ensure the inclusion of the most recent and comprehensive information available, thereby providing a timely and robust basis for examining the nexus between military expenditure and socio-economic development in Nigeria.

4.0 Presentation and Analysis of Results

4.1 Descriptive Statistics

Table 4.1 Descriptive Statistics Result of the Estimated Variables

	SE D	ME	SSS	INF	GR	GDP G
Mean	0.502	0.622	233.401	121.646	14.181	4.222
Median	0.488	0.540	137.686	70.016	13.150	4.200
Maximum	0.560	1.400	753.576	421.071	28.810	15.330
Minimum	0.449	0.350	1.391	2.414	5.120	-2.040
Std. Dev.	0.036	0.225	240.040	126.048	5.959	3.851
Skewness	0.317	1.430	0.831	1.140	0.587	0.525
Kurtosis	1.718	5.229	2.403	3.101	2.607	3.592
Jarq-B	2.982	19.175	4.552	7.602	2.238	2.122
Prob	0.225	0.000	0.103	0.022	0.327	0.346
Sum	17.559	21.760	8169.024	4257.594	496.330	147.780
Sum Sq. Dev.	0.044	1.723	1959.055	5401.991	1207.601	504.146
Obs	35	35	35	35	35	35

Source: Researcher's Compilation, 2026 from E-view-9.

The descriptive statistics reveal that socio-economic development (SED) remained relatively stable throughout the period, as evidenced by its low standard deviation, whereas military expenditure (ME), social sector spending (SSS), and inflation (INF) exhibited considerable variability, reflecting pronounced fluctuations over time. Moreover, SED, SSS, government revenue (GR), and GDP growth (GDPG) display moderate skewness and satisfy the normality condition, as confirmed by their respective Jarque-Bera probabilities, while ME and INF significantly depart from normal distribution, signalling heightened volatility and possible structural shifts. In addition, the wide dispersion between the minimum and maximum values of SSS and INF highlights episodes of intensified fiscal expansion and price instability. Collectively, these patterns point to a heterogeneous macroeconomic environment in which relative stability in human development coexists with substantial fiscal and inflationary pressures.

4.2. Augmented Dickey Fuller (ADF) Unit Root Test Results

Table 4.2. Results of Unit Root Test at Level and at First Differences using ADF

Variab le	Test Statistic	5% critical Value	Test Statistic	5% critical Value	Rema rk
SED	-----	-----	-6.449	-2.954	I(1)
ME	-3.903	-2.951	-----	-----	I(0)
SSS	-----	-----	-5.612	-2.954	I(1)
INF	-----	-----	-4.232	-2.594	I(1)
GR	-----	-----	-5.810	-2.954	I(1)
GDPG	-3.803	-2.951	-----	-----	I(0)

Source: Research's Compilation, 2026 from E-view-9

The Augmented Dickey-Fuller (ADF) unit root results indicate a mixed order of integration among the variables. Specifically, military expenditure (ME) and

GDP growth (GDPG) are stationary at levels, whereas socio-economic development (SED), social sector spending (SSS), inflation (INF), and government revenue (GR) become stationary only after first differencing. Crucially, none of the series is integrated of order two, satisfying the essential condition for the application of the ARDL modelling framework. This combination of I(0) and I(1) variables further underscores the appropriateness of employing bounds testing to investigate the existence of a long-run relationship among the variables. Overall, these findings provide a robust econometric foundation for proceeding with ARDL estimation. Accordingly, the ARDL model is particularly suitable for this study, as it effectively accommodates variables of mixed integration orders and enables a coherent analysis of both short- and long-run dynamics in examining the nexus between military expenditure and socio-economic development in Nigeria.

4.3. Correlation

Table 4.3. Correlation

	SED	ME	SSS	INF	GR	GDP G
SED	1					
ME	-0.191	1				
SSS	0.954	-0.144	1			
INF	0.934	-0.093	0.979	1		
GR	-0.676	0.036	-0.576	0.576	1	
GDP G	-0.279	-0.101	-0.202	0.227	0.472	1

Source: Research's Compilation, 2026 from E-view-9

The correlation analysis indicates that socio-economic development (SED) is strongly and positively associated with social sector spending (SSS) and inflation (INF), while exhibiting weak negative relationships with military expenditure (ME), government revenue (GR), and GDP growth (GDPG). Military expenditure (ME) shows generally weak correlations with all other variables, suggesting a limited direct linear association within the dataset. Interestingly, government revenue (GR) is negatively correlated with SED, SSS, and INF, yet positively related to GDP growth, implying a potential trade-off between social outcomes and economic expansion.

4.4 Results for Johansen Co-Integration Test

Table 4.4: Johansen Co-Integration Test

Trace Max-Eigen & Max-Eigen Statistics						
H ₀	Trace Statistic	Critical value at 5% level	Prob.*	Max-Eigen Statistic	Critical value at 5% level	Prob.*
Non e*	108.729	95.754	0.005*	43.648	40.078	0.019*
At most 1	65.081	69.819	0.113	31.318	33.877	0.098
At most 2	33.763	47.856	0.515	15.451	27.584	0.712
At most 3	18.312	29.797	0.543	9.017	21.132	0.831
At most 4	9.295	15.495	0.339	8.741	14.265	0.308

At most 5	0.554	3.841	0.457	0.554	3.841	0.457
Trace test indicates 1 co-integrating eqn.(s) at the 0.05 level. Denotes rejection of the hypothesis at the 0.05 level** indicates statistically significant.						

Source: Researcher’s Compilation, (2026)

The Johansen co-integration results show that the null hypothesis of no co-integration is rejected at the 5% level, as both the Trace statistic (108.729 > 95.754, p = 0.005) and the Max-Eigen statistic (43.648 > 40.078, p = 0.019) are significant. This confirms the presence of at least one long-run relationship among the variables. However, for the hypotheses of at most one to five co-integrating equations, both statistics are insignificant, indicating no additional long-run relationships. Overall, the results establish a single equilibrium relationship, thus supporting the use of the ARDL framework to estimate both short- and long-run dynamics.

Table 3: ARDL Bound Test Result

Test Statistic	Value	K: 5
F-statistic	3.79	
% critical levels	Critical value for Bound test	
Significance	1(0) Bound	1(1)
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Notes: ** denote significant at 5% levels. Critical values

Source: Research’s Compilation, 2026 from E-view-9

The ARDL bounds test results indicate an F-statistic of 3.79 with five regressors. At the 5% level of significance, this value exceeds the lower bound of 2.62 and is exactly equal to the upper bound of 3.79. As such, the test statistic lies precisely at the critical decision threshold, thereby providing modest yet acceptable evidence of a long-run relationship among the variables. While the statistic does not surpass the upper bound, this does not undermine the inference of cointegration; rather, it calls for a careful and measured interpretation. In this context, the null hypothesis of no cointegration can be cautiously rejected, implying the presence of a long-run equilibrium association. Accordingly, there is sufficient empirical justification to proceed with the ARDL framework, as it remains appropriate for capturing both the short-run adjustments and long-run dynamics inherent in the model.

Table 4.4: Short-Run Result of ARDL (Dependent Variable: SED)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(ME)	0.009	0.004	2.467	0.021**

D(SSS)	0.000	0.000	2.253	0.034**
D(INF)	0.000	0.000	1.921	0.067
D(GR)	-0.001	0.000	-2.841	0.009**
D(GDP G)	0.000	0.000	0.364	0.719
CointE q(-1)	-0.386	0.088	-4.379	0.000**
$R^2=0.999$; $Adjusted R^2=0.995$; $Prob(F-stat)=0.000$; $Durbin-Watson stat=2.721$				
** indicate statistically significant at the 0.05				

Source: Research’s Compilation, 2026 from E-view-9

The short-run ARDL estimates in Table 4.4 indicate that changes in military expenditure (D(ME)) exert a positive and statistically significant effect on socio-economic development (SED), consistent with the a-priori expectation that $\beta_1 > 0$. Economically, this suggests that increased defence spending can foster short-term development outcomes by enhancing security, stabilising the investment climate, and generating employment. However, the relatively modest coefficient implies that these gains are limited and may be constrained by inefficiencies in defence-related outlays. Empirical evidence corroborates aspects of this short-run effect. For example, Akande, Raifu, and Aminu (2023b) report that an upsurge in military spending positively influences economic growth across different quantiles in MENA countries, indicating that defence outlays can be growth-enhancing under specific conditions. Similarly, Akume and Akadiri (2025) find that positive changes in military expenditure exert a favourable, albeit statistically insignificant, short-run impact on economic growth in Nigeria, reflecting the potential of defence spending to act as a cyclical stabiliser when complemented by other macroeconomic policies. Nevertheless, the broader literature reveals heterogeneous effects: while some studies (Azam, 2020a; Akusta, 2024) emphasise short-term stimulus through multiplier mechanisms, others caution that, without robust institutions or productive spillovers, the developmental benefits of military expenditure may be limited or transient.

When connected to the Guns–Butter theoretical framework, the positive short-run effect of military expenditure on socio-economic development aligns with the notion that strategic allocation to “guns” can support immediate stability and development gains. The framework, originally proposed by Goebbels and further elaborated in contemporary studies (Carter *et al.*, 2021; Ikegami & Wang, 2023b), posits that governments face a trade-off in allocating scarce fiscal resources between defence and civilian priorities. In the Nigerian context, the observed short-term benefits of increased military spending likely reflect the necessity of security provision in a persistently insecure environment, which can temporarily stimulate economic activity, attract investment, and protect productive assets. However, the modest magnitude of the coefficient also reflects the theoretical caution that excessive allocation to defence (“guns”) risks crowding out investment in productivity-enhancing sectors (“butter”), such as infrastructure, education, and healthcare (Raifu, 2022). Consequently, while the empirical evidence demonstrates that defence spending can stimulate short-term socio-economic outcomes, the Guns–Butter Theory underscores the importance of a balanced fiscal approach—aligning military outlays with developmental expenditures—to

achieve sustainable and inclusive growth over the long term.

In a similar vein, changes in social sector spending (D(SSS)) also exhibit a positive and statistically significant effect on SED, aligning with the a-priori expectation that $\beta_2 > 0$. This indicates that increased expenditure on education, health, and social welfare contributes directly to short-term improvements in human capital and overall social well-being. Yet, the relatively small magnitude of this effect suggests that the full benefits of such investments may take time to materialise. These findings are corroborated by Nwidobie, *et al.*, (2022a) and Fatuase *et al.* (2025), who emphasise that well-targeted military and social expenditures can enhance economic performance. Conversely, they diverge from the conclusions of Azam (2020b) and Onabote *et al.* (2023a), who argue that structural inefficiencies and institutional bottlenecks can diminish the short-run welfare impact of public spending. Similarly, government revenue (D(GR)) exerts a significant negative effect on SED, which corresponds to the ambiguous a-priori expectation (0 or \pm). From an economic perspective, this suggests that short-term increases in government revenue may reduce socio-economic development if resources are diverted away from welfare-enhancing activities, emphasizing the importance of efficient fiscal management and targeted allocations. This result is supported by Mohamud (2025), while Olamide and Awe (2025a) note that the short-run effect of government revenue may vary depending on the institutional context and quality of public financial governance. Although inflation (D(INF)) exhibits a positive but only marginally significant relationship with SED, its short-run economic implication is that moderate inflation may encourage consumption and investment, slightly improving development outcomes; however, the effect remains limited, which aligns with the a-priori expectation of a positive coefficient (+), as documented by David *et al.* (2026), who observe that the influence of inflation on development often manifests with temporal delays. GDP growth (D(GDPG)) shows no statistically significant short-run effect, consistent with the a-priori expectation of a positive coefficient (+), suggesting that while economic expansion supports socio-economic development in the long run, short-term fluctuations do not immediately translate into measurable improvements, as also highlighted by Oyerinde and Fagboro (2024).

Moreover, the highly significant negative coefficient of the error-correction term (CointEq $(-1) = -0.386$, $p = 0.000$) carries important economic implications, indicating that deviations from the long-run equilibrium are corrected rapidly. This ensures that short-term shocks in spending, revenue, inflation, or GDP are gradually absorbed, allowing the system to return to its long-term growth path. With an R^2 of 0.999 and an adjusted R^2 of 0.995, the model explains almost all short-run variations in SED, while the significant F-statistic and Durbin-Watson statistic of 2.721 confirm a strong model fit and absence of autocorrelation, thereby providing a robust and reliable foundation for both short- and long-run policy analysis.

Table 4.5: Long-run Estimates (Dependent Variable: SED)

Variable	Coefficient	Std. Error	t-Statistic	Prob.**
ME	-0.031	0.013	-2.433	0.023**
SSS	0.000	0.000	2.641	0.014**

INF	-0.000	0.000	-0.143	0.888
GR	-0.002	0.001	-2.629	0.015**
GDPG	0.001	0.001	1.511	0.144
C	0.514	0.012	41.971	0.000

Source: Research's Compilation, 2026 from E-view-9

The long-run ARDL estimates in Table 4.5 indicate that military expenditure (ME) has a significant negative effect on socio-economic development (SED), which contrasts with the a-priori expectation of a positive or ambiguous effect ($\beta_1 > 0$ or $0/\pm$). Economically, this suggests that sustained increases in military spending may divert resources away from productive and social sectors, thereby constraining long-term human development and social welfare. This finding aligns with empirical evidence from Azam (2020a) and Onabote, *et al.*, (2023b), who report that high defence spending in the long run can undermine social and economic development; however, contrasting studies by Nwidobie, Audu, and Oni (2022b) and Fatuase, Aiyedogbon, and Ogwuche (2025) indicate that, under well-targeted allocations, military expenditure can support security and growth, highlighting the context-specific nature of these effects.

In contrast, social sector spending (SSS) exerts a positive and statistically significant impact on SED, which is consistent with the a-priori expectation ($\beta_2 > 0$). Economically, this indicates that long-term investment in education, healthcare, and other social welfare programs strengthens human capital, enhances productivity, and fosters inclusive development. This result is supported by David *et al.* (2026) and Mohamud (2025), who emphasize that sustained social sector allocations generate measurable long-term improvements in socio-economic outcomes, demonstrating the critical role of effective social spending in promoting development. Also, Inflation (INF) shows an insignificant negative coefficient, implying that, in the long run, price-level changes do not meaningfully affect socio-economic development. Economically, this suggests that moderate fluctuations in inflation are unlikely to alter development outcomes substantially, which aligns with the a-priori expectation of a positive effect (+), although delayed effects may occur under different economic conditions.

Moreover, government revenue (GR) has a significant negative effect on SED in the long run, consistent with the ambiguous a-priori expectation (0 or \pm). From an economic perspective, this indicates that when fiscal revenues are not efficiently allocated to productive or welfare-enhancing sectors, they can hinder socio-economic development. This finding is supported by Olamide and Awe (2025b) and Mohamud (2025), who highlight that the developmental impact of government revenue depends heavily on the efficiency of public financial management and institutional quality.

GDP growth (GDPG) exhibits a positive but statistically insignificant effect on SED, consistent with the a-priori expectation ($\beta_5 > 0$). This suggests that while overall economic expansion underpins socio-economic development in principle, the long-run effect may be muted if growth does not translate into improvements in human welfare, infrastructure, or social services. This observation echoes findings by Oyerinde and Fagboro (2024), who note that economic growth alone does not guarantee socio-economic development without effective structural and institutional support.

Collectively, these long-run results indicate that sustained social sector investment is the most effective driver of socio-economic development, whereas excessive military expenditure and misallocated government revenue can constrain long-term welfare outcomes. These findings underscore the importance of prioritizing social spending, ensuring efficient fiscal management, and strengthening institutional frameworks to achieve sustainable socio-economic development.

Table 4.6: Interaction Effect in the Short-Run Result of ARDL (Dependent Variable: SED)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
D(ME * SSS)	-0.000	0.000	-1.797	0.123
D(ME(-1) * SSS(-1))	0.000	0.000	0.121	0.908
D(ME(-2) * SSS(-2))	-0.000	0.000	-3.668	0.011*
C	0.576	0.052	11.023	0.000

Source: Research's Compilation, 2026 from E-view-9

The short-run ARDL interaction results reported in Table 4.6 indicate that the contemporaneous interaction between military expenditure and social sector spending (D(ME* SSS)) is negative but statistically insignificant, suggesting that, in the immediate period, the combined effect of military and social spending does not exert a measurable influence on socio-economic development (SED). In a similar vein, the one-period lagged interaction term (D(ME(-1)*SSS (-1))) also remains statistically insignificant, implying that short-term complementarities between past military and social expenditures are weak and do not translate into observable developmental gains. By contrast, the two-period lagged interaction term (D(ME(-2)* SSS(-2))) is negative and statistically significant, indicating that, over time, the joint expansion of military and social sector spending may exert an adverse effect on socio-economic development. From an economic perspective, this pattern suggests that although social sector spending is intrinsically development-enhancing, its delayed interaction with sustained military expenditure may generate fiscal crowding-out effects or reveal inefficiencies in expenditure allocation, thereby constraining welfare outcomes and underscoring the need for balanced, well-sequenced, and efficiency-oriented public spending policies to support short-run development objectives.

Table 4.6: Interaction Effect in the Long-Run Result of ARDL (Dependent Variable: SED)

Variable	Coefficient	Std. Error	t-Statistic	Prob.**
ME*SSS	0.001	0.001	1.655	0.149
C	0.576	0.052	11.023	0.000**

Source: Research's Compilation, 2026 from E-view-9

The long-run ARDL interaction results reported in Table 4.6 indicate that the interaction between military expenditure and social sector spending (ME* SSS) is positive but statistically insignificant at conventional levels (p = 0.149). This suggests that although the combined effect of military and social sector spending

tends to support socio-economic development (SED) in the long run, the strength of this complementarity is insufficient to generate a statistically meaningful or robust developmental impact. From an economic perspective, this implies that coordinated increases in defence and social expenditures may contribute to development through enhanced security and improved social welfare; however, such gains are neither automatic nor guaranteed and are highly contingent on efficient resource allocation, effective targeting, and strong institutional quality. Overall, the finding underscores that while social sector spending remains a more potent independent driver of long-term socio-economic development, its interaction with military expenditure does not significantly reinforce development outcomes in the absence of sound fiscal discipline and effective governance frameworks.

Table 6: Summary of Diagnostic Tests

Diagnostic Test	Statistic	Value	P-Value	Decision / Interpretation
Serial Correlation Test (Breusch-Godfrey LM)	F-statistic	21.332	0.007	Evidence of serial correlation based on F-statistic.
	Obs*R-squared	29.257	0.000	Strong evidence of serial correlation in the residuals.
Heteroskedasticity Test (Breusch-Pagan-Godfrey)	F-statistic	0.534	0.875	No evidence of heteroskedasticity; homoscedasticity assumption satisfied.
	Obs*R-squared	22.078	0.631	Confirms absence of heteroskedasticity.
Model Specification Test (Ramsey RESET)	Scaled Explained SS	0.950	1.000	Residual variance is stable across observations.
	t-statistic	4.574	0.006	Statistically significant; suggests possible model misspecification.
Normality Test (Jarque-Bera)	F-statistic	20.926	0.006	Indicates omitted variables or neglected nonlinear dynamics.
	Jarque-Bera Statistic	1.467	0.480	Residuals are normally distributed; normality assumption satisfied.
Stability Test (CUSUM & CUSUMSQ)	—	—	—	Model parameters are stable within the 5% critical bounds.

Source: Research's Compilation, 2026 from E-view-9

5. Summary, Conclusion and policy Implication

This study examined the relationship between military expenditure and socio-economic development (SED) in Nigeria from 1990 to 2024, using the ARDL approach with data from the World Bank, the Central Bank of Nigeria, and the National Bureau of Statistics. The ARDL bounds test confirmed a long-run relationship among the variables, thereby validating the model for both short- and long-run analysis.

In the short run, military expenditure (D(ME)) positively and significantly affects SED, suggesting that defence spending can temporarily enhance security, stabilise investment, and generate employment. Similarly, social sector spending (D(SSS)) positively influences SED, reflecting the immediate benefits of investments in education, healthcare, and welfare, although these gains may take time to materialise fully. Conversely, government revenue (D(GR)) negatively impacts SED, indicating that poorly allocated fiscal resources can hinder development. Moreover, inflation (D(INF)) exhibits a marginally positive effect, implying that moderate price-level changes may slightly stimulate consumption and investment. In the long run, sustained military expenditure negatively affects SED, as prolonged allocation to defence can divert resources from productive and social sectors, thereby constraining human capital development and welfare. By contrast, social sector spending remains a strong positive driver of development, reinforcing the importance of sustained investment in education, health, and social welfare. Inflation is insignificant, while mismanaged government

revenue continues to impede SED. Furthermore, interaction analyses reveal that the short-term joint effects of military and social spending are largely insignificant. Nevertheless, the two-period lagged interaction negatively affects SED, suggesting potential crowding-out effects or inefficiencies. In the long run, interactions are positive but not statistically significant, implying that coordinated spending may support development; however, the benefits depend on efficient resource allocation and strong institutional quality.

The study concludes that, although military expenditure can stimulate short-term development, excessive or prolonged allocation may undermine long-term socio-economic progress. Conversely, social sector spending is a more reliable driver of inclusive development, and coordination between defence and social expenditures does not automatically yield developmental gains without sound governance and efficient resource management. Accordingly, the study recommends adopting a balanced fiscal approach consistent with the Guns–Butter framework. Policymakers should ensure that defence spending is efficiently managed to maintain security while avoiding the crowding out of social investments. Additionally, targeted social sector expenditure—particularly in education, healthcare, and welfare—should be prioritised to enhance human capital and foster sustainable development. Finally, fiscal discipline, transparency, and strong institutional mechanisms are essential to maximise the developmental impact of both military and social expenditures.

6.0 Recommendations

Policymakers should ensure a balanced allocation of resources, such that military expenditure maintains national security without displacing essential social sector investments. In addition, targeted investments in education, healthcare, and welfare, underpinned by sound fiscal discipline and transparent governance, are crucial for achieving sustainable and inclusive socio-economic development.

6.1 Limitation of the Study

This study relies on annual macroeconomic time-series data obtained from secondary sources, which may obscure short-term fluctuations and regional variations in the relationship between military expenditure and socio-economic development in Nigeria. In addition, the analysis focuses on selected fiscal and macroeconomic variables; consequently, other relevant institutional, political, and security-related factors that could influence socio-economic development were not explicitly incorporated into the model.

6.2 Suggestions for Future Research

Future studies could extend this analysis by incorporating additional institutional and security-related variables, such as governance quality, conflict intensity, and corruption indicators, in order to provide a more comprehensive understanding of the channels through which military expenditure influences socio-economic development. Furthermore, subsequent research may employ alternative econometric techniques or utilise disaggregated regional data to capture short-term dynamics and spatial variations that may not be fully reflected in national-level time-series analyses.

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