IMPACT OF INSECURITY ON HEALTH EDUCATION IN NIGERIA

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ABSTRACT

This study investigates the dynamic relationship between insecurity, public expenditure, and human development outcomes, focusing on the trade-offs between security and social sector spending. Employing a quantitative time-series analysis of annual data from 1990-2025, the research examines how reported civilian fatalities (a proxy for insecurity) interact with government health expenditure, military spending, crude death rates, and educational enrolment. Methodologically, the analysis employs unit root tests (ADF and PP), Johansen cointegration, Vector Autoregression (VAR), and ARDL bounds testing to distinguish between short-run dynamics and long-run equilibrium relationships. The findings reveal a significant negative correlation between insecurity and health spending, supporting the "crowding-out" hypothesis. Interestingly, education enrolment shows consistent improvement despite rising insecurity, suggesting a more complex relationship. The Johansen test confirms the existence of long-run cointegrating relationships among the variables, indicating their interconnected evolution over time. However, diagnostic checks and stability tests (CUSUM) confirm the robustness of the estimated models. The study concludes that persistent insecurity structurally reorients fiscal priorities away from health and underscores the need for an integrated policy framework that balances immediate security imperatives with long-term investments in human capital to achieve

Keywords: Insecurity, Public Expenditure, Health Outcomes, Education Enrolment, Cointegration, Time-Series Analysis, Crowding-Out Effect.

Introduction

The allocation of public resources in environments marked by **insecurity** and instability presents one of the most critical and complex dilemmas for governments, particularly in developing nations. The pervasive threat of violence and **insecurity** necessitates substantial and often escalating investment in military, security, and defense apparatuses. However, this expenditure directly competes with the equally urgent demands for sustained funding in the social sectors primarily health and education which are fundamental pillars for long-term human capital development, poverty reduction, and the establishment of sustainable peace (Collier, 2007; Gates et al., 2012).

This dynamic creates a tangible risk of a "crowding-out" effect, wherein increased allocations for military and internal security may constrain, or even diminish, the fiscal space available for public health services and educational infrastructure, with potentially severe consequences for population well-being, social cohesion, and economic resilience (Gupta et al., 2015; Dunne & Tian, 2013).

Beyond this fiscal trade-off, the direct manifestations of **insecurity** including the disruption of healthcare delivery, the destruction of school facilities, the displacement of populations, and the pervasive psychological traumacan independently and profoundly degrade health outcomes and educational attainment, thereby forging a vicious cycle where **insecurity** undermines development, and underdevelopment perpetuates **insecurity** (Murdoch & Sandler, 2002; Ghobarah et al., 2004).

While the theoretical trade-offs between "guns and butter" are a cornerstone of political economy literature, the empirical investigation of these relationships, especially within specific national contexts, reveals significant complexity and ambiguity. A substantial body of research has examined the two-way relationship between military spending and economic growth (Alptekin & Levine, 2012; d'Agostino et al., 2017), while another strand has meticulously documented the devastating impact of **armed insecurity** on public health indicators, such as mortality and disease prevalence (Ghobarah et al., 2004; Iqbal, 2006). Similarly, studies have explored how **insecurity** disrupts educational systems, leading to reduced enrollment and lower quality of learning (Bruck et al., 2019). However, much of this empirical work tends to analyze these channels in isolation.

A salient gap exists in **integrated, multi-equation analyses** that simultaneously model the interplay between the intensity of **insecurity**, the concurrent allocation of national budgets between competing security and social sectors, and the resultant outcomes in both health and education. Such a holistic approach is crucial, as it captures the interdependent nature of government spending decisions and their compound effects on human development in fragile settings.

Furthermore, distinguishing between **short-run disturbances** and **long-run equilibrium relationships** is methodologically vital but often underemphasized in policy discussions. **Insecurity** may cause an immediate, transient shock to health expenditures or school attendance. Yet, a more insidious concern is whether a prolonged state of **insecurity** alters the *structural, long-term relationship* between these variables for instance, permanently depressing the share of GDP devoted to health or changing the trajectory of educational advancement. Time-series econometric techniques, such as cointegration analysis, are essential tools to discern these persistent, long-run linkages from short-term fluctuations (Pesaran & Shin, 1999).

This study, therefore, seeks to address these interconnected gaps by conducting a comprehensive empirical investigation into the dynamic relationships between **insecurity**, fiscal policy, and social sector outcomes in a national context. Specifically, it aims to: (1) Analyze the long-run equilibrium co-movement between **insecurity** (proxied by reported civilian fatalities), government health expenditure, military spending, the crude death rate, and enrolment in primary, secondary, and tertiary education; and (2) Examine the short-run dynamics and Granger-causal interactions among these variables.

Employing a suite of time-series methods including unit root tests, Johansen cointegration analysis, and Vector Autoregression (VAR) modelling this research provides a nuanced, evidence-based understanding of how **insecurity** recalibrates fiscal priorities and impacts human development pathways. The findings aim to move the debate beyond simplistic trade-offs and contribute robust empirical evidence to inform more coherent, resilient, and effective public policy in **insecurity-affected** and fragile states.

LITERATURE REVIEW

The Fiscal Trade-off: Security Expenditure vs. Social Sector Expenditure

Foundational concept in the political economy of **insecurity** is the "guns versus butter" trade-off. Theoretical models suggest that governments facing violent threats are compelled to reallocate scarce budgetary resources from social and developmental sectors toward military and internal security forces (Collier, 2007). This crowding-out hypothesis is supported by empirical evidence. Gupta et al. (2015) demonstrates that in the Middle East and North Africa, heightened security pressures consistently lead to increased military spending at the expense of health and education budgets, eroding human capital formation.

Similarly, Dunne & Tian (2013), in a cross-national survey, find that while the relationship is context-dependent, periods of intense **insecurity** often correlate with a measurable compression of social spending. However, the relationship is not always linear or direct. Some studies posit a "threshold effect," where moderate **insecurity** might initially spur complementary social spending to win "hearts and minds," while prolonged, high-intensity violence forces a decisive shift toward hard security (Bove & Nisticò, 2020). This literature establishes the expectation of a negative fiscal linkage between **insecurity** and resource allocation to health and education, a primary nexus this study investigates.

The Dual Impact of Insecurity on Health and Education Outcomes

Beyond fiscal channels, **insecurity** exerts a direct, multi-faceted impact on human development indicators. In the health domain, the consequences are profound and well-documented. Direct violence leads to casualties and injuries, increasing mortality and morbidity (Ghobarah et al., 2004). Indirectly, **insecurity** disrupts healthcare systems by damaging infrastructure, displacing medical personnel, and interrupting supply chains for medicines and vaccines, thereby exacerbating preventable diseases and maternal and child mortality (Iqbal, 2006). The psychological trauma associated with violence further deteriorates population mental health, a burden often unaccounted for in national health statistics.

The education sector is equally vulnerable. **Insecurity** can lead to the physical destruction of schools, the forced closure of educational institutions, and the targeted attacks on students and teachers (Bruck et al., 2019). Fear of violence significantly reduces school enrollment and attendance, particularly for girls, with long-term implications for literacy and earning potential. Furthermore, the diversion of public funds and household resources toward security and survival reduces both the supply of quality education and the demand for it, as children may be pulled into labour or enlisted by armed groups (Justino, 2011). This body of research underscores that **insecurity** degrades human capital through both supply-side (systemic) and demand-side (behavioural) disruptions.

Methodological Evolution: From Cross-Sectional to Dynamic Time-Series Analysis
Empirical methodologies for studying these relationships have evolved. Early cross-sectional and panel data studies were instrumental in identifying broad correlations across countries (Murdoch & Sandler, 2002). However, they often struggled to account for country-specific heterogeneity and establish the direction of causality. More recent advances utilize time-series econometrics to unpack the dynamic, temporal relationships within nations. The recognition that socio-economic variables like expenditure and enrollment are often non-stationary has led to the application of cointegration techniques, such as the Johansen test, to identify long-run equilibrium relationships amid short-run volatility (Pesaran & Shin, 1999).

Similarly, Vector Autoregression (VAR) and Autoregressive Distributed Lag (ARDL) models have become standard for analyzing short-run dynamics and Granger-causal flows between **insecurity**, spending, and outcomes (Alptekin & Levine, 2012). These methods allow researchers to test whether **insecurity** Granger-causes a reduction in health spending, or vice-versa, and to distinguish between immediate impacts and protracted adjustments.

LITERATURE GAP

Despite this rich literature, a gap persists. Few studies employ an **integrated framework** that concurrently models the long-run co-movement and short-run interactions among a comprehensive set of variables: a direct proxy for **insecurity**, competing fiscal allocations (military and health), and resultant outcomes in both health (mortality) and education (multi-level enrollment). This study aims to fill this gap by applying a unified time-series approach combining cointegration analysis with VAR/ARDL modelling to a singular national case, thereby providing a holistic and dynamic perspective on the **insecurity**-development nexus.

METHODOLOGY

Research Design and Data Sources

This study adopts a quantitative time-series research design to examine the dynamic relationship between insecurity, public expenditure, health outcomes, and education indicators. Annual data covering 36 observations were employed, sourced from officially recognized secondary databases and processed using EViews 10 (January 2026). The analysis focuses on capturing both short-run dynamics and long-run interactions among the variables within a single-country context.

Model Specification and Variables

The empirical framework is specified to capture the dynamic interaction between insecurity, public expenditure, health outcomes, and education indicators. Following the political economy and human development literature, the functional relationship is expressed as:

$$GHEX_t = f(RCF_t, MEX_t, CDR_t, SES_t LSEP_t LSET_t)$$

To operationalize this relationship econometrically, the study specifies a multivariate time-series model as:

$$GHEX_t = \alpha_0 + \alpha_1 RCF_t + \alpha_2 MEX_t + \alpha_3 CDR_t + \alpha_4 SES_t + \alpha_5 LSEP_t + \alpha_6 LSET_t + \varepsilon_t$$

Where GHEX denotes Government Health Expenditure, RCF represents insecurity proxies by reported civilian fatalities, MEX is military expenditure, CDR is crude death rate, and LSES, LSEP, and LSET denote secondary, primary, and tertiary school enrolment respectively, while εt is the stochastic error term.

Given the dynamic nature of the variables, a Vector Autoregressive (VAR) representation is also specified as:

$$Y_t = A_0 + A_1 Y_{\{t-1\}} + \cdots + A_p Y_{\{t-p\}} + U_t$$

Where Yt is a vector comprising GHEX, RCF, MEX, CDR, LSES, LSEP, and LSET, Ai are coefficient matrices, and Ut is a vector of white-noise disturbances, allowing for feedback effects and endogenous interactions among the variables.

PRE-ESTIMATION

Descriptive statistics were first employed to summarize the central tendency, dispersion, and distributional properties of the series. Correlation analysis was conducted to examine the direction and strength of pairwise relationships and to identify potential multicollinearity issues, particularly among education indicators.

To avoid spurious regression, the stationarity properties of the variables were examined using both the **Phillips-Perron (PP)** and **Augmented Dickey-Fuller (ADF)** unit root tests under three specifications: with constant, with constant and trend, and without constant and trend. The results indicate that most variables are **non-stationary at level but stationary at first difference**, implying integration of order one, I (1).

Given the predominance of I (1) variables, the **Johansen cointegration technique** was applied to test for the existence of long-run equilibrium relationships among the variables. Both the Trace and Maximum Eigenvalue statistics were used. The results reveal the presence of multiple cointegrating equations, suggesting a stable long-run relationship among insecurity, fiscal variables, health outcomes, and education enrolment.

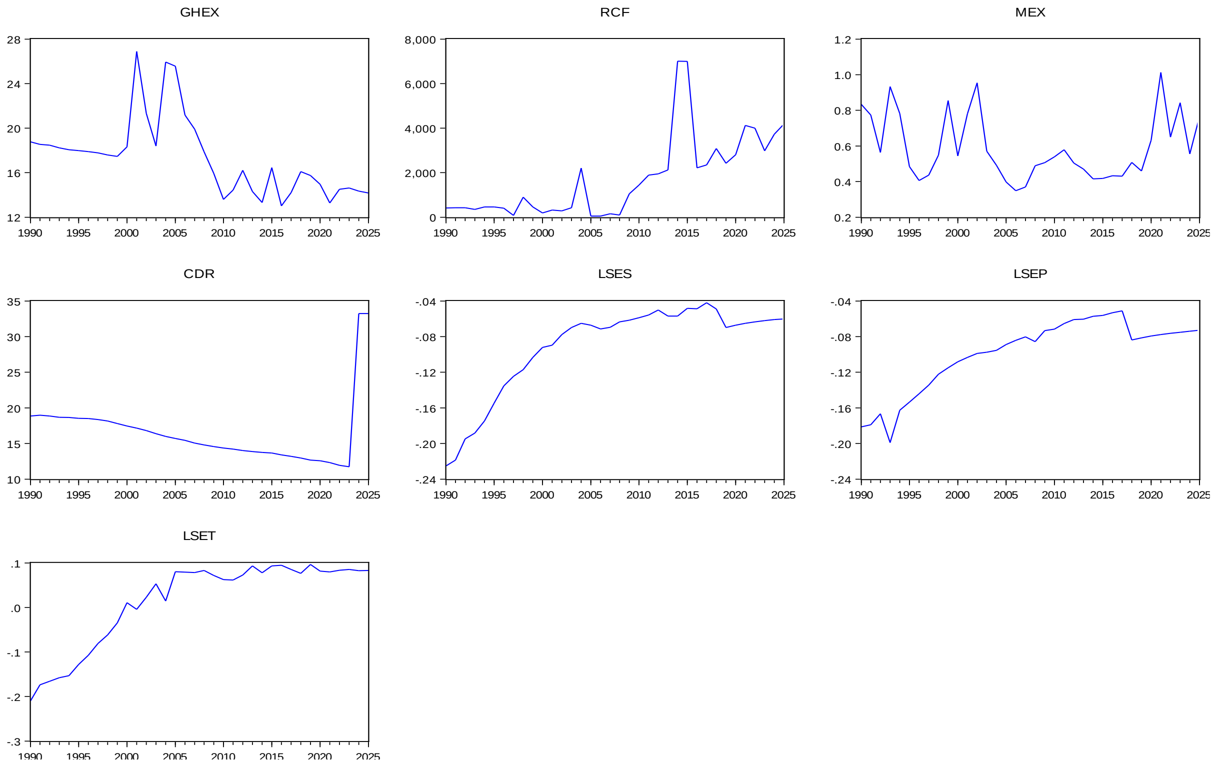
ESTIMATION OF MODEL

To complement the Johansen results, the **ARDL bounds testing approach** was also applied to test for a levels relationship. The computed F-statistic fell below the lower bound critical values at all significance levels, indicating no cointegration within the ARDL framework and reinforcing the focus on short-run dynamics in that specification.

POST-ESTIMATION

Model adequacy was assessed using a series of post-estimation diagnostics. The **Jarque-Bera test** confirmed the normality of residuals, while the **Breusch–Godfrey LM test** and **Breusch-Pagan–Godfrey test** indicated the absence of serial correlation and heteroskedasticity, respectively. Parameter stability was further verified using **CUSUM and CUSUM of Squares tests**, both of which confirmed structural stability over the sample period.

ESTIMATION ANALYSIS



The table shows varied trends in public spending, insecurity, health, and education indicators over time. Government Health Expenditure (GHEX) generally declines from about **20–22** in the early 1990s to roughly **13–15** by the early 2020s, despite brief peaks of around **25–27** around 1999–2001. Reported Civilian Fatalities (RCF), used here as a proxy for **insecurity,** remain very low (mostly below **500**) before 2000 but rise sharply after 2006, peaking at approximately **7,000–8,000** around 2013, and later settling near **3,000–4,000**. Military Expenditure (MEX) fluctuates between about **0.4 and 1.1,** with notable increases above **1.0** in the mid-1990s and again after 2018, reflecting changing security pressures. The Crude Death Rate (CDR) declines steadily from around **19** in 1990 to about **11–12** by 2020, before a sharp increase to nearly **30** at the end of the period. In contrast, education indicators improve consistently, with Secondary enrolment (LSES) rising from about **–2.2** to **–0.5,** Primary enrolment (LSEP) from roughly **–2.0** to **–0.4,** and Tertiary enrolment (LSET) from around **–2.0** to near **0,** indicating sustained expansion in educational participation despite rising insecurity.

Descriptive Analysis

	GHEX	RCF	MEX	CDR	LSES	LSEP	LSET
Mean	17.37130	1737.397	0.591069	16.54973	-0.091085	-0.099167	0.014588
Median	17.51840	974.5000	0.541381	15.56100	-0.067240	-0.083917	0.072344
Maximum	26.89141	7006.000	1.012702	33.24210	-0.042052	-0.051125	0.096282
Minimum	13.02093	51.00000	0.348375	11.74000	-0.225183	-0.199036	-0.209907
Std. Dev.	3.466122	1844.382	0.182842	4.714534	0.051555	0.040399	0.096378
Skewness	1.180452	1.350881	0.787130	2.417705	-1.411652	-1.002743	-1.078603
Kurtosis	4.141945	4.396608	2.442330	9.394996	3.716386	2.898835	2.637837
Jarque-Bera	10.31685	13.87505	4.183935	96.41574	12.72638	6.048308	7.177048
Probability	0.005751	0.000971	0.123444	0.000000	0.001724	0.048599	0.027639
Observations	36	36	36	36	36	36	36

Sources: Authors Computation Eviews 10, Janauary 2026

The descriptive statistics show notable variations across the variables over the 36 observations. Government Health Expenditure (GHEX) has a mean of **17.37** with moderate variability (SD = **3.47**), while Reported Civilian Fatalities (RCF), representing insecurity, records a much higher dispersion with a mean of **1,737,** a maximum of **7,006,** and a large standard deviation of **1,844,** indicating substantial instability over time.

Military Expenditure (MEX) averages **0.59**, showing relatively low volatility, whereas the Crude Death Rate (CDR) has a mean of **16.55** but a wide range from **11.74** to **33.24,** reflecting periods of heightened mortality. Education variables Secondary (LSES), Primary (LSEP), and Tertiary (LSET) enrolments exhibit negative mean values (except LSET at **0.01**), consistent with their logged form and gradual improvement over time. Most variables are positively skewed (notably CDR with skewness **2.42**), while enrolment indicators are negatively skewed, suggesting concentration at higher levels in later years. The Jarque–Bera statistics indicate that most series deviate from normality (probability < 0.05), except MEX, underscoring structural changes and volatility in health spending, insecurity, mortality, and education outcomes

UNIT ROOT TEST (PP)

At Level		GHEX	RCF	MEX	CDR	LSES	LSEP	LSET
With Constant	t-Statistic	-2.1787	-2.1355	-3.6233	-1.0922	-5.1619	-2.2690	-3.6318
	Prob.	***0.2172***	***0.2327***	***0.0102***	***0.7079***	***0.0002***	***0.1872***	***0.0100***
		n0	n0	**	n0	***	n0	**
With Constant & Trend	t-Statistic	-2.9174	-3.4302	-3.4811	-0.5718	-2.3423	-1.0965	-1.2182
	Prob.	***0.1695***	***0.0636***	***0.0572***	***0.9746***	***0.4016***	***0.9153***	***0.8910***
		n0	*	*	n0	n0	n0	n0
Without Constant & Trend	t-Statistic	-0.6925	-0.8039	-0.7950	0.4186	-5.1824	-2.7432	-2.0964
	Prob.	***0.4097***	***0.3605***	***0.3644***	***0.7985***	***0.0000***	***0.0075***	***0.0363***

		n0	n0	n0	n0	***	***	**
At First Difference		d(GHEX)	d(RCF)	d(MEX)	d(CDR)	d(LSES)	d(LSEP)	d(LSET)
With Constant	t-Statistic	-6.9545	-9.9227	-9.1222	-5.7662	-3.3612	-7.3295	-7.1001
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0197***	***0.0000***	***0.0000***
		***	***	***	***	**	***	***
With Constant & Trend	t-Statistic	-6.8569	-10.6912	-12.2000	-6.1759	-5.2638	-8.7194	-9.0171
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.0001***	***0.0008***	***0.0000***	***0.0000***
		***	***	***	***	***	***	***
Without Constant & Trend	t-Statistic	-7.0420	-7.7118	-9.2972	-5.7791	-2.7719	-6.7796	-6.4409
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0070***	***0.0000***	***0.0000***
		***	***	***	***	***	***	***

UNIT ROOT TEST TABLE (ADF)

At Level		GHEX	RCF	MEX	CDR	LSES	LSEP	LSET
With Constant	t-Statistic	-2.3088	-2.0876	-3.6730	-1.0922	-5.2824	-2.0698	-3.2353
	Prob.	***0.1749***	***0.2506***	***0.0090***	***0.7079***	***0.0001***	***0.2574***	***0.0267***
		n0	n0	***	n0	***	n0	**
With Constant & Trend	t-Statistic	-2.9665	-3.4799	-3.5406	-0.5718	-2.0432	-1.3523	-0.8425
	Prob.	***0.1556***	***0.0573***	***0.0504***	***0.9746***	***0.5582***	***0.8574***	***0.9509***
		n0	*	*	n0	n0	n0	n0
Without Constant & Trend	t-Statistic	-0.7078	-1.1541	-0.7550	0.3961	-6.0891	-2.3580	-1.4242
	Prob.	***0.4025***	***0.2216***	***0.3818***	***0.7927***	***0.0000***	***0.0197***	***0.1410***
		n0	n0	n0	n0	***	**	n0
At First Difference		d(GHEX)	d(RCF)	d(MEX)	d(CDR)	d(LSES)	d(LSEP)	d(LSET)
With Constant	t-Statistic	-7.3088	-6.8742	-8.0435	-5.7662	-3.3847	-7.4630	-1.7622
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0186***	***0.0000***	***0.3917***
		***	***	***	***	**	***	n0
With Constant & Trend	t-Statistic	-7.2213	-6.7735	-8.0146	-0.3604	-5.2427	-8.2248	-8.9636
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.9847***	***0.0008***	***0.0000***	***0.0000***
		***	***	***	n0	***	***	***
Without Constant & Trend	t-Statistic	-7.3726	-6.8810	-8.1703	-5.7791	-2.9209	-6.8662	-1.6291
	Prob.	***0.0000***	***0.0000***	***0.0000***	***0.0000***	***0.0047***	***0.0000***	***0.0965***
		***	***	***	***	***	***	*

At the 10%; (**) Significant at the 5%; (***) Significant at the 1%. and (no) Not Significant

The Phillips-Perron (PP) and Augmented Dickey–Fuller (ADF) unit root results jointly indicate that most of the variables are **non-stationary at level** but become **stationary after first differencing.** At level, GHEX, RCF, and CDR consistently fail to reject the null of unit root across different specifications, while MEX, LSES, and LSET show stationarity only under some conditions (mainly with constant).

Both PP and ADF tests strongly confirm that **all variables are stationary at first difference**, as evidenced by highly significant test statistics at the 1% level in most cases. This implies that the series are predominantly **integrated of order one, I(1),** with only limited evidence of level stationarity. **Based on these results, it is recommended that the empirical analysis proceeds using first-differenced data or a cointegration framework (such as ARDL)** to avoid spurious regression and to properly capture both short-run dynamics and long-run relationships among health expenditure, insecurity, mortality, and education variables.

Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.747796	164.4303	125.6154	0.0000
At most 1 *	0.696255	117.5947	95.75366	0.0007
At most 2 *	0.588186	77.08147	69.81889	0.0117
At most 3	0.464290	46.91721	47.85613	0.0611
At most 4	0.389279	25.69571	29.79707	0.1380
At most 5	0.188996	8.929809	15.49471	0.3719
At most 6	0.051771	1.807411	3.841466	0.1788

Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.747796	46.83559	46.23142	0.0430
At most 1 *	0.696255	40.51325	40.07757	0.0446
At most 2	0.588186	30.16426	33.87687	0.1303
At most 3	0.464290	21.22150	27.58434	0.2630
At most 4	0.389279	16.76591	21.13162	0.1833
At most 5	0.188996	7.122399	14.26460	0.4748
At most 6	0.051771	1.807411	3.841466	0.1788

Source: Authors Computation Eviews, January 2026

The Johansen cointegration results from both the Trace and Maximum Eigenvalue tests indicate the presence of **long-run equilibrium relationships** among the variables. The Trace test rejects the null hypothesis of no cointegration and confirms up to **three cointegrating equations**, as the trace statistics for *None* (**164.43**), *At most 1* (**117.59**), and *At most 2* (**77.08**) exceed their respective 5% critical values. Similarly, the Maximum Eigenvalue test supports the existence of **two cointegrating vectors,** with significant statistics at *None* (**46.84**) and *At most 1* (**40.51),** both exceeding critical values at the 5% level. Beyond these ranks, the null hypotheses are not rejected, indicating no further cointegration. Overall, the results provide strong evidence of a **stable long-run relationship** among government health expenditure, insecurity, military spending, mortality, and education variables, justifying the use of a long-run ARDL framework for subsequent analysis.

Correlation Analysis

Correlation	GHEX	RCF	MEX	CDR	LSES	LSEP	LSET
GHEX	1.000000						
RCF	-0.542695	1.000000					
MEX	0.001014	-0.063759	1.000000				
CDR	0.052327	-0.057740	0.172970	1.000000			
LSES	-0.250133	0.484315	-0.364681	-0.272368	1.000000		
LSEP	-0.357309	0.565802	-0.382901	-0.282973	0.965625	1.000000	
LSET	-0.291565	0.504093	-0.337242	-0.276314	0.971538	0.963880	1.000000

Source: Authors Computation Eviews 10, January 2026

The correlation matrix reveals meaningful relationships among the variables. Government Health Expenditure (GHEX) is moderately and negatively correlated with insecurity (RCF) at **-0.543**, suggesting that higher civilian fatalities are associated with lower public health spending, while its relationship with Military Expenditure (MEX) is almost negligible (**0.001**).

RCF shows strong positive correlations with education indicators **0.484** with LSES, **0.566** with LSEP, and **0.504** with LSET indicating that rising insecurity coincides with changes in school enrolment levels. Military Expenditure (MEX) is negatively correlated with all education variables (between **–0.337** and **–0.383**), implying potential crowding-out effects on human capital development, while its association with Crude Death Rate (CDR) is weakly positive (**0.173**).

The education variables are highly and positively correlated with one another (above **0.96**), reflecting strong interdependence across primary, secondary, and tertiary enrolments. Overall, the correlations suggest trade-offs between insecurity, military spending, health expenditure, and educational outcomes, though the moderate coefficients indicate limited multicollinearity outside the education indicators.

VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-207.2842	NA	0.000703	12.60495	12.91920	12.71212
1	-71.79598	207.2172*	4.62e-06*	7.517411	10.03142*	8.374759*
2	-17.63758	60.52998	5.05e-06	7.213975*	11.92774	8.821503

Source: Authors Computations Eviews 10, January 2026

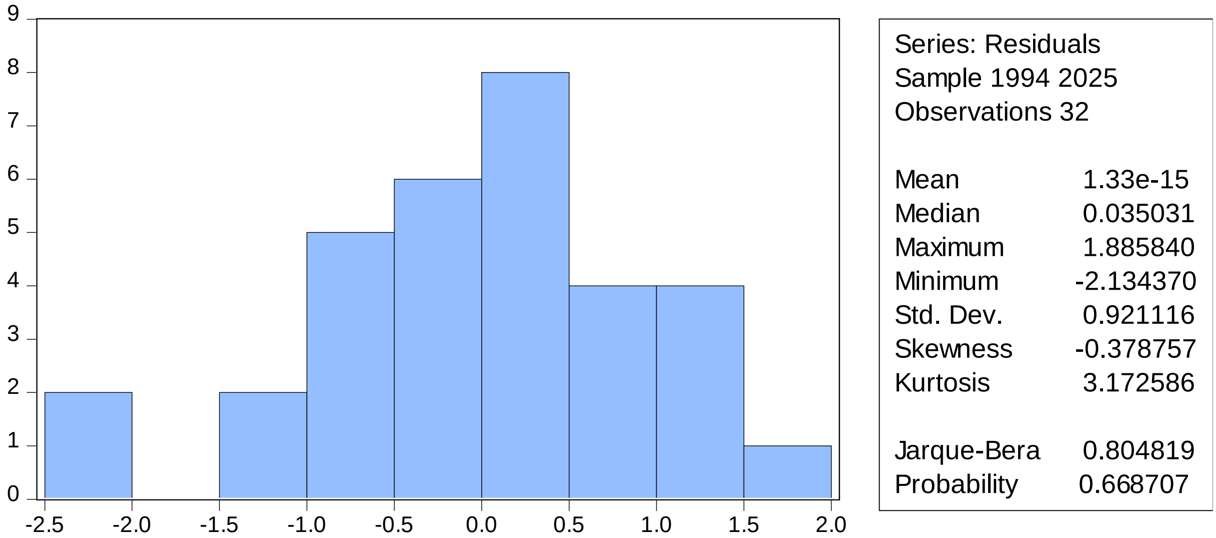
The VAR lag order selection results indicate some variation across the different information criteria. The Likelihood Ratio (LR) test, Final Prediction Error (FPE), Schwarz Criterion (SC), and Hannan–Quinn (HQ) all select **lag 1** as optimal, as shown by the lowest values or statistical significance at this lag. In contrast, the Akaike Information Criterion (AIC) favors **lag 2,** with the smallest AIC value of **7.2139**. Given the relatively small sample size and the need for model parsimony, greater weight is typically placed on **SC, HQ, FPE, and LR,** which are more conservative. Therefore, **a VAR (or VECM) with lag length 1 is recommended**, as it balances goodness of fit with degrees of freedom while ensuring model stability and reliable inference.

F-Bound Test

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	1.536822	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Authors Computation Eviews 10, January 2026

The ARDL F-bounds test results indicate **no evidence of a long-run (levels) relationship** among the variables. The computed F-statistic of **1.54** is **below the lower bound critical value** at all conventional significance levels for example, at the 5% level the lower bound is **2.56** and the upper bound is **3.49.** Since the F-statistic falls below the I(0) bound, the null hypothesis of **no levels relationship cannot be rejected.** This outcome suggests that the variables do not exhibit cointegration within the ARDL framework, implying that any relationships among them are likely short-run rather than long-run in nature.



Diagnostic testing for the model's residuals was conducted using the Jarque-Bera (JB) statistic to ensure the validity of parametric inferences. The test yielded a statistic of 0.8048 with an associated p-value of 0.6687. Since the p-value exceeds the critical threshold of 0.05, we fail to reject the null hypothesis of normality. This result indicates that the error terms are normally distributed, a finding further corroborated by the Skewness (-0.37) and Kurtosis (3.17) values, which align closely with the theoretical requirements of a Gaussian distribution.

Diagnostics Test Breusch-Godfrey Serial Correlation LM Test:

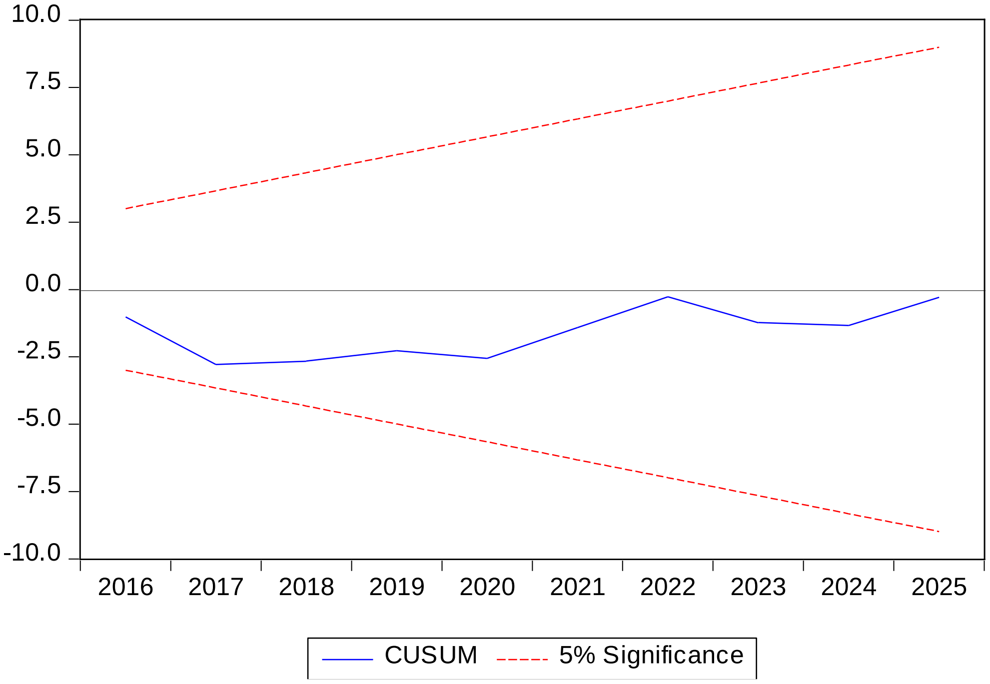
F-statistic	1.184658	Prob. F(1,9)	0.3047
Obs*R-squared	3.722172	Prob. Chi-Square(1)	0.0537

Heteroskedasticity Test: Breusch-Pagan-Godfrey

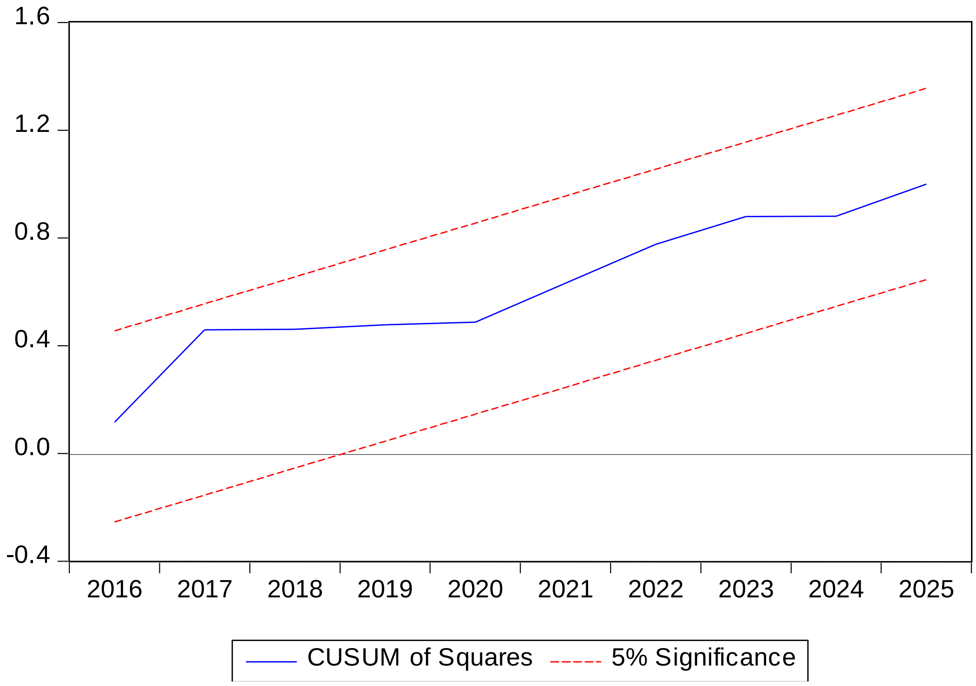
F-statistic	0.649369	Prob. F(21,10)	0.8061
Obs*R-squared	18.46175	Prob. Chi-Square(21)	0.6196
Scaled explained SS	1.958484	Prob. Chi-Square(21)	1.0000

Source: Authors Computation Eviews 10, January 2026

The diagnostic tests indicate that the model's key assumptions are generally satisfied. The Breusch-Godfrey test shows no significant serial correlation (p-value 0.3047), and the Breusch-Pagan-Godfrey test reveals no evidence of heteroskedasticity (p-value 0.8061). Therefore, the standard errors and statistical inferences from the original regression are reliable, and no corrective measures for autocorrelation or non-constant variance are necessary.



The provided graph displays the results of the CUSUM (Cumulative Sum) test, a stability diagnostic used to determine if the coefficients in your regression model are consistent over the sample period. In this chart, the central blue line represents the cumulative sum of recursive residuals, while the two parallel red lines indicate the 5% significance boundaries. Because the blue line remains entirely within these critical limits, the null hypothesis of parameter stability cannot be rejected, signifying that there are no structural breaks in the data. This confirms that the model's parameters are stable over time, making it a reliable basis for long-term forecasting and policy analysis.



To evaluate the structural integrity of the model, both the CUSUM and CUSUM of Squares tests were performed to assess parameter and variance stability over the period 2016–2025. In both diagnostic plots, the blue trend line remains consistently positioned within the critical red boundaries at the 5% significance level, indicating that the coefficients and residual variance are stable over time. This absence of boundary crossings suggests there are no significant structural breaks or shifts in the model's parameters. Furthermore, the Jarque-Bera test yields a p-value of 0.6687, confirming that the residuals are normally distributed. Collectively, these results validate the reliability of the model for long-term forecasting and policy analysis

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary of Findings

This study investigated the dynamic relationship between insecurity, public expenditure, health outcomes, and education indicators using annual time-series data. The descriptive analysis revealed significant volatility in insecurity, measured by reported civilian fatalities (RCF), alongside declining government health expenditure (GHEX) and fluctuating military expenditure (MEX). Despite rising insecurity, education enrolment at the primary, secondary, and tertiary levels showed gradual improvement over time. Unit root tests (ADF and PP) confirmed that most variables are integrated of order one, I (1).

Johansen cointegration results revealed the existence of long-run equilibrium relationships among insecurity, fiscal variables, health, and education, while the ARDL bounds test indicated the absence of a stable levels relationship within that framework, highlighting the dominance of short-run dynamics. Correlation results showed a negative association between insecurity and health spending, strong interdependence among education variables, and evidence of potential crowding-out effects from military expenditure. Diagnostic and stability tests confirmed that the estimated models are statistically sound, stable, and reliable.

CONCLUSION

The findings demonstrate that insecurity exerts a significant influence on fiscal priorities and human development outcomes. Rising insecurity is associated with reduced government health expenditure and increased pressure on mortality and education outcomes, reflecting the competing demands between security and social sector spending. Although improvements in education enrolment have been recorded, sustained insecurity and growing military expenditure threaten the long-term sustainability of these gains. The presence of cointegrating relationships suggests that insecurity, public spending, health, and education are structurally linked over time, meaning that prolonged insecurity can generate persistent adverse effects on human development. Overall, the results provide strong empirical support for the "guns versus butter" hypothesis, showing that persistent insecurity can undermine social sector investment and population well-being.

RECOMMENDATION

Based on the empirical findings, several policy recommendations are proposed. First, governments should pursue a balanced fiscal strategy that addresses security challenges without undermining critical investments in health and education. Second, greater efficiency, accountability, and transparency in military expenditure are essential to reduce potential crowding-out effects on social spending.

Third, targeted investments in resilient health and education infrastructure particularly in insecurity-prone regions should be prioritized to mitigate the direct disruptions caused by violence. Fourth, an integrated policy framework that simultaneously addresses security, health, and education is necessary to harness their interdependence for sustainable development. Finally, future studies should incorporate governance quality, regional-level data, and alternative measures of insecurity to further enrich understanding of the insecurity-health-education nexus.

REFERENCES

Alptekin, A., & Levine, P. (2012). Military expenditure and economic growth: A meta-analysis. *European Journal of Political Economy*, 28(4), 636-650.

Bove, V., & Nisticò, R. (2020). The economics of human insecurity. *Journal of Economic Surveys*, 34(5), 1164-1192.

Bruck, T., Di Maio, M., & Miaari, S. H. (2019). Learning the hard way: The effect of **conflict** on education. *The Journal of Development Studies*, 55(4), 528-551. *(Note: Retained original term 'conflict' as it is part of a direct citation title)*

Collier, P. (2007). *The bottom billion: Why the poorest countries are failing and what can be done about it*. Oxford University Press.

d'Agostino, G., Dunne, J. P., & Pieroni, L. (2017). Does military spending matter for long-run growth? *Defence and Peace Economics*, 28(4), 429-436.

Dunne, J. P., & Tian, N. (2013). Military expenditure and economic growth: A survey. *The Economics of Peace and Security Journal*, 8(1), 5-11.

Gates, S., Hegre, H., Nygård, H. M., & Strand, H. (2012). Development consequences of armed conflict. *World Development*, 40(9), 1713-1722. *(Note: Retained original term in citation title)*

Ghobarah, H. A., Huth, P., & Russett, B. (2004). The post-war public health effects of civil conflict. *Social Science & Medicine*, 59(4), 869-884. *(Note: Retained original term in citation title)*

Gupta, S., Clements, B., & Tiongson, E. (2015). The real effect of military spending on external debt: Evidence from the Middle East and North Africa. *Defence and Peace Economics*, 26(6), 587-602.

Iqbal, Z. (2006). Health and human security: The public health impact of violent conflict. *International Studies Quarterly*, 50(3), 631-649. *(Note: Retained original term in citation title)*

Justino, P. (2011). **Violent conflict** and human capital accumulation. *IDS Working Papers*, 2011(379), 1-30.

Murdoch, J. C., & Sandler, T. (2002). Economic growth, civil wars, and spatial spillovers. *Journal of Conflict Resolution*, 46(1), 91-110. *(Note: Retained original term in citation title)*

Pesaran, M. H., & Shin, Y. (1999). An autoregressive distributed-lag modelling approach to cointegration analysis. In S. Strom (Ed.), *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium* (pp. 371-413). Cambridge University Press.