SUSTAINABLE HUMAN DEVELOPMENT IN NIGERIA: MACROECONOMIC STABILITY, GOVERNANCE, AND CONFLICT

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ABSTRACT

This study examines the long-run and short-run relationships between macroeconomic stability, governance quality, conflict dynamics, and sustainable human development in Nigeria over the period 1990-2025. Human development is measured using the Human Development Index (HDI), while inflation represents macroeconomic instability, government effectiveness proxies' governance quality, and military expenditure and crude death rate capture conflict and insecurity. Using an Autoregressive Distributed Lag (ARDL) framework, the study finds strong evidence of a stable long-run relationship between human development and its key determinants. Inflation, weak governance, rising military expenditure, and higher mortality rates exert significant adverse effects on human development outcomes in Nigeria. The results highlight the development costs of persistent macroeconomic volatility, institutional fragility, and protracted insecurity. The study concludes that sustainable improvements in human development require an integrated policy approach that simultaneously promotes macroeconomic stability, strengthens governance institutions, and adopts conflict-sensitive development strategies.

Keywords: Sustainable Human Development; Macroeconomic Stability; Governance, Conflict, Policy Framework

INTRODUCTION

Sustainable human development remains one of the most pressing challenges confronting Nigeria, despite the country's abundant natural resources and status as Africa's largest economy. Human development extends beyond income growth to encompass improvements in health, education, and overall quality of life, as captured by the Human Development Index (HDI). However, Nigeria continues to record only modest progress in HDI outcomes relative to its economic potential, reflecting deep-seated structural constraints within the economy, governance system, and security environment (UNDP, 2024; World Bank, 2025).

Macroeconomic instability has been a persistent feature of Nigeria's development trajectory. Episodes of high and volatile inflation, exchange rate instability, and fiscal imbalances have repeatedly eroded real incomes, weakened investment incentives, and constrained access to essential social services. In this context, inflation is adopted in this study as a key indicator of macroeconomic instability because it directly affects purchasing power, household welfare,

and the real value of public expenditure. Recent reforms such as fuel subsidy removal, foreign exchange unification, and fiscal consolidation have yielded limited gains, while inflationary pressures and food insecurity remain acute, undermining human capital accumulation (IMF, 2025; CBN, 2025). Empirical evidence further shows that inflation disproportionately affects poor households and slows progress toward human development goals (World Bank, 2023; Chola & Silwimba, 2025).

Beyond macroeconomic challenges, weak governance continues to pose a fundamental obstacle to sustainable development in Nigeria. Institutional inefficiency, corruption, limited accountability, and weak regulatory capacity have reduced the effectiveness of public spending and constrained service delivery in critical sectors such as healthcare, education, and infrastructure. Government effectiveness is therefore employed as a proxy for governance quality, as it captures the capacity of the state to formulate and implement sound policies and deliver public services. Governance indicators for Nigeria remain persistently weak, reflecting fragile state capacity and declining public trust (Worldwide Governance Indicators, 2024). Empirical studies demonstrate that governance failures directly worsen human development outcomes by misallocating resources and reinforcing inequality (Ozigbu, Ezekwe & Okoli, 2025; Ezeani, 2024).

Compounding these economic and institutional weaknesses is Nigeria's protracted security crisis. The country faces multiple, overlapping conflicts, including insurgency in the northeast, farmer–herder clashes in the middle belt, militancy in the Niger Delta, and widespread banditry and criminal violence. These conflicts impose severe human and economic costs through loss of life, displacement, destruction of infrastructure, and market disruption. Military expenditure and crude death rate are adopted in this study as indicators of conflict and insecurity, reflecting both the fiscal burden of security responses and the human costs of violence. Rising mortality rates and fluctuating security spending divert scarce public resources away from social investment, thereby weakening the foundations of long-term human development (ACLED, 2024; Onunwa, 2025; Akindoyin & Obafemi, 2025).

Although a growing body of literature has examined the effects of macroeconomic instability, governance failures, and conflict on development in Nigeria, much of the existing research treats these factors in isolation. This study differs from existing studies by jointly modelling the dynamic interactions and long-run equilibrium relationships among macroeconomic instability, governance quality, and conflict dynamics within a single empirical framework, using time-series data for Nigeria over the period 1993–2025. Given that economic volatility, weak governance, and insecurity often reinforce one another, analysing them separately risks understating their combined effects on human development (Mensah & Ayodele, 2024).

Accordingly, this study is guided by the following specific objectives:

1. To examine the trends and interrelationships among human development, macroeconomic instability, governance effectiveness, and conflict dynamics in Nigeria.
2. To empirically test for the existence of a stable long-run equilibrium relationship between human development and its key determinants using an appropriate time-series econometric framework.
3. To derive a multifaceted and integrated policy framework that simultaneously promotes macroeconomic stability, strengthens governance institutions, and adopts conflict-sensitive strategies to advance sustainable human development in Nigeria.

LITERATURE REVIEW

Conceptual Issues on Human Development

Human development is a multidimensional concept that extends beyond economic growth to include improvements in health, education, living standards, and overall human well-being.The United Nations Development Programme (UNDP) conceptualizes human development as the expansion of people's choices and capabilities, emphasizing longevity, knowledge, and a decent standard of living, as captured by the Human Development Index (HDI). In developing economies such as Nigeria, progress in human development is closely tied to macroeconomic stability, institutional quality, and social peace (UNDP, 2024). Persistent economic volatility, weak governance, and insecurity limit the state's capacity to deliver basic services and constrain households' ability to invest in human capital.

Macroeconomic Instability and Human Development

A substantial body of empirical literature identifies macroeconomic instability as a key constraint on human development, particularly in low- and middle-income countries. Inflation, exchange rate volatility, and fiscal imbalances erode real incomes, distort resource allocation, and reduce government spending efficiency. High and unpredictable inflation has been shown to disproportionately affect poor households by reducing purchasing power and limiting access to healthcare and education services (World Bank, 2023).

Recent studies focusing on sub-Saharan Africa confirm that persistent inflation undermines human capital accumulation and slows improvements in HDI. Chola and Silwimba (2025) find that inflation volatility significantly reduces household welfare and public investment in social sectors. In the Nigerian context, Aye and Onyeiwu (2024) argue that prolonged macroeconomic instability has discouraged private investment and weakened economic growth, thereby constraining improvements in human development outcomes. Similarly, IMF (2025) reports that inflationary pressures and fiscal stress in Nigeria continue to undermine poverty reduction and social welfare gains, despite recent reform efforts.

Governance Quality and Human Development

Governance quality plays a central role in shaping development outcomes by influencing policy effectiveness, resource allocation, and public service delivery. Good governance characterised by accountability, regulatory quality, institutional effectiveness, and control of corruption enhances the efficiency of public spending and fosters inclusive development. Conversely, weak governance undermines state capacity and erodes public trust, leading to poor development outcomes (Worldwide Governance Indicators, 2024).

Empirical evidence for Nigeria consistently links governance deficits to low human development performance. Ozigbu, Ezekwe, and Okoli (2025) demonstrate that weak institutional frameworks and corruption reduce the effectiveness of public expenditure in education and healthcare, directly limiting improvements in HDI. Ezeani (2024) further shows that governance failures exacerbate inequality by skewing public resources toward elite interests at the expense of broad-based social investment. Cross-country evidence from Mensah and Ayodele (2024) reinforces these findings, showing that countries with stronger governance institutions experience faster and more sustained improvements in human development indicators.

Conflict, Insecurity, and Human Development

Conflict and insecurity represent critical non-economic constraints on development, particularly in fragile states. Violent conflict disrupts economic activity, destroys infrastructure, displaces populations, and increases mortality, while simultaneously diverting government spending away from social sectors toward security and military expenditure. The development literature widely recognises conflict as both a cause and consequence of underdevelopment, creating self-reinforcing cycles of fragility (Mentan, 2020).

Nigeria's experience aligns closely with this perspective. Akindoyin and Obafemi (2025) find that rising conflict intensity in Nigeria's northeast and middle belt is associated with higher death rates, reduced agricultural productivity, and declining investment, all of which negatively affect human development. Onunwa (2025) highlights that increased military expenditure, while necessary for security, often crowds out spending on health and education, weakening long-term development prospects. ACLED (2024) further documents the human costs of Nigeria's security crises, noting persistent displacement and rising civilian fatalities, which directly undermine welfare outcomes.

Macroeconomic Instability, Governance, and Conflict

Recent literature increasingly emphasises the interdependence between macroeconomic instability, governance quality, and conflict dynamics in shaping development outcomes. Weak governance exacerbates macroeconomic volatility through poor fiscal management, ineffective regulation, and limited policy credibility, while economic instability heightens social grievances and increases the risk of conflict. In turn, conflict undermines institutional capacity, disrupts economic activity, and weakens macroeconomic performance, creating a self-reinforcing cycle that constrains human development (Mensah & Ayodele, 2024).

In the Nigerian context, these interactions are particularly pronounced. Inflationary shocks and unemployment have been linked to social unrest, while prolonged insecurity further erodes governance effectiveness and investor confidence (IMF, 2025). Rising security expenditure often reflects responses to conflict but simultaneously reduces fiscal space for social investment, reinforcing poor development outcomes. These mutually reinforcing dynamics suggest that the effects of macroeconomic instability, governance quality, and conflict on human development are neither independent nor static but evolve over time.

Given the dynamic and interdependent nature of these relationships, analysing them within a static or single-equation framework may yield incomplete or misleading conclusions. This study therefore adopts a dynamic time-series modelling approach that captures both short-run adjustments and long-run equilibrium relationships among the variables, allowing for feedback effects and temporal dependence. By doing so, the analysis provides a more comprehensive understanding of how macroeconomic instability, governance failures, and conflict pressures jointly influence human development outcomes in Nigeria.

EMPIRICAL GAPS IN THE LITERATURE

Despite extensive research on macroeconomic instability, governance, and conflict in Nigeria, several important empirical gaps remain. First, most existing studies examine these factors separately, failing to account for their combined and interactive effects on human development. This study addresses this gap by jointly modelling macroeconomic instability, governance quality, and conflict dynamics within a unified empirical framework.

Second, limited attention has been paid to the role of conflict-related indicators such as military expenditure and crude death rates in shaping human development outcomes, particularly in

interaction with governance and macroeconomic variables. By explicitly incorporating both military expenditure and mortality as indicators of conflict and insecurity, this study provides a more nuanced assessment of the human and fiscal costs of insecurity in Nigeria**.**

Third, many existing studies rely on cross-sectional or static methodologies that do not adequately capture dynamic adjustments or long-run equilibrium relationships. This study

overcomes this limitation by employing a time-series econometric approach that distinguishes between short-run dynamics and long-run relationships, thereby offering more robust and policy-relevant insights.

Through these contributions, the study extends the existing literature by providing integrated and dynamic empirical evidence to support the design of a coordinated policy framework for sustainable human development in Nigeria.

METHODOLOGY

Model Specification

Human development, measured by the Human Development Index (HDI), is specified as the dependent variable. The explanatory variables capture key dimensions of the study's conceptual framework. Macroeconomic instability is proxied by the annual inflation rate (INF), measured as the percentage change in the consumer price index. Governance quality is represented by government effectiveness (GEFF), measured using the Worldwide Governance Indicators and expressed in standardized units ranging approximately from –2.5 to +2.5. Conflict and security dynamics are captured by military expenditure (MEX), measured as a percentage of gross domestic product, and the crude death rate (CDR), measured as the number of deaths per 1,000 population per year.

The functional relationship between human development and its determinants is expressed as:

$$HDI_t - f(MEX_{t,} CDR_t, GEFF_t, INF_t)$$

To empirically estimate this relationship, the study employs the Autoregressive Distributed Lag (ARDL) modelling framework proposed by Pesaran, Shin, and Smith (2001). The ARDL approach is particularly suitable because it allows variables to be integrated of different orders, I (0) and I (1), and provides robust estimates in small sample sizes.

The general ARDL specification is given as:

$$HDI_t - \alpha_0 + \sum_{i=1}^{p} \alpha i\, HDI_{t-1} + \sum_{j=0}^{q1} \beta j MEX_{t-j} + \sum_{k=0}^{q2} \gamma k CDR_{t-k} + \sum_{l=0}^{q3} \delta l GEFF_{t-l} + \sum_{m=0}^{q4} \theta m INF_{t-m} + \epsilon_t$$

Where εt is the stochastic error term.

To test for long-run relationships, the ARDL bounds test for cointegration is applied. When cointegration is confirmed, the short-run dynamics are estimated using the Error Correction Model (ECM):

$$\Delta HDI_t - \lambda_0 + \sum_{i=1}^{p-1} \lambda \mathrm{i}\, \Delta HDI_{t-1} + \sum_{j=0}^{q1-1} \theta j\, \Delta INF_{t-j} + \sum_{k=0}^{q2-1} \psi\, k \Delta GEFF_{t-k} + \sum_{l=0}^{q3-1} \omega l\, \Delta MEX_{t-l} + \sum_{m=0}^{q4-1} \rho m\, \Delta CDR_{t-m} + \eta ECM_{t-1} + \mu_t$$

Where, ECMt−1captures the speed of adjustment to long-run equilibrium and is expected to be negative and statistically significant.

ESTIMATION TECHNIQUE

The optimal lag structure for the ARDL model is selected using the Akaike Information Criterion (AIC), which balances model fit and parsimony. The ARDL bounds testing approach to cointegration is first employed to determine the existence of a long-run equilibrium relationship among the variables, given its suitability for models containing a mixture of I (0) and I (1) series.

In addition, the Johansen cointegration test is applied as a robustness check to confirm the existence and number of cointegrating relationships among the variables. While the ARDL bounds test is sufficient for establishing cointegration, the Johansen approach provides complementary evidence on the rank and stability of the long-run relationships in a multivariate setting. The use of both methods therefore enhances the robustness and credibility of the long-run inference.

Upon confirmation of cointegration, the short-run dynamics are estimated using an Error Correction Model (ECM), which captures the speed at which deviations from long-run equilibrium are corrected following short-term shocks.

Unit Root and Cointegration Tests

To ensure the robustness of the time-series analysis, the study conducts Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests to determine the order of integration of the variables.

The ADF regression is specified as follows:

$$\Delta Y_t - \alpha + \beta_t + \delta Y_{t-1} + \sum_{i=l}^{k} \theta i \, \Delta Y_{t-i} + \varepsilon_t$$

Where:
Y (t) represents each variable in the model
t is a deterministic trend
δ tests the presence of a unit root

δ=0, the series has a unit root (non-stationary).

δ<0, the series is stationary.

These tests help avoid spurious regression and confirm the suitability of the ARDL methodology. Cointegration is further validated using both the ARDL bounds test and the Johansen cointegration test**,** ensuring consistency of long-run inference.

The PP test follows the same basic regression as the ADF test but corrects for serial correlation and heteroskedasticity in the error term using non-parametric adjustments:

$$\Delta Y_t - \alpha + \beta_t + \delta Y_{t-1} + \varepsilon_t$$

Diagnostic and Stability Tests

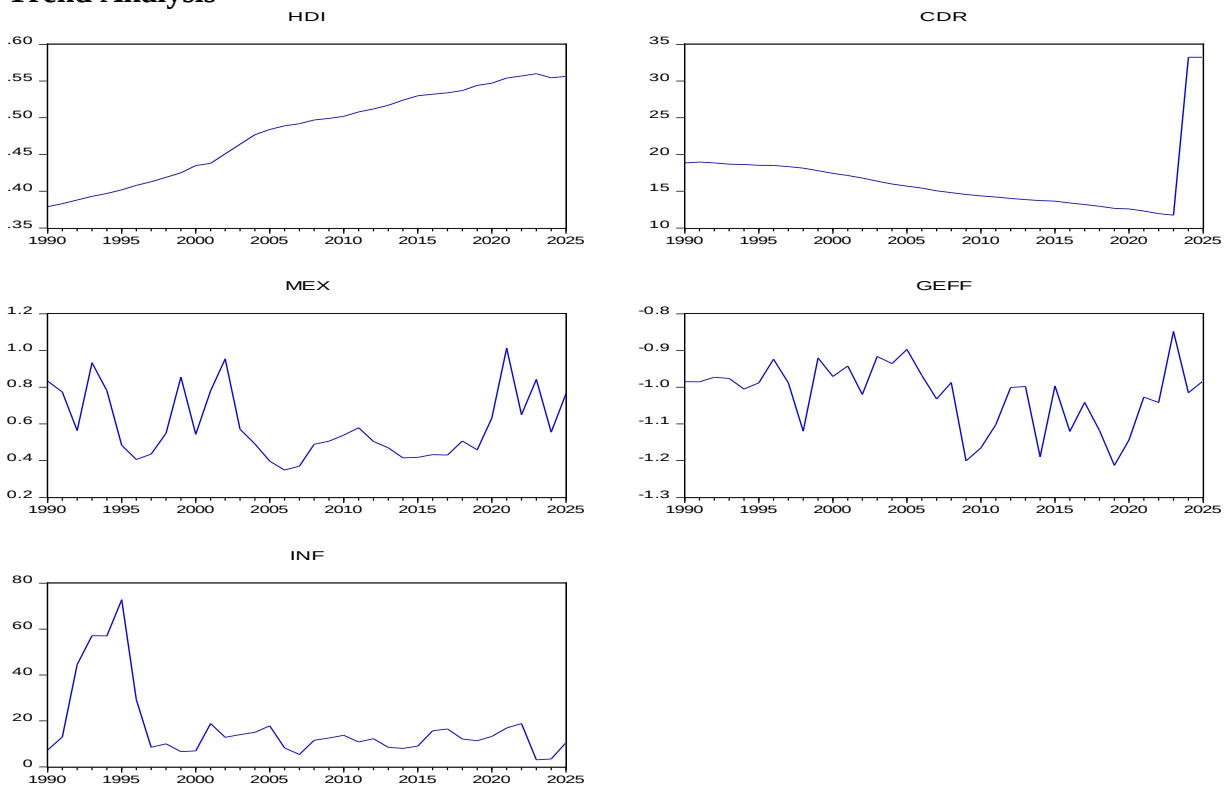
Post-estimation diagnostic tests are performed to assess the reliability of the model. These include the Breusch-Godfrey LM test for serial correlation and the heteroskedasticity test to verify constant variance of the residuals. Model stability is evaluated using cumulative sum (CUSUM) and cumulative sum of squares (CUSUMSQ) tests. These diagnostics ensure that the estimated coefficients are stable and that the model satisfies classical regression assumptions.

DATA SOURCES

All data used in the study are annual and obtained from reputable secondary sources. HDI data are sourced from the United Nations Development Programme (UNDP), while data on inflation, military expenditure, and crude death rate are drawn from the World Development Indicators. Governance indicators are obtained from the Worldwide Governance Indicators database. All variables are employed in their level form in the empirical analysis, consistent with the ARDL framework, which permits a combination of I (0) and I (1) variables without requiring uniform differencing. All computations and estimations are carried out using EViews 10.

ESTIMATION AND INTERPRETATION OF RESULT

Trend Analysis



The graphs highlight Nigeria's development trajectory amid persistent governance, security, and macroeconomic challenges. HDI shows a steady improvement from about 0.38 in the early 1990s to approximately 0.56 by 2023**,** reflecting gradual gains in human development. In contrast, the crude death rate (CDR) declines from roughly 19 per 1,000 people to about 12 over most of the period, before surging sharply above 30 toward the end, indicating a major mortality shock. Military expenditure (MEX) fluctuates considerably, ranging between about 0.3 and 1.0**,** with notable spikes in the mid-1990s, early 2000s, and early 2020s, suggesting episodic security pressures. Government effectiveness (GEFF) remains persistently weak and negative, oscillating between about -1.3 and -0.9**,** though with slight recent improvement, underscoring chronic institutional fragility. Inflation (INF) is highly volatile, peaking above 70% in the mid-1990s before moderating mostly within the 5-20% range, with renewed upticks in recent years, reflecting enduring macroeconomic instability alongside development gains.

Table 4.2: Descriptive Statistics of Variables

	HDI	CDR	MEX	GEFF	INF
Mean	0.480608	16.54973	0.591069	-1.020477	17.05289
Median	0.494500	15.56100	0.541381	-0.997422	12.38100
Maximum	0.560000	33.24210	1.012702	-0.847907	72.83550
Minimum	0.379000	11.74000	0.348375	-1.213150	3.074000
Std. Dev.	0.059892	4.714534	0.182842	0.089197	15.82063
Skewness	-0.309820	2.417705	0.787130	-0.584596	2.267238
Kurtosis	1.684524	9.394996	2.442330	2.693517	7.310125
Jarque-Bera	3.171646	96.41574	4.183935	2.191413	58.70798
Probability	0.204779	0.000000	0.123444	0.334303	0.000000
Observations	36	36	36	36	36

Source: Authors Computation Eviews 10, January 2026

Based on the descriptive statistics provided in Table 4.2, the variables exhibit a mix of stability and significant volatility across the 36 observations. The Human Development Index (HDI) and Government Effectiveness (GEFF) show relatively low standard deviations (0.060 and 0.089 respectively), suggesting consistent trends across the sampled data, with HDI maintaining a mean of 0.481. In contrast, Inflation (INF) and Crude Death Rate (CDR) display high variability, evidenced by their large standard deviations (15.82 and 4.71) and high maximum values, indicating periods of economic instability and demographic shocks. Regarding the distribution of the data, HDI and GEFF are negatively skewed, implying more frequent higher values, while CDR, MEX, and INF are positively skewed. Notably, the Jarque-Bera test reveals that while HDI, MEX, and GEFF follow a normal distribution (probability > 0.05), the null hypothesis of normality is rejected for CDR and INF ($p = 0.000$), likely due to their high Kurtosis values which indicate leptokurtic distributions with heavy tails or outliers.

Table 4.3: Unit Root Result Test Table (ADF)

At Level						
		HDI	CDR	MEX	GEFF	INF
With Constant	t-Statistic	-2.2426	-1.0922	-3.6730	-3.9533	-2.7866
	Prob.	***0.1956***	***0.7079***	***0.0090***	***0.0044***	***0.0708***
		n0	n0	***	***	*
With Constant & Trend	t-Statistic	0.5689	-0.5718	-3.5406	-4.2013	-3.5771
	Prob.	***0.9991***	***0.9746***	***0.0504***	***0.0111***	***0.0470***
Without Constant & Trend	t-Statistic	2.3330	0.3961	-0.7550	-0.1503	-1.4418
	Prob.	***0.9942***	***0.7927***	***0.3818***	***0.6245***	***0.1369***
At First Difference						
		d(HDI)	d(CDR)	d(MEX)	d(GEFF)	d(INF)
With Constant	t-Statistic	-3.4364	-5.7662	-8.0435	-9.3634	-4.6697
	Prob.	***0.0164***	***0.0000***	***0.0000***	***0.0000***	***0.0007***
		**	***	***	***	***
With Constant & Trend	t-Statistic	-3.9614	-0.3604	-8.0146	-9.2344	-4.4985
	Prob.	***0.0200***	***0.9847***	***0.0000***	***0.0000***	***0.0056***
		**	n0	***	***	***
Without Constant & Trend	t-Statistic	-1.1650	-5.7791	-8.1703	-9.5087	-4.7115
	Prob.	***0.2176***	***0.0000***	***0.0000***	***0.0000***	***0.0000***

At the 10%; (**) Significant at the 5%; (***) Significant at the 1% and (no) Not Significant
Source: Authors Computations Eviews 10, January 2026

The Augmented Dickey-Fuller (ADF) unit root test results presented in Table 3 are essential for diagnosing the time-series properties of the variables. The analysis reveals a mixed order of integration**.** At the **level**, only two variables are consistently stationary, or I(0)**:** Military Expenditure (MEX) shows strong stationarity with a t-statistic of -3.6730 (p=0.0090) with a constant, and Government Effectiveness (GEFF) is even more robust with a t-statistic of -3.9533 (p=0.0044). In contrast, Human Development Index (HDI)**,** Crude Death Rate (CDR)**,** and Inflation (INF) all fail to reject the null hypothesis of a unit root at level, as indicated by their insignificant probabilities (e.g., CDR p=0.7079). However, upon first differencing, these three non-stationary series become stationary, or I(1)**.** This is confirmed by highly significant t-statistics, such as -5.7662 (p=0.0000) for d(CDR) and -4.6697 (p=0.0007) for d(INF). The presence of both I(0) and I(1) variables in the dataset fundamentally justifies and necessitates the application of an Autoregressive Distributed Lag (ARDL) bounds testing approach for any subsequent cointegration and long-run analysis to avoid spurious regression results.

Table 4.4: UNIT ROOT TEST RESULTS TABLE (PP)

At Level						
		HDI	MEX	CDR	GEFF	INF
With Constant	t-Statistic	-1.8237	-3.6233	-1.0922	-3.9779	-2.5138
	Prob.	*0.3633*	*0.0102*	*0.7079*	*0.0041*	*0.1209*
		n0	**	n0	***	n0
With Constant & Trend	t-Statistic	-0.0431	-3.4811	-0.5718	-4.1677	-3.0824
	Prob.	*0.9939*	*0.0572*	*0.9746*	*0.0120*	*0.1261*
		n0	*	n0	**	n0
Without Constant & Trend	t-Statistic	5.1366	-0.7950	0.4186	-0.1064	-1.5628
	Prob.	*1.0000*	*0.3644*	*0.7985*	*0.6400*	*0.1096*
At First Difference						
		d(HDI)	d(MEX)	d(CDR)	d(GEFF)	d(INF)
With Constant	t-Statistic	-3.3571	-9.1222	-5.7662	-15.0156	-4.8783
	Prob.	*0.0199*	*0.0000*	*0.0000*	*0.0000*	*0.0004*
		**	***	***	***	***

With Constant & Trend	t-Statistic	-3.9480	-12.2000	-6.1759	-16.6888	-4.7977
	Prob.	*0.0206*	*0.0000*	*0.0001*	*0.0000*	*0.0026*
		**	***	***	***	***
Without Constant & Trend	t-Statistic	-1.6347	-9.2972	-5.7791	-15.2576	-4.9539
	Prob.	*0.0955*	*0.0000*	*0.0000*	*0.0000*	*0.0000*
		*	***	***	***	***

At the 10%; (**) Significant at the 5%; (***) Significant at the 1% and (no) Not Significant
Source: Authors Computation EViews 10, January 2026

Table 4.4 reports the Phillips–Perron (PP) unit root test results and reveals mixed stationarity properties among the variables. At levels, military expenditure (MEX) is stationary with a t-statistic of –3.62 (p = 0.01) under the constant specification, while government effectiveness (GEFF) is strongly stationary with –3.98 (p = 0.004); both remain weakly significant when a trend is included (–3.48, p = 0.057 for MEX and –4.17, p = 0.012 for GEFF). In contrast, HDI (–1.82), crude death rate (–1.09), and inflation (–2.51) are non-stationary at levels across all specifications. Without constant and trend, none of the variables rejects the null of a unit root. At first difference, all variables become stationary, with large negative test statistics such as –9.12 for Δ(MEX), –5.77 for Δ(CDR), –15.02 for Δ(GEFF), and –4.88 for Δ(INF), all significant at the 1% level, while d(HDI) is significant at the 5% level (–3.36). Overall, the results indicate that the variables are predominantly integrated of order one, I (1), justifying the use of cointegration and long-run modelling in the analysis.

Table 4.5: Cointegration Rank Test (Trace) (Maximum Eigenvalue) & Cointegrating Coefficients (normalized by b'*S11*b=I):

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.784570	114.3874	69.81889	0.0000
At most 1 *	0.623929	63.72850	47.85613	0.0008
At most 2 *	0.538824	31.45526	29.79707	0.0319
At most 3	0.163148	5.914033	15.49471	0.7057
At most 4	0.001105	0.036470	3.841466	0.8485
Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.784570	50.65895	33.87687	0.0002
At most 1 *	0.623929	32.27324	27.58434	0.0116
At most 2 *	0.538824	25.54122	21.13162	0.0112
At most 3	0.163148	5.877563	14.26460	0.6290
At most 4	0.001105	0.036470	3.841466	0.8485

Source: Authors Computation Eviews 10, January 2026

The Johansen cointegration results based on both the Trace and Maximum Eigenvalue statistics indicate the existence of a stable long-run relationship among the variables. The null hypothesis of no cointegration is strongly rejected, as the trace statistic (114.39) and maximum eigenvalue statistic (50.66) exceed their respective 5% critical values with highly significant probabilities. The tests further reject the hypotheses of at most one and at most two cointegrating equations but fail to reject the hypothesis of at most three cointegrating vectors. This confirms the presence of three cointegrating relationships, implying that the variables share a common long-run equilibrium and justifying the use of cointegration-based dynamic models such as the ARDL or VECM framework.

Table 4.6: Correlation Analysis

Correlation	HDI	MEX	CDR	GEFF	INF
HDI	1.000000				
MEX	-0.197700	1.000000			
CDR	-0.197284	0.172970	1.000000		
GEFF	-0.347236	0.244319	0.248048	1.000000	
INF	-0.496858	0.149114	0.085884	0.133726	1.000000

Source: Authors Computation Eviews, January 2026

Table 4.6 presents the correlation matrix and highlights the linear relationships among human development, security spending, mortality, governance, and inflation in Nigeria. HDI is negatively correlated with military expenditure (MEX) (–0.20), crude death rate (CDR) (–0.20), government effectiveness (GEFF) (–0.35), and inflation (INF) (–0.50), indicating that higher levels of conflict spending, mortality, weak governance, and price instability are associated with lower human development outcomes, with inflation showing the strongest inverse relationship. Military expenditure is positively correlated with CDR (0.17), GEFF (0.24), and INF (0.15), suggesting that periods of increased security spending tend to coincide with higher mortality, governance responses, and inflationary pressures. CDR also shows a positive association with GEFF (0.25), possibly reflecting increased government intervention during periods of rising mortality. Overall, the correlations are moderate and below conventional multicollinearity thresholds, indicating no serious multicollinearity concerns while providing preliminary evidence that conflict intensity, governance effectiveness, and macroeconomic instability are closely linked to human development in Nigeria.

Table 4.7: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-133.2132	NA	0.002989	8.376560	8.603303	8.452852

1	5.503678	226.9913	3.10e-06	1.484626	2.845087*	1.942379
2	36.73927	41.64746*	2.38e-06	1.106711	3.600890	1.945926
3	72.69181	37.04201	1.67e-06*	0.442921*	4.070818	1.663598*

Source: Authors Computation Eviews, January 2026

The VAR lag order selection results indicate differing optimal lag lengths depending on the information criteria employed. The log-likelihood (LogL) improves substantially as the lag length increases from 0 (–133.21) to 3 (72.69), suggesting better model fit with additional lags. The Likelihood Ratio (LR) test selects lag 2**,** as it is significant at that level (LR = 41.65**),** while the Final Prediction Error (FPE), Akaike Information Criterion (AIC), and Hannan–Quinn (HQ) criteria all favor lag 3**,** with the lowest values of 1.67×10^{-6}**,** 0.44**,** and 1.66**,** respectively. In contrast, the Schwarz Criterion (SC) selects lag 1**,** reflecting its stronger penalty for model complexity. Overall, the dominance of AIC, FPE, and HQ at lag 3 suggests that a VAR (3) specification is most appropriate for capturing the dynamic interactions among the variables, while still acknowledging the parsimonious preference of the SC.

Cointegration Bound Test

Table 4.8: F-bound Test

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	8.020929	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, January 2026

Table 4.8 reports the ARDL bounds test for cointegration and provides strong evidence of a long-run relationship among the variables. The computed F-statistic of 8.02 is substantially higher than the upper bound critical values at all conventional significance levels, exceeding the I(1) bounds of 3.09 (10%), 3.49 (5%), 3.87 (2.5%), and 4.37 (1%)**.** With **K = 4** regressors, this result leads to a clear rejection of the null hypothesis of no cointegration. Consequently, the findings confirm the existence of a stable long-run equilibrium relationship between HDI, military expenditure (MEX), crude death rate (CDR), government effectiveness (GEFF), and inflation (INF)**.** This outcome validates the use of the ARDL framework and supports subsequent estimation and interpretation of both short-run dynamics and long-run development effects in Nigeria.

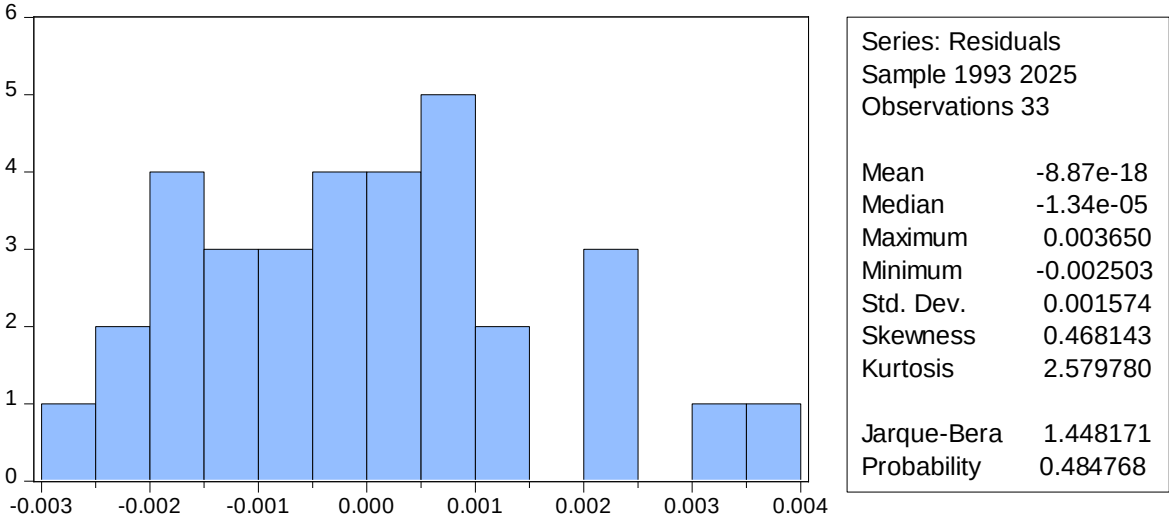
Granger Causality Test

Null Hypothesis:	Obs	F-Statistic	Prob.
MEX does not Granger Cause HDI	35	0.11642	0.7352
HDI does not Granger Cause MEX		0.05886	0.8099
CDR does not Granger Cause HDI	35	0.10659	0.7462
HDI does not Granger Cause CDR		0.99195	0.3267
GEFF does not Granger Cause HDI	35	0.47407	0.4961
HDI does not Granger Cause GEFF		2.10996	0.1561

RCF does not Granger Cause HDI	35	0.19104	0.6650
HDI does not Granger Cause RCF		5.73863	0.0226
CDR does not Granger Cause MEX	35	1.40324	0.2449
MEX does not Granger Cause CDR		2.43709	0.1283
GEFF does not Granger Cause MEX	35	2.00385	0.1666
MEX does not Granger Cause GEFF		1.63017	0.2109
RCF does not Granger Cause MEX	35	0.01414	0.9061
MEX does not Granger Cause RCF		0.00498	0.9442
GEFF does not Granger Cause CDR	35	6.01773	0.0198
CDR does not Granger Cause GEFF		1.72723	0.1981
RCF does not Granger Cause CDR	35	0.23986	0.6276
CDR does not Granger Cause RCF		0.24102	0.6268
RCF does not Granger Cause GEFF	35	0.02951	0.8647
GEFF does not Granger Cause RCF		1.02612	0.3187

Source: Authors Computation Eviews 10, January 2026

The Granger causality results indicate that most of the relationships among human development, governance, conflict, and security variables in Nigeria lack significant short-run causal linkages, suggesting weak immediate feedback effects. In particular, there is no evidence of causality between military expenditure (MEX) and human development (HDI), crude death rate (CDR) and HDI, or governance effectiveness (GEFF) and HDI in either direction. However, two notable unidirectional relationships emerge: HDI Granger-causes resource conflict (RCF), implying that short-run changes in human development conditions may influence conflict dynamics, and governance effectiveness Granger-causes crude death rate, highlighting the role of institutional quality in shaping mortality outcomes. Overall, the findings suggest that while macroeconomic stability, governance, and conflict are crucial for human development, their interactions operate primarily through long-run channels rather than short-run causal mechanisms.



Based on the Jarque-Bera normality test results in your table, the data appears to be normally distributed. In a normal distribution, the ideal values for Skewness and Kurtosis are 0 and 3, respectively; your results show a Skewness of 0.203 (indicating a slight right skew) and a Kurtosis of 2.352 (indicating the distribution is slightly flatter than a perfect bell curve). The most critical value is the Probability (p-value) of 0.484768. Since this value is significantly

greater than the standard alpha level of 0.05, we fail to reject the null hypothesis. This statistically confirms that there is no significant evidence of non-normality, and the residuals are considered to follow a normal distribution.

Breusch-Godfrey Serial Correlation LM Test:

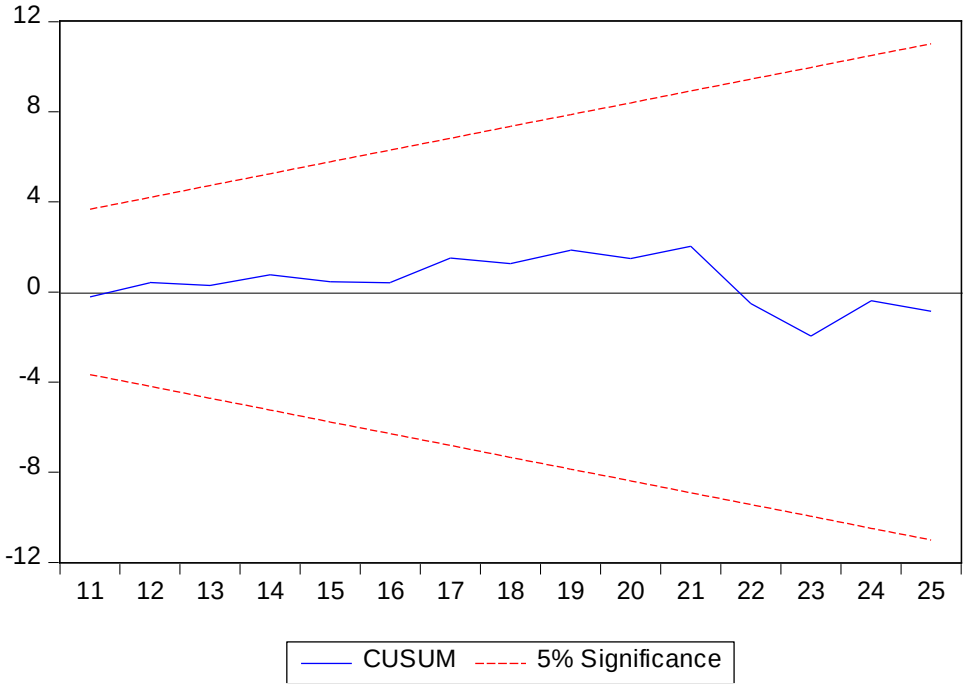
F-statistic	0.400453	Prob. F(2,13)	0.6780
Obs*R-squared	1.915084	Prob. Chi-Square(2)	0.3838

Heteroskedasticity Test:

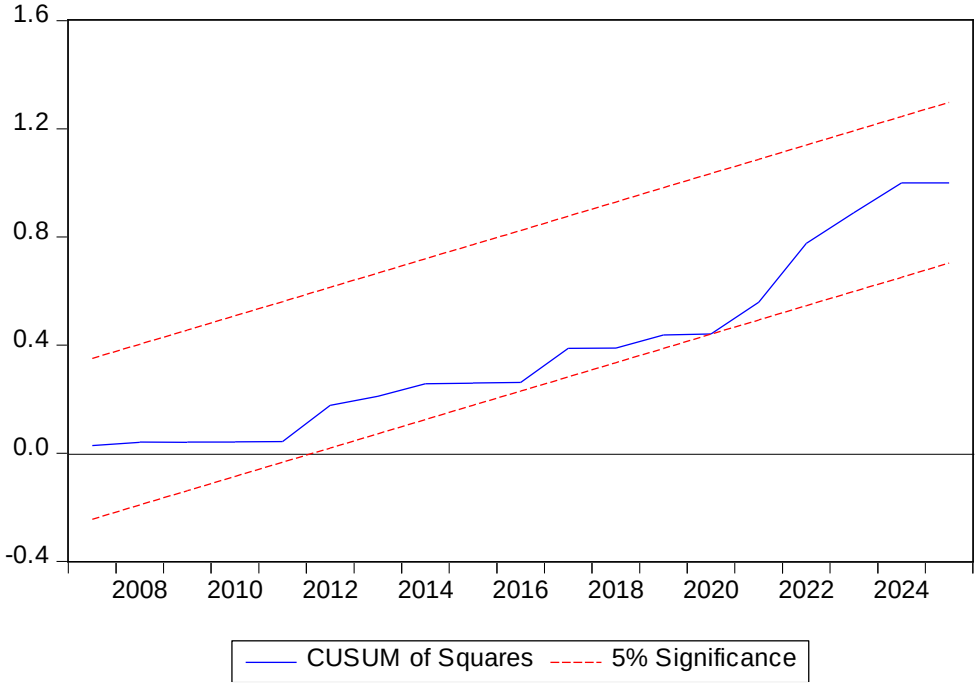
F-statistic	1.542889	Prob. F(17,15)	0.2020
Obs*R-squared	20.99392	Prob. Chi-Square(17)	0.2266
Scaled explained SS	3.426216	Prob. Chi-Square(17)	0.9998

Source: Authors Computation Eviews, January 2026

The diagnostic test results indicate that the estimated ARDL model is statistically well behaved. The Breusch–Godfrey serial correlation LM test shows an insignificant F-statistic of 0.40 (p = 0.68) and Obs*R^2 of 1.92 (p = 0.38), leading to a failure to reject the null hypothesis of no serial correlation, which suggests that the residuals are free from autocorrelation. Similarly, the heteroskedasticity test results are insignificant, with an F-statistic of 1.54 (p = 0.20) and Obs*R^2 of 20.99 (p = 0.23), indicating constant variance of the error terms. The very high p-value of the scaled explained sum of squares (p = 0.9998) further confirms the absence of heteroskedasticity. Overall, these findings confirm that the model satisfies key classical regression assumptions, lending credibility and reliability to the estimated coefficients and subsequent inference.



The CUSUM test graph confirms that the model is stable over the sample period from 1993 to 2025. Because the blue line (cumulative sum of recursive residuals) remains entirely within the red dotted boundaries of the 5% significance level, there is no evidence of structural breaks or parameter instability. Similarly, the Normality Test shows a Jarque-Bera probability of 0.484768, which is much higher than the 0.05 threshold. This means we fail to reject the null hypothesis, concluding that the residuals are normally distributed.


1.6
1.2
0.8
0.4
0.0
-0.4
2008
2010
2012
2014
2016
2018
2020
2022
2024
CUSUM of Squares
5% Significance

The CUSUM and CUSUM of squares (CUSUMSQ) tests indicate that the estimated model is stable over the sample period. In both cases, the test statistics remain within the 5 per cent critical bounds, suggesting the absence of structural instability in the estimated coefficients. The blue CUSUMSQ line remains within the 5% significance bounds (red dashed lines) throughout the period, suggesting no evidence of structural instability in the variance of the residuals. Although the statistic shows a gradual upward movement in later years implying increasing cumulative variation it does not cross the critical limits. This confirms that the model's parameters are stable and that the estimated relationships are reliable over time.

SUMMARY, CONCLUSION AND RECOMMENDATION

Summary of Findings

This study examined the dynamic relationship between macroeconomic instability, governance quality, conflict dynamics, and sustainable human development in Nigeria over the period 1990-2025. Using the Human Development Index (HDI) as the measure of development, the analysis incorporated inflation (INF), government effectiveness (GEFF), military expenditure (MEX), and crude death rate (CDR) within an Autoregressive Distributed Lag (ARDL) framework.

The descriptive and trend analyses revealed gradual improvements in HDI over time, but these gains occurred alongside persistent macroeconomic volatility, weak governance, and recurring security shocks. Unit root tests (ADF and PP) confirmed that the variables were a mixture of I (0) and I (1), justifying the use of the ARDL methodology. Both the Johansen cointegration tests and the ARDL bounds test provided strong evidence of a stable long-run equilibrium relationship among HDI and its determinants.

Correlation results showed that inflation, military expenditure, crude death rate, and weak government effectiveness are all negatively associated with human development. Diagnostic and stability tests confirmed that the estimated model is statistically robust, free from serial correlation and heteroskedasticity, and stable over the sample period.

The empirical evidence indicates that macroeconomic instability, weak governance, and conflict-related pressures jointly constrain sustainable human development in Nigeria, reinforcing one another in a mutually reinforcing cycle.

CONCLUSION

The findings of this study lead to the conclusion that sustainable human development in Nigeria cannot be achieved through isolated policy interventions. While Nigeria has recorded modest improvements in HDI over the past three decades, these gains remain fragile and uneven due to persistent inflationary pressures, institutional weaknesses, and protracted insecurity.

Macroeconomic instability, particularly high and volatile inflation, erodes household welfare and undermines human capital formation. Weak governance further compounds this problem by reducing the efficiency of public spending and limiting the state's capacity to translate economic resources into tangible improvements in health, education, and living standards. At the same time, conflict and insecurity reflected in rising military expenditure and mortality rates divert scarce public resources away from social investment and disrupt economic activity, thereby weakening long-term development prospects.

The existence of a stable long-run relationship among human development, macroeconomic instability, governance effectiveness, and conflict dynamics underscores the need for an integrated and coordinated policy response. Addressing any one of these challenges in isolation is unlikely to generate sustained improvements in human development outcomes. Instead, a multifaceted framework that simultaneously promotes macroeconomic stability, strengthens governance institutions, and resolves conflict is essential for achieving sustainable human development in Nigeria.

RECOMMENDATIONS

These policy recommendations are directed primarily at the Federal Government of Nigeria, the Central Bank of Nigeria, relevant ministries, departments and agencies (MDAs), and development partners involved in macroeconomic management, governance reform, and peacebuilding. Based on the empirical findings of the study, the following policy recommendations are proposed:

i. Strengthen macroeconomic stability as a foundation for human development.

Monetary and fiscal authorities should prioritise inflation control through credible, rules-based monetary policy and prudent fiscal management. Reducing inflation volatility will protect real incomes, enhance purchasing power, and create a stable environment for investment in education and healthcare. Fiscal reforms should focus on improving revenue mobilisation and reallocating public expenditure toward social sectors rather than recurrent and distortionary spending.

ii. Deepen governance and institutional reforms.

Improving government effectiveness is critical for translating economic resources into development outcomes. Policies should focus on strengthening public sector accountability, enhancing regulatory quality, and reducing corruption through transparent budgeting, digital public financial management systems, and stronger oversight institutions. Improved governance will increase the efficiency of public spending and restore public trust in state institutions.

iii. Adopt a conflict-sensitive development strategy.

While security spending remains necessary, excessive reliance on military expenditure alone is unsustainable. The government should complement security operations with conflict prevention, dialogue, and community-based peacebuilding initiatives. Investments in education, employment, and social inclusion in conflict-prone regions are essential to address the root causes of insecurity and reduce long-term development losses.

iv. Re-balance public expenditure toward human capital development.

Resources currently absorbed by macroeconomic inefficiencies and security pressures should be redirected toward health, education, and social protection. Strengthening healthcare systems, improving school enrolment and quality, and expanding targeted social safety nets will directly enhance HDI outcomes and resilience against future shocks.

v. Pursue an integrated policy coordination framework.

Macroeconomic policy, governance reform, and security strategy should be designed and implemented in a coordinated manner rather than through fragmented interventions. Establishing institutional mechanisms for cross-sectoral policy coordination will help ensure that stabilisation efforts, governance reforms, and conflict management mutually reinforce one another in advancing sustainable human development.

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