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MACROECONOMIC STABILITY INDICATORS AND ECONOMIC GROWTH IN NIGERIA

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Abstract

The persistent rise in inflation has been exacerbated by socio-cultural dynamics, including a culture of ostentatious consumption, which compounds inflationary pressures and distorts economic growth. This paper examines the impact of macroeconomic stability on economic growth in Nigeria, focusing on status-driven spending behaviors influence inflationary pressures and their implications on human development index. The study obtained empirical evidence to examine the relationship between economic growth and inflation rates in an economy that monetary and fiscal policies may have not have effect on spending behaviors due to culture and customs. Using the Autoregressive Distributed Lag (ARDL) model, the study analyzes data obtained from Trading Economics, the World Bank, and the United Nations covering the period from 1985 to 2023. The results indicate that inflation volatility and high interest rates negatively affect human development, while exchange rate fluctuations have a weaker direct impact. Persistent economic downturns further intensify these challenges, resulting in prolonged declines in the Human Development Index (HDI), unless comprehensive policy interventions are implemented. The study recommends that monetary and fiscal policies that are aimed at controlling inflation should take cognizance of cultural and customs' demands of the citizenry.

Keywords: Economic growth, inflation (JEL code: E31, D12, I31, L84, O47, E52, E62)

Introduction

Economic growth remains a central theme in economic discourse, serving as a key indicator of national progress and societal welfare (Metu, 2023; Schmelzer, 2017). However, the determinants of growth are complex, context-dependent, and influenced by both economic and behavioral factors. Traditional growth theories, such as Solow's (1956) model, emphasize labor, capital, and technology, while endogenous models by Romer (1994) highlight innovation and knowledge spillovers (Webb, 2024). More recent perspectives underscore the importance of governance, sound economic policies, and macroeconomic stability in this shaping development trajectories (Mahran, 2023). A recurring theme across these frameworks is the interaction between macroeconomic stability and human well-being, with key variables such as inflation, exchange rates, interest rates, and consumption patterns influencing socio-economic outcomes.

In the Nigerian context, macroeconomic instability has played a multifaceted role in shaping human welfare and development outcomes (Eriegha, 2022). Inflation, particularly when persistent and volatile, undermines purchasing power, discourages investment, and weakens the real value of income (Olusola et al., 2022; Ali & Asfaw, 2023). Similarly, exchange rate fluctuations increase the

cost of imported goods and services, affect firm competitiveness, and create uncertainty in household and business planning (Bawa et al., 2020). Interest rate movements influence borrowing, savings, and investment decisions, thereby affecting production and human capital formation. Consumption rates, reflecting both household spending and socio-cultural behaviors, also determine aggregate demand, which in turn interacts with inflation and interest rates to shape economic performance. These factors collectively impact the nation's **Human Development Index (HDI)**, which captures income, education, and health outcomes, serving as a human-centered measure of economic growth.

While macroeconomic variables are primarily economic in nature, their effects are mediated by socio-cultural behaviors, such as status-driven or ostentatious consumption, which can amplify demand pressures and influence inflationary trends (van Wyk, 2019; Pelser et al., 2023). By examining the interplay between inflation, exchange rates, interest rates, and consumption rates, this study investigates how macroeconomic stability affects economic growth in Nigeria, using HDI as the proxy for human-centered development. This approach allows for a comprehensive understanding of how both economic and behavioral factors influence national development outcomes.

The remainder of the study follows as: Section 2 discusses the review of literature, Section 3 presents the methodology, Section 4 describes the results and discussion, and Section 5 concludes with recommendations.

Review of Literature

In this section, we discuss three different aspect of literature review such as conceptual review, empirical review and theoretical review.

Conceptual Review

Inflation is a direct or indirect reaction or the outcome of some factors. These factors include the behaviour of demand and supply of goods and services, money supply (earned through productive activities and otherwise, monetary policy, fiscal policy (tax hike or reduction) and population general lifestyle among others. In the study, we considered inflation as a macroeconomic variable considered as the direct outcomes of monetary and/ or fiscal policies have the likelihood to influence the behaviour of inflation. For instance, a hike in inflation rate is expected to freeze money supply by taking some money out of circulation to ensure that consumption level is reduced and vice versa when the reverse occurs.

Also, a high foreign exchange rate is expected to lower demand for foreign goods in anticipation that domestic production would increase as demand shifts for domestic goods, services and local import substitutes. A high unemployment rate is a deprivation of abled labour to national growth and development. However, if the unemployed would depend on the employed segments of the economy where there are no government palliatives for at least their basic needs, this would put pressure on inflation rate regardless of the monetary policy in place. Tax policy on the other hand from the fiscal policy angle has the potential to regulate the disposable incomes for the tax payers. It therefore, behooves that a higher tax rate would produces lower disposal income with resultant reduced commission and lower inflation rate.

Empirical Review

Nigeria is one of the happiest countries in the world regardless of the level of poverty, insecurity, poor infrastructures and illiteracy that prevail, factors like communal relationships at family,

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township, religion, other group levels and personal sanity could take the credits (Tuki, 2024; Zombobah, 2020; Agbo, Nzeadibe and Ajaero, 2012; Asogwa and Onyezere, 2018). In fact, according Tuki (2024) in his study of what determines happiness of Nigerians in the midst of suffering and smiling observed that the socioeconomic and "self-rated health" were the major sources of happiness. In a paper on social impacts of inflation, Central Bank University (2024) posits that inflation affects the living standards of the citizenry and the profitability of every business across board. In the study of factors affecting inflation and its impact on human development index and poverty in Indonesia, Yolanda (2017) observed that impacts of inflation on poverty and the standard of living of the citizenry are both positive and significant.

According to Nandeeswara and Tolcha (2015), inflation forces households to make significant reduction in the amount they spend on food consumptions, healthcare, transportation, clothing and other basic needs for survival. In essence, inflation in an economy lowers the living standards of the citizenry especially the vulnerable who are mostly found in the bottom of the pyramid. The impact of inflation for instance on healthcare could trigger some vices like substance use that could exacerbate other vices like violence, stress with oucomes like low life expectancy, mental health, suicidal behavior and high mortality (Movsisyan. A. et. al (2024). In a nutshell, the rich and the more sophisticated citizens could have better access to funds and make gains than the poor, while the poor are more vulnerable to the disastrous impacts of inflation and would become poorer (Easterly and Fischer, 2001).

Beyond the general perception that inflation arose from excess of demand of goods and services over and above supply when available capital and labour force are fully and maximally engaged in productive actives, Ghosh (2023) identified rising profit margins and financial speculations especially in import dependent economies as big contributors. Other causes such as currency depreciation, large dependence on imports and quests for (exploitative) profits in spite of favourable resetting of indices that caused global economic crises and declining global inflation rates account for increasing inflation rates in developing economies (Ghosh, 2023; Chandrasekhar & Ghosh, 2022).

Literature on some of the previous studies of the relationship between variables - inflation, macro and non-macroeconomic variables and their impacts on the economic growth was reviewed below:

Topics of Study	Author(s)	Examined Variables	Research Models	Findings
The effects of inflation on economic growth in Nigeria	Yussuff, (2021)	Inflation rate, unemployment rate, gross fixed capital formation, real GDP and economic growth rate	Vector Error Correction Mechanism (VECM)	The relationship between inflation and economic growth was found insignificant
Impact of inflation on economic growth: Evidence from Nigeria	Adaramola, and Dada, (2020)	Real gross domestic product (GDP), inflation rate, interest rate, exchange rate, degree of economy`s openness, money supkply, and	Auto regressive distributed lag	Inflation was found to exert significant and negative impacts on economic growth

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		government consumption expenditures		
Analysis of factors affecting inflation and its impact on human development index and poverty in Indonesia	Yolanda, (2017)	Interest rate, foreign exchange rates, money supply, oil price and gold prices and Inflation,	Multiple linear regression model	With the exception of foreign exchange rate, all other variables exert positive and significant influence on inflation
Inflation and economic growth in Nigeria: detecting the threshold level	Doguwa, (2012)	GDP growth rate and inflation rate	Generalized Autoregressive Conditional Heteroscedasticity (GARCH)	Inflation poses a negative impact on economic growth at any point the inflation threshold point
Impact of inflation on economic growth: a case study of Tanzania	Kasidi and Mwakanemela	GDP growth rate and inflation rate	Inverse Multiple Linear Regression (ILS)	A negative correlation was observed between inflation and economic growth
Impact of inflation on gross domestic product growth in Ghana	Kankpeyeng, Mahama and Abubakar (2021)	Inflation, physical capital, government expenditure, money supply, and GDP growth rate	Vector Autoregressive (VAR)	GDP grows when inflation rate is stable and reduces and vice versa for high inflation rates
Effect of inflation on the growth and development of the Pakistan economy: An empirical analysis	Jacob, Rincy and Ajina (2023)	Inflation and GDP	Auto Regressive Distributive Lag (ARDL)	Prevailing inflation was found to be very harmful to the GDP growth of the economy when the inflation thresholdpoint was exceeded

Though examined literature did not provide consensus on the level of significance and the direction of inflation and other macroeconomic stability indicators on the economic growth as the outcomes

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varied from economies and periods of study, however there was a consensus of its negative impacts on the welfare of the citizenry. Aside from examining the influence of the lifestyle of citizenry on inflation and economic growth, the study a priori expectation was that lifestyle would violate cautions expected during high inflation and exert a positive impact on economic growth.

Theoretical Review

In order to carefully understand this research, five different theories were considered, including New Keynesian theory, Monetarist theory, Endogenous Growth theory, Aggregate Demand and Supply framework, and the Phillips Curve, also known as the Expectations-Augmented theory. Among these, New Keynesian theory was selected as the most appropriate for this study on inflation and economic growth because it provides a comprehensive framework for analyzing how inflation dynamics, expectations, and policy interventions affect economic performance. The theory was developed by several economists during the late 1970s and 1980s, with core contributors including Gregory Mankiw, David Romer, and Stanley Fischer, among others. It is based on several key assumptions, including the idea that prices and wages adjust slowly in response to economic shocks, that firms operate under imperfect competition with some control over prices, and that economic agents form rational expectations based on available information. This theory is highly relevant to the research because it explains how inflation expectations, interest rates, and supply and demand conditions can stimulate or slow economic growth, linking these macroeconomic variables to both short-run and long-run output. The contribution of the theory lies in offering a model that connects monetary dynamics and policy interventions to real economic outcomes, emphasizing how inflation influences investment, consumption, and human capital development. In this study, economic growth is measured using the Human Development Index, which captures income, education, and health outcomes. Independent variables such as inflation, exchange rates, and interest rates affect the HDI by influencing real income, investment in health and education, and overall economic stability. High or volatile inflation reduces real income, disrupts investment, and creates economic uncertainty, thereby lowering human development outcomes. By integrating these insights, New Keynesian theory provides a robust foundation for examining the relationship between inflation and human-centered economic growth.

Methodology

The study examined the influence of macroeconomic stability on economic growth. The macroeconomic stability is measured using inflation rate, exchange rate, interest rate and consumption expenditure while economic growth is proxied by human development measured as income per capital. The data type for the study was secondary and sourced from Central Bank of Nigeria's annual statistical bulletin and Nigeria's National Bureau of Statistics (NBS) publications.

The study used yearly time series data on inflation, economic growth, covering the period from 1985 to 2023. The datasets were obtained from various sources, including Trading Economics, the World Bank, and the United Nations. Data on inflation, exchange rates, and interest rates were sourced from the World Bank of Nigeria. Additionally, private consumption data was obtained from Trading Economics, while the Human Development Index was sourced from the United Nations.

Model

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The study adapated the modified Autoregressive Distributed Lag (ARDL) model of Pesaran and Shin (1999) as used by Malec et.al (2024) in their study of the relationship between inflation, exchange rate and economic growth in Ethiopia. The study examined the influence of inflation, GDP, money supply (MS), financial sector development and trade openesss on each interchangely as dependent variable. The study observed a long run relationship between GDP per capital, inflation and exchange rate, however the duo of inflation rate and exchange rate exert both long run, significant and negative effects on Ethiopia's economic growth.

The study's decision to use ARDL model was influenced by the fact that the model does not require all variables to be integrated of the same order, allowing its application when variables are integrated at order zero (I(0)), order one (I(1)), or fractionally integrated. It is also more efficient when working with small or finite sample sizes, making it a suitable choice for limited datasets. Additionally, ARDL provides unbiased estimates of the long-run model, ensuring more reliable parameter estimation (Harris & Sollis, 2003).

Another important feature of the ARDL approach is its ability to handle endogeneity issues effectively, as it includes sufficient lags of the dependent and independent variables to capture the underlying data-generating process. This reduces potential estimation bias and ensures robust inference. Furthermore, ARDL is particularly useful in cases where traditional cointegration methods, such as the Engle-Granger or Johansen approaches, may not be suitable due to their strict requirements on the integration order of variables.

The ARDL model is also capable of estimating both short-run and long-run relationships simultaneously, making it a valuable tool for policy analysis and forecasting. By transforming the estimated ARDL model into an Error Correction Model (ECM), it provides insights into the speed of adjustment toward long-run equilibrium, which is crucial for understanding dynamic relationships in economic and financial data. The model's flexibility in specifying lag structures allows researchers to account for complex interactions between variables, enhancing its applicability in empirical research.

The Malec et.al (2024) is restated below"

$$\text{Inflation} = \beta_{0+} \beta_1 DEER + \beta_2 DGDP + \beta_3 DM2 + \beta_4 DTOP + \beta_5 DFD_+ \text{È} \quad \text{- (1)}$$

Where inflation represents consumer price index, DEER is exchange rate, DGDP is gross domestic product per capita, DM2 is broad money supply. DFD is financial sector development, TOP is trade openness and *È* is the error factor.
The equation is rewritten as follows:

$$D(HDI_t) = \alpha_{01} + \beta_{11}(HDI_{t-1}) + \beta_{21}(Inflvo_{t-1}) + \beta_{31}\ln(Exrate_{t-1}) + \beta_{41}(intrate_{t-1}) + \beta_{51\ln}(consexp_{t-1}) + \sum_{i=1}^{K} \alpha 1i\, D(HDI_{t-1}) + \sum_{i=1}^{K} \beta 21\, (Inflvo_{t-1}) + \sum_{i=1}^{K} \beta 31\, D(Exrate_{t-1}) + \sum_{i=1}^{K} \beta 41\, (Intrate_{t-1}) + \sum_{i=1}^{K} \beta 51\, D2(Consexp_{t-1}) + \psi_{t..} \quad (2)$$

Where HDI represents human development rate, Inflvol is inflation volatility, Exrate is represented as exchange rate, Intrate indicates interest rate, and Consexp denotes consumption expenditure.

The ARDL bounds test is based on the assumption that the variables are either I(0) or I(1) (Pesaran & Shin, 1999; Pesaran et al., 2001).

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The data validation tests to avoid spurious outcomes were conducted. This study employed the Augmented Dickey-Fuller (ADF) test and the Phillips-Perron (PP) test to examine the stationarity of both the dependent and independent variables (Harris & Sollis, 2003).

To analyze the relationships in this study, both long-run and short-run dynamic interactions among the variables of interest were considered. The ARDL bounds testing approach estimates an unrestricted error correction model (UECM), which helps in simultaneously capturing the short-run adjustments and long-run equilibrium relationships. The bounds test relies on the joint F-statistic, which follows a non-standard asymptotic distribution under the null hypothesis of no cointegration. If the computed F-statistic exceeds the upper critical bound, cointegration is confirmed, indicating the presence of a stable long-run relationship. Conversely, if the F-statistic falls below the lower bound, there is no evidence of cointegration. However, if the value lies between the two bounds, the result remains inconclusive, requiring further investigation.

This method is particularly advantageous because it circumvents the need for pre-testing whether variables are purely I(1) or I(0), making it more applicable in empirical studies with mixed orders of integration. Furthermore, by transforming the estimated ARDL model into an Error Correction Model (ECM), the speed of adjustment toward long-run equilibrium can be determined, offering valuable insights into the nature of dynamic interactions between economic and financial variables. The **Vector Error Correction Model (VECM)** is specified as follows:

$$D(HDI_t) = \alpha_{01} + \sum_{i=1}^{K} \alpha 1i\, D(HDI_{t-1}) + \sum_{i=1}^{K} \beta 21\, (Inflvo_{t-1}) + \sum_{i=1}^{K} \beta 31\, D(Exrate_{t-1}) + \sum_{i=1}^{K} \beta 41\, (Intrate_{t-1}) + \sum_{i=1}^{K} \beta 51\, D2(Consexp_{t-1}) + \alpha ECT_{t-1} + \psi_{t..} \quad (3)$$

Results and Discussion

In this section, we present the result of the descriptive analysis, correlation and multicollinearity analysis as well as the time series analysis conducted using autoregressive distribution lag model.

Descriptive Analysis

The descriptive statistics in Table 1 shows that HDI has the least mean at 0.3149 while Consexp has the highest at 147.884. The mean for Inflvol, Exrate and Intrate were 19.253, 127.76 and 2.433 respectively. Both HDI and Consexp reported zero at least a period of zero activity or transaction. On the otherhand while both Inflvol and Extrate recorded 5.388 and 0.894 as minimum Intrate was negative -31.453. Extrate has a maximum of 425.98 while Intrate recored 18.18.

Table 1: Summary Statistics of the Variables

Variable	Mean	Std.dev	Min	Max	Skewness	Kurtosis	Jarque-bera	Pr(Jarque-bera
HDI	0.3149	0.2414	0	0.548	-0.5241	1.3528	6.195	0.0452
Inflvol	19.2532	16.9991	5.3880	72.8355	1.7921	5.0222	27.5215	0.0000
Exrate	127.7567	119.0001	0.8937	425.9792	0.9314	3.0662	5.501	0.0639
Intrate	2.4326	9.5581	-31.4526	18.18	-1.2193	5.5745	20.43	0.0000
Consexp	147.8846	149.7558	0	449	0.6415	1.8059	4.992	0.0824

Multicollinarity Tests

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Table 2 below illustrates the observed correlation between the dependent variable (HDI) and the

independent variables. Additionally, the Variance Inflation Factor (VIF) and tolerance level (calculated as 1/VIF) are assessed. The VIF values indicate no significant multicollinearity since all values are less than 5. When the VIF exceeds 5, it suggests a serious multicollinearity issue. The VIF results confirm the correlation values and tolerance levels, ensuring the reliability of the model's estimates.

Table 2: Correlation and Multicollinearity Analysis

Variable	HDI	Inflvol	Exrate	Intrate	Consexp	VIF	1/VIF
HDI	1.0000						
Inflvol	-0.3690	1.0000				2.60	0.3852
Exrate	0.7012	-0.3179	1.0000			1.74	0.5749
Intrate	0.2613	-0.7761	0.2719	1.0000		2.67	0.3743
Consexp	0.7086	-0.3830	0.6419	0.6419	1.0000	1.92	0.5209
Mean						**2.23**	

The VIF values indicate no significant multicollinearity since all values are less than 5. When the VIF exceeds 5, it suggests a multicollinearity issue that could lead to spurious outcomes. VIF results confirm the correlation values and tolerance levels, ensuring the reliability of the model's estimates.

Results and Discussion of findings

The variability in integration order presented in Table 1 suggested that the autoregressive distribution lag model is a suitable approach for analyzing the relationship among the variable. Given that the unit root test can handle variables integration at I(0) and I(1), the study presented the results of the Augmented Dickey-Fuller (ADF) and Phillips-Peron (PP) unit root test for the economic variables at diverse levels of differencing. The critical values indicate threshold for reject the null hypothesis of a unit root (non-stationarity). Based on the result, the order of integration for each dependent and the independent variable is presented in Table 2. Result of the analysis confirmed that HDI and Extrate becomes stationarity after first referencing, that is, it is integrated of order I(1) while other independent variables are stationary at level, meaning it is integrated at order I(0), and Consexp was stationary at second order differencing, I(2) order of integration. We proceeded to the selection of the optimal lag selection of each variable by selecting Akaike Information Criterion (AIC) among other lag selection. The criterion was used to determine the best lag length for each variable, selecting the smallest AIC value as the best chosen. HDI is optimed at 4 lags, Inflvol is optimed at 3 and others at lag 1.

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Table 3: Unit root Test

	ADF				PPT				
Variable	Level	First diff.	Second diff.	Critical value	Level	First diff.	Second Diff.	Critical value	Order of Integration
HDI	-2.583	-7.476		-2.969	-2.583	-9.919		-2.966	I(1)
Inflvol	-2.891			-2.964	-2.891			2964	I(0)
Exrate	2.471	-4.087		-2.969	2.471	-4.118		-2.969	I(1)
Intrate	-3.759			-2.964	-3.759			-2.964	I(0)
Consexp	-1.098	-1.519	-4.442	-2.975	-1.098	-5.187	-11.208	2.969	I(2)

Prior to conducting the Bounds Test, diagnostic checks were performed to assess the model's reliability. The diagonal tests confirmed that the model does not suffer from significant issues related to heteroskedasticity, misspecification, or autocorrelation, ensuring the estimated results are statistically valid. However, as indicated in Table 4, there may be some residual autocorrelation, as suggested by the Durbin-Watson statistic. Despite this, the long-run relationship among the variables is analyzed using the Bounds Test. As shown in Table 5, the F-statistic exceeds the upper bound critical value, while the T-statistic falls below the lower bound threshold. This confirms that the variables are cointegrated, indicating that they move together over time and share a stable long-run relationship.

Table 4: Model diagnostic

Model diagnostic	**T-statistic/Chi2**
Durbin_Watson	1.4031
Cameron & Trivedi's decomposition of IM-test	Chi2(32) = 33.00, p-value = 0.4180
Breusch-Godfrey LM test for autocorrelation	Chi2 = 3.594, p-value = 0.0580
Breusch-Pagan / Cook-Weisberg test for heteroskedasticity	Chi2(1) = 0.01, P-value = 0.9322
Ramsey RESET test	F(3, 15) = 11.06, P-value = 0.0004

Table 5: Bound Test

	Value	**I(0)**	**I(1)**
F-statistic	16.701	2.86	4.01
T-statistic	-8.939	-2.86	-3.99

The results of the ARDL model, as presented in Table 6, indicate that past changes in Human Development Index (HDI) have a strong and lasting negative effect on future HDI. The significance of all four lagged values suggests that declines in HDI persist over multiple periods, implying that recovery from economic downturns is slow and requires sustained efforts. Inflation volatility has a significant negative impact on HDI, meaning that economic instability reduces long-term human development. Similarly, higher interest rates are associated with lower HDI, likely due to reduced investment and slower economic growth. These findings underscore the crucial role of macroeconomic stability in fostering human development over time.

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On the other hand, exchange rate fluctuations and short-term changes in consumption expenditure do not have a meaningful effect on HDI, as their coefficients are small and statistically insignificant. This suggests that while these factors may influence the economy in other ways, they do not directly impact long-term human development in a significant manner. The overall model fits well, explaining approximately 59.93% of variations in HDI. The F-statistic confirms that the independent variables significantly contribute to explaining changes in HDI, reinforcing the reliability of the model. Given these findings, policymakers should prioritise stabilizing inflation and interest rates while implementing long-term strategies to mitigate the negative effects of past economic downturns.

From Table 7, since the Bounds Test confirms that the long-run result is the best, the analysis is restricted to the long-run estimates. The long-run results indicate that inflation volatility (Inflvo) has a significant negative impact on HDI, with a one-unit increase in inflation volatility reducing HDI by 0.0033 units. With a p-value of 0.000, this result is highly significant, meaning that the effect is statistically robust. The exchange rate differential (D_Exrate) also has a negative coefficient, suggesting a potential decline in HDI as the exchange rate changes. However, with a p-value of 0.089, this result is not statistically significant at the 5% level, indicating that exchange rate fluctuations do not exert a strong or reliable impact on HDI in the long run. Conversely, the interest rate (Intrate) has a significant negative effect, with a coefficient of -0.0049, meaning that a one-unit increase in the interest rate leads to a 0.0049-unit reduction in HDI. The very low p-value (0.0001) confirms the significance of this effect, making interest rate fluctuations a critical factor influencing long-term variations in human development. Finally, the second difference of consumption expenditure (D2_consexp) has a slight negative coefficient (-0.0002), but its p-value (0.298) indicates that this effect is not statistically significant. This suggests that changes in consumption expenditure do not play a meaningful role in shaping HDI in the long run. Inflation volatility and interest rates are the key macroeconomic variables influencing HDI, while exchange rate differentials and consumption expenditure do not exhibit significant long-run effects. These findings emphasize the importance of economic stability in driving sustainable development and provide key insights for policymakers seeking to enhance Nigeria's long-term financial resilience.

Table 6: ARDL Regression

	Coeff.	Std. Error	T-value	P-value	remarks
Constant	0.2189	0.0653	3.35	0.003***	
D_HDI					
L1	-0.8650	0.1397	-6.19	0.0000***	Significant
L2	-0.9621	0.1745	-5.51	0.0000***	Significant
L3	-0.5800	0.1766	-3.28	0.003***	Significant
L4	-0.5127	0.1394	-3.68	0.001***	Significant
Inflvo	-0.0068	0.0026	-2.64	0.015***	Significant
D Exrate	-0.0006	0.0012	-0.54	0.594	Not Significant
Intrate	-0.0116	0.0042	-2.70	0.013***	Significant
d2_consexp	0.0001	0.0004	0.24	0.809	Not Significant
F-test (8,23)	6.80	P-value	0.0001		

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R-squared	0.7027	Adj. R-squared	0.5993

Table 7: Short and long run Analysis

variable	Coeff	Std.Error	T-value	P-value	Remarks
D_HDI					
L1	-4.5532	0.5093	-8.94	0.000***	
	Long run result				
Inflvo	-0.0033	0.0007	-4.59	0.000***	Significant
D_exrate	-0.0006	0.0004	-1.80	0.089	Not significant
intrate	-0.0049	0.0012	-4.04	0.0001***	Significant
D2_consexp	-0.0002	0.0002	-1.07	0.298	Not significant
	Short run Result				
D_DHI					
LD	2.5673	0.4141	6.20	0.000***	Significant
L2D	1.4109	0.2720	5.19	0.000***	Significant
L3D	0.6439	0.1261	5.11	0.000***	Significant
Inflvo					
D1	0.0065	0.0028	2.35	0.030	Not significant
LD	0.0008	0.0017	0.45	0.660	Not significant
L2D	0.0049	0.0017	2.88	0.010***	Significant
D_exrate					
D1	0.0019	0.0012	1.56	0.137	Not significant
intrate					
D1	0.0072	0.0039	1.84	0.083	Not significant
D2_consexp					
D1	0.0009	0.0007	1.43	0.171	Not Significant

Figure 2 CUSUMSQ tests

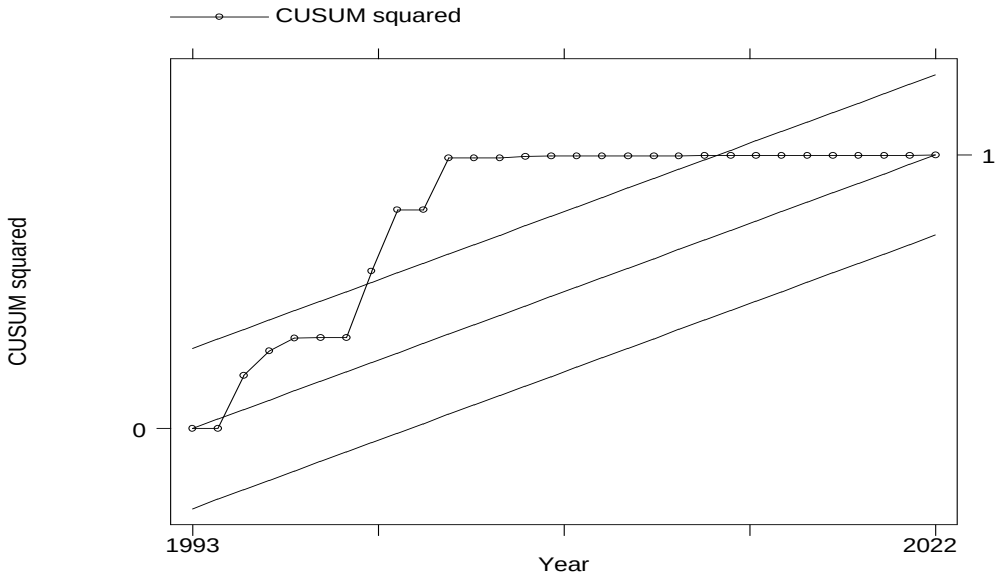

Figure 2 presents the CUSUM and CUSUM of Squares (CUSUMSQ) tests, which assess the stability of the estimated ARDL model over time. The CUSUM plot remains within the 5% significance bands,

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confirming that the estimated parameters are stable, with no major structural shifts affecting the regression results. The CUSUMSQ test further confirms the absence of substantial structural breaks, except for minor fluctuations in the early 1990s. This suggests that the relationships between Inflation Volatility, Exchange Rate, Interest Rate, Consumption Expenditure, and Economic Growth have remained consistent over time, particularly in the 2020s. The stability of the model confirms that the findings are statistically reliable, making them suitable for long-term policy recommendations on inflation management and economic growth strategies in Nigeria.

Discussion of Findings

The findings of this study reinforce the significant impact of inflation volatility, interest rates, and exchange rate fluctuations on Nigeria's Human Development Index (HDI). The results indicate that inflation volatility negatively affects HDI, with a one-unit increase in inflation volatility reducing HDI by 0.0033 units. This underlines the broader implications of macroeconomic instability on human well-being, mainly through reduced purchasing power, declining investment in social infrastructure, and worsening poverty levels. Inflation erodes the value of income, making essential goods and services increasingly unaffordable for low- and middle-income households and restricting access to healthcare, education, and other critical components of human development (Ali et al., 2023; World Bank, 2024).

Recent economic policies, including removing fuel subsidies and devaluing the naira, have intensified inflationary pressures, leading to sharp increases in transportation and food prices (Raifu & Afolabi, 2024). Reports indicate that over 30 million Nigerians are experiencing acute food insecurity due to rising costs and declining real incomes (Anyaogu, 2024). The World Bank (2024) warns that inflation-induced poverty could reach unprecedented levels without intervention, further deteriorating human development indicators.

Studies in other developing economies reinforce this relationship. Research on East African economies found that persistent inflation above 20% led to declining life expectancy and literacy rates due to reduced government spending on social programs (Cavusoglu & Gimba, 2021). Similarly, Brazil's hyperinflation crisis in the 1990s demonstrated how rapid price increases can severely undermine human development by making essential services unaffordable (Federation, 2019). Nigeria's case aligns with these findings to illustrate how inflation volatility disrupts long-term economic planning and weakens investment in key sectors such as education and healthcare.

Beyond household financial strain, inflation volatility also constrains government fiscal capacity, limiting the ability to fund social welfare programs effectively. High inflation reduces the actual value of tax revenues, forcing governments to cut essential services or increase borrowing, potentially leading to unsustainable debt levels (Banna, 2023). Recent budget allocations in Nigeria have prioritised debt servicing over social investments, with education and healthcare sectors experiencing significant funding shortfalls. This shift in fiscal priorities weakens long-term human capital development, ultimately reducing Nigeria's overall HDI performance (Adebayo, 2025).

Interest rates play a crucial role in shaping economic growth and human development. Higher interest rates, often used as a monetary policy to curb inflation, can have unintended negative consequences on HDI. The study finds that a one-unit increase in interest rates leads to a 0.0049-unit decline in HDI, as higher borrowing costs reduce access to credit, slow down investment, and lower overall economic growth. When borrowing costs rise, both businesses and individuals cut back on spending, reducing economic activity and public revenues that could otherwise be allocated to social services (Okunlola et al., 2024).

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In Nigeria, the central bank has significantly raised interest rates in response to inflation caused by fuel subsidy removals and exchange rate unification. While these policies aim to stabilise the economy in the long run, they have also increased the cost of living, reducing disposable income and making it harder for households to afford basic needs. Reuters (2024) reports that food inflation reached 31.5% in early 2024, intensifying economic hardship. Similar trends have been observed in South Africa and India, where high borrowing costs have discouraged business expansion and reduced job creation, ultimately affecting human development indicators (Sfundo Parakozov, 2025; Reuters, 2024). Exchange rate fluctuations play an important role in economic stability, yet their direct impact on HDI remains debatable. This study finds that exchange rate movements do not have a statistically significant effect on HDI in the long run. While changes in exchange rates may influence trade balances, inflation, and foreign investment, they do not directly translate into measurable differences in human development outcomes (Ijirshar, 2022). However, indirect effects persist, particularly in import-dependent economies like Nigeria, where currency depreciation increases the cost of essential goods and services (Eje, 2022).

Recent economic events highlight the broader effects of exchange rate fluctuations. The unification of the official and parallel market exchange rates in 2023 led to a significant depreciation of the naira, raising import costs and contributing to inflation (CBN, 2024). Despite these pressures, the relationship between exchange rate movements and HDI remains weak, primarily because other factors, such as fiscal policies and social spending, play a more direct role in shaping human development. For instance, while a weaker naira raises the cost of imported medical supplies and educational materials, government intervention through subsidies and social programs can mitigate these adverse effects (Ogwuche, 2024). Nigeria's reliance on imports makes it vulnerable to exchange rate depreciation, particularly in critical sectors such as healthcare, food production, and education. A depreciating currency increases the cost of essential goods, affecting access to food, medicine, and educational resources (Iorember, 2024). However, policies promoting domestic production and reducing import dependency can mitigate these effects. Countries like India and Indonesia have successfully offset currency depreciation effects on essential goods by investing in domestic manufacturing and agriculture (Thorbecke, 2021).

One of the most concerning findings of this study is that past declines in HDI persist over multiple periods, which implies that economic downturns have lasting effects on human development. This aligns with global evidence showing that once a country experiences a significant decline in HDI due to economic shocks, recovery can be slow unless comprehensive policy interventions are implemented (Kruk et al., 2018). In Latin America, prolonged declines in HDI due to repeated economic crises, hyperinflation, and political instability in Argentina and Venezuela demonstrate how economic mismanagement can result in long-term development setbacks (Singh, 2018). To mitigate the negative effects of inflation volatility, high interest rates, and exchange rate fluctuations on HDI, Nigeria's policymakers must implement strategic economic stabilization policies. These should include strengthening social safety nets to protect vulnerable populations, improving monetary policy coordination to manage inflationary shocks, and fostering domestic production to reduce import dependency (IMF, 2024). The results of the CUSUM and CUSUMSQ tests confirm the stability of the ARDL model over time, implying that the relationships between key macroeconomic variables and HDI remain consistent. This stability highlights the reliability of the findings and the need for targeted policy responses to improve human development outcomes in

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Nigeria. By implementing a balanced approach to economic policy, Nigeria can ensure long-term stability and sustained improvements in human development.

Conclusion and Recommendations

This study highlights the impact of macroeconomic instability, particularly inflation volatility, interest rates, exchange rate fluctuations, and consumption patterns, on Nigeria's Human Development Index (HDI). The findings indicate that inflation volatility and high interest rates have a significant negative effect on human development by reducing real income, discouraging investment, and limiting access to education and healthcare. Exchange rate fluctuations also affect HDI, primarily by increasing the cost of imports and creating uncertainty for businesses and households, while high consumption rates driven by socio-cultural spending patterns can exacerbate demand pressures, contributing indirectly to inflation and economic instability. Persistent economic downturns magnify these challenges, leading to sustained declines in HDI unless comprehensive policy interventions are implemented.

Based on these findings, the study recommends the adoption of targeted economic stabilization policies. These include coordinated monetary policies to control inflation and interest rates, strategies to stabilize the exchange rate through effective foreign reserve and fiscal management, and measures to encourage productive consumption and reduce excessive status-driven spending. Additionally, enhancing social safety nets and investing in domestic production can reduce import dependency, support income growth, and strengthen human capital development. By addressing macroeconomic instability through these sustainable policy frameworks, Nigeria can foster long-term economic stability and improve overall human development outcomes. The study also acknowledges limitations, including the measurement of consumption-driven inflation and the inherent volatility of Nigeria's economichj conditions, which may not be fully captured in econometric models, highlighting areas for future research.

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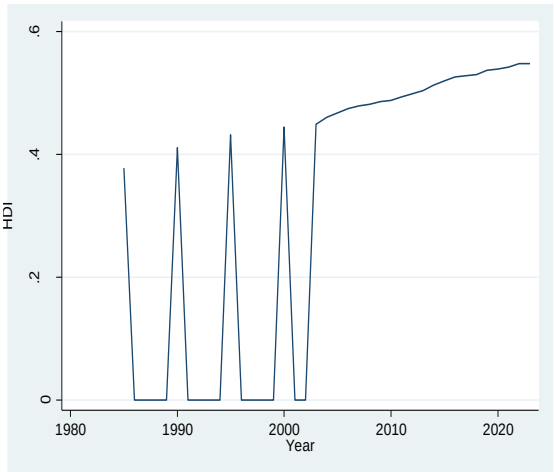
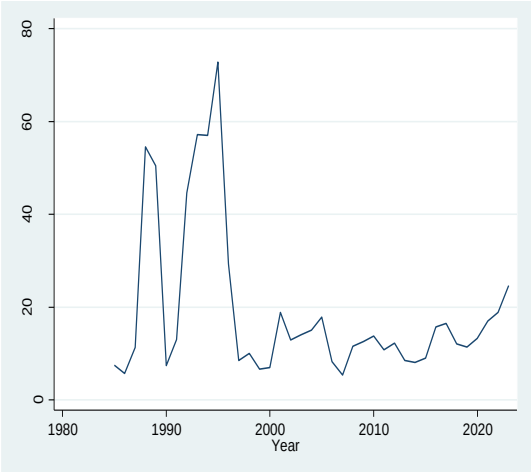
Appendix





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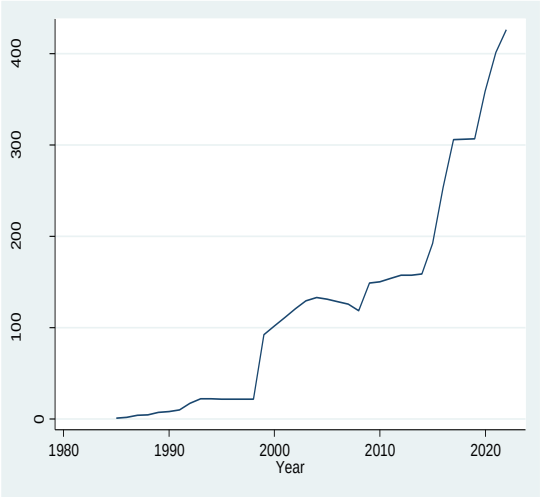

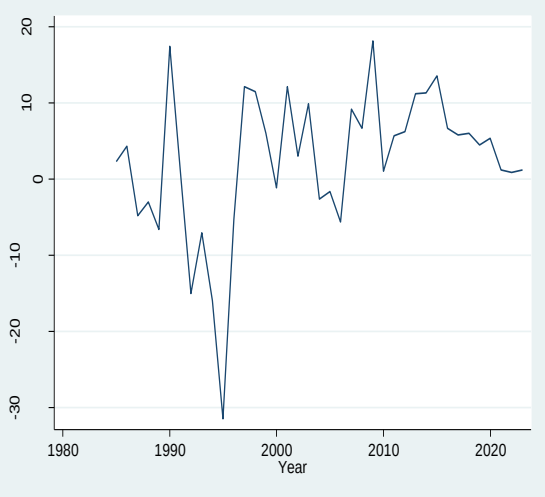

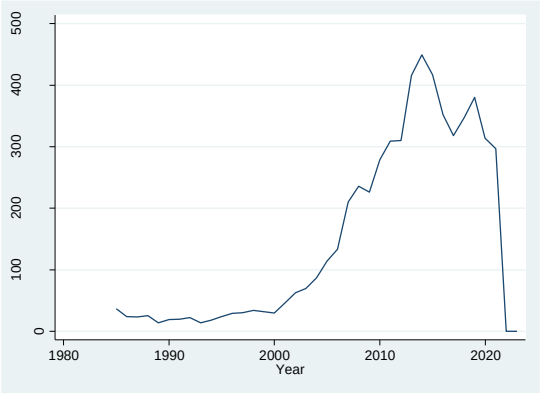

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