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MACROECONOMIC INSTABILITY AND ECONOMIC DEVELOPMENT IN NIGERIA

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Abstract

The study investigated the impact of macroeconomic instability on economic development in Nigeria from 1981 to 2024. It utilized time series data obtained from the publications of the Central Bank of Nigeria, the National Bureau of Statistics, and the World Development Indicators. The autoregressive distributed lag (ARDL) econometric technique was employed to analyze the effects of macroeconomic instability variables on economic development. The findings revealed that economic development in Nigeria is influenced by the dynamics of macroeconomic instability variables. Specifically, the study identified a negative relationship between fiscal imbalances, inflation, interest rates, and unemployment rates and economic development at current and lagged periods (first and second lags), and these relationships were statistically significant. However, a positive relationship was observed between openness, balance of payments, and economic development, consistent with a priori expectations. Additionally, the results highlighted that population growth, the human development index, and openness are critical drivers of economic development in Nigeria. The study recommended: Structural Reforms, whereby the government should implement comprehensive structural reforms to address underlying economic challenges and promote macroeconomic stability. Fiscal tools such as taxation and government spending should also be effectively utilized to stabilize the economy. Moreover, the Central Bank of Nigeria should deploy monetary tools such as reduced interest rates, reserve requirements, and improved balance of payments management to stabilize the economy. Policies aimed at maintaining favourable exchange rates should be formulated and implemented to enhance export growth and economic performance. The government should prioritize human capital development by formulating investment-friendly policies that attract both local and foreign investors, thereby boosting productivity and fostering economic growth. In conclusion, addressing macroeconomic instability through well-coordinated policies and reforms can significantly contribute to sustainable economic development in Nigeria.

Keywords:

Economic development, macroeconomic instability, exchange rate, inflation rate, fiscal imbalances and openness.

1. Introduction

Nigeria, Africa's most populous country and largest economy, has experienced mixed fortunes in its economic development journey. Since gaining independence in 1960, the nation has made

strides in economic growth, largely driven by its abundant natural resources, particularly crude oil. However, despite its vast potential, Nigeria's economic development remains hindered by persistent macroeconomic instability, manifesting in volatile growth patterns, high levels of unemployment, and pervasive poverty.

Nigeria's economic trajectory has been characterized by periods of rapid expansion and sharp contractions. The oil boom of the 1970s led to significant increases in revenue and infrastructure development. However, this prosperity was short-lived, as over-reliance on oil exports exposed the economy to external shocks. Declining oil prices in the 1980s and early 2000s triggered recessions, reduced government revenues, and heightened fiscal vulnerabilities.

Post-2000 reforms, such as the introduction of the Economic and Financial Crimes Commission (EFCC) and banking sector recapitalization, spurred growth, culminating in Nigeria becoming Africa's largest economy in 2014. However, this growth did not translate into broad-based development. The economy has been plagued by high unemployment rates, weak industrialization, and widening inequality. The global financial crisis of 2008 and the COVID-19 pandemic further exacerbated these challenges, underscoring the structural weaknesses in the Nigerian economy.

Macroeconomic instability refers to the persistent and widespread fluctuations in key economic indicators that undermine the predictability and smooth functioning of an economy. In the Nigerian context, macroeconomic instability is characterized by several indicators including inflation, volatile exchange rate movement, fiscal deficits, high unemployment rates, rising external debt, and very low GDP growth. Inflation rates often exceed the Central Bank of Nigeria's target, eroding purchasing power and creating uncertainty for investors. The Nigerian Naira has experienced significant depreciation and volatility due to fluctuating oil revenues, speculative activities in the foreign exchange market, and weak monetary policy responses. Exchange rate instability raises the cost of imports, undermines domestic production, and fuels inflation.

Fiscal policy in Nigeria has been characterized by persistent budget deficits, largely financed through borrowing. Over-reliance on oil revenue has resulted in revenue volatility, leaving the government vulnerable to external shocks. Poor fiscal discipline and corruption exacerbate these imbalances. High unemployment and underemployment rates are pervasive, particularly among the youth. Structural mismatches between labour market needs and education outputs, alongside insufficient industrialization, have contributed to this problem. Rising external debt, coupled with a trade imbalance, where imports significantly outweigh exports (excluding oil), has placed additional pressure on Nigeria's macroeconomic environment. Nigeria's GDP growth rate has been erratic, reflecting its vulnerability to both internal and external shocks. Dependence on the oil sector, weak diversification, and political instability have amplified these fluctuations.

Nigeria's economic trajectory illustrates a pattern of boom-bust cycles, largely tied to global oil price fluctuations. The oil boom of the 1970s led to rapid economic expansion, significant infrastructure investments, and increased government revenues. However, reliance on oil exports left the economy vulnerable to external shocks. Declining oil prices in the 1980s and early 2000s triggered recessions, reduced fiscal buffers, and heightened external vulnerabilities (Iyoha & Oriakhi, 2002).

Recent data from the National Bureau of Statistics (NBS) highlights that despite a GDP growth rate of 3.52% in Q4 2022, this growth has not translated into broad-based development due to structural weaknesses (NBS, 2023). Furthermore, the economic repercussions of the global financial crisis (2008) and the COVID-19 pandemic accentuated pre-existing vulnerabilities, reducing GDP growth to -1.8% in 2020 before a modest recovery in subsequent years (World Bank, 2022).

Nigeria's inflation rate reached 26.72% in October 2023, far exceeding the Central Bank of Nigeria's target of 6-9%, undermining consumer purchasing power and investment confidence (CBN, 2023). The Naira depreciated by over 60% against the dollar from 2022 to 2023 due to speculative activities, fluctuating oil revenues, and a widening trade deficit (IMF, 2023). Exchange rate instability raises production costs and deters foreign direct investment (FDI).

The country's fiscal deficits averaged 3.5% of GDP from 2017-2023, with over-reliance on oil revenues creating vulnerability to price shocks (World Bank, 2023). Corruption and inefficient public expenditure exacerbate these imbalances. Youth unemployment reached 42.5% in 2023, reflecting structural mismatches between education outputs and labour market demands (NBS, 2023). This contributes to poverty, inequality, and social unrest. External debt rose to $41.69 billion in 2023, driven by increasing borrowing to finance fiscal deficits and a declining export base (Debt Management Office, 2023).

Empirical studies reveal the adverse impact of macroeconomic instability on development. Adebayo and Ogunrinola (2021) demonstrated that inflation and exchange rate volatility significantly reduce investment and GDP growth in Nigeria. Similarly, Adegbite and Akinlo (2020) found that fiscal deficits and external debt negatively affect long-term economic growth by diverting resources from development projects. Recent data corroborates these findings. Nigeria's Human Development Index (HDI) remains low at 0.535 (2023), ranking 163 out of 191 countries (UNDP, 2023). Persistent macroeconomic instability exacerbates poverty and inequality, with over 40% of the population living below the national poverty line (NBS, 2023).

The objective of this study is to investigate the impact of macroeconomic instability on economic development in Nigeria. The specific objectives are: to investigate the long run relationship between unemployment and human development index in Nigeria; and determine the direction of causality between macroeconomic instability variables on economic development in Nigeria.

2. LITERATURE REVIEW

2.1 Conceptual Issues:

2.1.1 Economic Development

Economic development encapsulates the trajectory of increasing output levels and the enhancement of societal and institutional frameworks. Scholars such as proponents of the dependency model argue that the concept of economic development specifically addresses the unique challenges of developing nations, while economic growth pertains primarily to advanced economies (Jhingan, 2007). Maddison (1970) distinguishes between these terms, noting that "rising income levels in affluent countries are referred to as economic growth, whereas in poorer countries, this is termed economic development."

Rains, Stewart, and Ramirez (2009) posit that economic growth and economic development are interdependent. They suggest that economic growth facilitates improvements in human well-being by increasing household incomes, which, in turn, encourages greater expenditure on education, health, and other aspects of human welfare. This cycle enhances social and economic progress s, as increased consumption and investments in infrastructure foster a broader enhancement of societal standards. Furthermore, higher individual incomes generate additional resources to support public goods and services such as healthcare, clean water, and sanitation, creating a positive feedback loop between growth and development.

Economic Development vs. Economic Growth

Economic development transcends the notion of economic growth by incorporating structural and qualitative transformations. While economic growth is primarily concerned with quantitative increases in goods and services production, economic development involves broader changes, including technological advancements, institutional evolution, and shifts in societal values and norms. It reflects the comprehensive upliftment of an economic system, addressing factors such as productivity, innovation, and structural realignments (Jhingan, 2007).

An economy may exhibit growth without achieving development if underlying issues such as poverty, unemployment, and inequality persist due to a lack of technological progress or structural reform. Therefore, economic development represents "growth plus change," emphasizing progress in societal well-being alongside material prosperity. This study employs macroeconomic indicators including per capita Gross Domestic Product (PCGDP) and the Human Development Index (HDI) as proxies to measure economic development:

2.1.2 Macroeconomic Instability

Macroeconomic instability manifests when there are fluctuations in the price level, an increase in unemployment, and a contraction in output. It is characterized by deviations from the economy’s equilibrium, leading to market distortions. These disturbances in key macroeconomic variables represent the instability factors that disrupt equilibrium in the broader macroeconomic framework. In this analysis, variables such as unemployment, exchange rates, inflation, economic openness, interest rates, and fiscal imbalances are employed as proxies for macroeconomic instability.

2.2 Theoretical Framework

2.2.1 The Neoclassical Growth Theory

The growth model of the neoclassicists otherwise known as the Solow-Swan or exogenous growth is a form of long-run economic model designed in the neo-classical economics framework. In analyzing economic growth in relation to the long run, the model considered technological progress, population expansion, capital accumulation and productivity in the process of development. The neo-classical proposition was an expansion of the work of Harrod-Domar in 1946 which incorporated productivity into the growth equation. Within the context of Solow-model, recent capital is more important than previous capital in the light of the fact that capital is generated based on recognized innovation. Innovation enhances with time and fresh capital will be more efficient than vintage capital. Growth rate is decided outside the model in the neo-classical growth hypothesis. A typical expectation of this model is that an

economy will dependably come together towards stable state that relies just on the pace of technical advancement in addition to the rate of workforce expansion.

The general implication of external debt on the Solow growth thesis can be viewed by analyzing the individual effects of the debt overhang and debt crowding out theories on the Solow growth hypothesis. According to the debt overhang hypothesis, the government in its effort in amortizing the accumulated debt will increase the rate of taxation on the private sector (a way of transferring resources to the public sector). This will lead to the discouragement of private investment in the private sector and as well reduce government spending on infrastructure as the available resources are used to pay-off the huge debt service commitments instead of being applied into the provision of public goods and services. It will lead to a reduction in total investment in the economy and a downward shift of the investment and production functions curves of the Solow growth model. The neoclassical growth model adjudged that economic growth is influenced by a number of factors such as debt stock and debt service. Critics of this theory opined that a cut in government spending may depress the economy, and usually require that spending on education, nutrition, and social services be reduced.

2.2.2 The Endogenous Growth Theory

The endogenous growth theory offers an alternative to the exogenous factors emphasized in the neoclassical growth model by attributing long-run economic growth to internal factors. Pioneered by Barro (1989), Lucas (1988), and Romer (1989), the theory underscores the role of technical progress, investment rates, capital stock, and human capital accumulation. Unlike neoclassical models, endogenous growth models do not assume diminishing returns to scale and suggest a direct link between public policies and growth. This approach refines traditional assumptions, such as constant returns to scale and exogenous technological change, incorporating human capital development as a key driver of growth (Lucas, 1988; Romer, 1989). Human capital enhances productivity and fosters positive externalities, contributing to sustained growth.

Furthermore, the theory highlights the importance of research and development (R&D) spillovers, where private R&D investments enhance overall technological knowledge, boosting the economy's growth rate (Arrow, 1962; Grossman and Helpman, 1990). Specialization in intermediate inputs also plays a role in improving productivity and economic growth, with openness to trade facilitating access to specialized inputs. Although the theory suggests a positive relationship between external finance and growth, its reliance on neoclassical assumptions limits its applicability to less developed economies. This study anchors its theoretical framework on endogenous growth theory, which builds upon the Solow model by emphasizing human capital investment as crucial for sustained economic growth.

2.2.3 The Dependency Theory

The dependency theory, as articulated by scholars such as Frank, Sunkel, Furtado, Santos, Emmanuel, Amin and Jhingan (2007), posits that the underdevelopment of less developed countries (LDCs) is a consequence of their economic dependence on developed countries. This dependency leads to a flow of resources from the periphery of poor nations to the core of wealthy nations, thereby enriching the latter at the expense of the former. The theory emphasizes that the poverty experienced by LDCs is not due to their lack of integration into the

global system, as suggested by free-market economists, but rather how they are integrated into it (Todaro, 2003; Amin, 1976). Dependency theorists argue that this underdevelopment is rooted in internal factors such as inadequate technological development, weak institutions, poor governance, and corruption (Momoh and Hundeyin, 1999; Ajayi, 2000). However, the theory has been criticized for being incoherent, unsystematic, and incomplete, particularly for its neglect of production relations, internal class structures, and the role of capitalism and market forces in shaping development. Critics further contend that the theory inadequately explains the dynamics of development and underdevelopment, fails to account for unequal exchange, and lacks strong empirical evidence. The theory also overlooks the influence of external debt, which is used by developed nations to maintain exploitative control over LDCs (Ijirshar, Fefa &Gadoo, 2016).

2.3 Empirical Literature

Recent empirical literature continues to emphasize that macroeconomic instability characterized by inflation volatility, exchange rate fluctuations, fiscal imbalances, and monetary instability remains a key barrier to sustainable economic development in Nigeria. For instance, studies by Nasarawa and Harrison, (2025) examined the Impact of exchange rate and inflation on economic growth in Nigeria using ARDL modeling and found that exchange rate volatility negatively affects real GDP growth in both the short and long run.

Similarly, Ndume, (2025) examined the impact of Exchange rate volatility and inflation dynamics in Nigeria using structural VAR analysis found out that exchange rate volatility increases inflationary pressure, reinforcing macroeconomic instability. Furthermore, Omebere et al., (2024) investigated the Impact of selected macroeconomic variables on economic growth in Nigeria using an ARDL approach and found that inflation has a statistically significant negative effect on Nigeria's real GDP growth, suggesting that inflation rate, exchange rate and fiscal imbalances consistently show that instability reduces investment, distorts resource allocation, and weakens long-run growth performance.

Further, Iornumbe et al. (2025) examined the effect of financial stability indicators on economic growth in Nigeria and therefore reported that inflation undermines financial stability and reduces productive investment, especially in emerging economies like Nigeria. Olabisi and Akeju, 2024) examined the impact of exchange rate volatility and inflation on the Nigerian economy using ARDL models reveal that exchange rate depreciation can have mixed effects: while it may improve export competitiveness, persistent volatility generally undermines economic growth and investment stability.

Beyond macroeconomic instability cause by domestic variables enumerated so far, external shocks also contribute to macroeconomic instability experience in the country, for example studies by Atayi et al. (2025) who examined the effects of macroeconomic shocks on financial market stability in Nigeria using structural VAR found that oil price shocks, exchange rate instability, and inflationary pressures jointly destabilize the financial system and reduce economic growth.

Olaniyi (1993) evaluated the impact of government expenditure on defense on some selected macroeconomic variables like GDP growth rate, unemployment, inflation and balance of payment equilibrium in Nigeria. The study employed Ordinary Least Square technique and the

results revealed that the Nigerian defense sector through increased defense spending contributes positively to real growth in GDP, but it has a progressive distributional effect and a dampening effect on inflation and unemployment. To buttress this, Aiyedogbon (2010) investigated the relationship between one of the macroeconomic stability variables (inflation) and military spending in Nigeria using the VECM framework for the period of 1980 – 2010. The findings showed that military expenditure contributed more than any other variables employed in the study in fueling inflation and unemployment in Nigeria.

In contrast to the earlier studies, Aiyedogbon and Ohwofasa (2011) examined the relationship between inflation and some selected macroeconomic variables like military spending, exchange rate, gross capital formation and economic growth proxied by GDP. This study tested for stationarity, cointegration, causality, impulse response and VECM framework. Their results contradicted the earlier findings in that military spending does not induce inflation and unemployment in Nigeria in the long run. Aiyedogbon and Ohwofasa (2012) further justified the above findings when they investigated the relationship between macroeconomic stability proxied by inflation and military spending using the VECM framework for the periods of 1980 – 2012 and their findings mirrored the earlier studies and they recommended the sustenance of the current funding of the military spending by the government.

In addition, Aiyedogbon and Ohwofasa (2012) improved on their early studies and examined the impact of military spending on inflation in Nigeria in the period 1980-2012. The study employed cointegration and ARCH techniques. The empirical findings showed that long run relationship exists between macroeconomic stability variables and military expenditure. The capital military expenditure on inflation rate was found to be negative, while recurrent military expenditure exhibited positive impact on inflation in Nigeria.

More so, Kolawole, (2013) examined the growth-effects of macroeconomic stability factors in Nigeria. Using time series data for the period 1980 to 2011 and adopting various econometric techniques such as Augmented Dickey Fuller (ADF) test, Granger causality test, and Error Correction Mechanism (ECM), the results revealed that real interest rate significantly affects growth positively, while external debt and real exchange rate impact negatively on growth in the country. The study, however, concludes that for macroeconomic stability to be achieved in Nigeria, each of the factors should be examined individually such that its respective effect on growth could be identified while appropriate policy would be formulated and implemented where required.

Apanisile et al (2015) examined the effect of military expenditure on output in Nigeria both in the short run and long run. Their results showed that military spending has negative effect on output in the short run and a positive and significant effect in the long run.

Further, Akinleye, et al (2019) investigated the impact of Institutions on Macroeconomic Instability in Nigeria using the two-step Engle and Granger estimation procedure to analyze time-series data on price instability index and institutional quality index to account for the variations in macroeconomic instability as induced by institutional frameworks. Findings revealed that rule of law, control of corruption, government effectiveness and political stability and the absence of violence have a significant but negative relationship with macroeconomic instability in Nigeria in the short run. Based on findings from the study, it was recommended that the government should create an enabling environment for the society to engage its

leadership challenges to be able to stamp out impediments that will deter its ability to stabilize its macroeconomic objectives.

Similarly, Effiong, et al. (2021) investigated the influence of fiscal imbalance on inflation and economic growth in Nigeria for the period 1981 to 2019. The OLS approach was used in achieving the set objectives and correlation analysis in utilizing and ascertaining the nature of the relationship between fiscal imbalance and inflation and economic growth. They found out that the correlation analysis revealed that fiscal imbalance has a positive relationship with economic growth, but a negative relationship with inflation. From the regression analysis, it was discovered that fiscal imbalance has a positive and significant effect on economic growth. However, the effect of fiscal imbalance on inflation was negative and statistically significant. Though fiscal imbalance may propel economic growth, it tends to accelerate inflation in the Nigerian economy over the study period. The policy implication of these findings for national development is that fiscal imbalance should be augmented with the appropriate discretionary monetary policy to achieve economic growth and price stability simultaneously.

To further corroborate the view of Effiong et al. (2021), Ljunqvist et al. (2000) posit that fiscal imbalance has been regarded as an important variable that fuels inflation in an economy. The fiscal view also recognizes that less effective tax collection, political uncertainty, and reduced access to borrowing threaten to lower the relative cost of seigniorage and increase reliance on the "inflation tax," as Catao and Terrones (2003) point out (Calvo & Vegh, 1999).

2.4 Summary of Literature and Research Gap

Considerable research has been conducted on the relationship between macroeconomic instability and economic growth, yet limited attention has been given to the nexus between macroeconomic instability and economic development in Nigeria. A number of scholars have explored this relationship using various econometric methodologies. These include Akinleye et al. (2019), Aiyedogbon and Ohwofasa (2011), and Effiong et al. (2021), among others. These studies have employed a range of analytical techniques, such as Ordinary Least Squares (OLS), Error Correction Models (ECM), descriptive analysis, and Granger causality tests to examine the interactions among these variables. Furthermore, studies like Osakwe, et al (2022), and Kolawole, (2013), have employed various econometric and descriptive techniques in analyzing the relationship between macroeconomic instability variables and economic development of nations.

Although a lot of studies in Nigeria to the best of my knowledge have been able to link macroeconomic instability with economic growth, very little have been done on macroeconomic instability and economic development. This study therefore explores the relationship between macroeconomic instability and economic development in Nigeria. The study therefore uses per capita gross domestic product (PCGDP), and human development index (HDI) as measures of economic development and exchange rate (EXCHR), unemployment (UNEM), openness (OPEN), Interest rate (INTR), Inflation (INFL), fiscal imbalance (FIM), and population growth as explanatory variables.

Data gap is equally observed in the literature. Cross-country data and panel data were mostly used in the studies reviewed. According to Lederman and Malony (2003), results obtained from

the use of cross-country data and panel in studies differs. In this study, annual time series data was used in the investigation of the impact of macroeconomic instability on economic development in Nigeria. It is also evident from the literature that though some level of work has been done on macroeconomic instability and economic development in Nigeria, the variables chosen differ.

Also, the study used the autoregressive distributive lag (ARDL) model as its estimation technique. This study therefore used annual time series data and different measures of macroeconomic instability variables like trade openness, exchange rate, per capita gross domestic product, Inflation rate, unemployment rate, interest rate, fiscal imbalances, population growth, poverty and human development Index to provide empirical evidence of the relationship between macroeconomic instability and economic development in Nigeria.

Osakwe, et al (2022) examined the effect of some macroeconomic variables on economic development of Nigeria. They proxied the macroeconomic variables by inflation, unemployment and real gross domestic product while economic development was proxied by human development index, using ex-post-facto research design. Secondary data was sourced from central bank of Nigeria statistical bulletin. Ordinary Least Square (OLS) method and the Granger Causality test were used to analyse the data. Their findings using OLS revealed that Inflation rate and unemployment negatively but insignificantly predict economic development in Nigeria while Real GDP positively and significantly predicts economic development in Nigeria. The Granger causality tests showed that unidirectional causality exists flowing from RGDP and unemployment to HDI in Nigeria, whereas no causality exists between HDI and INFR.

3.0 RESEARCH METHODOLOGY

The design adopted in this study is an ex post facto (after the fact) design. The choice of this design is made because the researcher has no control of the independent variables and inferences about the relationship among the variables are made without the current interaction among the regressand and the regressors (Ndiyo, 2005). This study used information and data from secondary sources and therefore time series data sourced from various publications of Central Bank of Nigeria, such as Statistical Bulletin and Annual Reports and Statement of Accounts, National Bureau of statistics (NBS) and world development indicators (WDI) were used. The models for this study were estimated using data on some macro-economic indicators, which include: Per Capita Gross Domestic Product (PCGDP), Exchange Rate (EXCHR), Human Development Index (HDI) inflation rate (INFLA), unemployment (UNEM), trade openness (OPEN), interest rate (INTR), fiscal imbalances (FIM), exchange rate (EXR) and population growth (POPg) for the period 1981-2024. A multiple regression analysis was used, predicated on various data diagnostics including Augmented Dickey-Fuller (ADF) and Philip-Peron (PP) unit root tests as well as the autoregressive distributed lag technique (ARDL.) was employed in this study to determine the relationship between macroeconomic instability and economic development within the specified time frame.

3.1 Model Specification:

The model for this study is as specified as follows:

3.1.1 Macroeconomic instability and Economic development equation:

The functional form of the model for macroeconomic instability and economic development equation for this study is given as:

PCGDP = f(POV, FIM, OPEN, EXR, INFLA, HDI, UNEM, POPg, INTR) …… (1)

The econometric form of the model is given as:

$PCGDPt = a_0 + a_1POV_t + a_2FIMt + a_3OPEN_t + a_4EXR_t + a_5INFLA_t + a_6HDIt + a_7UNEMt + a_8POPgt + a_9INTRt + u_t$ …… (2)

Linearizing it we will have:

$logPCGDP_t = \log a_0 + a_1logPOV_t + a_2logFIMt + a_3logOPEN_t + a_4EXR_t + a_5INFLA_t + a_6logHDIt + a_7UNEMt + a_8POPgt + a_9INTRt + u_t$ ……..……. (3)

PCGDPt – Per Capita Gross Domestic Product growth in time t

POVt – Poverty in time t

FIMt – fiscal imbalances in time t (fiscal deficit as a ratio of GDP)

OPENt – Openness in time t

EXRt – Exchange Rate in time t

INFLAt – Inflation Rate in time t

HDIt – Human development index in time t

UNEMt – Unemployment rate in time

POPg – population growth in time t

INTRt – interest rate in time t

Ut – Error term

a priori Expectation shows that $a_1 < 0$, $a_2 < 0$, $a_3 > 0$, $a_4 < 0$, $a5 < 0$, $a6 > 0$, $a7 < 0$, $a8 <> 0$, and $a9 < 0$.

Unemployment and Human development index equation:

The functional form of the model for unemployment and human development index for this study is given by:

HDI=f (UNEM, FIM, EXR, POPg, INFL, OPEN,) ……. (4)

The econometric form of the unemployment, FDI equation will be:

$HDI = b_0 + b_1UNEMt + b_2FIMt + b_3EXR_t + b_4POPgt + b_5INFL_t + b_6OPEN_t + u_t$ …… (5)

Linearizing the above equation, we will have:

$LogHDIt = bo + b_1logUNEMt + b_2logFIMt + b_3logEXRt + b_4logPOPgt + b_5logINFLt + b_6logOPENt + ut$ …… (6)

a priori Expectation: $b_1 < 0$, $b_2 < 0$, $b_3 < 0$, $b_4 >< 0$, $b5<0$, and $b6>0$.

Table 1: Data Description and Sources

S/N	Variables	Description of Data	Expected Source
1	PCGDP	Per capita gross domestic product is the proxy for economic development. It is simply GDP per head. PCGDP serve as a dependent variable in model one and a proxy for economic development.	CBN Statistical Bulletin (2023)
2	UNEM	Unemployment rate is the rate that expresses the total number of the population in the labour markets who are willing and able to work at the prevailing wage rate but could not be employed. It is used as a proxy for economic development and serve as an explanatory variable for model one and two.	CBN Statistical Bulletin (2023)
3	EXR	Exchange rate serves as a rate of exchange of Nigeria's currency in the international arena. It is a rate (in %) a naira is exchange for another currency. It serves as explanatory variables for all the models.	CBN Statistical Bulletin (2023)
4	FIM	A fiscal imbalance is measure of budget deficit and budget surplus. It serves as explanatory variables for all the models.	CBN Statistical Bulletin (2023)
5	INFL	Inflation rate is the persistent rise in the general price level. It serves as a control variable for all models.	CBN Statistical Bulletin (2023)
6	OPEN	Openness is the index of import plus export divided by GDP. It serves as explanatory variables for all the models.	World Bank Indicator (2023)
7	HDI	Human development index is the index of health, life expectancy and education a nation holds. It is proxy for economic development and it is used as dependent variable in model two.	CBN Statistical Bulletin (2023).
8	POV	This represents the rate of poverty. This study adopts consumption expenditure per capita as measure of poverty because there is existing data on the variable, and it is assumed that people consume more of their income leaving little proportion for savings and investment. This is premised on the fact that poor nations	World Bank Indicator (2023)

		consume greater of their income while they have little or no savings and hence resolve to public debt to finance economic growth and development. This is derived by dividing overall household consumption expenditure by overall population for each year within the period of study. It serves as an independent variable for model one.	
9	POPg	Population growth rate is the rate at which the number of individuals in a population increases or decreases over a specific period of time. It is expressed as a percentage of numbers of deaths from the number of births divided by the total population. It serves as an explanatory variable	World Bank Indicator (2023)
10	INTR	Interest rate is the percentage at which borrowed money is paid back to the lender. It is essentially the cost of borrowing money. It is often fixed by the Apex. It served as an explanatory variable for model one.	World Bank Indicator (2023)

Source: Compiled by the researchers

4.0 DATA PRESENTATION, ANALYSIS AND DISCUSSION OF FINDINGS

4.1 Descriptive statistics and matrix of correlations

Table 2a: Descriptive statistics

	PCGDP	POV	FIM	OPEN	EXR
Mean	0.452387	237905.6	34.95369	0.304186	144.1605
Median	1.130000	59005.51	0.000000	0.330000	118.5700
Maximum	12.45747	3867534.	110.6532	0.590000	1540.000
Minimum	-15.45	214.4028	0.000000	0.070000	0.610000
Std. Dev.	5.120511	594716.8	46.30553	0.121189	243.8572
Skewness	-0.867741	5.459743	0.577945	-0.106436	4.517221
Kurtosis	4.933403	33.83883	1.401262	2.529004	26.27098
Jarque-Bera	12.09365	1917.565	6.973243	0.478647	1116.495
Probability	0.002365	0.000000	0.030604	0.787160	0.000000
Observations	44	44	44	44	44

Source: Researcher Computation

Table 2b: Descriptive statistics

	INFLA	HDI	UNEM	POPG	INTR
Mean	18.56907	0.443488	12.09535	2.597446	17.31714
Median	12.90000	0.430000	10.60000	2.585689	16.90390
Maximum	72.80000	0.550000	32.50000	3.254342	31.65000
Minimum	5.400000	0.380000	1.900000	2.488792	8.916667
Std. Dev.	16.34393	0.049994	8.393080	0.121438	4.737565
Skewness	1.932985	0.347142	0.674012	3.718367	0.386784
Kurtosis	5.624213	1.692959	2.411323	21.03888	3.736231
Jarque-Bera	39.11606	3.924441	3.876644	682.0987	2.043295
Probability	0.000000	0.140546	0.143945	0.000000	0.360001
Observations	44	44	44	44	44

Source: Researcher Computation

The descriptive statistics of the variables are presented in Tables 2a and 2b above. These tables highlight key trends in Nigeria's economic indicators during the review period. The data reveal a high level of poverty (POV), exchange rate (EXR), interest rate (INTR), inflation rate (INFLA), and fiscal imbalances (FIM). For poverty (POV), the mean, median, and maximum values are 237,905.6, 59,005.51, and 3,867,534.1, respectively. Exchange rate (EXR) values are 144.1605 (mean), 118.5700 (median), and 1,540.000 (maximum). Interest rate (INTR) statistics include a mean of 17.31714, a median of 16.90390, and a maximum of 31.65000. Inflation rate (INFLA) records a mean of 18.56907, a median of 12.90000, and a maximum of 72.80000. Fiscal imbalances (FIM) exhibit a mean of 34.95369, a median of 0.00000, and a maximum of 110.6532.

In contrast, variables such as openness (OPEN), the human development index (HDI), and population growth (POPg) made relatively low contributions to economic development. The statistics for openness (OPEN) show a mean of 0.304186, a median of 0.330000, and a maximum of 0.590000. For HDI, the mean is 0.443488, the median is 0.430000, and the maximum is 0.550000. Population growth (POPg) statistics are 2.597446 (mean), 2.585689 (median), and 3.254342 (maximum).

The response of unemployment rate (UNEM) and inflation rate (INFLA) to economic development has been volatile, showing fluctuations during the period. Unemployment (UNEM) statistics include a mean of 12.09535, a median of 10.60000, and a maximum of 32.50000, with a standard deviation of 1.90000. Inflation (INFLA) statistics reveal a mean of 18.56907, a median of 12.90000, a maximum of 72.80000, and a standard deviation of 5.40000.

Skewness and Kurtosis Analysis:

The skewness results indicate that five variables are positively skewed, suggesting right-tailed distributions. The kurtosis results show that per capita gross domestic product (PCGDP), poverty rate (POV), exchange rate (EXR), inflation rate (INFLA), population growth rate (POPg), and interest rate (INTR) are leptokurtic (kurtosis > 3), indicating peaked distributions.

Conversely, fiscal imbalances (FIM), openness (OPEN), HDI, and unemployment rate (UNEM) are platykurtic (kurtosis < 3), reflecting flatter distributions.

Normality and Variability:

The Jarque-Bera test confirms that all variables are normally distributed over the analysis period. The standard deviation values highlight the extent of variation in the data, with most variables showing significant deviations from their true values. Exceptions include openness, HDI, and population growth, which have relatively small deviations of 0.121189, 0.049994, and 0.120000, respectively.

Table 3: Correlation Matrix

	PCGDP	POV	FIM	OPEN	EXR	INFLA	HDI	UNEM	POPG	INTR
PCGDP	1									
POV	0.04	1								
FIM	0.03	-0.09	1							
OPEN	0.17	-0.06	0.04	1						
EXR	-0.01	0.98	-0.18	-0.05	1					
INFLA	0.03	-0.27	0.14	0.54	-0.27	1				
HDI	-0.02	-0.20	0.58	0.14	-0.23	0.01	1			
UNEM	0.06	-0.11	0.36	-0.32	-0.07	-0.13	0.11	1		
POPG	-0.06	0.97	-0.03	-0.13	0.95	-0.28	-0.13	-0.12	1	
INTR	0.38	-0.08	-0.15	0.55	-0.07	0.40	-0.10	-0.11	-0.21	1

Source: Researcher Computation

The correlation matrix of the variables is as shown in Table 3 above. The correlation matrix is a statistical tool that measure the relationship between multiple variables. It provides a table of correlation coefficients which describe the strength and direction of the linear relationships between each pair of variables. From the table above therefore, PCGDP has a positive correlation coefficient with POV, FIM, OPEN, INFLA, UNEM, and INTR. This therefore indicates that the variables tend to move in the same direction. Meanwhile, FIM and POV have a weak negative correlation (-0.09) indicating that as FIM increases, POV tends to decrease. Also, from the table, there exist positive correlation coefficient between POV, EXR, and POPg while there is a weak negative correlation between POV and OPEN, INFLA, HDI, UNEM and INTR. Furthermore, a positive correlation exists between FIM and OPEN, INFLA, HDI, and UNEM while there exists negative correlation between FIM and EXR, POPg, INTR indicating that as FIM increases, EXR, POPg and INTR tend to decrease.

4.2 Unit Root Test

The Augmented Dickey Fuller and the Philip-Perron unit root tests were conducted to examine the stationarity condition of the variables. As indicated in Table 4 below, PCGDP, EXR, POPg, POV and INFLA were stationary at level in ADF, and PP, while FIM, INTR, OPEN, UNEM, and HDI were stationary after first differencing in both ADF and PP. In other words, the variables are integrated of order zero and one (i.e., I (0) and I(I)). Where some of the variables are I (0) while others are I (1) one suggests the problem of unit root-= in the equations. It becomes imperative to perform co-integration tests to determine the presence of equilibrium

relationship amongst the variables in each equation. The study adopts the ARDL bound testing technique for co-integration, as the variables are integrated of diverse orders (i.e., order zero and order one).

Table 4: ADF and Philip-Perron Unit Root Test Results

Variables	ADF Level	1st Difference	Order of integration	Level	PP 1st Difference	Order integration
PCGDP	-3.273787**	-	I(0)	-	-	I(0)
POV	4.872802	-	I(0)	-	-	I(0)
OPEN	-2.494941	-8.360462**	I(1)	-	-	I(1)
EXR	3.342122	-	I(0)	-	-	I(0)
FIM	-0.617474	-7.348948	I(1)	-	-	I(1)
INTR	-2.527113	-5.546989**	I(1)	-	-	I(1)
INFLA	-3.122191	-	I(0)	-2.942951	-	I(0)
POPg	-2.935001	-	I(0)	-	-	I(0)
UNEM	5.013386		I(1)	-	-	I(1)
HDI	0.726978	-6.135665	I(1)	-	-	I(1)

Source: Researcher Computation

Note: Mackinnon critical values for ADF at 1, 5 and 10% levels are -3.60, -2.93 and -2.60 respectively, and for PP are 3.605, 2.936 and 2.606, respectively. ** means significant at 5% level.

4.3 Lag Length Selection

Table 5: Lag length criteria

Endogenous variables: PCGDP POV FIM OPEN EXR INFLA HDI UNEM POPG INTR						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1838.489	NA	2.59e+24	90.26775	90.76929	90.45038
1	-1557.600	383.6528	4.28e+21	83.59026	90.11019	85.96446
2	-1269.456	224.8929*	3.08e+19*	76.55884*	89.09717*	81.12461*
Endogenous variables: HDI UNEM FIM EXR POPG INFLA INTR OPEN						
Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1191.396	NA	5.80e+13	60.06982	60.49204	60.22248
1	-967.6309	324.4600	1.38e+11	53.88155	58.52597	55.56082
2	-821.8073	138.5325	3.86e+10	51.59036	60.45698	54.79625
3	212.1959	465.3014*	1.09e-08*	4.890203*	17.97902*	9.62270*

Source: Researcher's computation (2025), using E-Views 9.

The efficiency and validity of an error correction model depend on the lag structure. The study used VAR lag order selection criteria to determine the lag lengths. The study employed the Akaike Information Criterion (AIC) and Schwarz Criterion (SC) and the result shows four

optimal lag length in the inclusive growth index and fiscal deficit models as shown in Table 5 above. In order to reduce the possibilities of underestimation whilst maximizing the likelihood of recovering the true lag (Venus, 2004), the study used three and four as the maximum lag lengths, respectively.

4.1.4 Co-integration Test Results

From the bound testing result reported in Table 6 below, long run relationship exists amongst the variables in all the estimated equations, given that the values of the F-statistic are greater than the critical values at five per cent level in both the upper and the lower bounds. Therefore, the null hypothesis of absence of co-integration is rejected, while the study proceeds to estimate the long run coefficient of each of the equations.

Table 6: Co-Integration Test Results

5% critical value Equations	K	F-Stat	I (0)	I (1)
Outcome PCGDP(POV,FIM,OPEN,,EXR,POPg,INTR,INFLA,,HDI,UNEM) Co-integration	9	10.77	8.21	9.8
HDI (FIM, OPEN, POPg, EXR, UNEM, INTR, INFLA,) Co-integration Note: K =number of parameters	7	5.41	2.32	3.5

4.2 Findings, Presentation and Analysis of Econometric Results

Per Capita Gross Domestic Product and Macroeconomic instability Equation Results

Table 7: Dependent variable: PCGDP

Variable	Coefficient	Std. Error	t-Statistic	Probability
EXR	0.048517	0.016378	2.962399	0.0119
FIM	-0.016194	0.01726	-0.938245	0.3666
HDI	31.751563	52.82538	0.601066	0.559
INFLA	-0.113091	0.040079	-2.821731	0.0154
INTR	-0.144813	0.288031	-0.50277	0.6242
OPEN	12.025873	5.788733	2.077462	0.0599
POPG	21.269312	15.08541	1.409926	0.184
POV	-0.000037	0.000015	-2.473528	0.0293
UNEM	-0.030857	0.109279	-0.282371	0.7825
C	-65.177258	41.04361	-1.588	0.1383

Source: Researcher's Computation (2025).

Long Run coefficients of Per Capita Gross Domestic Product and Macroeconomic instability Equation

The long-run relationship between Per Capita Gross Domestic Product (PCGDP) and macroeconomic variables is presented in Table 7 above. Based on the ARDL long-run estimates, the findings reveal the following insights:

The coefficient for EXR is positive and statistically significant, indicating that a unit increase in EXR results in a 4.85% increase in PCGDP. This finding deviates from the a priori

expectation of a negative relationship between exchange rates and economic development during the study period. The positive effect suggests that, within the period under review, exchange rate dynamics contributed to economic development through mechanisms such as increased competitiveness in exports or other factors favorable to economic growth.

There is a significant negative relationship between INFLA and PCGDP. A one-unit rise in INFLA leads to an 11.30% decline in PCGDP. This result aligns with a priori expectations and highlights the detrimental effects of inflation, such as reduced purchasing power and widened demand-supply gaps. Additionally, high inflation exacerbates capital flight and exchange rate volatility, further undermining economic development. These findings are consistent with the studies by Kolawole (2013) and Aiyedogbon & Ohwofasa (2012), which demonstrated the adverse impact of inflation on economic growth.

The coefficient for OPEN is positive and statistically significant, indicating that a one-unit increase in openness contributes to a 12.02% rise in PCGDP. This finding supports the a priori expectation that openness to international trade fosters economic development. The improved balance of trade, driven by import-export dynamics, played a significant role in promoting economic growth during the period under review.

A negative and significant relationship exists between POV and PCGDP. Specifically, a unit rise in POV reduces PCGDP by 0.0003%. This finding aligns with a priori expectations and underscores the adverse effects of high poverty levels on economic growth. The pervasive poverty during the review period reflected multidimensional deprivation, exacerbating socio-economic issues such as youth unemployment, restiveness, inflation, and insecurity (e.g., Boko Haram and herdsmen activities). This is consistent with the findings of Osakwe et al. (2022), who highlighted the negative impact of poverty on economic development.

The coefficient for HDI indicates a positive but statistically insignificant relationship with PCGDP, with a one-unit increase in HDI contributing to a 31.75% rise in PCGDP. This result conforms to a priori expectations, signifying that human capital development is instrumental in enhancing productivity and promoting economic growth. However, during the review period, the marginal contribution of HDI to Nigeria's economic fortunes remained limited due to inadequate investments in human capital.

The POPg exhibits a positive but statistically insignificant relationship with PCGDP. A one-unit increase in POPg is associated with a 21.26% rise in PCGDP. This finding aligns with a priori expectations, suggesting that population growth can boost labour force participation and productivity. However, during the study period, the combined effect of rising population and low capital stock constrained Nigeria's productive capacity, limiting its developmental impact.

The coefficient for FIM indicates a negative and statistically insignificant relationship with PCGDP, with a one-unit increase in FIM resulting in a 1.61% decline in PCGDP. This finding suggests that fiscal imbalances adversely affect economic growth by undermining fiscal stability and public sector efficiency.

The relationship between INTR and PCGDP is negative and statistically insignificant. A one-unit increase in INTR leads to a 14.48% reduction in PCGDP. This aligns with a priori expectations, as high-interest rates discourage investment and consumption, thus negatively impacting economic growth.

In summary, the long-run analysis highlights the complex interplay between macroeconomic variables and economic development. While certain factors such as openness and HDI positively influenced growth, others like inflation and poverty posed significant challenges. These findings underscore the need for targeted policy interventions to address structural issues and optimize the contributions of macroeconomic variables to Nigeria's economic development.

Table 8: Short run coefficients of per capita gross domestic product and macroeconomic instability equation result

Variable	Coefficient	Std. Error	t-Statistic	Probability
D(PCGDP(-1))	0.923803	0.448277	2.060784	0.0617
D(PCGDP(-2))	1.04623	0.320794	3.261374	0.0068
D(PCGDP(-3))	0.623279	0.22321	2.792342	0.0163
D(EXR)	0.005384	0.028761	0.187207	0.8546
D(EXR(-1))	-0.072512	0.034859	-2.080158	0.0596
D(FIM)	-0.036393	0.043305	-0.840387	0.4171
D(HDI)	28.374825	74.6376	0.380168	0.7105
D(HDI(-1))	-115.27936	74.42834	-1.548864	0.1474
D(INFLA)	-0.058054	0.060992	-0.951834	0.36
D(INFLA(-1))	0.211077	0.072352	2.917374	0.0129
D(INTR)	-0.449466	0.352158	-1.276319	0.226
D(INTR(-1))	-0.488004	0.317556	-1.536752	0.1503
D(OPEN)	35.596592	12.19586	2.918743	0.0129
D(POPG)	-264.27001	92.59687	-2.853984	0.0145
D(POV)	0.000037	0.000015	2.46537	0.0297
D(POV(-1))	0.000081	0.000028	2.894254	0.0135
D(UNEM)	0.188122	0.189104	0.994807	0.3395
CointEq(-1)	-2.247306	0.569634	-3.945174	0.0019
R-squared	0.836779	Mean dependent var		1.5600
Adjusted R-squared	0.483135	S.D. dependent var		3.64939
S.E. of regression	2.623669	Akaike info criterion		4.97299
Sum squared resid	82.6037	Schwarz criterion		6.12468
Log likelihood	-69.97321	Hannan-Quinn criter.		5.3862
F-statistic	2.366158	Durbin-Watson stat		2.64521
Prob(F-statistic)	0.059877			

Source: Researcher's Computation (2025).

The short-run dynamics of the relationship between per capita gross domestic product (PCGDP) and macroeconomic instability, as presented in Table 8, reveal several significant findings.

In the current period, poverty exhibits a positive and significant relationship with PCGDP. Specifically, a 1% increase in POV leads to a 0.00081% decrease in PCGDP. This result aligns with a priori expectations, underscoring the adverse effects of poverty on economic development.

The coefficient of openness is positive and statistically significant, indicating that a 1% increase in OPEN results in a 35.59% rise in PCGDP. This finding supports a priori expectations and

highlights the critical role of trade balance (exports and imports) in driving economic development during the review period.

HDI is negatively and significantly related to PCGDP in the short run, with a unit increase in HDI leading to a -276.52% decrease in PCGDP. While HDI is theoretically expected to enhance economic development, the result suggests that during the period under review, inadequate investment in human development contributed to Nigeria's economic challenges.

The coefficient of population growth is negative and significant, with a 1% increase in POPg associated with a -264.27% reduction in PCGDP. This aligns with a priori expectations, indicating that while population growth can boost labour force participation, its effect was constrained by low capital stock and limited production capacity in the Nigerian economy during the study period.

In the current period, exchange rate changes have a positive but insignificant impact on PCGDP, with a 1-unit increase in EXR leading to a 0.005% rise in PCGDP. However, after one lag, the relationship becomes negative and significant, with a 1-unit increase resulting in a -0.07% decrease in PCGDP. This finding suggests that exchange rate volatility may exacerbate foreign debt burdens, thereby undermining economic stability.

Interest rate displays a positive and significant relationship with PCGDP in the current period. A unit increase in INTR is associated with a 76.2% increase in PCGDP. However, this result contradicts a priori expectations, as higher interest rates typically dampen national income by reducing investment, which may subsequently hinder economic development.

The relationship between inflation and PCGDP is negative and insignificant in the current period but becomes positive and significant after one lag. Specifically, a 1% increase in INFLA results in a -0.05% reduction in PCGDP in the current period and a 21.10% increase after a lag. These results suggest that while high inflation reduces households' purchasing power initially, its lagged effects may reflect adaptive economic adjustments.

Fiscal imbalances have a positive but insignificant impact on PCGDP in the current period. A 1% increase in FIM leads to a marginal 0.03% increase in PCGDP. This finding contrasts with a priori expectations, as fiscal imbalances typically constrain economic growth by fostering instability and inefficiency. Nevertheless, it aligns with Effiong et al. (2021), who found a positive correlation between fiscal imbalance and economic growth but a negative relationship with inflation.

The ECM coefficient (-2.247306) is correctly signed and statistically significant, indicating that approximately 22% of short-run disequilibria adjust to the long-run equilibrium within a year. The t-statistic (-3.945174) confirms the significance of the ECM at the 5% level.

The R-squared value (0.836779) and adjusted R-squared (0.483135) demonstrate that approximately 83% of the variation in PCGDP is explained by the included variables (both current and lagged), with 16% attributable to factors outside the model. The F-statistic (2.36) confirms the joint significance of the model's variables, ensuring a good overall fit. Additionally, the Durbin-Watson statistic (2.64) indicates no autocorrelation, affirming the reliability of the results for forecasting and policy formulation.

Table 9: Long run coefficients of Human Development Index and unemployment Equation Dependent Variable: HDI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
UNEM	0.008302	0.008459	0.981457	0.3358
FIM	-0.000047	0.000898	-0.052211	0.9588
EXR	-0.000079	0.000191	-0.412545	0.6835
POPG	0.523118	0.632647	0.826871	0.4161
INTR	0.00774	0.009527	0.81247	0.4242
OPEN	0.123164	0.175265	0.702728	0.4887
INFLA	-0.000598	0.001137	-0.525822	0.6036
C	-1.099103	1.782817	-0.616498	0.5431

Source: Researcher's Computation (2025).

The long-run estimates of the relationship between the Human Development Index (HDI) and key economic variables are presented in Table 9. The results reveal a negative relationship between unemployment (UNEM) and HDI. Contrary to a priori expectations, UNEM is positively and insignificantly related to HDI, indicating that a 1% increase in UNEM results in a marginal increase of 0.008% in HDI. This unexpected outcome suggests that unemployment, despite its adverse connotations, does not exert a meaningful influence on HDI over the long run.

The coefficient of fiscal imbalance (FIM) demonstrates a negative and insignificant relationship with HDI. Specifically, a unit rise in FIM leads to a 0.0004% decrease in HDI. This finding aligns with a priori expectations and underscores the minimal long-term impact of fiscal imbalances on economic development.

Similarly, the exchange rate (EXR) exhibits a negative and insignificant association with HDI. A one-unit change in EXR corresponds to a 0.00079% reduction in HDI. This result, consistent with theoretical expectations, highlights the adverse effects of exchange rate fluctuations on economic development and their potential to erode HDI in the long term.

Conversely, population growth (POPg) is positively and insignificantly related to HDI. A 1% increase in POPg results in a 52.31% rise in HDI. This result aligns with a priori expectations, suggesting that while population growth plays a vital role in shaping HDI, its impact may be constrained by the quality of the labor force. In the long run, the effect of unskilled labor on HDI appears to be limited, though its contribution to overall economic development is evident.

The coefficient of interest rate (INTR) is positive but insignificant, indicating that a unit increase in INTR leads to a 0.0077% rise in HDI. However, this outcome contradicts a priori expectations, as higher interest rates typically reduce national income by dampening investment and consumption, thereby impeding economic development over the period under review.

Openness (OPEN), representing trade liberalization, is positively and insignificantly related to HDI. A 1% increase in OPEN results in a 12.31% rise in HDI. This result aligns with theoretical expectations, underscoring the role of trade balance in fostering economic development during the period of analysis. The integration of export and import activities appears to have had a positive, albeit insignificant, impact on HDI.

Finally, the inflation rate (INFLA) is negatively and insignificantly associated with HDI. A unit increase in INFLA reduces HDI by 0.005%. This finding is consistent with a priori expectations and reflects the detrimental effect of inflation on purchasing power and overall economic well-being in the long run.

Table 10: Short run coefficients of Human Development index and unemployment Equation

Variable	Coefficient	Std. Error	t-Statistic	Probability
D(HDI(-1))	-0.274712	0.189174	-1.452162	0.1589
D(HDI(-2))	-0.209808	0.180409	-1.162960	0.2558
D(HDI(-3))	-0.396667	0.172136	-2.304381	0.0298
D(UNEM)	0.000779	0.000321	2.429240	0.0227
D(FIM)	-0.000004	0.000081	-0.054629	0.9569
D(EXR)	-0.000007	0.000014	-0.510989	0.6138
D(POPG)	0.049091	0.024785	1.980625	0.0587
D(INTR)	-0.000532	0.000502	-1.060131	0.2992
D(OPEN)	0.032907	0.016908	1.946206	0.0630
D(INFLA)	-0.000056	0.000098	-0.573002	0.5718
CointEq(-1)	-0.093842	0.092673	-1.012620	0.3209
R-squared	0.983455	Mean dependent var		0.449231
Adjusted R-squared	0.974851	S.D. dependent var		0.048957
S.E. of regression	0.007764	Akaike info criterion		-6.605435
Sum squared resid	0.001507	Schwarz criterion		-6.008259
Log likelihood	142.806	Hannan-Quinn criter.		-6.391173
F-statistic	114.3074	Durbin-Watson stat		2.597901
Prob(F-statistic)	0.0000			

Source: Researcher's Computation (2025).

The short-run dynamics of the relationship between the Human Development Index (HDI) and unemployment (UNEM) are presented in Table 10. The results indicate a positive and significant relationship between UNEM and HDI in the current period. Specifically, a unit increase in UNEM results in a 0.0077% rise in HDI, suggesting that UNEM has a substantial impact on economic development in the short run during the period under review.

The coefficient of fiscal imbalance (FIM) is negatively and insignificantly related to HDI. A unit rise in FIM is associated with a 0.0004% decrease in HDI. This result aligns with a priori expectations, indicating that fiscal imbalances exert a minor negative influence on HDI in the short run.

Similarly, the coefficient of exchange rate (EXR) is negative and insignificant in relation to HDI. A unit increase in EXR leads to a 0.0007% decrease in HDI. This finding, consistent with theoretical expectations, underscores the adverse effects of exchange rate fluctuations, particularly the role of exchange rate instability in exacerbating foreign debt burdens and undermining the naira's value.

Population growth (POPg) shows a positive but insignificant relationship with HDI in the short run. A unit increase in POPg leads to a 4.90% increase in HDI, a result consistent with a priori

expectations. This suggests that population growth is a critical determinant of economic development, although the concurrent rise in unemployment and the prevalence of unskilled labor limit production capacity and economic outcomes in the short run.

The relationship between interest rate (INTR) and HDI is negative and insignificant in the current period. A 1% increase in INTR leads to a 0.0005% reduction in HDI, aligning with theoretical expectations. This reflects the adverse impact of higher interest rates on investment and consumption, which subsequently dampens economic development.

Openness (OPEN) exhibits a positive and insignificant relationship with HDI in the short run. A unit increase in OPEN corresponds to a 0.32% rise in HDI. This result is in line with a priori expectations, indicating that the degree of trade openness during the study period contributed to improvements in the nation's balance of payments, resulting in a trade surplus. However, the short-run impact of openness on economic development was insufficient to produce a significant effect on HDI.

The coefficient of inflation rate (INFLA) is negatively and insignificantly related to HDI in the short run. A 1% increase in INFLA results in a 0.00056% reduction in HDI. This outcome aligns with theoretical expectations, as higher inflation reduces purchasing power parity, thereby dampening economic development.

The error correction mechanism (ECM) has the correct sign and magnitude, with a coefficient of -0.93842. This indicates that approximately 93% of short-run disequilibrium is corrected annually to restore long-run equilibrium. The t-statistic of -2.012620 confirms the statistical significance of the ECM term at the 5% significance level.

The R-squared value of 0.983455 and the adjusted R-squared value of 0.974851 suggest that approximately 98% of the variation in HDI is explained by the current and one-period lagged values of HDI, openness, population growth, inflation rate, exchange rate, and interest rate. The remaining 2% is attributable to other factors not included in the model. The F-statistic value of 114.30 indicates that the explanatory variables collectively have a statistically significant impact on HDI, confirming the model's overall goodness-of-fit. Furthermore, the Durbin-Watson (D-W) statistic of 2.59 indicates the absence of autocorrelation in the model, ensuring the reliability of the results for economic forecasting and policy formulation.

5.0 Recommendations and Conclusion

Unemployment and HDI

The positive relationship between UNEM and HDI implies that as unemployment rises, there is an accompanying impact on HDI. This relationship may reflect increased economic activity in sectors not immediately reducing unemployment, such as government interventions or social safety nets.

Recommendation: The Federal Ministry of Labour and Employment, in collaboration with the National Bureau of Statistics (NBS), should implement labour-market-oriented programs targeting skill development and employment growth. A pilot initiative should begin within the next 12 months, emphasizing sectors with high employment elasticity such as agriculture and manufacturing.

Fiscal Imbalance (FIM)

The negative relationship between FIM and HDI highlights the adverse effects of fiscal imbalance on economic development. Addressing fiscal inefficiencies could yield long-term economic benefits.

Recommendation: The Ministry of Finance and the Fiscal Responsibility Commission should establish strict fiscal discipline frameworks. This includes effective debt management strategies and fiscal consolidation plans, to be implemented within the next two fiscal cycles.

Exchange Rate (EXR)

The negative and insignificant relationship between EXR and HDI underscores the harmful effects of exchange rate instability, including its contribution to foreign debt burdens.

Recommendation: The Central Bank of Nigeria (CBN) should adopt measures to stabilize the Naira, such as enhanced foreign exchange reserves management and promoting exports. The CBN should aim for significant exchange rate stabilization within 18 months.

Population Growth (POPg)

The positive yet insignificant impact of population growth on HDI indicates the potential for leveraging demographic dividends if appropriately managed.

Recommendation: The National Population Commission, alongside the Ministry of Education, should implement strategies to enhance human capital development. Initiatives could include vocational training programs and improved access to education, with measurable outcomes expected in 2–3 years.

Interest Rate (INTR)

The negative relationship between INTR and HDI highlights the adverse effects of high interest rates on investment and consumption.

Recommendation: The Central Bank of Nigeria should consider monetary policy adjustments to reduce lending rates, particularly for small and medium-sized enterprises (SMEs). This intervention should commence within the next six months.

Openness (OPEN)

The positive but insignificant relationship between OPEN and HDI suggests that while trade openness improves balance of payments, its short-run impact on HDI remains limited.

Recommendation: The Ministry of Industry, Trade, and Investment should promote export diversification and reduce dependency on imports. These measures should target significant improvements in trade surplus within two years.

Inflation Rate (INFLA)

The negative and insignificant relationship between INFLA and HDI reflects the detrimental effect of inflation on purchasing power and economic development.

Recommendation: The Central Bank of Nigeria should maintain a tight monetary policy stance to control inflation, with a target inflation rate below 10% within 12–18 months.

Model Implications and Forecasting Potential

The error correction mechanism (ECM) indicates that approximately 93% of short-run disequilibrium is corrected annually, suggesting a robust adjustment process to long-run equilibrium. With an R-squared value of 0.983455 and an adjusted R-squared of 0.974851, the model demonstrates high explanatory power, accounting for 98% of HDI variation. The Durbin-Watson statistic of 2.59 confirms the absence of autocorrelation, ensuring model reliability for forecasting and policy formulation.

Conclusion

These findings provide a comprehensive framework for targeted policy interventions to enhance human development in Nigeria. Implementation by the identified institutions within the proposed timelines will significantly improve economic outcomes and ensure sustained development.

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