

FINANCIAL INCLUSION AS A DRIVER OF ECONOMIC DEVELOPMENT IN NIGERIA

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Abstract

This study investigates the role of financial inclusion as a driver of economic development in Nigeria, employing a quantitative explanatory research design and the Autoregressive Distributed Lag (ARDL) approach over the period 1990-2024. The study is anchored on the Financial Intermediation Theory by Gurley and Shaw (1960). Economic development is proxied by the Human Development Index (HDI), while financial inclusion is measured using a composite index of access, usage, and digital financial services, sourced from the World Bank Global Findex Database. Inflation, education, and infrastructure are included as control variables to capture macroeconomic stability, human capital, and physical infrastructure. Unit root tests show that the variables are integrated of mixed orders, justifying the use of the ARDL bounds testing method, which confirms a stable long-run relationship among the variables. Short-run estimates reveal that financial inclusion, education, and infrastructure do not have immediate significant effects due to adjustment lags and institutional rigidities; however, the error correction mechanism shows that about 78 percent of short-run disequilibrium is corrected annually, with the coefficient being negative and significant at the 1 percent level. Long-run results indicate that financial inclusion is a significant and positive determinant of economic development, while education and infrastructure have positive but weak effects, and inflation is insignificant. The study concludes that enhancing financial inclusion is critical for sustainable economic development in Nigeria. It recommends that the government prioritize policies that expand access to formal and digital financial services, supported by financial literacy programs and strong institutional frameworks, to maximize long-term developmental impacts.

Keywords: Economic Development, Financial Inclusion, Microfinance, Nigeria, Poverty Reduction

JEL Classification: E44, G21, G28, O16, O55

1.0 Introduction

Financial inclusion has become a central objective of economic development efforts globally, supported by extensive research demonstrating that access to formal financial services such as banking, credit, savings, and digital financial platforms can enhance investment, resource allocation, and inclusive growth. Foundational studies in finance and development reveal that well-functioning financial systems facilitate savings mobilization, efficient allocation of capital, and support long-term economic growth (Levine, 2005; Beck, Demirgüç-Kunt & Levine, 2007). Moreover, broad-based inclusion is linked to poverty reduction and improved welfare outcomes, as formal financial access enables households and firms to manage risks, engage in productive investments, and smooth consumption over time. The Global Findex database underscores the importance of these mechanisms, showing that inclusive financial services are associated with positive economic and social outcomes across countries (Demirgüç-Kunt et al., 2020).

In Nigeria, financial inclusion has been embraced as a strategic policy priority, underpinned by both government initiatives and empirical research that positions inclusion as a tool for economic development. Despite these efforts, significant segments of the population especially rural communities, women, and micro, small and medium enterprises (MSMEs) remain excluded from meaningful engagement with the formal financial system due to structural barriers such as limited infrastructure, low financial literacy, and high transaction costs (Obademi, Biiranee & Thomas, 2025). Empirical evidence from recent studies shows that key financial inclusion indicators such as commercial bank loans to rural areas, deposits from rural areas, and SME credits are positively associated with Nigeria's economic growth, highlighting inclusion's potential as a growth driver when effectively implemented (Obademi, Biiranee & Thomas, 2025). Similarly, research emphasizes the role of digital financial services and credit access in broadening participation and driving short- and long-run growth dynamics. Nonetheless, persistent gaps in infrastructure and systemic constraints continue to limit the full realization of financial inclusion's developmental benefits.

Against this backdrop, this study examines financial inclusion as a driver of economic development in Nigeria, with specific focus on how expanded access to financial services influences key outcomes such as income growth, employment creation, productivity enhancement, and poverty reduction. Building on established theory and recent Nigerian evidence including the positive long-run relationship between financial inclusion measures

and economic growth (Obademi, Biiranee & Thomas, 2025), the study is justified by its strong policy and social relevance, as understanding the effectiveness and limitations of inclusion strategies can guide more targeted interventions by government and non-governmental organizations. The structure of the study comprising the introduction, literature review, methodology, results and discussion, conclusion, and policy recommendations.

2.0 Literature Review

2.1 Conceptual Clarification

2.1.1 Financial Inclusion

Financial inclusion refers to the process through which individuals and firms gain access to useful, affordable, and timely financial products and services, such as savings, credit, payments, insurance, and digital finance, that meet their needs and support economic activity. This concept emphasizes not only the availability of financial services but also their effective usage and affordability for all members of society. Demirgüç-Kunt and Klapper (2012), highlight that inclusion enables previously excluded populations to engage with the formal financial sector, thereby improving economic participation for households and businesses alike (Demirgüç-Kunt *et al.*, 2018). Financial inclusion ensures that financial services are accessible without discrimination based on income, gender, or location (Sarma & Pais, 2011; Hannig & Jansen, 2010).

2.1.2 Access and Quality of Financial Services

Access and quality are central dimensions of financial inclusion. Access refers to the physical and institutional availability of financial services, such as bank branches, mobile money agents, and credit facilities, while quality reflects how well these services meet users' needs in terms of reliability, transparency, and user experience. Inclusive access and high-quality services reduce barriers to participation in the formal financial sector and support better financial decisions by households and firms (Sarma & Pais, 2011; Dev & Honohan, 2008). When financial services are both accessible and of good quality, individuals and MSMEs are more likely to use them for productive purposes, laying the foundation for broader economic engagement.

2.1.3 Economic Development

Economic development refers to sustained improvements in a country's economic performance and human welfare, commonly measured by income growth, employment expansion, poverty reduction, and overall welfare. The academic consensus suggests that financial inclusion contributes to economic development by enabling productive investment, supporting enterprise growth, and enhancing household resilience. Financial systems that effectively include a wide range of economic agents help allocate resources more efficiently, reduce poverty, and generate inclusive growth (Beck, Demirgüç-Kunt & Levine, 2007; Demirgüç-Kunt *et al.*, 2018).

2.1.4 Savings and Credit as Channels to Development

Savings mobilization and credit access are critical channels linking financial inclusion to economic development. Savings provide households and businesses with the ability to accumulate capital for future investment, while access to credit enables productive investment in business activities, education, and technology. These channels enhance productivity, support business expansion, and foster income growth, thereby driving broader economic development. Empirical studies show that increased savings and credit access through inclusive financial systems are associated with greater output and improved welfare (Demirgüç-Kunt *et al.*, 2018).

2.1.5 Consumption Smoothing and Risk Management

Consumption smoothing and risk management refer to how financial inclusion helps individuals and households manage economic volatility and shocks, such as health emergencies, crop failures, or income loss, by providing access to savings, insurance, and flexible credit. These financial tools allow households to maintain stable consumption levels, protect assets, and reduce vulnerability to poverty. Research shows that when households have better access to financial services, they can smooth consumption over time and manage risks more effectively, contributing to welfare and economic stability (Demirgüç-Kunt *et al.*, 2018).

2.2 Theoretical Literature

2.2.1 Financial Intermediation Theory

The Financial Intermediation Theory, developed by Gurley and Shaw in 1960, emphasizes the role of financial institutions in connecting savers and investors. According to this theory, banks and other intermediaries collect funds from surplus units and channel them to deficit units, facilitating productive investment. The theory argues that efficient financial intermediation is essential for economic growth because it mobilizes savings, reduces transaction costs, and allocates capital to the most productive sectors. In the Nigerian context, financial inclusion expands the reach of financial intermediaries to previously excluded populations, allowing households and businesses to access credit, savings, and payment services. This expanded access fosters investment, enhances productivity, and ultimately drives economic development.

2.2.2 Endogenous Growth Theory

The Endogenous Growth Theory, introduced by Romer (1986) and Lucas (1988), posits that economic growth is primarily driven by internal factors such as human capital, innovation, knowledge accumulation, and technology adoption, rather than external forces. Financial inclusion contributes to endogenous growth by providing individuals and businesses with access to financial resources necessary for education, skills development, entrepreneurship, and investment in technology. In Nigeria, inclusive financial systems enable wider access to credit and savings, which promotes entrepreneurship and innovation, enhancing productivity and fostering sustained economic growth over the long term.

2.2.3 Supply-Leading vs. Demand-Following Hypotheses

The Supply-Leading Hypothesis and Demand-Following Hypothesis explain the causal relationship between financial development and economic growth. Patrick (1966) proposed the Supply-Leading Hypothesis, which suggests that financial development drives economic growth by providing capital that stimulates investment and production. In contrast, the Demand-Following Hypothesis posits that economic growth stimulates the demand for financial services, making financial development a response rather than a driver. In Nigeria, financial inclusion reflects elements of both perspectives: expanding access to financial services (supply-leading) can stimulate economic activity in

underserved regions, while rising income and business growth also increase the demand for formal financial products (demand-following).

2.2.4 Inclusive Growth Theory

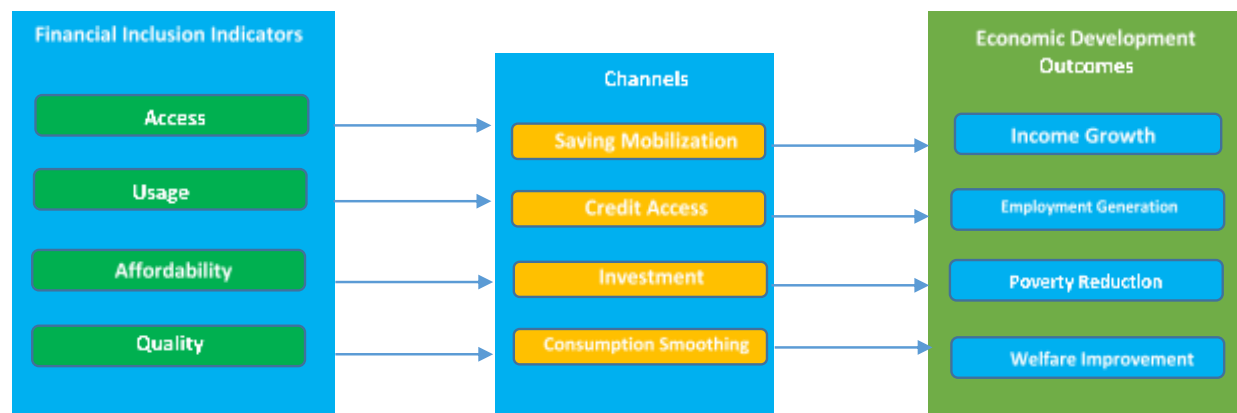
The Inclusive Growth Theory, emphasized by Klasen (2001) and supported by the United Nations Development Programme (UNDP), highlights that sustainable economic growth must be broad-based, equitable, and accessible to all segments of society. Inclusive growth focuses on reducing inequality, poverty, and social exclusion while promoting economic expansion. Financial inclusion operationalizes this theory in Nigeria by extending financial services to marginalized groups, including rural households, women, and micro, small, and medium enterprises (MSMEs). By increasing access to credit, savings, and payment services, financial inclusion ensures that economic development benefits a larger portion of the population, fostering equitable growth and poverty reduction.

2.3 Theoretical Framework

The Financial Intermediation Theory, first articulated by Gurley and Shaw in 1960, provides the most appropriate theoretical foundation for this study because it directly explains how financial systems facilitate economic development through the mobilization and allocation of financial resources. The theory postulates that financial intermediaries such as banks, microfinance institutions, and digital finance providers serve as conduits that link surplus units (savers) with deficit units (borrowers), thereby enhancing productive investment and reducing transaction and monitoring costs. Empirical studies that adopt this theory often emphasize its relevance in contexts where expanded access to formal financial services can reduce poverty and promote inclusive growth; for example, financial inclusion increases savings and credit access for previously excluded populations, which in turn supports productive activities and economic participation, particularly among low-income groups (Gurley & Shaw, 1960 as cited by studies on financial inclusion and financial intermediation theory). Recent evidence from Nigeria supports this linkage by showing that financial inclusion improves financial intermediation outcomes and drives savings mobilization, credit access, and broader economic engagement (Ejinkonye *et al.*, 2024; Financial Intermediation Theory applied in Nigerian context). This theoretical perspective aligns with the finance-led growth strand of the finance-growth literature, which finds that financial sector development precedes and contributes to economic growth (supply-leading hypothesis) rather than merely

responding to it (supply-leading vs. demand-following debate) Anchoring the study on Financial Intermediation Theory allows for an examination of how inclusive access to financial services through bank branches, automated teller machines, credit facilities, and savings mechanisms increases productive investment and drives economic development in Nigeria, making this theory a robust lens for analyzing the role of financial inclusion.

Figure 1: Flowchart of Financial Inclusion Impact



Source: Adopt from the work of; Demirgüç-Kunt & Klapper, (2012), Demirgüç-Kunt, et al. (2018), Demirgüç-Kunt, et al. (2020).

Financial inclusion is a multidimensional concept that researchers commonly define as the ability of individuals and businesses to access and use affordable, reliable, and appropriate financial services such as savings, credit, payments, and insurance, with positive implications for economic development (Demirgüç-Kunt et al., 2020; Global Findex Database). Access reflects the availability of financial infrastructure (e.g., bank branches, ATMs, mobile money services); usage captures the actual engagement with financial services like deposits, withdrawals, loans, and digital payments; affordability pertains to reasonable costs associated with financial products; and quality relates to the reliability, transparency, and client-centred nature of those services (World Bank Global Findex methodology). These dimensions operate through important channels including saving mobilization, which builds capital for investment; credit access that enables business and education financing; investment that fosters productivity and expansion; and consumption smoothing, which helps households manage risk and income fluctuations ultimately mediating the role of financial inclusion in driving broader development outcomes. Empirical evidence associates higher levels of inclusion with

income growth, employment generation, poverty reduction, and welfare improvements, as formal financial participation facilitates investment, entrepreneurship, risk management, and resilience to shocks (Demirgüç-Kunt *et al.*, 2020; Global Findex Database).

2.3.1 Financial Inclusion Indicators (Foundational Elements)

Financial inclusion refers to the extent to which individuals and firms can access and use affordable, reliable, and appropriate financial services. It is conventionally measured through indicators such as access, usage, affordability, and quality of services, where access captures the availability of financial infrastructure like bank branches, ATMs, and digital platforms; usage reflects how frequently and extensively households and businesses actually engage with these services; affordability concerns the cost of accessing financial products and services relative to users' income; and quality refers to the reliability, suitability, and security of financial services that influence sustained participation in the financial system (Omar & Inaba, 2020). Together, these indicators provide a multidimensional view of how inclusive a financial system is and help explain gaps in engaging underserved populations such as low-income groups, women, and rural households (Omar & Inaba, 2020).

2.3.2 Channels (Mechanisms Linking Inclusion to Growth)

Financial inclusion influences economic outcomes through several key channels that translate improved access and use of financial services into broader economic activity. One important channel is saving mobilization, whereby access to secure savings products encourages households and businesses to pool funds that can later be used for investment. Credit access enables both consumption support and investment in productive ventures, helping entrepreneurs and firms expand operations. Investment increases as savings and credit facilitate capital formation in education, health, and enterprise development, driving productivity. Consumption smoothing is another mechanism through which financial tools such as savings, loans, or insurance help households maintain stable consumption patterns in response to shocks, reducing vulnerability to poverty. Empirical research suggests these channels help explain how greater financial inclusion can foster stronger economic participation and resilience in developing contexts (Omar & Inaba, 2020).

2.3.4 Economic Development Outcomes (Ultimate Impacts)

The ultimate effects of financial inclusion through these channels are observed in several dimensions of economic development, including income growth, employment generation, poverty reduction, and welfare improvement. Higher levels of financial inclusion are associated with upward income mobility as individuals and businesses increasingly access credit, savings, and investment opportunities to improve their economic productivity. Greater financial integration also tends to support employment generation because easier access to capital allows firms to expand and hire more workers. Financial inclusion also contributes to poverty reduction by enabling poorer households to smooth consumption, build assets, and invest in income-generating activities, thereby lowering poverty rates over time. In addition, enhanced access to financial services is linked with welfare improvements through better access to healthcare, education, and social protection mechanisms that strengthen overall well-being in low- and middle-income countries (Omar & Inaba, 2020).

2.4 Empirical Literature

Financial inclusion has emerged as a critical driver of economic development, both globally and within Nigeria, by expanding access to financial services, mobilizing savings, and enabling investment. At the global level, Siddiki and Bala Keffi (2024) show that financial inclusion, measured through account ownership and mobile money usage, positively affects GDP growth across 153 countries, particularly in nations with higher financial development and strong institutional quality. This suggests that Nigeria, with its varying levels of institutional efficiency and financial infrastructure, could benefit from targeted inclusion policies, especially in regions where banking access is limited. Similarly, studies in sub-Saharan Africa emphasize that inclusion components such as availability and penetration strongly influence growth, while usage effects are less consistent (Ifediora *et al.*, 2022). For Nigeria, this indicates that while expanding access to financial services is crucial, encouraging active usage through affordable and accessible products is equally important, especially in rural and underserved communities. Yakubu and Bunyaminu (2021) also highlight that financial openness strengthens the growth impact of inclusion, implying that Nigeria's regulatory and policy environment could moderate the effectiveness of inclusion initiatives. Furthermore, Adedokun and Aga (2023) provide evidence of a bi-directional relationship, showing that economic growth can itself promote financial inclusion, which is particularly relevant for Nigeria

as rising economic activity in urban and semi-urban areas can increase demand for diverse financial services.

Focusing on Nigeria-specific studies, Afolabi (2020) identifies rural loans, bank branches, and liquidity as key channels through which financial inclusion enhances growth, while high interest rates constrain this effect. This underscores Nigeria's ongoing challenge of ensuring affordable credit for rural populations and SMEs. Obademi, Biiranee, and Adeyanju (2025) expand this understanding by incorporating SME financing and rural deposits, demonstrating both long-run and short-run growth effects, which highlight the microeconomic foundations of development through financial inclusion. Obayelu *et al.* (2019) further confirm that financial inclusion unidirectionally drives economic growth in Nigeria, signaling the importance of consistent policy efforts to expand financial access and deepen engagement. Collectively, these studies illustrate that while Nigeria has made progress in expanding access to financial services, critical issues persist, including uneven rural-urban coverage, limited digital financial penetration, high lending rates, and weak institutional frameworks. Addressing these challenges through improved regulatory policies, affordable credit facilities, digital finance promotion, and stronger institutional oversight could significantly enhance the role of financial inclusion as a driver of economic development in Nigeria.

3.0 Methodology

3.1 Research Design

The study will adopt a quantitative explanatory research design, which provides a unified framework to investigate the cause-and-effect relationship between financial inclusion and economic development in Nigeria. This design is appropriate because it allows the study to determine how different dimensions of financial inclusion influence economic outcomes while maintaining consistency and coherence in data collection, analysis, and interpretation. By using a single research design, the study ensures that all variables, indicators, and analytical approaches are aligned under one cohesive framework, facilitating robust examination of the dynamic relationship between financial inclusion and economic development (Ifediora *et al.*, 2022).

3.2 Source of Data

The data employed in this study are obtained from established international databases covering the period 1990 to 2024, ensuring consistency and comparability across

variables. Economic development, proxied by the Human Development Index (HDI), is sourced from the United Nations Development Programme (UNDP) Human Development Reports, which provide annual HDI series based on health, education, and income dimensions from 1990 onward. Financial inclusion data are derived from the World Bank's Global Findex Database, which reports internationally comparable indicators of access to and usage of formal and digital financial services at periodic survey intervals. Given the absence of annual observations in the early years, financial inclusion values for 2009–2011 were generated through interpolation to ensure continuity of the time series and facilitate econometric analysis. Inflation, measured as the annual consumer price inflation rate, is obtained from the World Bank's World Development Indicators (WDI), which compile official national price statistics with long-run coverage. Education, proxied by the secondary school enrolment rate, is sourced from the UNESCO Institute for Statistics (UIS) and disseminated through the World Bank WDI, providing a consistent measure of human capital development over time. Infrastructure indicators, including electricity consumption per capita and transport-related proxies such as road density, are also drawn from the World Bank World Development Indicators, which offer comprehensive and reliable infrastructure statistics suitable for longitudinal analysis over the study period.

Table 1: Variables and Measurement

Variable	Measurement / Proxy	Description	Expected Sign
Economic Development (ED)	Human Development Index (HDI)	Composite index capturing income, education, and health outcomes to reflect overall economic development	-
Financial Inclusion (FI)	Composite Financial Inclusion Index	Index constructed from access, usage, and digital financial inclusion indicators	Positive
Inflation (INF)	Inflation rate (%)	Measures macroeconomic stability and purchasing power	Negative
Education (EDU)	Secondary school enrolment rate (%)	Proxy for human capital development and skill acquisition	Positive
Infrastructure (INFR)	Electricity consumption per capita / road density	Captures availability of basic infrastructure supporting economic activities and financial services	Positive

Source: Author's Computation (2026)

This paper adopts the Auto-Regressive Distributive Lag (ARDL) model. The model was developed by Pasaran and Shin (1999) and adjudged efficient in capturing relationships among variables of different order of integration, that is, estimating a model with a mixture of I(0) and I(1) variables. It has the advantages of being just a single- equation model, making it simple to interpret and implement, also, different variables can be assigned different lag length and they enter the mode (Pesaran *et al.*, 2001). Because of its ability to accommodate and estimate variables of different order of integration (i.e. mixture of I(0) and I(1), it can estimate efficiently both short-run and long-run relationships in a given model. The ARDL as specified by Pasaran and Shin (1999), is presented as follow;

$$ED_t = f(FI_t, INF_t, EDU_t, INFR_t) \quad (3.1)$$

Transform equation (3.1) into econometric model

$$ED_t = \beta_0 + \beta_1 FI_t + \beta_2 INF_t + \beta_3 EDU_t + \beta_4 INFR_t + \mu_t \quad (3.2)$$

where; ED_t =Economic development (GDP per capita or HDI), FI_t =Financial inclusion indicators, including rural loans, bank branches, and liquidity, INF_t = Inflation rate (macroeconomic control), EDU_t =Education (human capital proxy), $INFR_t$ = Infrastructure development indicator. β_0 = intercept, β_1 - β_4 =coefficient, μ_t = error term.

Transformed 3.2 to the ARDL specification as;

$$\begin{aligned} \Delta \ln ED_t = & \theta_0 + \theta_1 \ln ED_{t-1} + \alpha_1 \ln FI_{t-1} + \alpha_2 \ln INF_{t-1} + \alpha_3 \ln EDU_{t-1} + \alpha_4 \ln INFR_{t-1} + \sum_{i=1}^b \beta_1 \Delta \ln ED_{t-1} + \sum_{i=1}^b \beta_2 \Delta \ln FI_{t-1} \\ & + \sum_{i=1}^b \beta_3 \Delta \ln INF_{t-1} + \sum_{i=1}^b \beta_4 \Delta \ln EDU_{t-1} + \sum_{i=1}^b \beta_5 \Delta \ln INFR_{t-1} + \varepsilon_t \end{aligned} \quad (3.3)$$

The first part of the equation, without Δ , indicates long-run dynamics, while the second part, with Δ , represents short-run dynamics. The bounds testing approach is utilized to establish cointegration among the variables before estimating the equation. To estimate the short-run adjustment to equilibrium, the Error Correction Model (ECM) is specified in Equation 3.4 as follows:

$$\begin{aligned} \Delta \ln ED_t = & \theta_0 + \sum_{i=1}^b \beta_1 \Delta \ln ED_{t-1} + \sum_{i=1}^b \beta_2 \Delta \ln FI_{t-1} + \sum_{i=1}^b \beta_3 \Delta \ln INF_{t-1} + \sum_{i=1}^b \beta_4 \Delta \ln EDU_{t-1} + \sum_{i=1}^b \beta_5 \Delta \ln INFR_{t-1} \\ & + \delta ECM_{t-1} + \varepsilon_t \end{aligned} \quad (3.4)$$

Where δ represents the speed of adjustment of the parameters toward long-run equilibrium following a shock to the system, and $ECMt-1$ is the error correction term. A-priori expectations, $\beta_1 > 0, \beta_2 < 0, \beta_3 > 0, \beta_4 > 0$

4.0 Results and Presentation

Pre-estimation tests: the study conducted stationerity tests using the Augumented - Dickey Fuller (ADF) and the Philips - Perron (PP) test. The tests allow us to examine the behavior of the series overtime. It makes us understand the predictability or otherwise of the variables. The bound test was also conducted to establish whether or not there is a long-run relationship among the variables. These tests are presented below;

Table 2: Descriptive Statistics

Descriptive	ED	FI	INF	EDU	INFR
Mean	0.523657	32.22286	11.44657	62.55429	50.18000
Median	0.523000	31.10000	11.19000	61.80000	50.90000
Maximum	0.658000	59.10000	19.82000	75.10000	70.60000
Minimum	0.405000	2.600000	0.000000	50.40000	29.10000
Std. Dev.	0.074470	17.17574	4.460446	7.381588	12.25820
Skewness	0.128872	-0.031021	-0.313543	-0.001045	-0.039789
Kurtosis	1.840481	1.840022	3.443056	1.831886	1.779083
Jarque-Bera	2.057585	1.967873	0.859739	1.989889	2.183084
Probability	0.357438	0.373837	0.650594	0.369744	0.335698
Sum	18.32800	1127.800	400.6300	2189.400	1756.300
Sum Sq. Dev.	0.188558	10030.20	676.4498	1852.587	5108.956
Observations	35	35	35	35	35

Source: Author's Computation (2026)

Table 2 shows the descriptive characteristics of the series included in the model. Economic Development (ED), measured by the Human Development Index on a 0-1 scale, records an average of 0.524, with a minimum of 0.405 and a maximum of 0.658. This suggests that, on average, Nigeria has achieved about 52.4 percent of the maximum possible human development score over the study period. Financial Inclusion (FI), measured in percentage terms, has a mean of 32.22%, with a minimum of 2.6% and a maximum of 59.1%, indicating that on average about one-third of the population had access to formal financial services, while some periods experienced very low inclusion levels. Inflation (INF) averages 11.45% annually, ranging from 0% to 19.82%, reflecting

moderate but persistent price increases in the Nigerian economy. Education (EDU), proxied by secondary school enrolment rate in percentage terms, records a mean of 62.55%, with a minimum of 50.4% and maximum of 75.1%, suggesting that, on average, about two-thirds of eligible students are enrolled in secondary education. Infrastructure (INFR), measured on a 0-100 index capturing electricity access and road density, has an average value of 50.18, with a minimum of 29.1 and a maximum of 70.6, indicating moderate infrastructure development in the country. Examination of the kurtosis and Jarque-Bera statistics shows that all variables are approximately normally distributed except inflation, which has slightly higher kurtosis (3.44), suggesting occasional extreme values. The descriptive statistics reflect moderate variation in financial inclusion, education, and infrastructure, persistent but manageable inflation, and relatively stable economic development outcomes in Nigeria over the study period.

Table 3: Unit Root Test

Variables	ADF	PP		I(d)	
	Levels	First difference	Levels		First difference
ED	0.3124	-8.5838***	0.5026	-18.7240***	I(1)
FI	-0.7986	-6.5878***	-1.3164	-20.4377***	I(1)
INF	-6.6065***	-	-6.8544***	-	I(0)
EDU	0.0370	-7.1704***	-0.6365	-20.2248***	I(1)
INFR	-0.4498	-5.8126***	-0.1993	-18.8949***	I(1)

***, **, *, signify significance level at 1%, 5% and 10% respectively.

Source: Author's Computation (2026)

Table 3 shows the unit root test results tests using ADF and PP. these results indicate the series are stationary in mixed order. While Inflation (INF) are stationary at levels (I(0)), other variables as Economic Development (ED), Financial Inclusion (FI), Education (EDU), and Infrastructure (INFR) are stationary at first difference (I(1)). The stationarity behavior of the series informs the conduct of the bound test to find out if a long-run relationship exists among the variables. The bound test is presented below;

Table 4: Bound Test

Critical value bounds			Test statistic	Value	k
Significance	IO Bound	I1 Bound			
10%	2.2	3.09	F-statistic	7.726369	4
5%	2.56	3.49			
1%	3.29	4.37			

Source: Author Computation (2025)

From Table 4 above, IO bound represents short-run relationship and I1, long-run relationship. A long-run relationship exists if the F-statistic exceeds the I1 bound at any significant level, and otherwise if below IO bound. If the F-statistic (7.726369) falls in between the IO bound and I1 bound, the relationship is unclear. However, if the variables are stationary in mixed order of I(0) and I(1), and the co-integrating equation (CointEq(-1) component of the estimate, using ARDL method of estimation is negative, less than one and statistically significant, the long-run relationship among the variables can be justified. From the result obtained above, there exist along-run relationships among the variables as the F-statistics exceeds critical values at all levels.

Table 5: Short run estimation result.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FI)	0.000419	0.000636	0.6585	0.5162
D(EDU)	0.000103	0.000967	0.1060	0.9164
D(INFR)	-0.000935	0.000573	-1.6319	0.1152
CointEq(-1)	-0.788879	0.105768	-7.4585	0.0000***
R-Squared	0.9853			
Adjusted R-Squared	0.9853			
F-Stat	209.64(0.000)			

Source: Author's Computation (2026)

Table 5 in the short run, the results show that changes in financial inclusion, education, and infrastructure do not exert immediate and statistically significant effects on Nigeria's economic development as measured by the Human Development Index (HDI). Specifically, a 1 percentage point increase in financial inclusion raises HDI by only about 0.0004, while a similar increase in secondary school enrolment improves HDI by

approximately 0.0001, indicating that short-term expansions in access to finance and education do not instantly translate into welfare gains. Infrastructure, measured on a 0-100 index scale, records a negative but insignificant short-run effect, reflecting adjustment costs, implementation delays, and inefficiencies commonly associated with infrastructure projects in developing economies such as Nigeria. This outcome is consistent with empirical evidence showing that the short-run impact of financial inclusion on development and growth in Nigeria is often weak or insignificant due to institutional rigidities and delayed policy transmission mechanisms (Onaolapo *et al.* 2015. It also aligns with studies on fintech-driven inclusion, which report that welfare and growth effects materialise only after a gestation period (Ozili, 2018). The highly significant and negative error-correction term further confirms rapid adjustment toward long-run equilibrium, supporting earlier findings that Nigeria's development dynamics are characterised by short-run disturbances but strong long-run convergence (Pesaran *et al.*, 2001; Afolabi, 2020).

Table 6: Long run estimation result.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FI	0.002174	0.001232	1.7641	0.0899*
INF	0.000625	0.000560	1.1163	0.2749
EDU	0.004041	0.002908	1.3893	0.1770
INFR	0.000655	0.001417	0.4621	0.6480
C	0.170225	0.131982	1.2898	0.2089

$$EC = ED - (0.0022*FI + 0.0006*INF + 0.0040*EDU + 0.0007*INFR + 0.1702)$$

Source: Author's Computation (2026)

Table 6 in the long run, the results reveal a clearer and more policy-relevant relationship, with financial inclusion emerging as a key driver of economic development in Nigeria. A 1 percentage point increase in financial inclusion leads to an approximate 0.002 increase in the HDI index, underscoring the role of inclusive financial systems in improving household welfare, productivity, and access to economic opportunities over time. This finding is strongly supported by a large body of empirical literature showing that expanded access to banking services, credit to SMEs, and digital finance significantly enhances long-term growth and development in Nigeria (Onaolapo, *et al.* 2015; Ozili, 2018). Education and infrastructure display positive but statistically weak long-run

effects: a 1 percentage point increase in secondary school enrolment raises HDI by about 0.004, while a one-unit increase in the infrastructure index improves HDI by roughly 0.0007, suggesting that human capital formation and infrastructure investment contribute to development but are constrained by quality issues, funding gaps, and weak absorptive capacity an observation widely noted in the Nigerian literature (Adeyemi & Ogunsola, 2016; Afolabi, 2020). Inflation shows a very small and insignificant long-run effect on HDI, consistent with studies arguing that the inflation-development nexus in Nigeria is nonlinear and often moderated by monetary policy responses and financial sector depth (Fasanya & Onakoya, 2013; Chimobi, 2010). The long-run evidence reinforces the central argument of this study that financial inclusion is a critical driver of economic development in Nigeria, while education and infrastructure play complementary but constrained roles under prevailing structural and institutional conditions.

Post estimation test: The study conducted post-estimation test on the estimated model in the form of Normality test, Heteroscedasticity test and serial correlation test and Ramsey test. The tests show that the variables in model are normally distributed, no heteroscedasticity in the model, no serial correlation and there is parameter stability in the model. These results are presented below;

Table 7: Post estimation test

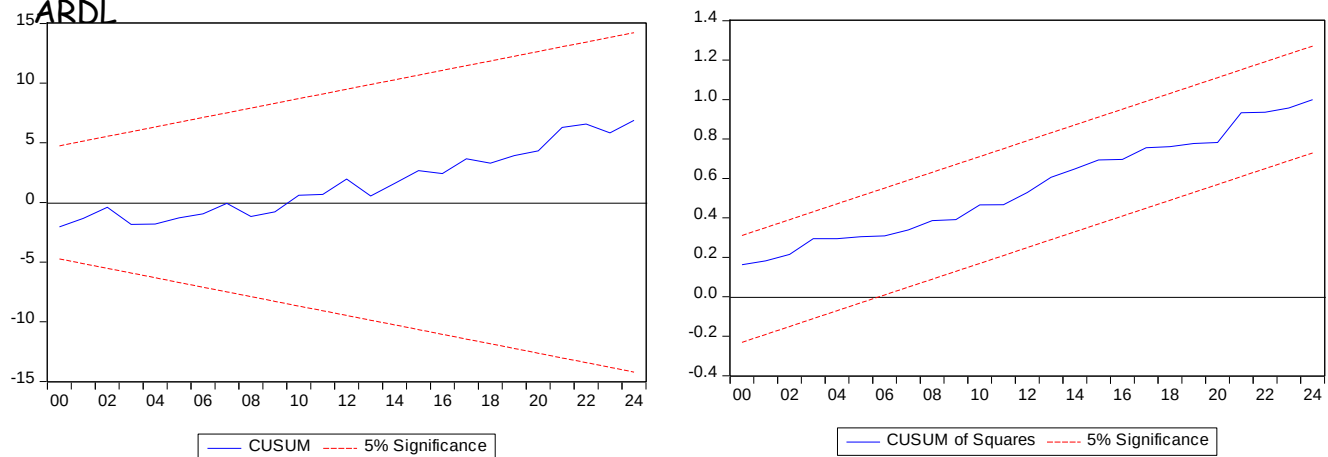
Post estimation test		
Test	F-Stat	Prob
Serial Correlation	0.989426	0.3871
Heteroscedasticity	0.562396	0.7981
	Jarque-Bera	
Normality	0.352614	0.8383

Source: *Author's Computation (2026)*

From Table 7, the null hypothesis posits that the model is free from serial correlation, exhibits no heteroscedasticity, the residuals are normally distributed, and the parameters of the model are stable over the sample period. The diagnostic tests conducted, including the F-statistics and associated probabilities, indicate that the null hypothesis cannot be rejected. This implies that the estimated model satisfies the key classical linear regression assumptions, confirming that the residuals do not exhibit

autocorrelation, the variance of the errors is constant, the model parameters are stable, and the series are normally distributed. Based on these results, it can be concluded that the model is well-specified and reliable for interpreting the relationships between financial inclusion, education, infrastructure, inflation, and economic development in Nigeria (Afolabi, 2020).

Figure 2: Cumulative Sum of Recursive Residuals of Cusum and Cusum of Square of ARDL



Source: Author's Computation, (2026)

As depicted in Figure 2, the stability analysis of the model shows that the coefficients and relationships remain consistent over time. This consistency suggests that the model is dependable and appropriate for making forecasts and assessing policies.

5.0 Conclusion and Recommendations

This study examined the financial inclusion as drivers of economics development in Nigeria using the ARDL approach and found that economic development remained moderate over the study period, alongside relatively low financial inclusion, persistent inflation, and moderate performance in education and infrastructure. The unit root and bounds test results confirmed the existence of a stable long-run relationship among the variables despite their mixed order of integration. The short-run estimates indicate that changes in financial inclusion, education, and infrastructure do not exert immediate and statistically significant effects on economic development due to adjustment lags and institutional rigidities; however, the error-correction term is negative, less than unity, and statistically significant at the 1 percent level, indicating rapid and strong adjustment

toward long-run equilibrium following short-run shocks. In the long run, financial inclusion emerged as a significant driver of economic development, underscoring the role of expanded access to formal financial services in improving welfare and productivity, while education and infrastructure exhibited positive but statistically weak effects, reflecting constraints related to quality, funding, and absorptive capacity. Inflation was found to have an insignificant long-run effect on economic development, suggesting that its influence is moderated by macroeconomic management and financial sector depth. The post-estimation diagnostic and stability tests further confirm that the model is well-specified, stable, and reliable, leading to the conclusion that deepening financial inclusion is critical for advancing economic development in Nigeria, alongside sustained reforms to strengthen education and infrastructure outcomes. Based on the conclusion the following recommendations were made;

- i. Scholars should deepen empirical inquiry by adopting more robust and disaggregated analytical frameworks that capture the channels through which financial inclusion influences long-run economic development and human development outcomes in Nigeria.
- ii. The government should strengthen and integrate financial inclusion policies with education and infrastructure development, focusing on digital finance, financial literacy, and institutional effectiveness to enhance long-run economic development.
- iii. NGOs should support inclusive development by promoting financial literacy and targeted inclusion programs for underserved groups, helping to translate access to finance into improved welfare and human development outcomes.

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