



Banking the Unbanked: Financial Inclusion and Poverty Alleviation Outcomes in Nigeria

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Abstract: This study examined the long-run and short-run effect of financial inclusion on poverty alleviation in Nigeria from 1992 to 2023. The research utilized the Auto-Regressive Distributed Lag (ARDL) model for its estimations. The findings indicated a significant and positive relationship between several financial inclusion variables and poverty reduction in the long run. Specifically, the long-run results showed that an increase in the number of commercial bank branches had a diminishing but significant impact on the poverty rate. Similarly, higher deposit mobilization by banks in rural areas, loans granted under the agricultural credit guarantee scheme, and increased commercial bank credit to small and medium-sized enterprises (SMEs) all led to a significant decline in the poverty rate. However, microfinance banks' loans were found to have a negative but insignificant impact on poverty alleviation in the long run. The short-run analysis revealed mixed results across the different variables. The study concluded that various financial inclusion initiatives, particularly those targeting rural areas, agriculture, and SMEs, are effective tools for long-term poverty alleviation in Nigeria.

Keywords: Financial inclusion, poverty alleviation, ARDL, Nigeria

1. INTRODUCTION

Financial inclusion ensures that, irrespective of income level, all individuals, households and businesses have access to appropriate financial and banking services (Osuma, 2025). The populations that have no access to these products are considered

as being financially excluded and have no access to formal banking services (Enhancing Financial Innovations and Access, 2015). However, financial exclusion could be voluntary or involuntary. Voluntary exclusion is linked to a situation where a proportion of the population or firms resolve not to use financial services either because they have no need for them or due to lack of knowledge of such financial services. Conversely, involuntary exclusion takes its root from insufficient income and high-risk profile or due to discrimination and market failures and imperfections (World Bank, 2014).

It is well acknowledged in the finance literature that access to financial services is core to reducing the rate of poverty inherent among low-income earners, rural dwellers and the unemployed in low-income countries (Onyele, Ene and Umezurike, 2025). Eze and Alugbuo (2021) referred to the aforementioned groups as vulnerable, who have been denied benefits accruing to the financial sector, as the competition inherent among the financial institutions led to the closure of some rural branches due to viability challenges. It was based on this premise that Kofi Annan (the former UN Secretary General) asserts that “the stark reality is that most poor people in the world still lack access to sustainable financial services, whether it is savings, credit or insurance. This stresses the need for policies towards innovation and creation of financial products that will be suitable for the poor and rural dwellers towards poverty alleviation through financial inclusion.

Poverty alleviation has been receiving increasing global focus, and the challenges are becoming more daunting. It is, however, encouraging to note that research findings and empirical evidence have shown that significant poverty reductions are possible and have, indeed, occurred in many developing countries. In particular, it has been established that poverty inversely affects the growth of an economy (Kama and Adigun, 2013). For example, studies have revealed that the absolute number of people living in poverty has dropped in all the developing countries that have experienced sustained rapid economic growth over the past few decades (Ugwuanyi, Ezeaku and Ibe, 2017). There is no doubt that the establishment of a stable financial system is an important precondition towards poverty alleviation.

Financial inclusion, within the broader context of inclusive development, is viewed as an important means to tackle poverty and inequality. It has been indicated that a small loan, a savings bank account and an insurance policy can make a great difference to the poor and low-income family. These financial services enable

the poor to have better funding for their small-scale businesses, afford nutrition, housing, education for children and better healthcare and improve their standard of living (Odili and Onyele, 2021). Financial inclusion therefore serves as an effective way to alleviate poverty in the world. Hence, the issue of financial inclusion becomes very paramount in view of the linkage between finance and productivity. While many researchers have focused on the relationship between financial development and economic growth in Nigeria, less attention has been devoted to the possible link between financial inclusiveness and poverty reduction in Nigeria, and this has implications for policy designs towards enhancing direct access to formal financial services by small business owners and households in the rural areas.

Nigeria introduced the National Financial Inclusion Strategy (NFIS) in 2012 with the primary aim of decreasing the number of Nigerians that are financially excluded from 46.3% to 20% by the year 2020 (Oladipo *et al.*, 2025). Despite being Africa's largest economy, only about 30% of Nigerian adults have an account at a formal banking institution (EFInA, 2015). The Enhancing Financial Innovations and Access (EFInA) in Nigeria 2014 survey showed that approximately 52.5%, 46.3%, 39.7% and 39.5% of the adult population were financially excluded in 2008, 2010, 2012 and 2014, respectively. The slow growth of the Nigerian banking system is perhaps due to the limited level of exposure of its services to the public, thereby resulting in a low level of access to these facilities. Indeed, access to and use of financial services is one of the driving factors of growth and poverty alleviation in Nigeria.

2. LITERATURE REVIEW

2.1. Conceptual framework

The conceptual framework for this study is anchored on the premise that financial inclusion serves as a catalyst for poverty alleviation in Nigeria by expanding access to formal financial services among low-income and rural populations. Financial inclusion, measured through indicators such as the number of commercial bank branches, bank deposits of rural dwellers, Agricultural Credit Guarantee Scheme Fund (ACGSF), banking sector credit to SMEs, and microfinance banks' loans, represents the depth and accessibility of financial intermediation in the economy. These channels facilitate savings mobilization, credit access, and investment in productive ventures, thereby enhancing household income, entrepreneurship, and economic empowerment, especially among marginalized groups (Kama and Adigun, 2013).

On the other hand, poverty alleviation, captured by the poverty rate, reflects the extent to which improved financial access translates into better living standards and reduced income inequality. The framework posits that as financial inclusion deepens—through increased bank outreach, rural savings mobilization, agricultural financing, SME support, and micro-lending—productive capacities of individuals and small businesses expand, leading to higher income generation and reduced poverty levels. Hence, the conceptual link assumes a negative relationship between financial inclusion indicators and poverty rate, implying that improved financial inclusion contributes to significant reductions in poverty in Nigeria.

The interplay between financial inclusion and poverty alleviation lies in the ability of financial access to empower individuals and communities economically. Financial inclusion provides the poor with the tools to manage their finances, save, invest, and access credit for productive purposes, thereby enhancing their income-generating capacity (Ugwuanyi *et al.*, 2017). When people can borrow to start or expand small businesses, save for emergencies, and insure against risks, they become more financially stable and resilient. This process stimulates economic activity at the grassroots level, leading to job creation, higher household incomes, and improved living standards. Hence, financial inclusion acts as both a catalyst and a conduit for poverty reduction by integrating the economically marginalized into the formal financial system.

Conversely, poverty alleviation reinforces financial inclusion by increasing the capacity of individuals to participate in formal financial markets (Osuma, 2025). As poverty levels decline, households are better positioned to maintain bank accounts, access credit facilities, and engage in investment activities, which further deepen financial inclusion. This mutually reinforcing relationship creates a virtuous cycle where access to finance reduces poverty, and reduced poverty expands financial participation. In the Nigerian context, strengthening this interplay through policies that expand rural banking, promote microfinance, and support small enterprises is essential for achieving inclusive, sustainable economic growth and poverty reduction.

2.1.1. Transmission channels of financial inclusion towards poverty alleviation in Nigeria

The number of commercial banks' branches is a vital indicator of financial inclusion, as it reflects the physical accessibility of formal financial services to individuals

and businesses across different regions. An increase in bank branches enhances the outreach of financial institutions, particularly in underserved rural and semi-urban areas, thereby enabling more people to open bank accounts, save, access credit, and engage in other financial transactions (Osuma, 2025). This expansion promotes financial literacy, encourages formal savings, and reduces reliance on informal financial systems. Consequently, a higher density of commercial bank branches contributes to greater inclusion in the financial system, fostering economic participation and supporting efforts toward poverty reduction and inclusive growth in Nigeria.

Bank deposits of rural dwellers are a crucial measure of financial inclusion, as they indicate the extent to which individuals in rural areas participate in the formal financial system. When rural dwellers open and maintain deposit accounts, it reflects their trust and engagement with banking institutions, promoting a culture of savings and financial security. Increased rural deposits enable banks to mobilize more funds for productive lending, particularly to agriculture and small enterprises that drive rural economies (Ugwuoke *et al.*, 2023). This financial participation not only empowers rural households to manage risks and invest in income-generating activities but also reduces dependence on informal saving methods. Thus, higher levels of rural bank deposits signify deeper financial inclusion, improved access to financial resources, and greater potential for poverty alleviation in Nigeria's rural communities.

The **Agricultural Credit Guarantee Scheme Fund (ACGSF)** is a significant instrument for promoting financial inclusion in Nigeria, particularly among farmers and rural entrepreneurs. By guaranteeing loans granted by banks to individuals and cooperatives engaged in agricultural production and processing, the ACGSF reduces the credit risk faced by financial institutions, thereby encouraging them to lend more to the agricultural sector. This scheme widens access to formal credit for smallholder farmers who are often excluded from traditional banking services due to lack of collateral or credit history. Through enhanced access to agricultural financing, rural populations can invest in improved farming techniques, expand production, and increase income levels (Eze and Alugbuo, 2021). Therefore, the ACGSF plays a vital role in deepening financial inclusion by bridging the gap between rural farmers and formal financial institutions, fostering economic empowerment and contributing to poverty reduction.

Banking sector credit to SMEs is a key driver of financial inclusion, as it broadens access to financial resources for a vital segment of the economy. SMEs often face financing constraints due to limited collateral and perceived high risk, which restrict their ability to grow and contribute to employment generation (Onyele, Ikwuagwu and Umezurike, 2025). When the banking sector extends more credit to SMEs, it facilitates greater participation of entrepreneurs and small business owners in the formal financial system. This access to finance enhances business expansion, innovation, and productivity, which in turn stimulates job creation and income growth (Omenihu *et al.*, 2024). Consequently, increased banking credit to SMEs not only strengthens financial inclusion by integrating more economic actors into formal financial activities but also supports inclusive economic development and poverty alleviation in Nigeria.

Microfinance banks' loans play a pivotal role in promoting financial inclusion, especially among low-income individuals, informal sector operators, and micro-entrepreneurs who are often excluded from traditional banking services. By providing small, accessible, and flexible loans, microfinance banks empower people with limited collateral to engage in productive economic activities such as petty trading, farming, and small-scale manufacturing (Ondiege, 2015). These loans enhance financial participation by bringing marginalized populations into the formal financial system, encouraging savings, and promoting financial literacy. As more individuals and small businesses gain access to microfinance services, income levels and living standards improve, thereby fostering inclusive growth (Onyele and Onyekachi-Onyele, 2020). Thus, the expansion of microfinance banks' lending activities directly contributes to deepening financial inclusion and alleviating poverty in Nigeria.

2.2. Theoretical Review

2.2.1. Financial intermediation theory

The Financial Intermediation Theory was propounded by Gurley and Shaw in 1960 (Gurley and Shaw, 1960). The theory explains the crucial role of financial intermediaries—such as banks, microfinance institutions, and credit unions—in bridging the gap between surplus and deficit economic units. According to the theory, financial intermediaries mobilize savings from individuals or institutions with excess funds and channel them to those in need of capital for productive investment. This intermediation process enhances capital formation, resource

allocation, and economic growth by ensuring that idle funds are efficiently utilized in sectors that drive development and employment.

The key tenets of the Financial Intermediation Theory include efficient mobilization of savings, risk diversification, liquidity transformation, and the reduction of information and transaction costs in financial markets. Financial intermediaries play a central role in assessing credit risk, providing access to credit, and offering savings and insurance products that enable economic agents to plan for the future. In the context of Nigeria, the Financial Intermediation Theory is highly relevant in studying the impact of financial inclusion on poverty alleviation. By increasing access to financial institutions—through more bank branches, microfinance banks, and rural credit schemes—the poor and underserved populations can save, borrow, and invest in income-generating activities. This process not only empowers individuals economically but also promotes entrepreneurship, job creation, and improved living standards. Hence, effective financial intermediation strengthens financial inclusion, which in turn serves as a powerful mechanism for reducing poverty and fostering inclusive economic growth in Nigeria.

2.2.2. Endogenous growth theory

The Endogenous Growth Theory was propounded by Romer (1986) and further developed by Lucas (1988). The theory emerged as a response to the limitations of the neoclassical growth model, which viewed long-term economic growth as dependent on external (exogenous) technological progress. In contrast, the Endogenous Growth Theory posits that economic growth is primarily driven by internal factors within the economy, such as human capital development, innovation, and knowledge accumulation. It emphasizes that policy measures, institutional quality, and access to financial resources can influence productivity and sustain growth over time without diminishing returns.

The main assumptions of the endogenous growth theory include:

- investment in human capital, innovation, and knowledge generates positive externalities and increasing returns to scale;
- technological progress is an outcome of deliberate economic decisions rather than external forces;
- financial development and inclusion facilitate productive investments and innovation; and

- government policies, such as education and financial sector reforms, can influence the long-run growth rate. The theory assumes that access to finance enables individuals and firms to engage in research, entrepreneurship, and skill acquisition, thereby fostering continuous economic expansion.

The endogenous growth theory is highly relevant to the study of the impact of financial inclusion on poverty alleviation. Financial inclusion expands access to credit, savings, and investment opportunities, empowering individuals and small businesses to enhance productivity and generate income. By facilitating investment in human capital, entrepreneurship, and innovation—especially among rural and low-income populations—financial inclusion promotes inclusive and sustained economic growth (Onyele and Ariwa, 2020). Consequently, it serves as an effective tool for reducing poverty and achieving equitable development, aligning with the core principles of the endogenous growth theory.

2.3. Empirical Review

In a study of financial inclusion and poverty, Oladipo *et al.* (2025) estimated the short-run and long-run effects of savings and credit from deposit money banks (DMBs) and microfinance banks (MFBs) on poverty reduction in Nigeria, with poverty headcount as the dependent variable. The Autoregressive Distributed Lag (ARDL) model was employed, using time-series data obtained from reputable national and international organizations. Findings showed that DMB savings significantly reduced poverty in both the short run and long run, emphasizing their role in mobilizing resources that enhance household welfare. DMBs credit also reduced poverty in the short run and demonstrated marginal long-run significance, reflecting its contribution to productive opportunities. By contrast, MFB savings showed only weak short-run significance and no long-run effect, while MFB credit remained insignificant in both the short run and long run.

Okolo-Obasi *et al.* (2025) investigated the impact of financial inclusion on poverty reduction among rural women in sub-Saharan Africa using Nigeria evidence during the period of 2001 to 2022. The research specifically examines the effect of volume of deposit with rural branches, commercial, micro loan, and non-interest banking on poverty reduction. The result of a multiple regression analysis using Ordinary Least squares (OLS) method carried out with data collected from CBN which covering a period of 22 years (between 2001- 2022) showed that

both e-banking and non-interest banking had serious positive link with financial inclusion and had made significant impact on poverty reduction in Nigeria. Also deposit with commercial banks and micro loans had link with financial inclusion but had made no significant impact positive or negative on poverty reduction in Nigeria.

Osuma (2025) examined how financial inclusion influenced economic growth and poverty reduction across three Sub-Saharan Africa regions, namely East, West, and Southern Africa, spanning 28 countries from 2016 to 2023 using a system Generalised Method of Moments (GMM) and quantile regression approach. The findings emphasised the pivotal role of digital financial services in expanding access to financial resources through bank branches and credit extension, particularly in East and Southern Africa, while highlighting ongoing disparities in West Africa. Findings showed that rural branch network of banks and digital financial services were effective in promoting financial inclusion, and infrastructure and digital literacy improvements were recommended to accelerate progress.

Aroyewun-Khostly and Akinola (2024) examined the effect of financial inclusion on poverty alleviation in Nigeria from 1982 to 2020. It highlights the importance of financial inclusion as a tool to combat poverty, emphasizing the significant impact of poor financial inclusion on the inability of the poor to access financial services, thereby exacerbating poverty levels. The study employed ARDL to analyze the data and assess the relationship between financial inclusion and poverty. The findings revealed both short-term and long-term negative relationships between financial inclusion and poverty in Nigeria. Specifically, variables such as the number of commercial bank branches, loans by rural bank branches, and credits to the private sector were found to have a negative association with poverty. Conversely, lending rates were positively correlated with poverty levels. Additionally, while credits to the private sector and loans by rural bank branches were statistically insignificant, the number of commercial bank branches showed significance at a 5% level.

Akande, AbdulKareem and Olohunlana (2024) analysed institutional quality and financial inclusion on poverty reduction in Nigeria. The paper is anchored on the Capability Approach and adopted the Human Development Index (HDI) as a proxy for poverty reduction as it measures basic human capabilities. With time series data from 1987 to 2022 the VECM was employed as the estimation technique given the established long-run relationship obtained from the ARDL bounds test

cointegration technique. Findings revealed that in the short run, financial inclusion and institutional quality were statistically significant and positive for poverty reduction. In the long run, however, these relationships became insignificant. This study, therefore, elucidated on the opposing directions of financial inclusion and poverty alleviation in the country with institutional quality also shown to be vital. Consequently, financial inclusion and institutional quality were found to be necessary, but insufficient conditions for poverty reduction.

Omenihu *et al.* (2024) looked at the impact that the three dimensions of financial inclusion may have on poverty alleviation. In doing so, the study relied on demand and supply-side data to measure Nigeria's FI. The demand-side data were derived from the 2021 Global Findex data, and the supply side data were sourced from the IMF Access survey database (2004–2021). The supply-side data were analysed using the ordinary least squares regression (OLS), while the demand-side data were analysed using the probit regression model. The study outcomes revealed a negative and significant relationship between financial access and poverty rate, further indicating that those who use financial services are less likely to experience poverty.

Okoduwa, Kwanashie and AC-Ogbonna (2023) investigated the effect of financial development and financial inclusion on poverty in Nigeria for the period 1981 to 2020. The study utilized causality and ARDL techniques. In the study financial development was proxy by tow indicators – banking sector development and stock market development. The results of the study indicated that banking sector development contributed significantly to poverty reduction in Nigeria while stock market development and financial inclusion had insignificant effect on poverty reduction in Nigeria. The causality results showed unidirectional causality from poverty to banking sector development and financial inclusion.

Ugwuoke, Ogbonna and Aye-Agele (2023) investigated the role of microfinance institutions as a vehicle for driving financial inclusion and alleviating poverty in Nigeria using the EFinA 2018 household survey data. The probit model, propensity score matching, and average treatment effect methods were applied for the analyses. The study found that financial inclusion driven by access to, and usage of products/services provided by microfinance institutions reduced poverty.

Damiyano and Mago (2023) related financial inclusion to development and poverty in the SACU region. Financial inclusion is very vital for development and poverty reduction. The most financially excluded populations, the vulnerable,

were found in developing countries and mainly women. The member states of the SACU region were also developing nations. The results of this study had indicated the importance of women's education on financial literacy to enhance financial inclusion. There was also a need in the region to create employment opportunities for women so that they will be able to get access to formal financial institutions, for savings, bank accounts, withdrawals and salaries, which will in turn have a significant impact on financial inclusion. Poverty eradication or reduction is very critical in SACU region to enhance financial inclusion. The governments of the SACU member states must enact policies that are targeted at poverty eradication, which is in line with sustainable development goals, not just enacting, but in conjunction with implementation and close monitoring to make the policies effective.

Kumar and Jie (2023) investigated the impact of financial inclusion on poverty, focusing on the role of unequal access to finance and various inequalities in developing countries during the 2004–2018 period. The study applied two-stage fixed-effect methods and conditional analysis to examine these issues. The results revealed that financial inclusion was more effective in poverty reduction in countries where women and the poor have higher access to formal finance. Though financial inclusion significantly affected poverty in countries with high inequalities, high income, and gender inequality diminished its impact. The study also investigated how institutional quality and educational attainment affect financial inclusion's impact on poverty and found that these factors improved the effect of financial inclusion.

Adeleke and Olomola (2022) *examined three measures of financial inclusion and its effect in reducing poverty and inequality in Nigeria using the Vector Autoregressive model (VAR) and quarterly data from 2004 to 2018. The result revealed an insignificant relationship between all financial inclusion measures and poverty reduction. However, the domestic credit by banks to the private sector had a significant long-run relationship with inequality in Nigeria. Lastly, institutional quality and inflation had no impact on poverty and reducing inequality in Nigeria. Thus, it is recommended that government should undertake policy interventions that would be targeted towards providing accessible and easy to use financial services to the poor. This would go a long way to reduce poverty and inequality in Nigeria.*

Eze and Alugbuo (2021) determined the effect of financial inclusion on poverty reduction in Nigeria. The study estimated two models using data from the World Bank's 2017 Global Findex survey for Nigeria: a Logit model and an Instrumental

variable model. The dependent variable was a dummy variable labeled "poor," which was set to 1 if the individual's "within economy income quintile" was in the bottom 40%, and 0 otherwise. The explanatory variables include, financial inclusion index constructed by the author, age of respondents, educational level of respondents, gender, employment status, wage, government transfers, pension, savings, and self-employment. The study established that financial inclusion reduced household poverty in Nigeria even after controlling for endogeneity in the explanatory variables.

Thanh and Thu (2021) investigated the impact of financial inclusion and other control variables on poverty reduction. The study employs Principal Component Analysis (PCA) to build a financial inclusion index. Using 2SLS and the GMM regressions for a panel data of 29 European countries during the period from 2011 to 2017, the results showed that financial inclusion had a negative impact on poverty at all three poverty lines of USD1.9, 3.2, and 5.5 per day. The proportion of the population aged 15–64 and the ratio of service employment to the total number of employment also had a negative effect on all three levels of POV1.9, POV3.2, and POV5.5. In contrast, GDP per capita, trade openness and the proportion of the population aged from 25 with at least secondary school education had a positive impact on poverty at three levels of poverty. The results confirmed that financial inclusion plays an important role in reducing poverty.

Similarly, Omar and Inaba (2020) studied the effect of financial inclusion on poverty reduction in 116 developing economies for the period of 2004 and 2016. Adopting a novel index of financial inclusion using a broad set of financial sector outreach indicators, the findings show that financial inclusion significantly reduces poverty. Even though the study examined other factors apart from the financial ones, it did not include the role institutions can play in influencing the financial inclusion-poverty relationship.

Michael (2016) examined whether increased access to financial services by farmers can bring about sustainable development in Nigeria merits attention. In response, the study adopted survey research design to obtain and analyzed the perception of 105 farmers in Ogun State, Nigeria on the subject. It was observed that financial inclusion in the Nigerian agriculture sector can be used to achieve sustainable development.

Ajide (2015) analysed the effect of financial inclusion on poverty reduction in Nigerian rural communities using time series data from 1996–2013 and ARDL bounds

test result showed that there was a long-run relationship among the variables. Both short and long run relationship confirmed the importance of financial inclusion as a suitable strategy for poverty reduction in rural communities. As the beneficial effect of financial inclusion on rural poverty reduction is dampened or even cancelled out by cost of borrowing and degree of financial openness, the policy package must take into account the risk of interest charged by banks and financial exposure or openness of rural communities in Nigeria. This did not allow people to understand financial services they have around them which may serve as an opportunity for banks to be exploited.

In analyzing the determinants of financial inclusion in selected African countries, Ondiege (2015) examined the role of regulatory environment in financial inclusion through digital means that use of mobile phones to provide financial services such as payments and deposits. The paper focused on innovative mobile phones money and banking options in four African countries- Kenya, Nigeria, Tanzania and Uganda. The paper concluded that Microfinance Banks should upgrade their technology to be able to adopt the emerging mobile banking technology and also seek solutions that are user-friendly and easy to implement.

Onakoya and Onakoya (2014) attempted to understand how Islamic microfinance as a financial inclusion strategy can be applied in alleviating poverty and maintain sustainable development in Nigeria. The study analyzed the principles of Islamic finance and conceptualizes its operational details to see the linkage between the real economies and sustainable development. The survey conducted in Ogun State, a sub national government of Nigeria revealed that notwithstanding the current upsurge in religious tension in Nigeria, religion is not a hindering factor to the implementation of Islamic microfinance. It also showed that Islamic microfinance in concert with the right fiscal and monetary policies framework, will contribute positively to poverty alleviation.

2.4. Research Gap

Fundamental to the foregoing discussions is the question of representation of financial inclusion. Here, the literature shows that there are different views as to what variable best captures financial inclusion stance of a country. Out of the broad financial areas; banking and other financial institutions, microfinance institutions, insurance, pensions, etc. the literature did not single any one of these as the most

representative in terms of financial inclusion. While many studies have made use of aggregate banking sector credit as a proxy for financial inclusion, others have used aggregate commercial banks credit to account for the financial inclusion in their estimations. To make a difference, this study used commercial banks loans to rural dwellers, deposits of commercial banks in rural branches and number of commercial banks in the rural areas to proxy financial inclusion as opposed to the models used in prior empirical works reviewed.

3. METHODOLOGY

An *ex post facto* design was used in this study. The choice of design is based on the fact that it does not provide the study an opportunity to control the variables mainly because they have already occurred and cannot be manipulated. The data for this study are mostly from secondary sources. This is evidently true as the data were obtained from the Central Bank of Nigeria (CBN) and World Bank databases, 2024.

The primary objective of this study is to estimate the impact of financial inclusion indicators on poverty alleviation in Nigeria. The functional form of the model is represented by equation 1.

$$POVR = f(\text{NCBB}, \text{DPST}, \text{ACGS}, \text{CBCS}, \text{MFBL}) \quad (1)$$

The mathematical form of equation 3.1 is denoted by equation 2.

$$POVR = \beta_0 + \beta_1 \text{NCBB} + \beta_2 \text{DPST} + \beta_3 \text{ACGS} + \beta_4 \text{CBCS} + \beta_5 \text{MFBL} + \varepsilon \quad (2)$$

Since the variables under consideration are not in the same measure, the model was transformed into a logarithmic form as shown in equation 3.

$$\log(POVR) = \beta_0 + \beta_1 \log(\text{NCBB}) + \beta_2 \log(\text{DPST}) + \beta_3 \log(\text{ACGS}) + \beta_4 \log(\text{CBCS}) + \beta_5 \log(\text{MFBL}) + \varepsilon \quad (3)$$

Where,

POVR = Poverty rate

NCBB = Number of commercial bank's branches in rural areas

DPST = Deposits in rural commercial banks

ACGS = Loans to rural dwellers under the agricultural guarantee credit scheme

CBCS = Commercial banks credit to SMEs

MFBL = Microfinance bank loans

β_0 = Constant

$\beta_1 - \beta_5$ = Coefficients or parameters

Log = logarithmic notation

ε = Estimated error term

The OLS-based ARDL/bounds testing approach was used for testing the long-run co-integrating relationship among the time series variables. The Bounds testing methodology developed by Pesaran, Shin and Smith (2001) has some advantage over conventional co-integration testing approaches because it can be used with a mixture of I(0) and I(1) data, and again, it involves just a single-equation set-up, making it simple to implement and interpret.

Generically, the “unrestricted” error correction model (ECM) is given as in equation (4):

$$\Delta \ln Y_t = \alpha_{0y} + \sum_{i=1}^n \alpha_{yi} \Delta Y_{t-i} + \sum_{i=1}^n \alpha_{xi} \Delta X_{t-i} + \beta_{1y} \ln Y_{t-1} + \beta_{2y} \ln X_{t-1} + e_{it} \quad (4)$$

Where Δ is the first difference operator, α are the short-run dynamic coefficients of the model, and β are the long-run effects.

As a preliminary step in ARDL/Bound testing, we employed the Augmented Dickey Fuller (ADF) unit root test to confirm the order of integration of the time series variables. This is necessary because the presence of an order of integration higher than I(1) such as I(2) will invalidate the use of computed F-statistics which is based on the assumption that the underlying variables must be either I(0) or I(1) or mutually integrated.

The unit root or stationarity test was carried out using the ADF test. The following generic equation is used to check the stationarity of the time series data used in the study.

$$\Delta Y_t = \beta_{0t} + \delta Y_{t-1} + \alpha \sum_{i=1}^m \Delta Y_{t-i} + \varepsilon_t \quad (5)$$

Where ε_t is white noise error term and where δ is the coefficient of the lagged length, Y_{t-1} .

In general, δ , the coefficient of the lagged length Y_{t-1} is expected to be negative, and the estimated t statistic will have a negative sign. Therefore, a large negative t value is generally an indication of stationarity. The null hypothesis is HO: $\delta = 0$ (i.e., there is a unit root or the time series is non-stationary or it has a stochastic trend). The alternative hypothesis is HI: $\delta < 0$ (i.e., the time series is stationary, possibly around a deterministic trend).

4. EMPIRICAL FINDINGS

4.1. Descriptive Statistic

The descriptive statistics of the data are presented in Table 1.

Table 1: Descriptive Statistics

	LOGPOVR	LOGNCBB	LOGDPST	LOGACGS	LOGCBCS	LOGMFBL
Mean	1.762813	2.866733	1.052663	6.170921	1.515585	4.288847
Median	1.771656	2.872720	1.246802	6.469493	1.612464	4.542943
Maximum	1.893207	2.910624	2.665093	6.981645	2.176178	5.419344
Minimum	1.489958	2.810904	-1.698970	4.907658	1.031408	2.132900
Std. Dev.	0.086285	0.026122	1.288218	0.702538	0.335100	0.944866
Skewness	-1.440194	-0.563079	-0.940374	-0.493609	0.163189	-0.479729
Kurtosis	5.255648	2.437042	3.262849	1.743067	1.859596	1.992852
Jarque-Bera	17.84611	2.113540	4.808399	3.405977	1.876057	2.579876
Probability	0.000133	0.347577	0.090338	0.182138	0.391399	0.275288
Observations	32	32	32	32	32	32

Source: Author's computations using EVIEWS 10.0

The descriptive statistics for the six log-transformed variables—LOGPOVR, LOGNCBB, LOGDPST, LOGACGS, LOGCBCS, and LOGMFBL—reveal distinct central tendencies, variability, and distributional characteristics across 32 observations. The means and medians for all variables are relatively close, suggesting central clustering, with the highest average values observed in LOGACGS (6.17) and LOGMFBL (4.29). Variability differs considerably, with LOGDPST exhibiting the largest standard deviation (1.29), indicating wide dispersion, while LOGNCBB is the most concentrated (Std. Dev. 0.026). Skewness measures indicate mostly left-skewed distributions (negative values), except for LOGCBCS, which shows a slight right skew. Kurtosis values suggest that LOGPOVR has a leptokurtic distribution (peaked, 5.26), while the others are platykurtic (flatter), particularly LOGACGS (1.74). The Jarque-Bera test results show that only LOGPOVR significantly deviates from a normal distribution ($p < 0.05$), with the remaining variables failing to reject the null hypothesis of normality at the 5% significance level, indicating their distributions are reasonably close to normal. In summary, the descriptive statistics show that the data are normally distributed after taking their logarithmic transformation.

4.2. Unit root tests

The time series variables, when used in their natural form, often lead to spurious regression results, and this misleads policy makers. In order not to obtain spurious results, the variables were first tested for stationarity by employing the Augmented Dickey-Fuller test (ADF). The result obtained from the analysis is presented in Table 2:

Table 2: Unit Root Test Results

Variables	ADF tests @ Level, $I(0)$		ADF tests @ First Difference		Order of integration
	<i>t</i> -Statistics	Prob.	<i>t</i> -Statistics	Prob.	
LOGPOVR	-4.606360	0.0048	-	-	I(0)
LOGNCBB	-3.386230	0.0717	-5.505429	0.0007	I(1)
LOGDPST	-1.990514	0.5728	-4.143838	0.0142	I(1)
LOGACGS	-0.762889	0.9585	-3.876388	0.0259	I(1)
LOGCBCS	-1.245877	0.8826	-5.489796	0.0005	I(1)
LOGMFBL	-3.056215	0.1341	-6.966516	0.0000	I(1)

Source: Author's computations using EViews 10.0

The results of the Augmented Dickey-Fuller (ADF) unit root tests indicate that the variables exhibit different orders of integration. The variable LOGPOVR is stationary at level, $I(0)$, because its *t*-statistic of -4.606360 has a *p*-value (Prob.) of 0.0048, which is less than the typical 5% significance level, allowing us to reject the null hypothesis of a unit root at level. In contrast, variables LOGNCBB, LOGDPST, LOGACGS, LOGCBCS, and LOGMFBL are non-stationary at level as their *p*-values (e.g., 0.0717 for LOGNCBB) are greater than 0.05. However, these variables become stationary after the first difference, $I(1)$, with all their respective *p*-values in the first difference column being less than 0.05 (e.g., 0.0007 for LOGNCBB and 0.0000 for LOGMFBL), allowing us to reject the null hypothesis of a unit root in their first-differenced forms. Thus, the analysis shows a mix of $I(0)$ and $I(1)$ variables.

4.3. ARDL Estimation

4.3.1. Bounds test

Akaike Information Criteria (AIC) was used to identify the most suitable ARDL model as seen from Figure 1. Among the top 20 models, the optimum model was ARDL (3, 3, 3, 3, 2, 1).

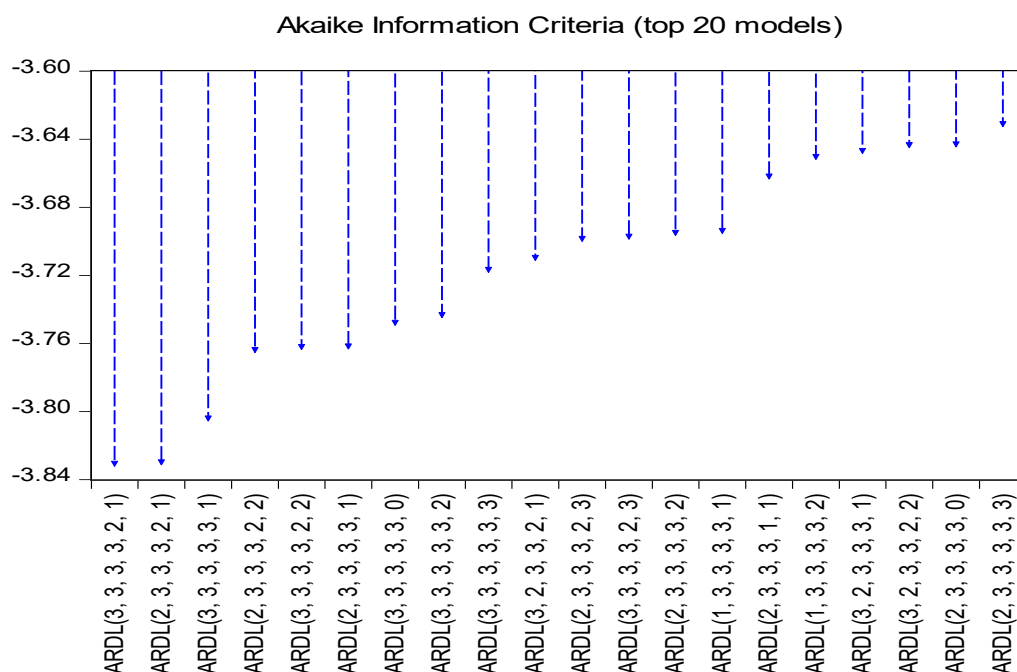


Figure 1: AIC model selection plot

The results of the ARDL bounds tests are given in Table 3:

Table 3: Bounds Test for Cointegration

Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	12.24705	10%	2.75	3.79
k	5	5%	3.12	4.25
		1%	3.93	5.23

Source: Author's computations using EVIEWS 10.0

The F-statistic from the bounds test is used to determine if a long-run, cointegrating relationship exists among the variables. The decision is made by comparing the calculated F-statistic (12.24705) to the lower critical bound, $I(0)$, and the upper critical bound, $I(1)$, at the chosen significance level. Since the calculated F-statistic (12.24705) is greater than the upper critical bound $I(1)$ at all significance levels (10% [3.79], 5% [4.25], and 1% [5.23]), the null hypothesis of no cointegration is rejected. Therefore, there is strong evidence to conclude that a long-run cointegrating relationship exists among the variables in the model. The value

$k=5k$ represents the number of independent variables or degrees of freedom used in the model calculation.

4.3.2. Long-run estimates

Having established that the variables under consideration are cointegrated, the long-run estimates of the ARDL were generated as presented in Table 4.

Table 4: Long-run of the ARDL Model

<i>Variable</i>	<i>Coefficient</i>	<i>Std. Error</i>	<i>t-Statistic</i>	<i>Prob.</i>
LOGNCBB	-1.776551	0.652854	-2.721206	0.0297
LOGDPST	-0.048436	0.012371	-3.915295	0.0058
LOGACGS	-0.370299	0.116273	-3.184747	0.0154
LOGCBCS	-0.135671	0.053247	-2.547948	0.0382
LOGMFBL	-0.023814	0.071707	-0.332096	0.7495

Source: Author's computations using EViews 10.0

The hypotheses testing was based on the long-run estimates reported earlier in Table 4. The hypotheses testing was based on the following decision rule:

- Accept the null hypothesis of "no significant effect" and reject the alternative hypothesis of "significant effect" if the probability value is greater than 0.05.
- Reject the null hypothesis of "no significant effect" and accept the alternative hypothesis of "significant effect" if the probability value is less than 0.05.

In the long-run analysis, the coefficients indicate the estimated long-term equilibrium relationship between the independent variables and the poverty rate. The coefficient for LOGNCBB (-1.777, $p < 0.05$) suggests that, in the long run, a 1% increase in NCBB is associated with a 1.777% decrease in poverty rate, and this impact is statistically significant at the 5% level ($p = 0.0297$). Similarly, the statistically significant negative coefficients for LOGDPST (-0.048, $p < 0.05$), LOGACGS (-0.370, $p < 0.05$), and LOGCBCS (-0.136, $p < 0.05$) indicate long-term inverse impact on poverty rate. Specifically, a 1% increase in ACGS is associated with a 0.370% decrease in poverty rate in the long run. The variable LOGMFBL, however, did not have a statistically significant long-run effect ($p = 0.7495$), as its p -value is greater than the typical 0.05 threshold.

4.3.3. Error correction mechanism (ECM)

The essence of the ECMs is to study the pressure of the estimated long-run equilibrium on the short-run dynamics, and the *a priori* is that error-correction coefficients, which examine the adjustment from shock, are expected to be statistically significant, negatively signed, and have a sizable range of values which has to be between zero and one (Enders, 2010). Table 5 displays the results of the ECM.

Table 5: Error Correction Mechanism (ECM)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	12.65053	1.127138	11.22359	0.0000
@TREND	0.042331	0.003813	11.10175	0.0000
D(LOGPOVR(-1))	0.198769	0.073711	2.696599	0.0308
D(LOGPOVR(-2))	-0.096307	0.064419	-1.495007	0.1786
D(LOGNCBB)	-0.257778	0.243980	-1.056555	0.3258
D(LOGNCBB(-1))	1.424241	0.333779	4.267016	0.0037
D(LOGNCBB(-2))	0.797989	0.274315	2.909022	0.0227
D(LOGDPST)	-0.032003	0.009055	-3.534337	0.0095
D(LOGDPST(-1))	0.045903	0.010584	4.337166	0.0034
D(LOGDPST(-2))	0.039898	0.008800	4.534061	0.0027
D(LOGACGS)	-0.191223	0.060041	-3.184863	0.0154
D(LOGACGS(-1))	0.281449	0.064370	4.372392	0.0033
D(LOGACGS(-2))	0.297665	0.066326	4.487905	0.0028
D(LOGCBCS)	-0.312975	0.027584	-11.34632	0.0000
D(LOGCBCS(-1))	-0.092777	0.038442	-2.413432	0.0465
D(LOGMFBL)	0.099348	0.034408	2.887333	0.0234
CointEq(-1)	-0.405872	0.095260	-4.260676	0.0000
R-squared	0.973081			
Adjusted R-squared	0.937189			
F-statistic	27.11122			
Prob(F-statistic)	0.000001			
Durbin-Watson stat	2.176380			

Source: Author's computations using EViews 10.0

The regression output includes a crucial element for interpreting an error correction mechanism (ECM): the "CointEq(-1)" variable. The coefficient for "CointEq(-1)" is -0.405872, and its associated p-value is 0.0000. This highly statistically significant, negative coefficient confirms the presence and functioning

of a long-run equilibrium relationship among the variables. The coefficient, often referred to as the speed of adjustment parameter, indicates that approximately 40.6% of the previous period's disequilibrium is corrected in the current period, pulling the short-run dynamics back toward the long-run equilibrium. The strong significance (Prob. 0.0000) assures that this adjustment mechanism is reliable and not due to random chance.

The short-run dynamics of the model are captured by the coefficients of the differenced variables (e.g., $D(\text{LOGPOVR}(-1))$, $D(\text{LOGNCBB})$, etc.). These coefficients show how changes in the independent variables in the current and previous periods affect the dependent variable in the immediate term. $D(\text{LOGDPST})$ has a significant negative impact (-0.032, Prob. 0.0095), while $D(\text{LOGDPST}(-1))$ has a significant positive impact (0.046, Prob. 0.0034). The combination of these short-run impacts and the long-run error correction term completes the ECM framework, which successfully models both immediate responses and the long-term return to equilibrium.

Overall model fit is excellent, as indicated by the high R-squared value of 0.973081 and an Adjusted R-squared of 0.937189, suggesting that the model explains over 93% of the variation in poverty rate. The highly significant F-statistic (Prob(F-statistic) 0.000001) further confirms the overall validity and significance of the regression model. The Durbin-Watson statistic of 2.176380 is close to 2, suggesting that there is no significant serial correlation in the residuals, which is a desirable quality for this type of time series analysis.

4.3.4. Diagnostic tests

To ascertain the robustness of the outcomes of the results, it was important to ensure that the stability and the correct functional form of the models were specified, and avoidance of severe serial correlation and heteroscedasticity. The test statistic for the various tests must be statistically insignificant to ensure the absence of the aforementioned econometric problems. The diagnostic tests are presented in Table 6.

Table 6: Diagnostic Tests

<i>Test</i>	<i>Test statistic</i>	<i>Prob.</i>
Breusch-Godfrey Serial Correlation LM Test:	2.487515	0.1779
Heteroskedasticity Test: Breusch-Pagan-Godfrey	1.884597	0.3113
Jarque-Bera	1.068752	0.9662

Source: Author's computations using EViews 10.0

The results of the diagnostic tests were presented in Table 6. The tests of serial correlation based on the Breusch-Godfrey Serial Correlation LM test among the residuals confirmed the absence of any serious serial correlation since the F-Statistic was statistically insignificant. The test of heteroscedasticity based on the Breusch-Pagan-Godfrey test also reported a statistically insignificant F-statistic at 5% level, thus indicating the absence of heteroscedasticity among the residuals, that is, the residuals were homoscedastic. Also, the Jarque-Bera test confirmed that the residuals of the ARDL were normally distributed since its probability value was greater than 0.05. This gives the assurance that the results from the models are reliable, efficient and suitable for forecasting and policy and decision making.

Figure 2a to Figure 2b showed that the cumulative number of recursive residues (CUSUM) and the cumulative number of recursive residues of squares (CUSUMSQ) for the ARDL models were within critical limits for the 5% significance level, indicating that the ARDL model coefficients in each specification were stable.

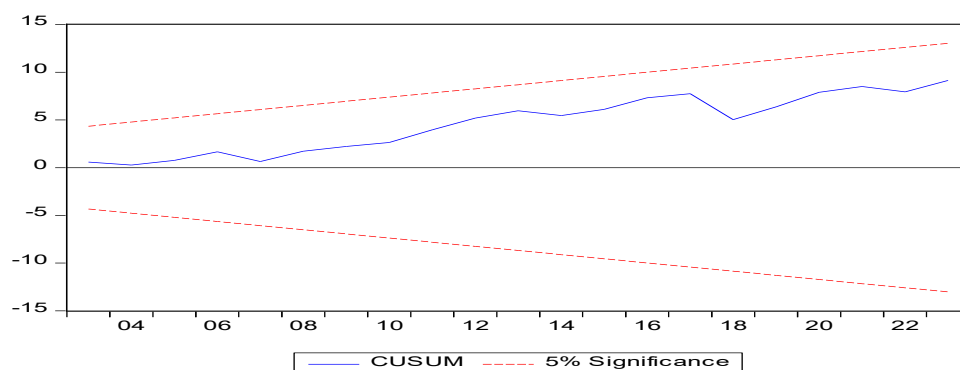


Figure 2a: CUSUM test

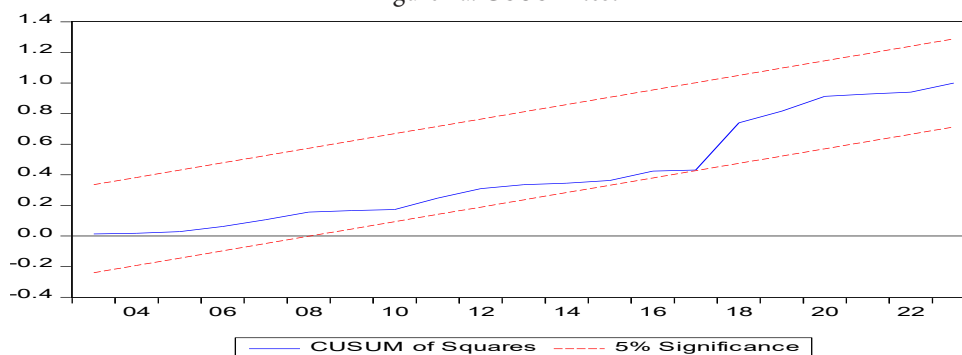


Figure 2b: CUSUMSQ test

4.5. Discussion of Findings

From the findings, a negative and significant effect of bank branches on the poverty rate in the long-run implies that as the number of bank branches increases, poverty levels decline. This relationship suggests that wider geographical access to banking services enhances financial inclusion, enabling more people—especially in rural and low-income areas—to access credit, savings, and payment facilities. Increased bank presence promotes entrepreneurship, facilitates investment in small businesses, improves household financial management, and encourages savings culture, all of which contribute to higher income and reduced poverty. Hence, the significant negative relationship indicates that expanding banking infrastructure plays a crucial role in alleviating poverty through improved access to financial resources and economic opportunities. This aligns with Aroyewun-Khostly and Akinola (2024) and Osuma (2025) who found that an increase in bank branches in rural areas enhances financial inclusion by providing easier access to savings, credit, and other financial services, which empowers individuals to invest, grow businesses, and ultimately alleviate poverty.

Again, the study found a negative and significant effect of rural deposits on poverty reduction in the long-run. A negative and significant impact of rural deposits with banks on the poverty rate indicates that as rural bank deposits increase, poverty levels decrease. This suggests that when people in rural areas save more money in banks, they become more financially secure and better able to manage risks, invest in productive ventures, and access credit for agricultural and small business activities. Higher rural deposits also strengthen local banks' capacity to provide loans and support rural development initiatives. Consequently, increased rural savings foster economic empowerment, reduce vulnerability to income shocks, and enhance living standards, leading to a significant reduction in poverty among rural households. This is in consonance with Adeleke and Olomola (2022) and Okolo-Obasi *et al.* (2025) who observed that an increase in bank deposits in rural areas boosts financial inclusion by encouraging savings, strengthening banks' capacity to lend, and enabling investment in productive activities that reduce poverty.

Agricultural credit guarantee scheme (ACGS) funds caused a diminishing effect on poverty rate. A negative and significant effect of the Agricultural Credit Guarantee Scheme (ACGS) on the poverty rate means that as access to guaranteed agricultural credit increases, poverty levels decline. This relationship indicates that the scheme

effectively provides farmers—especially smallholders—with the financial support needed to invest in improved seeds, fertilizers, equipment, and modern farming techniques. By reducing the risk faced by banks in lending to the agricultural sector, the scheme enhances credit availability, boosts agricultural productivity, and raises farmers' incomes. Consequently, improved agricultural output and income generation translate into better living standards, food security, and employment opportunities, thereby significantly alleviating poverty in rural and agrarian communities. This is in agreement with Okoye *et al.* (2017) who found that financial intermediation through credit schemes improves financial inclusiveness and reduces poverty.

Commercial banks' credit to SMEs considerably reduced poverty in the long-run. A negative and significant effect of commercial banks' credit to SMEs on the poverty rate implies that increased lending to small and medium-sized enterprises leads to a reduction in poverty. This occurs because SMEs are vital drivers of job creation, income generation, and local economic development. When commercial banks provide more credit to SMEs, these businesses can expand their operations, invest in new technologies, and employ more workers. The resulting rise in employment and business income boosts household earnings and stimulates economic activity in surrounding communities. Therefore, the significant negative relationship indicates that greater access to bank credit for SMEs promotes entrepreneurship and inclusive economic growth, thereby helping to alleviate poverty. This finding agrees with Michael (2016) who found that an increase in credit to SMEs enhances financial inclusion by expanding access to finance for entrepreneurs, fostering business growth, job creation, and income generation, thereby reducing the poverty rate.

A negative but insignificant effect of microfinance banks' loans to SMEs on the poverty rate suggests that while microfinance lending to small and medium-sized enterprises tends to reduce poverty, its effect is too weak or inconsistent to be statistically meaningful. This may be due to factors such as limited loan sizes, high interest rates, poor loan supervision, or the diversion of funds to non-productive uses. Additionally, many microfinance institutions operate in urban rather than rural areas, limiting their reach to the poorest populations. Inefficiencies in management, inadequate financial literacy among borrowers, and high default rates can also reduce the effectiveness of such loans. Thus, although microfinance lending has the potential to alleviate poverty, its current structure or scale may not be sufficient to produce a significant impact. This affirms the findings of Ugwuoke *et al.* (2023)

and Okolo-Obasi *et al.* (2025) who found that microfinance banks in Nigeria were unable to considerably reduce poverty due to their poor performance as a result of undercapitalization.

5. CONCLUSION

This study investigated the effect of financial inclusion on poverty alleviation in Nigeria using an ARDL model from 1992 to 2023, it can be concluded that various financial inclusion initiatives have had a significant and positive impact on reducing poverty in the long run. Specifically, a higher rate of deposit mobilization by banks in rural areas and an increase in loans granted under the agricultural credit guarantee scheme were found to cause a significant decrease in the poverty rate. Similarly, an increase in commercial banks' credit to small and medium-sized enterprises (SMEs) also led to a significant fall in poverty. However, while an increase in the number of commercial bank branches had a significant impact, this impact was diminishing. The study also noted that microfinance banks' loans had a negative but insignificant impact on the poverty rate in the long run. As such, it was concluded that financial inclusion is a prominent strategy for poverty alleviation in Nigeria overtime.

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