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AN ECONOMIC STUDY OF FINANCIAL INCLUSION AND POVERTY REDUCTION IN NIGERIA

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ABSTRACT

This study empirically examines the effect of financial inclusion on poverty reduction in Nigeria using annual time-series data spanning 1981–2022. To achieve the objectives, secondary data were obtained from the Central Bank of Nigeria (CBN) Statistical Bulletin, the National Bureau of Statistics and the World Development Indicators. The Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests were used to establish the order of integration of the series, while the Autoregressive Distributed Lag (ARDL) bounds testing approach to co-integration was used to estimate the short-run and long-run relationships. Financial inclusion was measured by two indicators: bank branches in rural areas (BBR) and loans to rural area branches of commercial banks (LRACB). The unit root results show that the variables are a mixture of I(0) and I(1) and the bounds test confirms a stable long-run relationship among the variables. In the short run, bank branches in rural areas is associated with a rise in poverty on impact but with poverty-reducing effects in the first and third lag periods, while loans to rural areas reduce poverty on impact but are associated with higher poverty across all three lag periods. In the long run, both indicators of financial inclusion are positively related to poverty: the effect of bank branches is not statistically significant, but the effect of rural loans is positive and statistically significant. This indicates that, as currently structured, financial inclusion has not translated into long-run poverty reduction in Nigeria. Real GDP growth reduces poverty in both the short and long run, while the effects of inflation, education and per capita income are mixed across the two horizons. The study concludes that expanding rural bank branches and rural lending, without addressing structural bottlenecks such as high transaction costs, elite capture of rural branches and credit misallocation, will not by itself reduce poverty in Nigeria. The study recommends that the banking sector, in collaboration with monetary authorities, redesign rural credit delivery to prioritize the productive poor and complement branch expansion with targeted financial literacy and low-cost transaction mechanisms.

KEYWORDS: Financial Inclusion, Poverty, Loans, Bank Branches, Rural Areas, Economic growth
JEL Classification: G21; I32; O16; O55; R11.

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INTRODUCTION

Financial inclusion is part of a broader financial deepening agenda that focuses on ensuring the efficient and sustainable provision of financial services to households, enterprises, and governments, while minimizing the risk of fragility (Beck, 2016). Since the late 1990s, financial inclusion has attracted growing attention owing to evidence of its significant effects on improving economic development, reducing poverty (Boukhatem, 2016), and improving financial stability (Han & Melecky, 2013).

Financial inclusion in the fight against poverty is one of the Sustainable Development Goals. This has made almost all countries across the globe consider financial inclusion a priority, with the sole aim of mitigating poverty at both national and global levels. It has been argued that a high rate of financial inclusion is often associated with a high rate of investment, employment, high income, and a low poverty rate, and that economic growth can only be sustained if a significant proportion of the population has access to formal financial services (Umar, 2013). This is because financial inclusion boosts effective demand, which induces investment and generates employment and income. Martinez (2011) similarly argued that financial inclusion helps accelerate the pace of sustainable and inclusive growth and development, through efficient distribution of scarce resources to improve societal well-being. According to Bateman et al. (2019), one of the remedies to eradicating poverty is financial inclusion.

Poverty has been defined as a situation in which a person is unable to meet his or her basic needs, such as food, water, shelter, health, and education (Ajakaiye, 1998). The World Bank (2014) describes poverty as encompassing hunger, lack of shelter, sickness without access to medical care, illiteracy, lack of access to school, lack of employment, and fear of the future. As a global phenomenon, poverty continues to receive attention from governments, civil society organizations, donor agencies, and international organizations, especially in developing countries, where the incidence is already alarming despite efforts to curb it. Africa is regarded as the poorest continent in the world, housing 28 of the world's poorest countries, with about half of the African population living without access to basic needs such as nutrition, clean water and shelter, and 47 percent of the African population living on US$1.90 or less a day (World Bank, 2017). Two out of five African adults are illiterate, and although the number of schools is increasing, the quality of learning and general school attendance remain low, partly due to local violence and gender-based exclusion; the global poor are projected to become increasingly concentrated in Africa.

In Nigeria, poverty has been a persistent problem that has rendered various policy strategies of successive administrations largely ineffective, given its continuous rise over the years. In 2018, Nigeria was ranked the poverty capital of the world, overtaking India from the topmost spot (Kharas, Hamel & Hofer, 2018; Uzoho, 2021). The incidence of poverty in Nigeria stood at 47.3 percent in 2021, representing about 98 million Nigerians living below US$1.90 per day (Onyeiwu, 2021). This upward trend has made Nigeria a leading contributor to the increase in global poverty, rendering the World Bank's projection of halving poverty by 2030 increasingly unrealistic.

The World Bank estimated that 1.29 billion people were living in absolute poverty in 2008, of which sub-Saharan Africa accounted for the highest incidence rate at 47 percent. Between 1990 and 2010, about 663 million people moved above the absolute poverty line, yet extreme poverty remains a global challenge from which even some middle-income economies are not exempt. In Nigeria specifically, 40.1 percent of people were poor based on the 2018/2019 national monetary poverty line, and by 2022 about 63 percent were multi-dimensionally poor (National Bureau of Statistics [NBS], 2022). Multidimensional poverty is considerably higher in rural areas (72 percent) than in urban areas (42 percent) (NBS, 2022). Given this, the empirical evidence on the effect of financial inclusion on poverty reduction in Nigeria remains an important and unsettled empirical question.

It is against this background that this study examines the impact of financial inclusion on poverty reduction in Nigeria, with attention to the differential effects that may exist between the short run and the long run.

Objectives of the Study

The broad objective of this study is to examine the effect of financial inclusion on poverty reduction in Nigeria over the period 1981–2022. The specific objectives are to:

1. examine the short-run and long-run effects of bank branches in rural areas (BBR) on poverty reduction in Nigeria;

2. determine the short-run and long-run effects of loans to rural area branches of commercial banks (LRACB) on poverty reduction in Nigeria;
3. assess the extent to which economic growth, inflation, education, and income influence poverty reduction in Nigeria, alongside financial inclusion.

Research Hypotheses

In line with the specific objectives, the following hypotheses, stated in their null form, are tested:

H01: Bank branches in rural areas (BBR) have no significant effect on poverty reduction in Nigeria, in either the short run or the long run.

H02: Loans to rural area branches of commercial banks (LRACB) have no significant effect on poverty reduction in Nigeria, in either the short run or the long run.

H03: Economic growth, inflation, education, and income have no significant effect on poverty reduction in Nigeria.

Significance of the Study

This study is significant for several categories of stakeholders. For policymakers, particularly the Central Bank of Nigeria, the findings offer time-series evidence on whether current financial-inclusion instruments — rural branch expansion and rural lending — are actually reducing poverty, and where the transmission is breaking down. This can help redesign financial inclusion strategy around the National Financial Inclusion Strategy targets rather than around branch and loan volumes alone. For the academic community, the study contributes to the sparse indigenous, rural-focused literature on financial inclusion and poverty in Nigeria, and offers a transparent reconciliation of ARDL short-run and long-run coefficients that can serve as a methodological reference for similar country-level studies. Finally, for rural households and civil society organizations working on poverty alleviation, the findings provide an evidence base for advocacy on the terms under which financial inclusion programmes should be designed to genuinely benefit the poor, rather than merely expanding access on paper.

The study covers a 42-year period (1981–2022). The rest of the paper is organized into five sections: literature review, methodology, data analysis and results discussion, and conclusion and recommendations.

LITERATURE REVIEW

This section reviews the conceptual, theoretical, and empirical literature on financial inclusion and poverty reduction, and presents the conceptual framework guiding the study.

CONCEPTUAL FRAMEWORK

A. Financial Inclusion

Financial inclusion is access to finance & financial services for all in a fair, transparent and equitable manner at an affordable cost (Sarma, 2008; Solo, 2008). Murari and Didwania (2010) denote it as a delivery of financial services at a reasonable cost to the vast sections of the disadvantaged and low-income groups including households, enterprises, SMEs, and traders and bringing the weaker & vulnerable sections of society within the ambit of the organised financial system. It creates conditions for access to timely & adequate credit and other financial services by vulnerable groups at affordable cost. In other words, financial inclusion is access, usage, and availability of financial services from formal financial institutions.

- **Access:** It refers to the ability to use available financial products and services from the formal financial institutions. It provides an insight and analysis of potential barriers to opening and using of bank accounts such as cost, physical proximity of bank branches, etc.
- **Availability:** It is described as services which bank is providing. It includes services such as loan, overdraft, insurance, passbook, debit card, etc.
- **Usage:** It is related to regularity, frequency and length of time used. It focuses on the depth and extent of financial service or product.

B. Measurement for Financial Inclusion:

Some of the dimensions of financial inclusion include automated teller machines (ATMs) per 100,000 adult, commercial bank branches per 100, 000 adults, borrowers from commercial banks per 1,000 adults, domestic credit to GDP ratio, and depositors of commercial banks per 1,000 adults. The first two measurement criteria relate to accessibility of banking products/services and the last three relates to usage of banking services, as dimensions of financial inclusion. These financial inclusion dimensions were then used to construct the financial inclusion index as postulated by Sarma (2008).

C. Impediments to Financial Inclusion

There are several barriers to the successful achievement of financial inclusion. These barriers to financial inclusion often prevent poor people from accessing even the most basic formal financial services. Simply being too poor or the geographic distance to a bank can be a huge deterrent for a poor person. 65% of adults without account attributed it to lack of enough money to use one. 20% also attributed not having account to the fact that banks are too far away (Demirguc & Klapper, 2012).

Among these barriers to financial inclusion are:

- Distance to a bank
- Lack of financial infrastructure
- Restrictive regulations
- Governance failure and
- Lack of suitable products that cater for the poor people

D. Poverty

Poverty is a social problem experienced by people having limited economic resources and a low standard of living (Umar, 2013). Aduda and Kalunda (2012) established that poverty is a humiliation to humanity, efforts around have been put together to remove it.

In developing country like Nigeria, the reality of poverty cannot be denied. The intensity of poverty on peoples' life these days and most especially in Nigeria is very alarming and worrisome! Poverty is robbing people of their safety, stripping people not only of safe water, adequate food, clothing and shelter, education and health, but constantly predisposing youths to blood ritual practices and other get rich evil syndromes. Poverty is not just about physical disadvantage; it is also about lack of opportunity and loss of hope. Poverty is one of the worst causes of violence either at family level or in the general society (Ogbeide & Igbinigie 2019). According to Ogwumike (2001), poverty is a situation where people have low or inadequate income to meet the basic needs of life. Erenstein (2011) sees poverty as the deprivation of basic human needs, which commonly include health care, shelter, sanitation, water, food, clothing, and education.

In Nigeria, Aluko (2011) notes that the level of poverty is immensely high, with about two thirds of the population below the poverty line especially in rural areas. Alleviating the scourge of poverty is a function of enabling government policies and concerted efforts by individuals in a country. This presupposes that variables that can influence poverty alleviation are a concern on theoretical and empirical fronts. By simple clarification, poverty alleviation is a set of measures, which include both economic and humanitarian which goals are meant to permanently lift people out of poverty (Onaolapo, 2015). It also involves improving the living conditions of people who are already poor. Poverty alleviation may be achieved by increasing income generation. Income generation should imply people have access to at least micro loans or loan facility from conventional banks for investment and productivity purpose. This obviously creates self-empowerment and wealth creation which eventually leads to poverty reduction.

THEORETICAL LITERATURE

This study is anchored on the financial development theory of poverty reduction, as articulated by Beck (2016), which is itself rooted in the broader financial intermediation and financial liberalization tradition associated with McKinnon (1973) and Shaw (1973). The core postulate of this tradition is that a well-functioning financial system — one that efficiently mobilizes savings and allocates credit — lowers the cost of intermediation between savers and borrowers, and that expanding the reach of this system to previously excluded households (financial inclusion) can reduce poverty through two distinct, clearly specified channels.

A. The Indirect Channel through Economic Growth

A major channel by which financial sector development supports poverty reduction is through economic growth. Many believe that economic growth reduces absolute poverty. The influence growth has on poverty reduction runs through possible number of channels. First, economic growth could create jobs for the poor. Second, it has been proposed that a higher rate of growth could decrease the wage differentials between skilled and unskilled labor at a later stage of development (Galor & Tsiddon 1996), which benefits the poor. Third, high growth could bring about higher tax revenues, enabling the government to set aside more fiscal resources on social spending such as education, health, and social protection, hence benefiting the poor; and the poor would also be able to invest in human capital (Perroti 1993).

Fourth, as capital accumulation rises with high economic growth, more funds would be avail to the poor for investment purposes (Aghion & Bolton 1997), thus increasing their income.

B. The Direct Channel through Access to Financial Services

Many persons believe that financial sector development can directly add to poverty reduction by providing or broadening the poor's access to financial services. Many economists are of the view that financial intermediary development will have a disproportionately beneficial effect on the poor. This is because informational asymmetries produce credit constraints that are particularly binding on the poor as they do not have the resources to fund their own projects, nor the collateral to access bank credit (Banerjee and Newman 1993, Galor and Zeira 1993, and Aghion and Bolton 1997). These credit constraints restrict the poor from exploiting investment opportunities, thus slowing aggregate growth by keeping capital from flowing to its highest-value use. A poorly functioning financial system will produce higher income inequality by disproportionately keeping capital from flowing to "wealth-deficient" entrepreneurs. Financial sector development reduces information and transaction costs and, therefore, (i) allows more entrepreneurs—especially those less fortunate—to obtain external finance, (ii) enhance the allocation of capital, and (iii) apply a particularly large impact on the poor.

There are, however, also skeptical views on whether financial sector development can lead to a broadening of access to finance by the poor, especially at early stages. Some argue that it is the rich and politically connected who would benefit from improvements in the financial system (Haber 2004). Therefore, greater financial development may only succeed in channeling more capital to a select few considering these conflicting views, it is left to empirical investigation whether or not financial system development accelerates economic growth and reduces poverty. Therefore, country-specific investigation cannot be undermined.

EMPIRICAL LITERATURE

Numerous empirical studies have examined the relationship between financial inclusion and poverty, without reaching a common consensus. While some studies find a poverty-reducing effect of financial inclusion, others find the opposite, and a recurring theme is that financial inclusion below a certain threshold may reduce poverty while inclusion beyond that threshold could worsen it.

Recent Nigeria-focused studies reinforce this ambiguity. AbdulKareem and Olohunlana (2024), using a VECM anchored on the ARDL bounds-testing cointegration technique with data for 1987–2022, found that financial inclusion and institutional quality were positively and significantly associated with poverty reduction in the short run, but that these relationships became insignificant in the long run — a pattern broadly consistent with the short-run/long-run divergence documented in the present study. Oladipo, Ben-Caleb, Olasupo, Madugba, Ogunsola, Ipindola and Adepoju (2025), examining the effects of deposit money bank and microfinance bank savings and credit on the poverty headcount, found that deposit money bank savings significantly reduced poverty in both the short run and the long run, suggesting that the specific channel through which financial inclusion is measured — savings mobilization versus branch presence or lending volume — matters for the sign and significance of the poverty effect. At the regional level, Nsiah and Tweneboah (2025) estimated a threshold level of financial inclusion beyond which institutional quality begins to matter for poverty reduction across Africa, underscoring that the poverty effect of financial inclusion is conditional rather than uniform.

In Nigeria, Okoduwa, Kwanashie and C-Ogbonna (2023) investigated the effect of financial development and financial inclusion on poverty for 1981–2020, using causality tests and the ARDL technique. They found that banking sector development contributed significantly to poverty reduction, while stock market development and financial inclusion had insignificant effects; causality ran unidirectionally from poverty to banking sector development and financial inclusion.

Using Hansen's threshold estimation and difference GMM, Nsiah, Yusif, Tweneboah, Agyei and Baidoo (2021) examined the threshold effect of financial inclusion on poverty in sub-Saharan Africa using annual data for 2010–2017. They found that beyond a threshold level of 0.365, financial inclusion reduced poverty, with money supply positively associated with poverty reduction.

For a panel of 53 developing countries, Ouechtati (2020) examined the contribution of financial inclusion to reducing poverty

and income inequality between 2004 and 2017, using bias-corrected fixed effects, difference GMM, and system GMM estimators. The study found a negative relationship between financial inclusion and poverty, with access to credit and deposit accounts significantly alleviating poverty.

Inoue (2019) examined the impact of financial inclusion on poverty in India using an unbalanced panel dataset for 1973–2004 and a generalized method of moments estimator. The study found that financial inclusion and financial deepening were inversely related to the poverty ratio for public sector banks, but not for private sector banks.

Dawood, Pratama, Masbar and Effendi (2019) used a binary logistic model with data from about 300,000 Indonesian households and found that financial inclusion reduced the probability of a household falling into absolute poverty.

Bakari, Donga, Idi, Hedima, Wilson, Babayo and Ibrahim (2019) examined the effect of financial inclusion on poverty in sub-Saharan Africa using a static panel data model. Savings, the ratio of private-sector credit to GDP, ATM access, information technology, inflation, and government expenditure were found to be critical to poverty reduction, with rural banking and affordable internet access also playing a role.

In Nigeria, Umaru and Chibuzo (2018) investigated the relationship between financial inclusion and poverty reduction, considering the moderating effect of microfinance, using survey data from 384 microfinance customers in Kebbi State. Partial least squares structural equation modelling showed a significant positive effect of financial inclusion on poverty reduction.

Jabir, Mensah and Gyeke-Dako (2017) analyzed the effect of financial inclusion on poverty among low-income households in 35 sub-Saharan African countries, using 2011 cross-sectional data, and found that financial inclusion significantly reduced poverty by providing net wealth and welfare benefits to the poor.

Sanya and Olumide (2017), studying financial inclusion as a tool of poverty alleviation in Ekiti State using multiple regression, found it to be an efficient and significant tool for combating poverty and creating rural employment; age, marital status, income level, religion, financial discipline, product usage, distance from financial service providers, household size, access to political contracts, and gender were also found to significantly affect poverty alleviation.

Focusing on Indonesia, Anwar, Uppun and Reviani (2016) found that financial inclusion had a negative effect on poverty reduction but a positive effect on investment, employment, and economic growth, indirectly reducing poverty and inequality. Schmied and Marr (2016), using random and fixed effects models for Peru, found that financial inclusion did not have an alleviating effect on poverty indicators directly, although access to communication technology played a significant role in poverty reduction and employment creation.

Using the index of financial inclusion as developed by Sarma (2008), the paper attempts to identify the factors that are significantly associated with financial inclusion. The study pointed out that, human development as well as financial inclusion levels, in the country move closely with one another, although with exceptions in a few cases. Among socio-economic factors, income is said to be positively associated with the levels of financial inclusion. This study, however, provided useful information regarding the financial inclusion index. From the studies reviewed, it is evident that while some studies are Nigeria- or country-specific, many others are cross-country or focused on non-African contexts. There remains limited indigenous evidence specifically on rural areas of Nigeria, which have been identified as a major locus of poverty; as Adawo (2011) put it, "the war against poverty must start from the rural areas," where an estimated 60 percent of Nigerians live. This gap — combined with the divergent short-run and long-run findings emerging from the most recent Nigerian studies (AbdulKareem & Olohunlana, 2024; Oladipo et al., 2025) — warrants the present, rural-focused, short-run/long-run investigation.

RESEARCH METHODOLOGY

This section describes the research design, model specification, variables, data sources, and analytical technique adopted to achieve the study's objectives.

Research Design

The study adopts an ex-post facto research design, appropriate because the study relies on historical, already-existing time-series data rather than data generated through experimental manipulation.

Model Specification

From the theoretical and empirical literature reviewed, poverty reduction is expected to depend on financial inclusion,

alongside other macroeconomic variables. As financial inclusion increases, poverty is expected to decline as more people gain access to financial services to smooth consumption and engage in productive activity. Following Okoduwa, Kwanashie and C-Ogbonna (2023), with modification to reflect the Nigerian context, poverty (POVt) is expressed as a function of financial inclusion (FIt) and a vector of control variables (Zt):

POVt = f {FIt, Zt} … … … … … (1)

Financial inclusion is proxied by bank branches in rural areas (BBR) and loans to rural area branches of commercial banks (LRACB), in line with Sarma's (2008) accessibility and availability dimensions of financial inclusion. Economic growth rate (GDPY), inflation rate (INF), education (EDU), and per capita income (INC) are included as macroeconomic control variables, following Ouechtati (2020). Thus:

$POV_t = \beta 0 + \beta_i FI_t + \delta_j Z_t + Ui_t$ - - - - - - (2)

Where;

FI_t= {BBR, LRACB} - - - - - - (3)

Z_t= {GDPY, INF, EDU, INC} - - - - - - (4)

Substituting (3) and (4) into (1) and expressing the model in estimable form, with a constant and stochastic error term:

POVt = α0 + α1BBRt + α2LRACBt + α3GDPYt + α4INFt + α5EDUt + α6INCt + εt … (5)

Where: POV = poverty (proxied by the poverty headcount ratio); BBR = bank branches in rural areas (financial inclusion proxy); LRACB = loans to rural area branches of commercial banks; GDPY = GDP growth rate (proxy for economic growth); INF = annual inflation rate; EDU = government expenditure on education as a share of GDP; INC = per capita income; ε = stochastic error term; α0 is the constant; α1–α6 are the coefficients of the independent variables; and t denotes the sample period 1980–2022.

Apriori Expectation

The coefficient of BBR (α_1), LRACB (α_2), GDP growth rate (α_3), education (α_5), and income (α_6) are expected to be negative, i.e. an increase in these variables is expected to increase reduce poverty. The coefficient of inflation (α4) is expected to be positive, i.e. an increase in inflation is expected to raise poverty.

Description of Variables

Poverty rate (POV)

Poverty rates also refer to the poverty headcount ratio at the national poverty line as a percentage of the total population. An increase in access to financial services including savings, remittance facilities, loans, payments, and insurance services etc, will expand poor people's access to financial services, increase their economic opportunities, and improve their lives. Therefore, it is expected that financial inclusion will promote a reduction in poverty.

Bank Branches in Rural Areas (BBR)

This measures the number of commercial bank branches per 1,000 km² in rural areas, used as an access indicator of financial inclusion, following Dorothy et al. (2023). Having an adequate number of bank branches in rural areas, will enable people to save their money and have access to financial services thus, reducing the level of exclusion which will in turn reduce poverty.

Loans to Rural Area Branches of Commercial Banks (LRACB)

This is referred to the amount of loan disbursed to the rural area. The number of loan from commercial banks per 1,000 adults in the rural area is used as usage of banking service indicator. An Increase in the loan granted to the rural (LRACB) dwellers will help increase the productivity and standard of living of the rural dwellers.

Gross Domestic Product Growth Rate (GDPGR)

Gross Domestic Product Growth rate (this captures the level of economic growth in the country). A stable economic growth rate means a good economic performance and therefore is more attractive to foreign investors (Sahoo, 2006).

Inflation Rate (INF)

This is the persistent rise in the general price level of goods and services. It's proxy by the annual inflation rate.

EDUCATION

Education is a powerful driver of development and one of the strongest instruments for reducing poverty, and improving health, gender equality, peace, and stability (WDR 2018). In this study, it is measured by government expenditure on education to the total percentage of GDP. This is gotten by dividing total government expenditure for all levels of education by the GDP.

INCOME

This is measured by per capita income. It measures the amount of money earned per person in a nation or geographic region. The expectation is that an increase in per capita income will reduce poverty and income inequality. This is because an increase in income per capita indicates that the individual has enough funds to improve their standard of living, which, in turn, decreases poverty level and income inequality (Agyemang-Badu, 2018).

Nature and Sources of Data

Annual time-series data covering 1980–2022 were obtained from the World Development Indicators, the CBN Statistical Bulletin (2022), and the National Bureau of Statistics (2022).

Estimation Technique

Unit Root Test. Prior to cointegration testing, the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were used to establish the stationarity properties of the series and avoid spurious regression.

Analytical Technique. The Autoregressive Distributed Lag (ARDL) bounds-testing approach, based on the unrestricted error correction model (UECM) developed by Pesaran and Pesaran (1997) and Pesaran, Shin and Smith (2001), was employed to examine the short-run and long-run effects of financial inclusion on poverty. The approach is applicable irrespective of whether the underlying variables are I(0) or I(1), allows a general-to-specific lag selection, and performs efficiently in both small and large samples.

The Model

Following Pesaran et al (2001), the ARDL model for equation 5 above becomes:

$$\Delta POVI_t = \alpha_0 + \Sigma i=1\ \alpha_1 \Delta POVI_{t-1} + \Sigma i=1\ \alpha_2 \Delta lnBBR_{t-1} + \Sigma i=1\ \alpha_3 \Delta LRACB_{t-1} +$$

$$\Sigma i=1\ \alpha_4 \Delta lnGDPY_{t-1} + \Sigma i=1\ \alpha_5 \Delta lnINF_{t-1} + \Sigma i=1\ \alpha_6 \Delta EDU_{t-1} + \Sigma\ \alpha_7\ \Delta INC_{t-1} + \delta_1 POVI_{t-1} +$$

$$\delta_2 lnBBR_{t-1} + \delta_3 LRACB_{t-1} + \delta_4 GDPY_{t-1} + \delta_5 INF_{t-1} + \delta_6 EDU_{t-1} + \delta_7 INC_{t-1} + \varepsilon_t \quad - \quad - \quad - \quad (6)$$

Where t is the period, Δ is the first different operator; α_0 is the constant, α_1-α_7, with the summation signs, represent the short-run dynamics. δ_1- δ_6 represent the long-run coefficients respectively, Ɛ is the error term that satisfies the stochastic assumptions of OLS.

When co-integration between the poverty rate and the independent variables exists, the error correction model (ECM), which measures the short-run dynamics or adjustment of co-integrated variables towards their equilibrium values is estimated. The general error correction representation of equation (4) becomes:

$$\Delta POVI_t = \alpha_0 + \Sigma i=1\ \alpha_1 \Delta POVI_{t-1} + \Sigma i=1\ \alpha_2 \Delta lnBBR_{t-1} + \Sigma i=1\ \alpha_3 \Delta lnLRACB_{t-1} + \Sigma i=1\ \alpha_4\ \Delta GDPY_{t-1} + \Sigma i=1\ \alpha_5\ \Delta INF_{t-1} + \Sigma i=1\ \alpha_6\ \Delta lnEDU_{t-1} + \Sigma i=1\ \alpha_7\ \Delta INC_{t-1} + \Theta ECMt\text{-}1 + \varepsilon_t \quad - \quad - \quad (7)$$

For a stable system, the coefficient of ECM (Θ), which measures the speed of adjustment of the dependent variable to the value implied by the long-run relationship, is expected to be fractional, negative, and significant.

To test for the existence of co-integration, the null hypothesis of no co-integration among the variables, defined by

Ho: $\delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 = 0$ is tested against the alternative

Hi : $\delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = \delta_6 = \delta_7 \neq 0$

The F test was used for the bound test. This test has two sets of critical values; one set assumes that all variables are of order I(0) while the other set assumes that they are I(1). If the computed F statistic falls above the upper critical values, which corresponds to I(1), the null hypothesis of no co-integration is rejected. If it falls below the lower bound, which corresponds to I(0), the null hypothesis is not rejected. If it falls between the two bounds, the result is inconclusive. The order of Lag was selected by the Akaike information criteria.

Diagnostic and Stability Test

To assess the reliability of the estimated ARDL model, the study conducts White's test for heteroscedasticity, the Breusch-Godfrey Lagrange Multiplier (LM) test for serial correlation, and the Jarque-Bera test for normality.

Parameter stability is assessed using the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) tests proposed by Brown, Durbin and Evans (1975).

DATA ANALYSIS AND RESULTS DISCUSSION

This section presents the results of the various estimation techniques used to achieve the objective of the study.

Unit Root Tests

We begin this analysis by examining the time properties of the data. This is done to avoid spurious regression. The orders of integration of the variables are examined using the Augmented Dickey-Fuller (ADF) and the Phillip-Perron (PP) test statistics. The result of this test is presented in Table 1.

Table 1: Unit Root Test Results

Variable	ADF Level	ADF 1st Diff.	ADF Order of Integration	PP Level	PP 1st Diff.	PP Order of Integration
POV	-3.621756	—	I(0)	-4.021212	—	I(0)
BBR	-2.354774	-4.191826	I(1)	-2.369568	-6.026941	I(1)
LRACB	-5.138565	—	I(0)	-4.398700	—	I(0)
EDU	-2.792812	-7.498963	I(1)	-2.812446	-7.683099	I(1)
GDPY	-4.012490	—	I(0)	-4.239558	—	I(0)
INC	-2.752750	-4.442576	I(1)	-3.861961	-4.473904	I(1)
INF	-3.843836	—	I(0)	-3.268766	—	I(0)

Source: Authors' computation using EViews 12. Note: The ADF and PP critical values at the 5% and 10% levels are -3.5103 and -3.1913 respectively, based on the MacKinnon (1996) criterion; all series were tested with intercept and trend.

The result shows that the two tests are consistent, suggesting that poverty (POV), loans from rural area branches of commercial banks (LRACB), economic growth rate (GDPY) and inflation (INF), are stationary at level which implies that it is integrated of order zero I(0), while all other variables: Bank branches in Rural areas (BBR), education (EDU), income (INC) possess unit roots and became stationary only after we transformed them to their first differences, meaning they are integrated of order one I(1).However, the variables under the study are integrated at either I(0) or I(1). Thus, in the absent of I (2), the findings satisfy our choice of carrying out the Autoregressive Distributed Lag (ARDL - Bounds) testing approach to co-integration proposed by Pesaran et al. (2001).

Lag Length Selection and Bounds Test for Cointegration

The optimal lag length was determined prior to the bounds test, since an inappropriate lag order can invalidate ARDL bounds testing results. Based on the minimum Akaike Information Criterion (AIC), an optimal lag order of 4 was selected.

Table 2: VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1409.685	NA	8.40e+22	72.65050	72.94909	72.75763
1	-1185.758	355.9857	1.11e+19	63.67991	66.06861*	64.53696
2	-1130.882	67.53972	1.06e+19	63.37858	67.85739	64.98554
3	-1074.125	49.48038	1.51e+19	62.98078	69.54972	65.33766
4	-938.2546	69.67727*	1.25e+18*	58.52588*	67.18493	61.63267*

Note: * Indicates lag order selected by the criterion; LR: sequential modified LR test statistic (each test at 5% level); FPE: Final Prediction Error; AIC: Akaike Information Criterion; SC: Schwarz Information Criterion; HQ: Hannan-Quinn Information Criterion.

F-Bound Test Co-integration

With the optimal lag order established, the ARDL (2,4,4,4,3,4,3) bounds test was estimated. The computed F-statistic of 7.06 exceeds the upper bound critical value of 3.61 at the 5% level of significance, so the null hypothesis of no cointegration is rejected, confirming a stable long-run relationship among poverty, financial inclusion, and the macroeconomic control variables.

Table 3: ARDL Bounds Test for the Existence of Cointegration

Model	F-Statistic	I(0) Bound (5%)	I(1) Bound (5%)	Decision
POV = f(BBR, LRACB, GDPY, INF, EDU, INC)	7.06	2.45	3.61	Cointegration exists

Presentation and Discussion of ARDL Short run and long run Results.

Table 4 presents the short-run ARDL estimates (the error correction regression), and Table 5 presents the associated long-run coefficients. The dependent variable is D(POV), the first difference of the poverty headcount ratio. All coefficients and probability values below are taken directly from the EViews 12 output and are reported and interpreted together, so that the sign, significance, and interpretation of each variable are internally consistent.

Table 4: ARDL Short-Run (Error Correction) Results

. ARDL Error Correction Regression
Dependent Variable: D(POV)
Selected Model: ARDL(2, 4, 4, 4, 3, 4, 3)
Case 3: Unrestricted Constant and No Trend
Date: 03/20/24 Time: 04:04
Sample: 1980 2022
Included observations: 39

ECM Regression
Case 3: Unrestricted Constant and No Trend

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(POV(-1))	-0.164449	0.092465	-1.778489	0.1132
D(BBR)	0.034125	0.008253	4.134959	0.0033
D(BBR(-1))	-0.019057	0.006904	-2.760205	0.0247
D(BBR(-2))	-0.015028	0.006233	-2.410980	0.0424
D(BBR(-3))	-0.030186	0.006081	-4.963677	0.0011
D(LRACB)	-0.021344	0.005742	-3.717268	0.0059
D(LRACB(-1))	-0.098078	0.015841	-6.191414	0.0003
D(LRACB(-2))	-0.090565	0.011358	-7.973427	0.0000
D(LRACB(-3))	-0.067300	0.008770	-7.673706	0.0001
D(GDPY)	-5.557635	1.604920	-3.462874	0.0085
D(GDPY(-1))	3.731731	1.101108	3.389068	0.0095
D(GDPY(-2))	-0.402487	0.274017	-1.468839	0.1801
D(GDPY(-3))	-0.714636	0.204720	-3.490806	0.0082
D(INF)	-0.098517	0.064544	-1.526368	0.1654
D(INF(-1))	0.051473	0.056382	0.912932	0.3880
D(INF(-2))	0.157453	0.064810	2.429470	0.0412
D(EDU)	-0.009770	0.063115	-0.154797	0.8808
D(EDU(-1))	-0.212696	0.067180	-3.166057	0.0133
D(EDU(-2))	0.059305	0.059850	0.990891	0.3508
D(EDU(-3))	0.333033	0.069632	4.782758	0.0014
D(INC)	0.333639	0.105053	3.175918	0.0131
D(INC(-1))	0.807324	0.107741	7.493209	0.0001
D(INC(-2))	0.223069	0.066101	3.374643	0.0097
CointEq(-1)*	-0.643389	0.069197	-9.297889	0.0000

EC = POV - (0.0546*BBR + 0.1675*LRACB -33.9445*GDPY -0.5929*INF + 0.2018*EDU -0.0413*INC)

Table 5: ARDL Long-Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
BBR	0.054558	0.031084	1.755170	0.1173
LRACB	0.167512	0.052236	3.206848	0.0125
GDPY	-33.94447	8.464928	-4.010012	0.0039
INF	-0.592936	0.296872	-1.997279	0.0809
EDU	0.201765	0.178730	1.128881	0.2917
INC	-0.041288	0.035074	-1.177164	0.2730
C	121.2515	12.71001	9.539842	0.0000

R-square = 0.970674 **F-Stat. =8.826420**
Adjusted R-square = 0.860700 **f. Prob. = 0.001627**

Source: Author's computation from E-views 12, 2024.

DISCUSSION OF RESULTS

The one-period lagged dependent variable, D (POV (-1)), carries a negative coefficient (-0.164449) but is not statistically significant at conventional levels (p = 0.1132). This suggests that, once the other regressors are controlled for, last year's poverty level does not, on its own, exert a statistically reliable drag on current poverty.

Bank branches in rural areas (BBR) show a mixed short-run pattern. In the current period, BBR carries a positive coefficient of 0.034125, significant at the 1% level (p = 0.0033); this does not conform to the a priori expectation of an inverse relationship, and suggests that newly opened branches are, on impact, associated with higher rather than lower poverty — plausibly because branches are often sited in already poorer, under-served rural areas, or because the initial cost of accessing a new branch (transaction and opportunity costs) outweighs its benefits in the very short run. From the first lag onward, however, the relationship reverses and conforms to expectation: BBR (-1) is -0.019057 (p = 0.0247), BBR (-2) is -0.015028 (p = 0.0424), and BBR (-3) is -0.030186 (p = 0.0011), all significant and negative. This indicates that once a rural branch has been in place for at least a year, it begins to reduce poverty, consistent with the direct-access channel of financial inclusion (Beck, 2016) and with Omojolaibi's (2017) finding for Nigeria. In the long run, however, the coefficient of BBR (0.054558) is positive and not statistically significant (p = 0.1173). This implies that bank-branch expansion in rural areas has no reliable long-run effect on poverty in Nigeria — the short-run poverty-reducing effect from the lagged terms does not persist into a lasting long-run improvement, possibly because branch presence alone, without complementary financial products tailored to the poor, does not translate into sustained welfare gains. This is broadly consistent with the short-run/long-run divergence reported by AbdulKareem and Olohunlana (2024).

Loans to rural area branches of commercial banks (LRACB) show a more internally consistent short-run pattern than BBR: the current-period coefficient (-0.021344, p = 0.0059) and all three lagged coefficients — LRACB(-1) = -0.098078 (p = 0.0003), LRACB(-2) = -0.090565 (p = 0.0000), and LRACB(-3) = -0.067300 (p = 0.0001) — are all negative and significant at the 1% level. This means that, in the short run, an increase in loans disbursed to rural areas is consistently associated with lower poverty, both on impact and for up to three years afterward, conforming to the a priori expectation and consistent with Jabir, Mensah and Gyeke-Dako's (2017) finding that credit access delivers welfare benefits to the poor. In the long run, however, the coefficient of LRACB (0.167512) is positive and significant at the 5% level (p = 0.0125) — a reversal of sign relative to every short-run estimate. This means that, over the long run, higher cumulative rural lending is associated with higher, not lower, poverty. Taken together with the short-run results, this suggests that rural credit delivers a genuine but temporary poverty-reducing effect, which is not sustained — and may even be reversed — once loans accumulate over a longer horizon. A plausible explanation, consistent with Appiah, Frowne and Tetteh (2020), is that rural credit in Nigeria is not consistently channelled into productive, income-generating activity, so that debt servicing and misallocated credit erode the poor's welfare over time rather than compounding an escalating loan portfolio into lasting income growth.

Real GDP growth (GDPY) is negatively related to poverty in the current period (-5.557635, p = 0.0085) and at the third lag (-0.714636, p = 0.0082), both conforming to the a priori expectation and significant at the 1% level, consistent with the indirect, structural-transformation channel through which growth generates jobs for the poor (Galor & Tsiddon, 1996). This can be explained by Dollar and Kraay's (2002) finding that growth tends to increase the income of the poor proportionately with the overall growth. The first lag, GDPY (-1), is positive and significant (3.731731, p = 0.0095) — a temporary reversal that may reflect adjustment dynamics in how growth translates into poverty reduction — while the second lag is not statistically significant (p = 0.1801). In the long run, GDP growth remains strongly poverty-reducing, with a coefficient of -33.94447, significant at the 1% level (p = 0.0039), the largest and most robust poverty-reducing effect in the model, and fully consistent with the theoretical prediction and prior expectation.

Inflation (INF) is not significant in the current period (-0.098517, p = 0.1654) or at the first lag (0.051473, p = 0.3880), but at the second lag it is positive and significant at the 5% level (0.157453, p = 0.0412), conforming to the a priori expectation that higher inflation erodes real incomes and raises poverty.

The result is parallel with a study by Cardoso (1992), who concluded that inflation reduces the disposable income of people rendering them poorer in return. In the long run, the coefficient of inflation is -0.592936 and significant only at the 10% level (p = 0.0809). This negative long-run sign does not conform to the a priori expectation, and was statistically significant. This means that inflation rather stimulates poverty reduction in the long run. This finding is in support of Romer and Romer's (1998) argument which states that higher inflation will produce more investment possibilities and job chances, which will lead to lower unemployment, and increased income, which will assist the poor meeting their basic needs.

Also in the short run, the lagged value of education (-1) has a negative relationship with poverty with a coefficient of -0.212696. It conforms to the a priori expectation, and was statistically significant at 1%. This means that a percentage increase in education will lead to about 21.26% decrease in poverty level. This implies that education enables one to gain knowledge and skills that can increase employment chances and enhance the standard of living. This result is in line with the findings by Ajayi & Ross (2019). However, in the long run the coefficient of education (0.201765) was positively related to poverty. This means that an increase education leads to an increase in Poverty level. It does not conform to the a priori expectation, and was not statistically significant. This implies that a gain of knowledge by individuals does not necessarily expose them to a better employment chance which will enhance their livelihood.

Per capita income (INC) is positive and significant across the current period and both lags — INC = 0.333639 (p = 0.0131, significant at 5%), INC (-1) = 0.807324 (p = 0.0001, significant at 1%), and INC (-2) = 0.223069 (p = 0.0097, significant at 1%) — which does not conform to the a priori expectation in the short run. This counter-intuitive short-run result may reflect the fact that per capita income is a national average that can rise alongside widening income inequality, so that average income and the poverty headcount can move together in the short run if growth is concentrated among the non-poor. In the long run, however, the coefficient of income (-0.041288) is negative, conforming to the a priori expectation, though it is not statistically significant (p = 0.2730). This is broadly consistent with Kumar, Naidu and Kumar (2011), who found that rising per capita income enables greater participation in financial services over time, even where the short-run relationship is more ambiguous.

Finally, the error correction term, CointEq(-1), is correctly signed (negative), fractional in magnitude (-0.643389), and highly significant (p = 0.0000), confirming that the variables are genuinely cointegrated and that approximately 64 percent of any deviation from the long-run equilibrium is corrected within one year. The model's explanatory power is high, with an R^2 of 0.9707 and an adjusted R^2 of 0.8607, and the overall model is statistically significant (F-statistic = 8.8264, p = 0.0016).

Diagnostic Tests

Diagnostic tests were conducted to assess the reliability of the estimated ARDL model. The results are presented in Table 6.

Table 6: Summary of Diagnostic Tests

Test	R^2 Statistic	Probability Value
Breusch-Godfrey LM test for serial correlation	17.58499	0.0002
White heteroskedasticity test	31.28303	0.4016
Jarque-Bera normality test	0.850724	0.653533

The White heteroskedasticity test (p = 0.4016) indicates that the residuals are homoscedastic, and the Jarque-Bera statistic (p = 0.6535) indicates that the residuals are normally distributed.

However, the Breusch-Godfrey LM test rejects the null of no serial correlation (p = 0.0002), indicating the presence of serial correlation in the residuals.

This is a limitation of the estimated model: while the ARDL coefficients remain consistent, the presence of serial correlation means the standard errors — and therefore the significance levels reported above — should be interpreted with some caution, and future extensions of this study should consider a higher-order or Newey-West-corrected specification to address this issue directly.

Stability Test

The stability of the model's parameters was assessed using the cumulative sum of recursive residuals (CUSUM) and the cumulative sum of squares of recursive residuals (CUSUMSQ) tests (Brown, Durbin & Evans, 1975), plotted against the 5% critical bounds in Figures 1 and 2. In both cases, the plotted statistics remain within the critical bounds, indicating that the estimated short-run and long-run parameters are stable over the sample period.

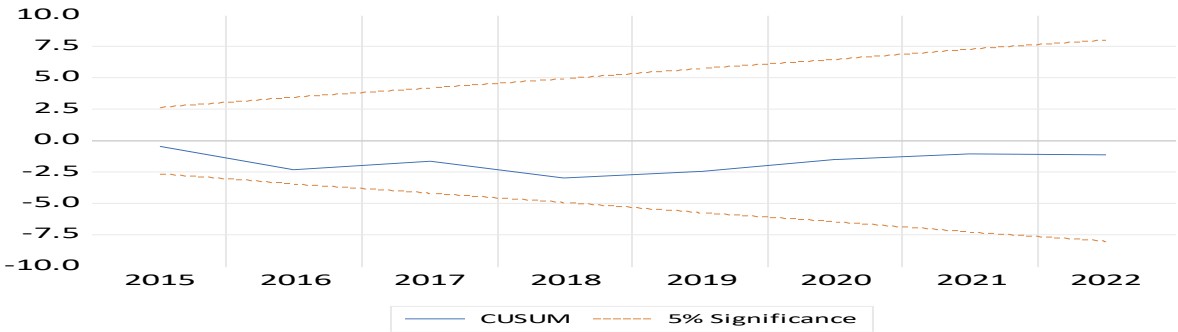

Figure 1: Cumulative Sum of Recursive Residuals (CUSUM) Test

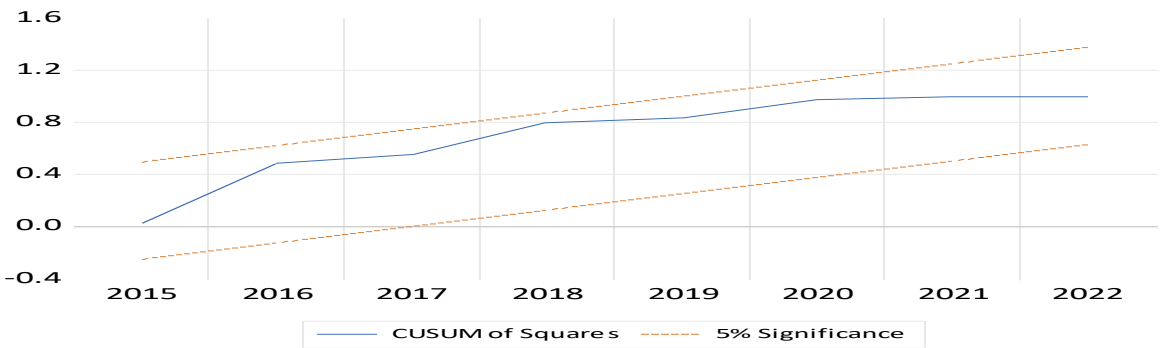

Figure 2: Cumulative Sum of Squares of Recursive Residuals (CUSUMSQ) Test

CONCLUSION AND RECOMMENDATIONS

This study examined the short-run and long-run effects of financial inclusion — proxied by bank branches in rural areas (BBR) and loans to rural area branches of commercial banks (LRACB) — on poverty reduction in Nigeria over 1980–2022, using the ARDL bounds-testing approach. The results show that financial inclusion's relationship with poverty is genuinely dynamic rather than one-directional: in the short run, rural lending consistently reduces poverty at every lag, and rural branch presence reduces poverty from the first year after opening; but in the long run, both indicators are positively related to poverty, and this positive long-run relationship is statistically significant for rural loans. This indicates that financial inclusion, as currently delivered through branch expansion and loan disbursement in rural Nigeria, produces a real but temporary poverty-reducing effect that is not sustained, and in the case of rural lending, appears to reverse over the long run. Economic growth is the most robust and consistent poverty-reducing factor in both the short and long run, while the effects of inflation, education, and income are more mixed and, in several cases, are not statistically significant.

Accordingly, the following recommendations are made:

- The Central Bank of Nigeria and deposit money banks should move beyond simply expanding the number of rural bank branches, and instead pair branch expansion with financial products and literacy programmes specifically designed to convert access into sustained poverty reduction, since branch presence alone shows no significant long-run effect on poverty.
- Rural lending institutions should strengthen credit appraisal, monitoring, and end-use tracking to ensure that loans disbursed to rural borrowers are channeled into productive, income-generating activity rather than consumption or non-productive uses, given that the poverty-reducing effect of rural loans reverses over the long run.
- Because economic growth shows the strongest and most consistent poverty-reducing effect, growth-oriented macroeconomic policy — particularly policies that generate rural, labour-intensive employment — should remain a central pillar of Nigeria's poverty-reduction strategy, complementing rather than substituting for financial inclusion policy.

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