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RURAL FINANCIAL INTERMEDIATION AND PER CAPITA INCOME GROWTH IN NIGERIA

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Abstract

Nigeria continues to experience persistently low per capita income growth, a challenge that is especially acute in rural areas where the majority of the population resides. One major contributing factor to this stagnation is poor rural financial intermediation, characterized by limited access to credit, inadequate deposit mobilization, and insufficient banking services through rural branches of commercial banks. This financial exclusion constrains investment opportunities and entrepreneurial activities, thereby impeding income growth in rural communities. This study investigates the long-run effect of rural financial intermediation on per capita income growth in Nigeria, focusing on the role of rural branches of deposit money banks in improving income in underserved rural areas. Building on existing research linking financial inclusion to economic growth, this study disaggregates rural financial intermediation to specifically examine rural loans and deposits, addressing a gap in understanding their direct impact on income growth. Using an ex-post facto research design, time-series data are analyzed with an Autoregressive Distributed Lag model to estimate the long-term relationships between rural banking operations, population growth, interest rates, and per capita income growth. The study concludes that while rural financial intermediation shows positive signs of influencing per capita income growth in Nigeria, its current impact is statistically insignificant. However, the significant positive effect of interest rates indicates that access to credit continues to play a vital role in driving income growth despite borrowing costs. In light of these findings, it is recommended that policymakers should focus on expanding credit availability alongside financial education to promote productive borrowing.

Keywords: Rural Banking, Financial Intermediation, Per Capita Income, Interest Rate, ARDL Model

JEL Classification: G21, G20, O47, E43, C32

INTRODUCTION

Rural financial intermediation has increasingly been recognized as a key driver of economic development, particularly for nations striving to enhance inclusive growth. It serves as a mechanism through which financial institutions mobilize rural savings, extend credit, and support productive activities that stimulate household welfare and local enterprise development. Mbodj and Laye (2025) emphasize that access to financial services in rural communities is directly associated with improvements in investment capacity, income

generation, and poverty reduction. Despite this potential, many developing countries including Nigeria continue to experience a persistent gap in rural financial access, driven by infrastructural limitations, high operational risks, and socio-economic constraints (Ogbonna et al, 2024). This gap significantly limits rural households and businesses from accessing affordable credit and dependable savings mechanisms, which are critical for investment and economic productivity. As a result, inadequate rural financial intermediation restricts income-generating activities and capital accumulation, leading to stagnant or slow per capita income growth in rural areas. Without sufficient financial support, rural economies face challenges in expanding productive enterprises and improving livelihoods, thereby contributing to the overall sluggish growth in per capita income across the country (Mbodj & Laye, 2025).

Low per capita income growth in Nigeria remains a pressing development challenge that directly affects poverty reduction and inclusive economic growth. According to the National Bureau of Statistics (2023), Nigeria's real per capita income has grown at an average annual rate of less than 1% over the past decade, reflecting sluggish improvements in the standard of living for a majority of its population. This stagnation is particularly pronounced in rural areas, where about 45% of Nigerians reside and where poverty rates are significantly higher than in urban centers (World Bank, 2024). The lack of substantial income growth in these rural communities limits household capacity to invest in education, health, agriculture, and small enterprises which are key drivers of long-term economic progress.

A critical factor exacerbating this challenge is the inadequate rural financial intermediation system, which restricts access to formal financial services for millions of rural households and businesses. The World Bank (2024) reports that only about 28% of rural Nigerians have access to formal credit facilities, compared to 65% in urban areas. This disparity largely stems from infrastructural deficits, high transaction costs, and limited financial literacy in rural regions, all of which impede the effective delivery of financial services (CBN, 2020). Consequently, rural residents often rely on informal and sometimes exploitative sources of credit that lack the capacity to support productive investments at scale.

Moreover, poor rural financial intermediation limits the mobilization of savings from rural communities, thereby constraining the pool of funds that commercial banks and microfinance institutions can deploy as loans to stimulate economic activities. This weak financial intermediation creates a cycle of low investment and income stagnation, perpetuating rural poverty and widening the income gap between urban and rural areas (Udohaya, 2025). Without robust financial services to facilitate savings, credit access, and risk management, rural populations remain vulnerable to economic shocks and unable to capitalize on opportunities for income growth (Umeaduma, 2023). Thus, understanding how rural banking activities such as loan disbursement and deposit mobilization interact with demographic and macroeconomic factors is vital for designing policies that foster sustainable income growth.

In recognition of these challenges, the Nigerian government has adopted several policy frameworks aimed at promoting financial inclusion and enhancing access to financial services in rural communities. The Central Bank of Nigeria (CBN), through its National Financial Inclusion Strategy (NFIS), revised in 2018, set a target of reducing the percentage of financially excluded adults to 5% by 2024. Measures implemented under this strategy include the expansion of commercial bank branches in rural areas, licensing of microfinance banks, promotion of agent banking, and the use of technology-driven solutions such as mobile banking and biometric identification (CBN, 2018). Despite these commendable efforts, many rural dwellers remain excluded from formal banking, largely due to geographical barriers,

lack of financial education, high transaction costs, and stringent loan requirements (Christiaan & Wong, 2025).

According to Aroyewun-Khostly and Akinola (2021), Loans of Rural Branches of Commercial Banks (LRBCB) are crucial in driving per capita income growth by providing rural households and entrepreneurs with access to the credit necessary for productive investments. Hence, access to affordable credit allows rural micro and small enterprises to expand their operations, hire more workers, and diversify income sources, thereby generating broader economic benefits within rural communities. The infusion of credit not only promotes capital accumulation but also stimulates local markets and encourages entrepreneurship, which are critical drivers of sustainable per capita income growth. However, Adedokun et al (2025) caution that despite the potential benefits, many rural credit facilities face significant challenges that hinder their effectiveness. These include stringent collateral requirements that many rural borrowers cannot meet, limited geographic outreach of banking institutions, and inadequate financial literacy among rural populations. Such constraints reduce the volume of loan disbursement and limit the impact of rural credit on income growth, underscoring the need for targeted policy interventions to improve the accessibility and suitability of rural credit products.

Moreover, Deposits of Rural Branches of Commercial Banks play a vital role in fostering per capita income growth by mobilizing savings that form the essential capital base for rural lending and productive investment. Chima et al (2021) highlight that increased deposits collected from rural customers improve the liquidity position of banks, which in turn enables these institutions to extend more credit to individuals and businesses engaged in income-generating activities. This enhanced lending capacity is critical for stimulating agricultural productivity, small-scale entrepreneurship, and local trade, all of which contribute directly to raising per capita income in rural areas. Additionally, the mobilization of rural deposits fosters a savings culture within these communities, encouraging households to accumulate capital over time, build financial resilience against shocks, and plan for future investments such as education, health, or expansion of their businesses. This culture of saving is especially important in rural economies where informal financial mechanisms may be unreliable or insufficient (Ogbonna et al, 2024).

Adegboye and Omankhanlen (2015) note that low levels of financial literacy among rural populations restrict the understanding and use of formal banking services, leading to a preference for informal savings methods. Furthermore, inadequate banking infrastructure, including limited branch networks and poor technological adoption, constrains access to deposit facilities, making it difficult for many rural dwellers to save securely and conveniently. These barriers significantly impede the ability of rural banking deposits to contribute fully to per capita income growth, highlighting the need for targeted financial education programs and investments in rural banking infrastructure to maximize the developmental impact of deposit mobilization.

In addition, Population Growth (POPG) influences per capita income growth by shaping demand for financial services and economic opportunities in rural areas. Edewhor et al (2025) notes that rapid population growth increases the labor force and potential consumer base, which can stimulate economic activity and income generation if matched with adequate financial services. However, without corresponding growth in rural financial intermediation and infrastructure, population pressure can lead to underemployment and income dilution, suppressing per capita income growth (Edewhor et al, 2024). Therefore, effective

management of demographic trends through expanded credit and deposit services is essential for translating population growth into sustainable income improvements.

Salaudeen and Zakariyah (2022) noted that interest rates (INTR) play a pivotal role in shaping the dynamics of rural financial intermediation and its ultimate impact on per capita income growth. High interest rates increase the cost of borrowing, discouraging rural households and small businesses from accessing credit to invest in agriculture, microenterprises, and other income-generating activities. This constraint on credit uptake limits productive investments, which in turn slows down income growth and poverty reduction efforts in rural communities. Moreover, elevated borrowing costs often lead to higher default risks, which can make rural lending less attractive for commercial banks and microfinance institutions, further restricting the flow of funds to underserved rural areas. On the other hand, if interest rates are kept too low, banks may experience reduced profitability, diminishing their incentives to mobilize deposits and extend credit (Ogbonna et al, 2024). This delicate balance highlights the critical need for interest rate policies that encourage affordable borrowing while ensuring financial institutions remain sustainable. Consequently, effective interest rate management is essential for strengthening rural financial intermediation, improving access to credit and savings, and fostering sustainable per capita income growth in Nigeria's rural economy.

Furthermore, while several studies have investigated the broader relationship between financial inclusion and poverty alleviation (Chima et al, 2021; Sakanko, 2023; Ogbona et al, 2024), few have focused specifically on rural financial intermediation and its direct linkage to per capita income growth. Moreover, existing literature tends to focus broadly on financial inclusion without disaggregating the specific role of rural financial intermediation, particularly the distinct functions of loan disbursement and deposit mobilization by rural commercial bank branches. For instance, Eze and Alugbuo (2021) emphasize general financial inclusion indicators such as account ownership and mobile banking usage, but do not isolate the performance of rural bank branches. Similarly, Okorie and Abubakar (2021) highlight the challenges of rural access but underscore the need for empirical studies that investigate the volume of rural credit and deposits as distinct mechanisms influencing per capita income growth.

This presents a significant gap in both policy and academic literature. Understanding the long run impact of rural financial intermediation on per capita income is crucial for designing effective development finance interventions and banking strategies. Loans from rural commercial bank branches, for example, can empower farmers to invest in modern tools and inputs, boost yields, and increase household income. Likewise, mobilizing rural savings provides financial institutions with liquidity to lend, promotes a savings culture, and encourages capital accumulation among rural dwellers.

This study, therefore, aims to empirically examine the long-run effect of rural financial intermediation on per capita income growth in Nigeria. Specifically, it evaluates how Loans of Rural Branches of Commercial Banks (LRBCB) and Deposits of Rural Branches of Commercial Banks (DRBCB) influence Per Capita Income Growth (PCIG), while controlling for Interest Rate (RATE) and Population Growth (POPG).

LITERATURE REVIEW

Conceptual Review

Rural Financial Intermediation

Rural financial intermediation refers to the process by which financial institutions especially rural branches of commercial banks mobilize deposits and disburse credit within rural

communities. It facilitates the flow of funds from savers to borrowers, enabling economic activities such as farming, small-scale trading, and rural enterprise development (Okorie & Abubakar, 2021). This financial function plays a central role in reducing financial exclusion and promoting inclusive growth (Levine, 2005; Beck, Demirgüç-Kunt, & Levine, 2007).

Per Capita Income Growth

Per capita income growth refers to the increase in average income per person within an economy over time. It is widely used as an indicator of economic welfare and living standards. An increase in per capita income often suggests improved productivity, access to opportunities, and economic wellbeing (Todaro & Smith, 2015). It also serves as a proxy for poverty reduction and inclusive economic progress (World Bank, 2020).

Theoretical Framework

This study is based on the Financial Intermediation Theory by Gurley and Shaw (1960), which highlights the crucial role of financial institutions in mobilizing savings and directing them toward productive investments. By bridging savers and borrowers, these institutions reduce transaction costs and information gaps, promoting efficient resource allocation and economic growth. The theory is relevant here as it explains how rural branches of commercial banks, through credit and savings services, can empower rural individuals and businesses to undertake income-generating activities. Effective rural financial intermediation enables investment and productivity improvements, thereby contributing to per capita income growth. This theoretical framework underpins the study's focus on assessing how enhanced rural financial access can drive income increases in Nigeria.

Empirical Review

Recent empirical studies provide compelling evidence on the importance of rural financial intermediation in fostering economic growth and improving per capita income, though results vary depending on context, methodology, and the dimensions of financial inclusion examined. The work of Hu et al. (2023) in China illustrates that rural finance significantly promotes high-quality agricultural development—a major driver of rural income growth. Their study employed panel data and advanced econometric models to show that the effectiveness of rural finance depends on economic growth rates, regional functional characteristics, and financial literacy levels, with spatial spillover effects amplifying its impact. This underscores the nuanced and context-dependent nature of rural financial intermediation's influence on income outcomes.

In the Nigerian context, Abu (2024) analyzed data from 2006 to 2022 and found significant positive relationships between economic development (proxied by GDP) and multiple dimensions of financial inclusion, including rural branch deposits and loans. This study supports the critical role of rural commercial bank activities in driving overall economic growth. Complementing these macro-level findings, Aroyewun-Khostly and Akinola (2021) utilized data spanning nearly four decades (1982–2020) and showed that increased financial inclusion measured partly through loans from rural bank branches negatively correlates with poverty levels in Nigeria. However, they also noted the persistent challenge of high lending rates, which tend to exacerbate poverty, suggesting that interest rates (INTR) are a crucial moderating factor in rural finance's effectiveness.

Further reinforcing these conclusions, Ogbonna et al. (2024) confirmed that rural financial inclusion positively affects Nigerian economic growth and poverty reduction, highlighting that increases in rural deposits and loans significantly raise per capita income. Their use of

advanced econometric techniques, including vector error correction models, reveals that rural financial intermediation contributes to savings growth and income expansion, though interest rates remain an important determinant of credit demand and economic outcomes.

At a more localized level, Sakanko (2023) demonstrated through survey data that various components of financial inclusion such as access to banking services, credit availability, and mobile phone ownership significantly reduce poverty and increase income in rural Nigerian communities. This finding aligns with the study by Christiaan and Wong (2025), who emphasized the pivotal role of financial literacy in enhancing the utilization of formal financial services and consequently improving income and business growth in rural areas. These studies highlight the critical role of financial literacy and infrastructure in enabling rural financial intermediation to translate into tangible income benefits.

Conversely, Gbanador and Okpu (2023) offered a nuanced perspective, showing that while aggregate loan-to-deposit ratios positively influence Nigeria's GDP, loans and deposits specifically from rural branches had negative or insignificant effects on GDP within their analysis period. This suggests potential inefficiencies or access barriers in rural banking that may undermine the expected positive impact on income growth. Their findings indicate the need to carefully examine the quality, accessibility, and institutional framework of rural financial services.

International evidence further supports the significance of rural financial intermediation. For example, Khan et al. (2022) analyzed data from G20 countries and found that financial inclusion positively impacts financial efficiency, poverty reduction, and economic expansion in the long run, implying that sustained inclusive financial policies are essential for economic growth. Similarly, Mbodj and Laye (2025) found that improved financial inclusion and financial sector development significantly reduce poverty in developing countries by increasing access to credit and investment opportunities, which are critical for raising per capita income.

Population dynamics also influence the rural financial intermediation–income growth nexus. Musa et al. (2024) confirmed that increases in commercial bank branches and monetary supply positively shock GDP growth in Nigeria, but poverty rates negatively affect GDP. This suggests that population growth and demographic pressures could potentially dilute income gains from rural finance if not matched with adequate financial infrastructure and investment. Moreover, some studies indicate that the broader effects of financial inclusion on income growth and poverty reduction vary significantly across regions and financial segments, highlighting the importance of rural-specific analysis. For instance, Nizam et al. (2021) found that while financial inclusion positively affects economic growth, the effects differ by region and financial sector, underscoring the need for focused studies on rural financial dynamics. Omar and Inaba (2022) affirmed the role of financial inclusion in reducing poverty nationally but did not differentiate between urban and rural financial flows, which may have distinct responses to banking policies. Similarly, Eze and Alugbuo (2021) identified account ownership and digital finance as important for poverty alleviation but did not specifically investigate the impact of loans and deposits mobilized by rural bank branches.

Taken together, these studies collectively demonstrate that rural financial intermediation through mechanisms such as rural loans, rural deposits, moderated by interest rate conditions and demographic factors—plays a crucial role in driving per capita income growth and poverty reduction in Nigeria. However, empirical gaps remain in simultaneously assessing

these interrelated variables within integrated models over the long run, particularly focusing on rural branches of commercial banks and their unique contributions to rural economic welfare. This identified research gap forms the foundation for the study’s central hypothesis: H_0 : Rural financial intermediation does not have any significant effect on per capita income growth in Nigeria.

METHODOLOGY

This study adopts the ex-post facto research design, which is appropriate for evaluating the effect of rural financial intermediation on per capita income growth using historical data. The design is particularly suitable for this study, which seeks to assess the long-run influence of rural banking activities measured through credit and savings mobilization on income growth in Nigeria’s rural areas. This study adopts the ex-post facto research design, which is appropriate for evaluating the effect of rural financial intermediation on per capita income growth using historical data. The design is particularly suitable for this study, which seeks to assess the long-run influence of rural banking activities measured through credit and savings mobilization on income growth in Nigeria’s rural areas. The study utilizes secondary data obtained from credible and authoritative sources. All variables, including rural loans, rural deposits, interest rates, per capita income, and population growth, were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin and annual reports, the National Bureau of Statistics (NBS), and World Bank databases. The dataset spans from 1988 to 2023, allowing for a comprehensive long-run analysis.

The model for this study adapts the work of Ogbonna et al. (2024), who investigated the impact of rural financial intermediation on poverty reduction, savings and economic growth in Nigeria using key financial indicators such as loans and deposits of rural bank branches, alongside interest rates, inflation rates and exchange rates. The adaptation of this work is justified on the basis that the authors directly captures the core aspects of rural financial intermediation which includes rural deposits and loans alongside digital financial transactions, which are central to understanding income growth in rural Nigeria. Its inclusion of key macroeconomic variables such as interest rate, inflation, and exchange rate ensures that important economic influences are accounted for. The model is specified as:

$$PCI_{it} = \beta_0 + \beta_1 DRA_{it} + \beta_2 LRA_{it} + \beta_3 EMB_{it} + \beta_4 ITR_{it} + \beta_4 IFR_{it} + \beta_4 EXR_{it} + \mu_{it}$$

Where:

PCI = Per capita income a

DRA = Deposits from rural areas

LRA = Loans to rural areas

EMB = Electronic money banking transactions

ITR = Interest rate

IFR = Inflation rate

EXR = Exchange rate

In line with this, the study specifies a functional relationship linking rural financial intermediation to per capita income growth, while incorporating population growth and interest rate as control variables to account for demographic and macroeconomic influences on income. the functional relationship for this study is expressed as:

$$Y = f(XZ) \dots\dots\dots (1)$$

Where

Y = Dependent Variable (Per Capita Income Growth)

X = Independent Variable (Rural Financial Intermediation)

Z = Control Variable (Population Growth and Interest Rate)

PCIG = f(LRBCB, BRBR, POPG, INTR)

Mathematically,

$$PCIG_{it} = \beta_0 + \beta_1 LRBCB_{it} + \beta_2 DRBR_{it} + \beta_3 POPG_{it} + \beta_4 INTR_{it} + \mu$$

Where:

PCIG= Per Capita Income Growth

LRBCB = Loans of rural branches of commercial banks

DRBR= Deposits of rural branches of commercial banks

POPG = Population Growth

INTR = Interest Rate

β_0 is the constant

β_1 β_4 coefficients of independent and control variables

Estimation Technique

The study employs the Autoregressive Distributed Lag (ARDL) model to analyze both the short-run and long-run effects of rural financial intermediation on per capita income growth in Nigeria from 1988 to 2023. The ARDL technique, which effectively handles variables with mixed levels of stationarity and moderate sample sizes, allows for simultaneous estimation of short- and long-term relationships. Key variables include loans and deposits from rural bank branches as measures of financial intermediation, with population growth and interest rate serving as control variables. Using data from the Central Bank of Nigeria and the World Bank, the study applies the ARDL Bounds Testing approach to determine cointegration and assess how rural financial activities influence income growth over time.

Measurement of Variables

Table 1: Measurement of Variables

S/N	Variables	Measurement	Source
1	Per Capita Income Growth	Annual percentage change in per capita income	Ogbonna et al. (2024); Abu (2024)
2	Deposits of rural branches of commercial banks	Total deposits mobilized by rural branches of commercial banks	Ogbonna et al. (2024); Abu (2024)
3	Deposits of rural branches of commercial banks	Total loans disbursed by rural branches of commercial banks	Aroyewun-Khostly & Akinola (2021); Ogbonna et al. (2024)
4	Population Growth	Annual percentage increase in population	Musa et al. (2024); Nizam et al. (2021)
5	Interest rate	Monetary Policy Rate	Aroyewun-Khostly & Akinola (2021); Ogbonna et al. (2024)

RESULTS AND DISCUSSION

Table 2: Descriptive Statistics

	PCIG	LRBCB	DRBR	POPG	INTR
Mean	1.535277	91.75224	58.81879	2.578215	18.33208
Median	1.553723	13.96575	12.92690	2.582495	17.76781
Maximum	12.45747	988.5879	427.4466	2.680930	29.80000

Minimum	-4.457078	0.373600	0.019723	2.488792	10.50000
Std. Dev.	3.790554	215.1999	114.7890	0.066080	3.927856
Skewness	0.514094	3.101204	2.204833	0.068592	0.773553
Kurtosis	3.438252	11.81322	6.406359	1.587561	4.323720
Jarque-Bera	1.873851	174.2141	46.57266	3.020704	6.218654
Probability	0.391831	0.000000	0.000000	0.220832	0.044631
Sum	55.26998	3303.080	2117.477	92.81572	659.9548
Sum Sq. Dev.	502.8905	1620884.	461178.2	0.152828	539.9819
Observations	36	36	36	36	36

Source: Authors' Computation, 2025 Note: Per Capita Income Growth (PCIG), Loans of rural branches of commercial banks (LRBCB), Deposits of rural branches of commercial banks (BRBR), Population Growth (POPG), Interest Rate (INTR)

The descriptive statistics reveal key patterns in rural financial intermediation and economic performance in Nigeria from 1988 to 2023. Per Capita Income Growth (PCIG) averaged 1.54 with notable fluctuations, indicating periods of both strong growth and decline. Loans from Rural Branches of Commercial Banks (LRBCB) and Deposits in Rural Branches (DRBR) showed high means and wide variability, reflecting uneven credit disbursement and savings mobilization across rural areas. Population Growth (POPG) remained relatively stable around 2.58%, while Interest Rate (INTR) averaged 18.33% with moderate volatility, influenced by monetary policy changes. Normality tests showed that most financial variables were not normally distributed, suggesting structural shifts and policy effects.

Table 3: Correlation Matrix

	PCIG	LRBCB	DRBR	POPULATION	INTR	VIF
PCIG	1					
LRBCB	0.023271	1				1.277705
DRBR	-0.291442	0.160751	1			1.285055
POPUL	0.236569	0.344895	-0.134672	1		1.276992
INTR	0.280833	-0.182761	-0.367451	-0.233394	1	1.194878
Mean						1.258657

Source: Authors' Computation, 2025: Note: Per Capita Income Growth (PCIG), Loans of rural branches of commercial banks (LRBCB), Deposits of rural branches of commercial banks (BRBR), Population Growth (POPG), Interest Rate (INTR)

The table 2 presents both the correlation matrix and Variance Inflation Factor (VIF). In the table, we can observe that the correlation coefficients between most pairs of variables are relatively low, indicating a weak linear relationship. For example, the correlation coefficient between LRBCB and DRBR is 0.160751, between DRBR and POPULATION is -0.134672, and between POPULATION and INTR is -0.233394. These coefficients suggest a weak correlation between these variables. In summary, based on the low correlation coefficients, there is no evidence of multicollinearity among the variables LRBCB, DRBR, POPULATION, and INTR.

This is further affirmed by the VIF with the mean of 1.258657 which is less than 5. This suggests a weak correlation between the variables in the model.

Table 4: Unit Root of Augmented Dickey Fuller Test (ADF)

Variables	LEVEL	FIRST DIFFERENCE	CRITICAL VALUE	ORDER OF INTEGRATION
PCIG	-2.154696	-10.49824	-2.954021	I (1)
LRBCB	-1.876145	-8.633937	-2.954021	I (1)
DRBR	2.643852	-3.914202	-2.954021	I (1)
POPG	-4.605822	-	-2.954021	I (0)
INTR	-4.047042	-	-2.954021	I (0)

Source: Authors' Computation, 2025: Note: Per Capita Income Growth (PCIG), Loans of rural branches of commercial banks (LRBCB), Deposits of rural branches of commercial banks (BRBR), Population Growth (POPG), Interest Rate (RATE)

The Augmented Dickey-Fuller (ADF) test results show that Per Capita Income Growth (PCIG), Loans from Rural Branches (LRBCB), and Deposits in Rural Branches (DRBR) are stationary after first differencing, indicating they are integrated of order I(1). In contrast, Population Growth (POPG) and Interest Rate (RATE) are stationary at level, meaning they are integrated of order I(0). Overall, the mix of I(0) and I(1) variables justifies the use of the ARDL model for analyzing both short-run and long-run relationships in the study.

Table 5: Bound Testing Co-integration

F-statistic	4.549678	K=4
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Authors' Computation, 2025: Note: Per Capita Income Growth (PCIG), Loans of rural branches of commercial banks (LRBCB), Deposits of rural branches of commercial banks (BRBR), Population Growth (POPG), Interest Rate (INTR)

Table 4 presents the results of the bound testing co-integration analysis. The table shows the F-statistic value is 4.549678., with the critical values of 2.86 at 5% significance level showed that there exists a long run relationship between financial inclusion ad poverty reduction in Nigeria. This indicates strong evidence of co-integration among the variables in the analysis.

Table 6: Estimated Coefficients of Short run and Error correction Term

Variables	Coefficient	Stand. Error	T-Statistics	P-Value
Method: ARDL				
D(DRBR)	0.007631	0.006620	1.152698	0.2588
D(LRBCB)	0.002926	0.002857	1.024017	0.3146
D(POPULATION)	-0.137020	0.041426	-3.307585	0.0026
D(INT)	0.505595	0.188258	2.685648	0.0120
ECT (-1)	-0.816561	0.162097	-5.037491	0.0000

Source: Authors' Computation, 2025: Note: Per Capita Income Growth (PCIG), Loans of rural branches of commercial banks (LRBCB), Deposits of rural branches of commercial banks (BRBR), Population Growth (POPG), Interest Rate (INTR).

The short-run ARDL results indicate that rural deposits and loans have positive but insignificant effects on income growth, suggesting limited short-term impact of rural financial intermediation. Population growth exerts a significant negative influence, while interest rates have a significant positive effect on income growth. The error correction term (-0.816561) is

negative and highly significant, showing that any short-run disequilibrium is quickly corrected toward long-run stability. Overall, the findings suggest that although rural financial activities have weak short-run effects, the economy adjusts efficiently toward long-run equilibrium.

Table 7: Long-run estimated result of Rural Financial Intermediation and Per Capita Income Growth in Nigeria

Variables	Coefficient	Stand. Error	T-Statistics	P-Value
Method: Long-Run Effect				
Dependent Variable - PCIG				
DRBR	0.009345	0.008647	1.080729	0.2890
LRBCB	0.003583	0.003647	0.982452	0.3343
POPG	-0.123391	0.112644	-1.095413	0.2827
INTR	0.619176	0.260399	2.377799	0.0245
C	2.155690	0.091644	23.52243	0.0000
R-squared	0.453012			
Adjusted R-squared	0.335800			
F-Statistics	3.864901*** (0.006201)			

Source: Authors' Computation, 2025: Note: Per Capita Income Growth (PCIG), Loans of rural branches of commercial banks (LRBCB), Deposits of rural branches of commercial banks (DRBR), Population Growth (POPG), Interest Rate (INTR)

The table provides the results of the long-run effect analysis of financial inclusion and poverty reduction in Nigeria. The coefficient for the DRBR is 0.009345 suggesting that a one-unit increase in Deposits of rural branches of commercial banks (DRBR) leads to an estimated increase of 0.009345 units in PCIG. However, the coefficient is not statistically significant at the conventional significance level of 0.05, as the p-value (0.2890) is greater than 0.05. Also, LRBCB coefficient of 0.003583 indicated that a one-unit increase in Loans of rural branches of commercial banks (LRBCB) leads to an estimated increase of 0.003583 units in PCIG. Similar to DRBR, the coefficient is not statistically significant (p-value = 0.3343 > 0.05). The coefficient for the population growth (POPG) is -0.123391. This suggests that a one-unit increase in Population Growth (POPG) leads to an estimated decrease of 0.123391 units in PCIG. The coefficient is not statistically significant (p-value = 0.2827 > 0.05).

The coefficient for the RATE is 0.619176. This indicates that a one-unit increase in Interest Rate (INTR) leads to an estimated increase of 0.619176 units in PCIG. The coefficient is statistically significant (p-value = 0.0245 < 0.05), suggesting that changes in interest rates have a significant impact on PCIG. Although this result appears counterintuitive since higher lending rates typically discourage borrowing and investment several explanations may apply in the Nigerian rural context. First, in underdeveloped rural credit markets, access to credit may matter more than its cost. Even at higher lending rates, borrowers may still accept credit because of limited financing alternatives. Thus, lending activity could still boost income-generating ventures. Moreover, the positive relationship might indicate a resilience effect, where rural borrowers only take loans for high-return projects, meaning even expensive loans are used efficiently to generate income. This selection effect can result in lending still having a net positive impact on income growth, despite higher costs.

The coefficient for the intercept term (C) is 2.155690. This represents the estimated value of PCIG when all other independent variables are zero. The intercept term is statistically significant (p-value = 0.0000), indicating that it has a significant effect on PCIG. Adjusted R-

squared: The adjusted R-squared value is 0.335800. This explains that all dependent variables explains about 33.58% of the variation in PCIG. The F-statistic is 3.864901, and it has a p-value of 0.006201 suggests that the model, including all the independent variables, is statistically significant in explaining PCIG.

Breusch-Godfrey Serial Correlation LM Test:	2.3209	0.1182
Heteroskedasticity Test: Breusch-Pagan-Godfrey	1.757566	0.1446
CUSUM test	Stable	
CUSUM Square Test	Stable	

Source: Authors' Computation, 2023:

The diagnostic tests indicate that the model meets key assumptions for reliable estimation. The Jarque-Bera test (3.82, $p = 0.07$) suggests the residuals are normally distributed. The Breusch-Godfrey Serial Correlation LM test (2.32, $p = 0.12$) shows no evidence of serial correlation in the residuals. The Breusch-Pagan-Godfrey test (1.76, $p = 0.14$) indicates no significant heteroskedasticity. Additionally, both CUSUM tests confirm the model's stability within the 5% significance level. Overall, these results support the model's validity and robustness.

Discussion of Findings

The positive but statistically insignificant impact of rural deposits on per capita income growth suggests that while rural savings theoretically provide financial institutions with capital to support lending and stimulate rural economic activity, this process faces practical limitations. This finding resonates with Gbanador and Okpu (2023), who observed that rural deposits did not significantly enhance GDP, possibly due to inefficiencies in fund allocation or diversion of resources from rural sectors. Similarly, Sakanko (2023) highlighted the role of limited financial literacy and inadequate rural banking infrastructure in constraining the conversion of deposits into income growth. Theoretically, according to Financial Intermediation Theory, deposits must be effectively intermediated into productive investments to foster growth. The insignificant effect found here reflects structural challenges that hinder rural deposit mobilization from fully translating into per capita income improvements.

Similarly, the insignificant positive effect of rural bank loans on income growth indicates that while credit provision is critical in enabling investments and entrepreneurial activities in rural areas, practical challenges such as limited credit access, stringent collateral requirements, and monitoring inefficiencies may restrict the potential benefits. This aligns with the findings of Aroyewun-Khostly and Akinola (2021), who noted that although rural loans are linked to poverty alleviation, their impact can be dampened by high lending rates and credit constraints. Theoretically, credit allocation is fundamental in the Financial Development Theory to drive economic activities, but its effectiveness depends on the quality of financial institutions and borrower capabilities. Thus, the current results suggest that despite credit availability, systemic barriers may limit its role in significantly boosting rural per capita income.

The observed negative yet statistically insignificant relationship between population growth and per capita income growth is consistent with classical economic theories that posit rapid population increases can strain limited resources, dilute capital per worker, and hamper income gains, particularly in developing economies. Musa et al. (2024) similarly found that population pressures can slow GDP growth when not accompanied by proportional financial and infrastructural development. This underscores the importance of aligning demographic

growth with adequate financial services and investment to avoid adverse effects on income growth.

Interestingly, the positive and significant relationship between interest rates and per capita income growth in rural Nigeria challenges conventional economic expectations, which often suggest that higher interest rates discourage borrowing and investment. One plausible explanation is that in rural settings, where formal credit alternatives are limited, borrowers may accept higher costs to access necessary funds, particularly for high-return agricultural and entrepreneurial activities. This finding corresponds with Mia et al (2021), who suggested that in certain contexts, higher lending rates may reflect a more formalized and efficient credit market that selects viable projects, enhancing productive investments and income. From the perspective of financial market theory, this indicates that interest rates not only act as costs but also as signals of creditworthiness and resource allocation efficiency, which can positively influence income outcomes in constrained rural markets.

CONCLUSION AND RECOMMENDATION

This study establishes that rural financial intermediation in Nigeria, while conceptually vital for economic development, has yet to translate effectively into significant per capita income growth. The positive but statistically weak influence of rural loans and deposits signals that existing rural banking mechanisms are constrained by structural inefficiencies, limited financial literacy, and inadequate infrastructure, which impede the full realization of their economic potential. The finding that lending interest rates positively correlate with income growth suggests a complex rural credit environment where access to finance even at higher costs remains critical for productive investments.

Given these insights, it is imperative for policymakers and financial institutions to prioritize reforms that enhance the accessibility, affordability, and efficiency of rural financial services. This includes strengthening rural banking infrastructure, promoting financial literacy, and designing credit products that mitigate risks and lower barriers to entry for rural borrowers. Moreover, demographic pressures such as population growth must be addressed through integrated socio-economic planning to ensure that rural financial intermediation supports sustainable income growth. Without such comprehensive reforms, the capacity of rural finance to drive inclusive economic prosperity in Nigeria will remain limited.

Recommendations

- i. Given the significant positive relationship between interest rates and income growth, policymakers and financial institutions should focus on widening access to credit, even at higher rates, while implementing financial education programs and advisory services to guide borrowers toward productive loan utilization and minimize default risks.
- ii. For rural loans, deposits, and population growth, while their effects were statistically insignificant in this study, continuous support and monitoring of these variables remain important for rural economic development.

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