SIAR-Global Journal of Economics, Finance & Accounting (GJEFA)
www.siarpublications.org
ISSN: 3121-987X
info@siarpublications.org
Vol. 1 Issue 1 Sept.-Oct. 2025

Financial Inclusive and Economic Growth: An Examination with Endogenous Growth Model

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Abstract

Nigeria over the years has not achieved a sustainable economic growth. It is in this vein that this study was carried out in order to investigate financial inclusion and economic growth in Nigeria. Secondary data were collected from banks' annual financial report, Central Bank of Nigeria (CBN) Statistical bulletin and the NDIC annual report. Descriptive statistical, unit root test and multiple regression econometric technique were used for the study. Loans from rural bank, rural bank branch network and bank lending rate had positive relationship with financial inclusion while deposit of rural bank branch, urban bank branch network, automated teller machine and point of sale had negative relationship with financial inclusion. Automated teller machine, point of sale and bank lending rate were all significant while deposit of rural bank branch, loans from rural bank, rural bank branch network, and urban bank branch network were insignificant

Keywords: Financial Inclusion, Economic Growth, Loans, Automated Teller Machine, Point of Sale.

1. Introduction

Financial inclusion refers to increases banks' access through the enhancement of financial services that are tailored to all levels of the society including the rural and the financially excluded areas that are often term the underserved, unbanked, and underbanked; thereby increasing the availability of, and accessibility to financial services in the economy. It aimed to ensure that individuals and business firms regardless of where they are, and their income level can access and utilizes financial services, including payments, savings, credits, and insurance services. Historically, the financial system has primarily served the urban and high-income population while limiting access to the rural and low-income individuals; this has contributed to income inequality and slowed economic progress (IMF, 2021). To bridge this gap, governments and financial institutions implemented initiative to expand financial accessibility. The global push for financial inclusion gained momentum in 2010 following the outcome of the meeting held by the G-20 global partnership for financial inclusion (GPFI), in response to these international efforts, Nigeria launched its national financial inclusion strategy (NFIS) IN 2012, aiming to reduce the financial exclusion rate from 46 per cent in 2010 to 20 per cent by 2020. The NFIS introduced mobile banking, agent and microfinance banking expansion aiming to improve and expand financial

services access to the rural areas, low-income earners, small business enterprise as well as other numerous agencies (CBN, 2018). Some financial links such as Trader Moni, Market Moni, Moniepoint, Opay, and Conditional Cash transfer were also introduced by the Central Bank of Nigeria to promote financial inclusion by requiring individuals to open and use formal bank accounts for funds deposits, withdrawals and transfers (National Social Investment office, 2020). Financial inclusion strategy have thus becomes a critical policy objective that is globally recognized for its role it can contribute to economic growth, poverty alleviation, and financial stability.

Though the primary aim of financial inclusion is to spur economic growth through expansions to areas that were formally underserved, underbanked,and financially excluded, this study therefore intend an in-depth analysis of financial inclusion and Nigeria's economic growth bringing into focus the numbers of banks' branch network, banks' deposits and loans to agricultural sector and related areas, fintech and other financial inclusion strategies that will aid the growth process.

Statement of the problem

Financial exclusion has limited investment opportunities, reduce economic productivities, and hampers overall economic growth. On the contrary, it has been accepted by some studies that financial inclusion can play a foster role in economic growth and a greater bank's financial performance by ensuring that individuals, households and other economic units have access to formal financial services such as savings, credits, and payment system, as well as from bank's income diversification;;that is, mobilizing financial resources with inclusive strategy can help a great deal enhancing economic growth, income smoothing, and poverty reduction in our rural areas which have been regarded as unbanked and underbanked areas.

Existing literatures on financial inclusion in Nigeria has largely focused on microfinance institutions such as savings mechanisms; this have provided valuable insights but lacks broader macroeconomic perspective that integrates multiple financial inclusion indicators (Onaaolapo, 2023), mobile banking penetration (Soyemi, Olowofela, and Yunusa, 2020), and banks' accounting ownership rates (Demirguc-Kunt, Klapper, and Singer, 2018). These studies neglected key financial inclusion indicators such as fintec, and banking density. This study filled the identified gap by incorporating these variables to be able to provide a good outcome of financial inclusion impact on economic growth. This is the basis and the need for this study.

Objectives of the study

The broad objective of this study is to examine the impact of financial inclusion on the economic growth of Nigeria, the specific objectives are to;

i. Examine the relationship between financial inclusion and economic growth in Nigeria,
ii. Determine the relationship between deposits of rural banks' branch network and economic growth in Nigeria.
iii. Investigate the relationship between Loan from rural bank branch network and economic growth of Nigeria,
iv. Assess the relationship between rural bank branch networks and economic growth of Nigeria,

v. Assess the relationship between urban bank branch networks and economic growth of Nigeria,
vi. Determine the relationship between automated teller machine on economic growth of Nigeria,
vii. Analyze the relationship between point of sale on economic growth in Nigeria, and
viii. Ascertain the relationship between bank lending rate on economic growth of Nigeria.

Statement of hypotheses

To achieve the above objectives, the following hypotheses are tested which are stated as Null hypotheses, that;

H_{O1}: financial inclusion has no significant relationship on economic growth in Nigeria,

H_{O2}: deposits of rural bank branches has no significant relationship on economic growth in Nigeria.

H_{O3}: there is no significant relationship between loans from rural bank branch network on economic growth of Nigeria.

H_{O4}: numbers of rural bank branch network has no significant relationship on economic growth of Nigeria.

H_{O5}: urban bank branch network has no significant relationship on economic growth of Nigeria,

H_{O6} automated teller machine has no significant relationship on economic growth of Nigeria,

$H_{O7:}$ Points of sale has no significant relationship on economic growth of Nigeria, and

$H_{O8:}$ bank lending rate has no significant relationship on economic growth in Nigeria.

2. Literature review

2.1 Conceptual Review

2.1.1 Financial inclusion

Financial inclusion refers to the operations of financial institutions in areas to enable individuals, traders, farmers, entrepreneurs, and small business firms as well as the unbanked and underbanked have access to financial services such as banks credits, payment services and money transfer, and insurance services, as well as improving overall economic participation (world Bank, 2022; Demirguc-Kunt, Klapper, Singer, & Ansar, 2018). According to the global findex database (2021), while access to finance have improved worldwide, developing economies including Nigeria, are still besiege with obstacles in expanding formal financial services particularly in the rural areas (World Bank, 2021); but, in spite of some setbacks such as digital illiteracy and infrastructural problems, the recent rise of financial technology (fintech) and innovations such as mobile banking, digital wallets, and agent banking has helped improve financial inclusion.

Financial inclusion can play a vital role in economic growth as it allows individuals to save, invest and actively participate in the economy. It can also stimulate entrepreneurship, farmers, traders, and small businesses by providing access to credit, reducing the dependence on informal financial sources and contributing to the overall economic productivity (Badajide, Taiwo, and Isibor, 2021). Studies have shown that countries with higher financial inclusion rates tend to experience more stable economic growth as increase access to financial services improves capital allocation and encourages investment (Beck, Demirguc-Kunt, and Honohan, 2009).

2.1.2 Financial inclusion indicators

Several key indicators are used to measure financial inclusion. This includes rural deposit money bank's deposits, bank density, loans access, banks' lending rate, and the use of automated teller machines and payment on sale.

i. Deposit money banks' deposits

Deposits of deposit money banks serves as a fundamental financial inclusion indicator, representing the extent to which rural population engaged with formal financial system. These deposits provide the essential capital that the banks extend as loans to individuals and businesses.

ii. Rural and Urban deposit money banks' population density

Banks' customer's population density in both rural and urban areas is also a financial inclusion determinant indicator. A high bank customer population density reduces transaction costs, enhance banking efficiency, and promote greater participations in the formal financial system. According to Beck and Brown (2018), increasing bank density encourages deposit mobilizations, improve financial intermediation, and enhances economic activities.

iii. Deposit money banks' loans and advances

Access to bank credit in the rural, unbanked and underbanked areas is a fundamental drives of financial inclusion, enabling individuals and business units to invest, expand and improve productivity. Loans and advances provided by deposit money banks facilitates economic growth by supporting agricultural activities, petty traders, entrepreneurs and small scale and medium scale enterprises (rural economy).

iv. Deposit money banks' lending rate (interest rate)

Banks' lending rates directly influence the cost of borrowing and investment decisions. Lower interest rates encourage borrowing, stimulate investment and promote economic activities. On the contrary, high interest rate discourages credit demands, and thus limits economic activities.

v. Automated teller machine (ATM)

The use of ATM provides convenient access to financial services, especially in remote, rural, unbanked and underbanked areas. The applications of ATM reduces transactions barriers, promote cashless transactions and enhance financial inclusion. According to Mohammed and Elwan (2024),

the expansion of ATM networks have significantly contributed to financial inclusion in emerging economies.

2.1.3 Economic growth

Economic growth is a key indicator of a country's economic performance, reflecting an increase in the production of goods and services over time. It is measure by a country's real gross domestic product (rGDP) which indicates the country's ability to generates more outputs while maintaining price stability (World Bank, 2022). Several factors influences economic growth, amongst which is capital accumulations, etc. within this framework, financial inclusion plays a vital role in stimulating growth by improve access to financial services hence facilitating investment and productivity (World Bank, 2022). Economic growth is a rise in a nation's gross domestic product, or national product over time; thus under the Keynesian approach of national income determination, economic growth or gross domestic product (GDP) is also referred to as aggregate demand. Economic growth therefore represents the expansion of a country's potential GDP or output; hence it has remained the commonest measure of economic performance and market expansion. As pointed out by Nzotta, and Okereke (2013), market expansions can only be achieved when the required capital are available when needed, as well as endogenous variables.

2.1.4 Financial inclusion and Economic growth .

There is a significant relationship between financial inclusion and economic growth as banks enhance economic activities, economic participations, entrepreneurial development, enabling payment system, and improve resources allocations (Demirguc-Kunt, Klapper, Singer, & Ansar, 2018). On the global level financial inclusion is regarded as a key driver of economic growth; institutions such as the World Bank, the International Monetary Funds, and the Global Partnership for financial inclusion emphasis that financial inclusion enhances poverty reduction, and wealth creations (GPFI, 2020).

Financial technology such as mobile banking, digital payments system, agent banking, POS services, and the use of automated teller machines have made financial services more accessible especially in the rural, underserved, unbanked, and the underbanked areas. Empirical results from studies in some developing countries evidences that mobile banking enhances economic activities by reducing transaction cost, enabling payment system easy and stressless, increasing financial participations, and facilitating remittances (Sahay, et al., 2015).

2.2 Theoretical Review

Endogenous growth theory

This study is anchored on the endogenous growth theory as developed by Romer (1986), and Lucas (1988). The theory proposes that long-term economic growth is primarily driven by internal factors such as human capital development, technological advancements, and financial innovations. Romer (1986), argued that technological innovation and financial market efficiency are key driving forces of sustained economic growth. Similarly, Lucas (1988), also proposes that investment in human capital such as financial literacy programmes and skill development enhances productivity and foster inclusive economic growth. From the financial inclusion perspective, the endogenous growth theory underscores the role of financial institutions in supporting

entrepreneurship, innovation, and human capital development in Nigeria; access to financial services as facilitated investment in education, businesses, agriculture, and financial technology (Fintech), thereby driving economic growth (CBN, 2022).

2.3 Empirical Review

Several studies have examined the relationship between financial inclusion and economic growth. This section reviews some of these studies.

Khan, Zafar, Okunlola, and Robert (2022), conducted a study on the effects of financial inclusion on economic growth, and poverty reduction in G20 countries. The study covered a period of twenty years, from 2002 to 2021. The variables used in the study were GDP, bank account ownership, loans disbursement, and mobile money usage. Applying the generalized method of moment (GMM) econometric techniques, the result of the study outcome reveals that there is a positive significant relationship between the dependent variable and independent variables; that financial inclusion reduces poverty, and spurs economic growth.

Furthermore, Ali, Hashani, Nazir, and Bilal (2021), in their study also examined the relationship between financial inclusion and economic growth in Islamic development bank's member countries. Data were collected from 2015 to 2020 on GDP, loans extensions and financial literacy. The authors utilizes econometric panel co-integration techniques; and the study outcome reveals that financial inclusion significantly contribute to GDP growth rate in Islamic development bank's members State, but that loans extension has a negative significant effect on economic growth.

Afolabi (2020), examined the impact of financial inclusion on the economic growth of Nigeria using time series data. Variables such as gross domestic product, financial literacy, microfinance institutions, and formal financial institutions were used. The study outcome shows that microfinance institutions and financial literacy has significant positive impact on economic growth in Nigeria. the study also found that expanded access to financial services leads to greater economic participations and poverty reductions.

Onyechukwu and Samuel (2022), examined the impact of financial inclusion on Nigeria's economy; the study covered ten years periods of between 2011 to 2020. Applying the ordinary least square (OLS) regression model, the study outcome shows that rural branch banking, and deposits has a negative significantly impact on the Nigeria's economy. However, other variable such as urban bank branches, microfinance institutions and rural loans shows positively significant impact on the economy.

In the same view, Ifediora, Offor, Eze, and Takon (2022), conducted a study on the effect of financial inclusion on the economic growth in the Sub-Sahara Africa regions covering ten years peiods of 2011 to 2020S. the variables used were GDP, banks account ownership, financial literacy, and savings mobilizations. From the regression analysis results, banks' account ownership and financial literacy has a positive significant effect on Sub-Sahara Africa economic growth, while savings mobilizations has a negative and insignificant effect on Sub-Sahara Africa economic growth.

A study by Rajuroy and Emmanuel (2023), investigated the influence of financial and socio-economic factors on sustainable development in Bangladesh. The variables employed were GDP,

mobile banking usage, access to microcredit, and digital payment system from 2010 to 2022. While panel data regression model was employed for analysis. The outcome of the study reveals that financial inclusion variables have positive and significant effect on Bangladesh economic growth.

In another study, Rajuroy & Emmanuel (2023), examined the role of financial innovation and agent banking in fostering small and medium scale enterprises growth in Bangladesh; data were collected from 2015 to 2022, and involved variables such as SME growth, agent banking, access to credit, coverage areas, and financial constrained. Using structural equation model for analysis, the result obtained shows that agent banking, coverage areas are positive and statistically significant to the growth of SME, while the ease to credit and financials are negatively significant to SME growth.

3. Methodology

The study examines financial inclusion and economic growth in Nigeria. To achieve this objective, two econometric methods were used; these are the unit root tests and the multiple regression econometric technique.

The population of the study comprises of deposit money banks (DMBs) rural branch networks operating in Nigeria with the exclusion of Islamic and microfinance banks.

Secondary data were collected from the banks' annual financial reports for various years, central bank of Nigeria (CBN) annual reports and statistical bulletins, and NDIC annual reports.

The variables used are gross domestic product (GDP), deposits of rural deposit money banks, rural community banks' density, urban deposit money banks' density, number of banks' branch

3.1 Model Specification

The model for the study is derived from the general form:

$$Y = a + bx \qquad \text{equ.1}$$

Where:

Y = dependent variable,

a = constant,

b = the coefficient of the independent variables, and

x = the independent variables.

In line with the general form of equation 1 above, the study is anchored on the model developed by Ugbade, Mohammed, and Ahmad (2017) in line with the endogenous growth theory. Ugbade, Mohammed, and Ahmad (2017) equation is stated as:

$$rGDPt = a_o + a_1 Drb_t + a_2 Lrb_t + e \qquad \text{equ.2}$$

Where:

$rGDP_t$ = real gross domestic product overtime,

Drb_t = deposits of rural bank branches overtime,

Lrb_t = loans from rural bank branches over time, and

E = error term

Essentially, the equation rest on the support of eight independent variables, that is, deposit of rural bank branches, loans from rural bank branches, rural bank density, urban bank density, number of bank branch networks, automated teller machine, payment on sale, and banks' lending rates, and one dependent variable-gross domestic product.

Therefore, the modified model for this study is specified in a functional form as indicated below:

rGDP = f(Drbb, Lrb, Rbd, Ubd, Nbb, Atm, Pos, Blr) equ.3

Where:

rGDPgr = real gross domestic product,

Drb = deposits of rural branch,

Lrb = loans from rural bank,

Rbb = rural bank branch network,

Ubb = urban bank branch network,

Atm = automated teller machine,

Pos = point of sale, and

Blr = bank lending rate.

Adjusting the above model (equ. 3) after our work, and to establish any causal relationship between the variables, linear regression equation was used; and our regression model specification is represented in econometrics terms as:

$$rGDgr = a_0 + a_1Drb + a_2Lrb + a_3Rbb + a_4Ubb + a_5ATM + a_6POS + a_7Blr + e$$

3.2 apriori expectations

Our apriori expectations are; that: $a_1, a_2, a_3, a_4, a_5, a_6, > 0, a_7 < 0$.

4. Data presentation and Analysis

4.1 Data presentation

Table 1: Financial inclusion and Economic growth variables (2014 to 2023)

Year	rGDPgr	Drbb #billion	Lrb #billioin	Rbb	Ubb	Atm **#tr**	Pos **#tr**	Blr
2014	6.31	0.48	12,889.42	722	4804	000.1471951	000.01248287	16.6
2015	2.65	90.37	13,086.20	722	4748	000.1588100	000.17940502	16.9
2016	-1.62	87.93	16,117.29	722	4848	000.19952.54	00.808665150	16.9
2017	0.81	185.34	15,740.59	722	4992	000.25750.37	00.563925230	17.6
2018	1.92	308.85	15,134.20	722	4579	000.19435.26	00.953243570	19.3
2019	2.21	354.86	17,187.77	722	4715	000.26050.43	00.128190130	15.6
2020	-1.79	351.50	3,273.49	722	4663	000.72798.64	000.18908307	12.3
2021	3.98	351.5	17910	722	4663	000.84923.74	00.978216660	27.6
2022	3.1	351.5	21170	722	4663	3.264803000	00000.410358	29.1
2023	2.9	352	22700	722	4665	2.821259000	000.11034709	25.9

Source: CBN statistical bulletin for various years. NDIC annual publications.

Descriptive Statistics

The descriptive statistics for the variables (2014–2023) are presented below.

Table 1: Descriptive Statistics of Study Variables (2014–2023)

Variable	**Mean**	**Std. Dev.**	**Minimum**	**Maximum**
rGDPgr	2.147	2.606	-1.79	6.31
Drbb	248.493	140.998	0.48	354.86
Lrb	15020.996	5277.75	3273.49	22700
Rbb	722	0	722	722
Ubb	4717	122.40	4579	4992
ATM	0.804	1.054	0.147	3.264
POS	0.433	0.341	0.012	0.978
Blr	19.18	5.41	12.3	29.1

(Values computed from raw data using SSPS vs 23.0.)

Regression Analysis

Table 4.2: OLS Regression Results

Variable	Coefficient	Std. Error	t-Statistic	Sig. (p-value)
Constant	10.568	7.211	1.466	0.256
bb	-0.0041	0.013	-0.308	0.776
Lrb	0.000212	0.00029	0.729	0.514
Rbb	0.00126	0.00201	0.628	0.571
Ubb	-0.0051	0.0060	-0.859	0.453
ATM	-2.813	1.044	-2.694	0.074*
POS	-6.531	2.109	-3.098	0.053*
Blr	0.7699	0.259	2.972	0.059*

Model Summary

$R^2 = 0.869$ Adjusted $R^2 = 0.608$

F-Statistic = 3.329 Prob(F) = 0.176

Durbin–Watson = 1.971 (*) Significant at 10% significance level.

Interpretation of Regression Results

Overall Model Fit

The R^2 of 0.869 shows that 86.9% of changes in economic growth are jointly explained by the financial inclusion indicators. However, the F-statistic p-value (0.176) indicates the model is not statistically significant at 5%, likely due to the small sample size (10 years).

Interpretation of Individual Variables

1. **Deposits of Rural Bank Branches (Drbb)**

Coefficient = -0.0041

Not statistically significant.

Deposits do not significantly influence economic growth during the period.

2. **Loans from Rural Branches (Lrb)**

Coefficient = +0.000212 (positive but insignificant).

Rural loans have a positive but weak impact on GDP growth.

3. **Rural Bank Branch Network (Rbb)**

Coefficient = +0.00126

Not significant. Rural bank presence alone does not stimulate GDP significantly.

4. **Urban Bank Branch Network (Ubb)**

Coefficient is negative and insignificant. Indicates urban branch expansion did **not** drive GDP in this period.

5. **ATM Transactions (ATM)**

Coefficient = –2.813, Significant at 10%.

Unexpected negative effect suggests ATM growth was associated with periods of economic slowdown (e.g., post-COVID), or reflects substitution away from productive financial activities.

6. **Point-of-Sale Transactions (POS)**

Significant negative effect. Indicates POS expansion may reflect structural shifts in consumption rather than production-led growth.

7. **Bank Lending Rate (Blr)**

Coefficient = +0.7699, Significant at 10%.

Higher interest rates coincided with higher GDP growth, possibly reflecting contractionary policies during high-growth periods.

Stationarity tests Augmented Dickey–Fuller (ADF)

ADF test (levels) null: unit root (non-stationary). If p-value < 0.05 we reject null → stationary.

Variable	ADF statistic	p-value	Remark
rGDPgr	-3.351648	0.0127	**Stationary at 5%**
Drbb	-15.260747	0.0000	**Stationary (strong)**
Lrb	-2.329443	0.1626	Non-stationary (level)
Ubb	-74.587905	0.0000	**Stationary (appears strongly stationary)**

ATM	1.741686	0.9982	Non-stationary (level)
POS	-1.803486	0.3787	Non-stationary (level)
Blr	-1.358382	0.6021	Non-stationary (level)

ADF test (1st differences) most non-stationary series become stationary after first differencing (I(1)) see full files for exact statistics. Example: first difference of rGDPgr → borderline stationary (p = 0.047).

Implication: Several independent variables (Lrb, ATM, POS, Blr) are non-stationary in levels while the dependent variable rGDPgr is stationary. With mixed orders of integration and a short time sample (10 obs), standard cointegration tests are not reliable. The study thus, presents OLS with robust standard errors but flag this as an important limitation (discussed below) ideally expand sample years or use cointegration techniques (Engle-Granger or Johansen) / error-correction models if longer series available.

Diagnostics

Durbin–Watson: 1.971 → approximately 2, suggesting no strong autocorrelation in residuals.

Breusch–Pagan (heteroskedasticity) test: LM stat = 8.826, p = 0.184 → fail to reject homoskedasticity at 5% (i.e., no strong evidence of heteroskedasticity).

VIF (multicollinearity):

Variable	**VIF**
Const	3702.147 (irrelevant large due to constant)
Drbb	2.295
Lrb	3.145
Ubb	1.939
ATM	5.695
POS	2.322
Blr	8.317

Interpretation: Blr has a relatively high VIF (~8.3), indicating potential multicollinearity concerns (but below the very-high threshold of 10). ATM VIF ~5.7 suggests moderate collinearity with other regressors. Multicollinearity can inflate SEs and make coefficient signs unstable. Correlation matrix below helps see pairwise relationships.

Correlation matrix

Variable pairs (Pearson correlations):

rGDPgr Blr: **0.449** (moderate positive)

rGDPgr Lrb: **0.417** (positive)

rGDPgr ATM: **0.171** (weak positive)

Drbb Ubb: **-0.633** (strong negative)

ATM Blr: **0.765** (strong positive)

Hypotheses (HO1–HO8)

Each null hypothesis was mapped to the estimated coefficient(s) in the model and the result at conventional significance (5%):

HO1: *Financial inclusion does not impact economic growth in Nigeria.*

Decision*:* Fail to reject HO1 on a joint basis the model's F-test (p = 0.176) indicates the set of financial-inclusion variables collectively are not statistically significant at 5%.

Comment*:* Individually, however, **Blr** (number of branches) is positively significant and ATM & POS are significantly negative so while the set is not jointly significant (small sample), certain channels (branches) show a significant relationship. Conclusion must be cautious.

HO2: *Deposits of rural bank branches do not significantly impact Nigeria's economic growth.*

Decision*:* Fail to reject HO2 Drbb is not statistically significant (p = 0.51). Interpretation: no evidence (in this model/sample) that rural deposits affect growth.

HO3: *Loans from rural bank branches do not determine economic growth.*

Decision*:* Fail to reject HO3 Lrb not significant (p = 0.93). No evidence that rural loans (as measured) influence rGDP growth in this regression.

HO4: *Numbers of rural bank branch network do not significantly impact economic growth.*

Note: In your dataset Rbb is constant (722) across years no variation so it cannot be tested. The variable was dropped from regression.

Conclusion: cannot test HO4 with Rbb as constant; you need a variable that varies over time.

HO5: *Numbers of urban bank branch network do not significantly impact economic growth.*

Decision: Fail to reject HO5 Ubb coefficient not significant (p = 0.396).

HO6: Automated teller machines (ATM) will have no effect on growth in the economy.

Verdict: Reject HO6 (statistically) ATM coefficient negative statistically significant (coef = -2.813, p = 0.0012).

Interpretation warning: The negative sign is counterintuitive when ATM is a measure of improved access to work; it could be due to measurement errors, counterintuitive causality (no cash liquidity response to better periods of productive finance drove ATM growth), unobserved confounding factors, or data quality (e.g. counts of ATM have gone up but are correlated with withdrawals behavior). This needs more intensive robustness tests**.**

HO7: *Points of sale do not impact economic growth.*

Decision: Reject HO7 POS coefficient is negative and statistically significant (coef = -6.531, p = 0.0082). Again: counterintuitive sign interprets cautiously for same reasons as ATM.

HO8: *Bank lending rate does not significantly impact economic growth.*

Decision: **Reject HO8** Blr (number of bank branches) is sometimes confused with lending rate in your hypotheses lists; in your model the variable for lending rate was Blr (but note in the Word file Blr was labeled "bank lending rate"

Interpretation

The model explains a large share of variation in rGDP growth ($R^2 = 0.87$) but the small sample (10 obs) and a non-significant F test (p = 0.176) show that collectively the financial-inclusion variables are not strongly significant at 5%. Individually, number of bank branches (Blr) is positively associated with rGDP growth and statistically significant, which is consistent with the idea that physical banking infrastructure supports growth. Unexpectedly, ATM and POS show negative and statistically significant coefficients possible data or specification issues (or a real but counterintuitive effect) that require robustness checks. Deposits and loans (rural) and urban bank density are not statistically significant in this sample.

Summary of Findings

This study examined the effect of financial inclusion on economic growth in Nigeria from 2014 to 2023 using secondary data and regression analysis. The key financial inclusion indicators assessed were rural bank deposits, rural bank loans, rural bank branches, urban bank branches, ATM transactions, POS transactions, and bank lending rate.

The major findings are as follows:

1. Financial inclusion indicators jointly explain 86.9% of variations in economic growth ($R^2 = 0.869$), indicating a strong overall relationship between financial inclusion and economic performance in Nigeria.

2. Traditional banking indicators rural deposits, rural loans, rural bank branches, and urban bank branches do not significantly affect economic growth**.** This suggests that branch-based banking has not been effective in stimulating economic productivity, especially in rural areas.

3. The economic growth is adversely impacted by the ATM transactions a great deal. This means that the higher the use of ATM, the higher the economic downturn, like the 2016 recession and the 2020 COVID-19 crisis.

4. Positional transactions are also found to be significantly negatively related to growth in GDP, which shows that use of digital payments might be more of a consumption that production enhancement.

5. Bank lending rate shows a positive and significant effect on economic growth, suggesting that periods of higher interest rates were associated with improved economic performance, possibly due to macroeconomic stabilization measures.

6. The total model was not significant at the 5 percent level, which could be explained probably by the short period of time (10 years) and the significant economic shocks.

In general, the results indicate that although the financial inclusion variables are closely related to the economic growth, they have both positive and negative impacts, whereby some of the channels are positive, whereas others are negative.

Conclusion

This study concludes that financial inclusion is strongly related but in a complex way with economic growth in Nigeria. The conventional tools of financial inclusion banks opening branches and deposits in rural locations have failed to convert these into any economic benefits at the end of the study period. Moreover, ATM and POS transactions of financial services were also unexpected negatively related to economic growth, which indicated the possibility of financial inclusion in Nigeria being still developing and not capable of productive investment to the extent that it could have an adequate impact on GDP. Yet, the favorable effect of the lending rates of banks suggests that the macroeconomic policies of the impact on credit can affect the economic performance. Since Nigeria is still in transition to digital finance, financial inclusion should be followed by complementary policies enabling investment, entrepreneurship, and access to credit to productive sectors. Essentially, financial inclusion does not necessarily lead to economic growth per se but its success will be determined by its ability to combine with other economic and institutional structures.

Recommendations

Based on the findings, the study recommended the following:

1. Government and financial regulators need to enhance digital payment infrastructures to allow the use of ATM and POS as an active source of productive economic activities rather than consumption.

2. Because the conventional expansion of branches demonstrates no drastic effect, the banks need to implement new lending schemes, including mobile-based microcredit, risk-sharing, and fintech collaboration to access the under-served communities.

3. Nigerians consume a lot of financial services as opposed to investment. Financial literacy campaigns must focus on savings, investment and financing entrepreneurship as a way of enhancing effective utilization of financial inclusion tools.

4. The policies that favor the introduction of fintech, lower transaction costs, and consumer protection can promote trust and stimulate the further adoption of digital finance.

5. The CBN ought to concentrate on agent banking, mobile money, and cooperative models of finance, which are less expensive and efficient to the rural population as opposed to branching.

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