



## Financial Inclusion and Economic Growth in Nigeria

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**Abstract.** The study investigated the link between financial inclusion and economic growth in Nigeria over the period 2009 to 2023. The specific objectives of the study were to find out whether automated teller machine (ATM), number of registered mobile money accounts (RMM), private credit to GDP (PCR), number of bank branches (NBB) and total volume of mobile money transactions to GDP (VMM) significantly affected economic growth. For this reason, the fully modified ordinary least squares (FMOLS) method was employed for the analysis of data and the results obtained indicated that automated teller machine (ATM), private credit to GDP (PCR), number of bank branches (NBB) and total volume of mobile money transactions to GDP (VMM) had significant positive relationship with economic growth; while the number of registered mobile money account (RMM) does not have any significant impact on economic growth in Nigeria. The study therefore concludes that financial inclusion is a significant determinant of economic growth in Nigeria within the period of investigation. Thus, it is recommended that, since automated teller machine (ATM) is a significant determinant of economic growth in Nigeria, regulators and indeed, management of banks must constantly provide the enabling environment for expansion of the use and functionality of automated teller machines (ATMs) so that it will continue to make positive impact on the Nigerian economy.

**Keywords:** Financial inclusion, Economic growth, Automated teller machine, Mobile money.

### 1. Introduction

Nigeria, one of Africa's biggest economies in terms of Gross Domestic Product (GDP), is at a crossroad between long-standing structural issues and economic potentials. The National Bureau of Statistics (NBS) has stated that Nigeria's GDP grew by 3.40% in 2024. This growth is primarily driven by the non-oil sector,

especially the services sector, which accounted for 57.38% of the total. Agriculture and industry followed with 25.59% and 17.03%, respectively, as well as the recovery in the crude petroleum and natural gas sectors (NBS, 2024). Despite these indications of expansion, the nation nevertheless faces a challenging economic environment marked by pervasive unemployment, poverty, and income disparity. Approximately 54% of Nigerians, according to World Bank (2024) estimates live below the national poverty line. Furthermore, NBS reports that in the second quarter of 2024, unemployment was 4.3%. Concerns regarding the sustainability and inclusivity of Nigeria's growth trajectory are raised by these numbers, which highlight the unequal distribution of economic gains. In order to solve these problems, economic growth is essential. In order to pull people out of poverty, lessen inequality, and guarantee widespread involvement in economic activities, inclusive growth is more important than GDP expansion alone (Todaro & Smith 2020). A key tactic for fostering equitable economic growth in this regard is financial inclusion (Demirgüç-Kunt, Klapper, & Singer, 2017). Particularly in emerging nations like Nigeria, where a sizable section of the populace is still unbanked or underbanked, financial inclusion is becoming more widely recognized as a critical engine of economic growth. Limited access to financial services hinders Nigeria's capacity for progress by exacerbating poverty and economic inequality in the country. By enabling marginalized groups to participate in and profit from economic activity, financial inclusion democratizes access to financial services and promotes sustainable growth (Beck, Demirgüç-Kunt, & Levine, 2010). By improving access to credit, savings, and investment opportunities, financial inclusion can promote productivity, entrepreneurship and the effective use of resources. Additionally, financial inclusion helps strengthen small and medium-sized businesses (SMEs), which are essential for reducing poverty and creating jobs (Eton, Mwosi, Okello-Obura,

Turyehbwa, & Uwonda, 2021). Moreover, the regulatory environment and the caliber of financial services determine how well financial inclusion promotes economic growth. But in spite of these possible advantages, Nigeria still faces issues like high rates of financial exclusion and inadequate financial infrastructure, which begs the question of how financial inclusion will actually affect the nation's economic growth trajectory (World Bank, 2024).

Over the past 20 years, financial inclusion in Nigeria has evolved in response to the nation's bigger socioeconomic issues. The Central Bank of Nigeria (CBN) launched a microfinance policy in 2005 with the goal of using microfinance organizations to offer financial services to the unbanked populace (CBN, 2011). The groundwork for further financial inclusion initiatives was established by this strategy. With the audacious objective of lowering the percentage of adults who are financially excluded from 46.3% in 2010 to 20% by 2020, the CBN unveiled the National Financial Inclusion Strategy (NFIS) in 2012 (CBN, 2018). Nevertheless, the goal was not met by 2020, as only 64.1% of people were financially included; by 2024, 74% of individuals were financially included (EFInA, 2024). Notwithstanding this deficiency, new developments in digital technology, especially mobile banking and financial technology breakthroughs, have made the push for financial inclusion even more urgent. The relevance of financial inclusion cannot be overemphasized; it helps people save, invest, and manage their financial risks. It also boosts capital formation and resource allocation, which contributes to the growth of the national economy (Demirgüç-Kunt et al., 2017).

There have been conflicting findings from prior studies investigating the link amid financial inclusion and economic growth in Nigeria. A number of scholars, including Oyadeyi (2024) and Adedokun and Ağa (2023), claim a positive correlation between increased financial inclusion and a higher rate of economic growth, encouraging investments, savings, and job creation. According to these results, improving financial services accessibility may boost economic activity and help many Nigerians escape poverty. Other investigations, on the other hand, such as that by Nkwede (2015) showed a negative link between financial inclusion and economic growth and contend that the significant degree of financial exclusion of bankable individuals from Nigeria's financial system was the possible cause of the outcome. In order to reconcile the available literature and shed light on the true nature of this link, these conflicting findings call for additional research.

Furthermore, it is important to address methodological flaws in past investigations because a large number of studies have mostly used Ordinary Least Squares (OLS) procedures, which are recognized to have drawbacks such as omitted variable bias and inefficiency when estimating long-run associations (Greene, 2018). However, by resolving possible endogeneity and serial correlation problems, Fully Modified Ordinary Least Squares (FMOLS) offers a strong substitute that produces estimates of long-term correlations that are more reliable (Pedroni, 2001). Despite its efficiency, not enough research has been done on the use of FMOLS to analyze how financial inclusion affects economic growth in Nigeria. This work intends to eliminate this methodological gap by using FMOLS to offer a more precise analysis of the link between economic growth and financial inclusion, ultimately adding to the conversation about economic policy in Nigeria.

## 2. Literature Review

### 2.1 Conceptual Literature

Financial inclusion, a complex idea, has been defined and explained distinctly by different academics, demonstrating its ever-changing and dynamic nature. Financial inclusion, as opined by Demirgüç-Kunt et al. (2017), is the accessibility and use of formal financial services by people and firms to fulfill their financial needs. They highlight how it can help alleviate poverty and promote economic growth. Another dimension is provided by Chikalipah (2017), who argues that financial inclusion includes expanding access to financial services to groups that have historically been excluded, such as low-income households and small businesses. Lastly, Ozili (2020) offers a comprehensive definition, claiming that financial inclusion entails giving low-income and underprivileged groups of people access to financial services at reasonable prices in order to improve their ability to participate in the economy and maintain financial stability. Combining these definitions, financial inclusion can be viewed as an all-encompassing approach to increase access to and the efficient utilization of a wide array of financial services for all individuals and firms, especially those from marginalized communities with a view to fostering economic growth and lower inequality.

Examining the various dimensions of financial inclusion is essential to comprehending it completely. The first dimension is the accessibility of physical financial infrastructure, which is frequently assessed using metrics like the number of ATMs per 100,000 adults and bank branches. Based on World Bank's

Global Financial Development Database (2022) estimates, Nigeria has modest levels of accessibility in 2020, with 4.4 bank branches per 100,000 adults, 16.1 ATMs per 100,000 adults, and 1310.4 bank accounts per 1,000 adults. But since most of these numbers are concentrated in cities, rural populations are underserved. The second dimension pertains to digital financial services, especially mobile money, which has experienced rapid expansion in the past few years. As of 2024, there were 2.1 billion active mobile money accounts in Nigeria (GSMA, 2025). This figure demonstrates the growing dependence on mobile technologies for financial transactions in a nation with insufficient traditional banking infrastructure. The credit market is another crucial dimension. Another important metric, the private sector credit to GDP ratio, was 13% in 2022, which was among the lowest in sub-Saharan Africa (World Bank, 2025). In 2024, mobile money transaction volumes grew by 20 percent year-on-year, while transaction values surged by 16 percent, up from a 13 percent growth in 2023. Around 108 billion transactions, representing over \$1.68 trillion, were processed using mobile money accounts in 2024 (GSMA, 2025). Together, these dimensions show the strengths and weaknesses of Nigeria's financial inclusion initiatives, highlighting the need for more focused approaches to reduce current gaps, particularly in rural areas.

## 2.2 Empirical Literature

The impact of financial inclusion on economic growth in Nigeria has been a subject of empirical inquiry, with various studies indicating positive, negative and mixed results between the two variables. Oyadeyi (2024) explored the effects of financial inclusion and banking innovation on Nigeria's economic growth using mixed data sampling (MIDAS) and autoregressive distributed lag (ARDL) models with monthly and quarterly data from 2009 to 2021 which was sourced from the CBN Statistical Bulletin and the World Development Indicator. The researcher revealed that financial inclusion and banking innovations, particularly ATMs and mobile transactions, exert a consistent positive effect on economic growth with both analytical techniques. POS and web transactions also contributed to growth but showed inconsistent results between the MIDAS and ARDL methods, while cheque transactions did not significantly affect economic growth in the ARDL model. Notably, POS transactions had the most substantial impact, followed by ATMs, mobile, and web transactions. The researcher closed by suggesting that financial inclusion and innovations in the banking industry are crucial for engendering economic growth in Nigeria.

Adedokun and Ağa (2023) examined the relationship between financial inclusion and economic growth in Sub-Saharan Africa (SSA) from 2004 to 2017. Utilizing the GMM and Dumitrescu–Hurlin causality test, the study developed a composite index for financial inclusion using principal component analysis. The results show a significant positive impact of financial inclusion on economic growth in SSA, signifying that improved access to financial services facilitates economic activities and growth. Additionally, the study uncovers a short-run causality from economic growth to financial inclusion, implying that as economies grow, financial inclusion tends to improve, creating a reinforcing cycle that promotes further growth.

Ben Abdallah, Becha, Kalai, and Helali (2023) analyzed the connection between traditional financial services, digital financial inclusion, and economic growth in 14 Middle-East and North Africa (MENA) nations from 2000 to 2021. Employing the PMG-ARDL and GMM-system procedures to capture both short-run and long-run associations, the study found that digital financial inclusion exerted a positive effect on GDP per capita, outperforming traditional financial services. The study also identified internet usage and mobile subscriptions as major influencing variables of digital financial inclusion in the MENA area. These findings imply that enhancing digital financial services can significantly contribute to economic growth in the area, highlighting the importance of technology and digital infrastructure in the financial sector.

Chinoda and Kapingura (2023) examined the influence of institutional quality and governance on the relationship between digital financial inclusion and economic growth in Sub-Saharan Africa (SSA) from 2014 to 2020. Using the GMM procedure to control for endogeneity, the research focused on four main factors: digital financial inclusion index, governance, GDP per capita growth and institutional quality. The result revealed a substantial positive effect of institutional quality and governance on the nexus amid digital financial inclusion and economic growth. Moreover, the research discovered that trade and population growth positively affected economic growth, while inflation had a negative impact in the area. These results suggest that robust institutions and sound governance structures enhance the positive impacts of digital financial inclusion on economic growth within SSA.

Ibechiale (2023) assessed the impact of financial inclusion on Nigeria's economic growth from 1992 to 2021 using secondary data sourced from the Central Bank of Nigeria's statistical bulletins. The study used

commercial bank loans to rural areas, bank deposits from rural areas, and credits to small and medium-scale enterprises (SMEs) as proxies for financial inclusion, while GDP represented economic growth. Through regression analysis employing the OLS technique, the research revealed that bank loans and deposits to and from rural areas had a significantly positive impact on GDP. In contrast, credits to SMEs showed a negative and insignificant relationship with GDP. The study concluded that financial inclusion, primarily through rural banking services exert a positive and significant connection with economic growth in Nigeria.

Avouba, Akougbe, and Ondze (2023) examined the nonlinear connection amid financial inclusion and economic growth within the West African Economic and Monetary Union (WAEMU) using a panel-corrected standard error (PCSE) model for eight nations from 2014 to 2018. The findings indicated a U-shaped correlation amid the extended banking rate and economic growth. The results implied that economic growth exhibited two different behaviors depending on the regime relative to the inflection point of financial inclusion. This non-linear association implies that at different levels of financial inclusion, the impact on economic growth varies, thereby suggesting that under- and over-financial inclusion could possess distinct implications for economic growth in the WAEMU region.

Ifediora, Offor, Eze, Takon, Ageme, Ibe, & Onwumere (2022) investigated the impact of financial inclusion on economic growth across 22 SSA countries between 2012 and 2018 employing a system GMM approach. A combined index of financial inclusion, alongside each indicator, was used to examine different facets of financial inclusion including availability and penetration. The results indicated that both the availability, penetration dimensions as well as the combined index of composite financial inclusion (the entire indicators combined) significantly and positively influenced economic growth, whereas the usage dimension does so insignificantly. More so, bank branches and ATMs are found to have a substantial positive effect, deposit accounts and outstanding loans enhance economic growth but insignificantly whilst outstanding deposits negatively impacted growth. Mobile money indicators present a mixed picture: mobile money agents are detrimental to expansion, whereas mobile money accounts and transactions have a positive, though insignificant, effect. The study suggests that financial education strategies should be followed to maximize the benefits of financial inclusion, indicating that mere

access is insufficient without adequate knowledge and trust in financial services.

Emara and El Said (2021) analysed the relationship between financial inclusion, governance, and economic growth in the Middle East and North Africa (MENA) area using a system GMM dynamic panel model with annual data spanning from 1990 to 2018. The study employed various indicators of financial inclusion, comprising the number of bank branches and bank accounts, households' and firms' access to finance, percentage of enterprises utilizing banks to finance investments, as well as the proportion of enterprises employing bank loans to finance working capital. The outcomes revealed that financial inclusion significantly boosts GDP per capita growth in the MENA region. However, the positive impact of businesses' access to finance is only significant when strong institutions are present. This suggests that the gains of financial inclusion are contingent on the existence of robust governance structures, including the rule of law, political stability and judicial independence. Hence, the study concludes that nations with low levels of financial access, including those in the MENA area, could greatly profit from improving governance to optimize the benefit of financial inclusion on economic growth.

Liu, Luan, Wu, Zhang, and Hsu (2021) explored the relationship between digital financial inclusion and economic growth in China by employing a Bayesian macroeconomic analysis framework and provincial panel data from 2011 to 2019. They introduce the degree of internet development as a threshold variable to examine the potential mediating effects. Their findings suggest that digital financial inclusion substantially propels economic growth, especially when considering the internet threshold effect. Furthermore, they identified two primary channels through which digital financial inclusion fosters growth: promoting entrepreneurship among SMEs and stimulating consumer spending. The study implied that digital financial inclusion can drive economic expansion by leveraging internet infrastructure to enhance financial services access.

Ali, Hashmi, Nazir, Bilal, and Nazir (2021) analysed the link amid financial inclusion and economic growth of member nations of Islamic Development Bank (IsDB) using a financial inclusion index (FII). The research analyzed data from 45 countries from 2000 to 2016 utilizing a range of econometric techniques including the GMM, panel vector autoregressive (VAR), two-stage least squares (2SLS) and Granger causality tests. Results indicates that financial inclusion exerts appositve effect on economic growth,

with the Granger causality analysis revealing a bidirectional association amid financial inclusion indicators and economic growth and a unidirectional causality amid the FII and economic growth. These findings suggest that enhancing financial inclusion can foster economic development in IsDB member countries, and, reciprocally, economic growth can promote greater financial inclusion.

Enueshike and Okpebru (2020) assessed the effects of financial inclusion on Nigeria's economic growth from 2000 to 2018 using archival data from the Central Bank of Nigeria. The investigation used variables such as loans to SMEs (LSME), and rural bank deposits (RBD), as well as inflation (INF) as control variable. Unit roots and co-integration were performed. Employing the ARD for analysis, they found that LSME, RBD and INF exert a positive and considerable effect on economic growth. The researchers further confirmed long-run relationships among the variables, indicating that policies aimed at increasing loans to SMEs and enhancing rural banking services can exert a substantial effect on Nigeria's economic growth.

Adegboyegun, Ademola, & Kazeem (2020) investigated the impact of financial inclusion on Nigeria's economic growth and using Auto Regressive Distributed Lag (ARDL) and causality techniques to analyze data spanning from 1986 to 2018. They included variables such as GDP, loans to rural areas, number of bank branches, deposits from rural areas and interest rates. Their results indicated that financial inclusion positively affected economic growth, whereas high-interest rates negatively impacted it. Additionally, causality tests reveal a unidirectional causality flowing from economic growth to financial inclusion, primarily facilitated via loans to rural areas. This finding suggests that fostering economic growth can, in turn, enhance financial inclusion, especially in underserved areas.

Nkwede (2015) used time series data from 1981 to 2013 to investigate the impact of financial inclusion on the expansion of the African economy, with a particular emphasis on Nigeria. The results of the multiple regression analysis employing the OLS estimate approach showed that financial inclusion had a considerable but negative impact on the Nigerian economy. The significant degree of financial exclusion of bankable individuals from Nigeria's financial system was attributed by the researcher as the possible cause of the outcome.

### 3. Data and Methodology

#### 3.1. Data

The study investigated the correlation between financial inclusion and economic growth in Nigeria from 2001 to 2023. The population of study included data of the entire financial inclusion and economic growth indices in Nigeria. Due to the difficulty in obtaining the data for the entire variations of financial inclusion indices affecting economic growth in Nigeria, the study's sample was restricted to the variables of the study such as the number of ATMs per 100,000 adults, number of registered mobile money accounts per 1,000 adults, private credit to GDP, number of bank branches per 100,000 adults, total volume of mobile money transactions as a percentage of GDP, and real gross domestic product. The study employed time series data obtained from the CBN annual statistical bulletin (2023), NBS annual bulletin, Enhancing Financial Innovation & Access (EFInA) annual survey (2023) and the World Bank for the period under review.

#### 3.2. Theoretical Framework and Model Specification

The poverty gap theory, which emphasizes the difference between the income of the poor and the poverty line, provides the foundation for this investigation. The works of Sen (1976) and other development economists had a major influence on this hypothesis. Sen (1976) made a significant contribution by defining poverty in a way that takes into account capacities and the multifaceted nature of poverty rather than just income levels. According to the poverty gap theory, poverty encompasses both a lack of money and access to necessary services, such as financial services that can enable people to improve their financial situation (Alkire & Foster, 2011). The poverty gap hypothesis offers a framework for understanding how financial services access may help close this gap within the context of financial inclusion, encouraging economic engagement among the impoverished and stimulating economic growth in general. The poverty gap theory highlights the possible influence that financial inclusion exerts on economic growth within the Nigerian setting. By following this hypothesis, Nigeria can enhance economic activity and growth by shrinking the poverty gap through greater financial inclusion.

The regression model for this study was adapted from previous research conducted by Sophia, Adesina-Uthman, and Joshua (2023). Their model is presented as follows:

$$GRT_t = \alpha_0 + \beta_1BLR_t + \beta_2ATM_t + \beta_3BRC_t + \beta_4M2_t + \beta_5CAP_t + \beta_6LAB_t + \mu_t \dots\dots\dots (3.1)$$

The current study modifies the model of Sophia et al. (2023) by incorporating financial inclusion metrics such as the number of automated teller machines per 100,000 adults (ATM), number of registered mobile money accounts per 1,000 adults (RMM), private credit to GDP (PCR), number of bank branches per 100,000 adults (NBB), and total volume of mobile money transactions as a percentage of GDP (VMM) as independent variables.

The functional form of the modified model is expressed as follows:

$$RGDP_t = f(ATM_t, RMM_t, PCR_t, NBB_t, VMM_t) \dots\dots\dots (3.2)$$

The functional model is expressed in its econometric form as:

$$RGDP_t = \beta_0 + \beta_1ATM_t + \beta_2RMM_t + \beta_3PCR_t + \beta_4NBB_t + \beta_5VMM_t + \varepsilon_t \dots\dots\dots(3.3)$$

Where:  $RGDP_t$  = Real gross domestic product at time  $t$ ;  $ATM_t$  = Number of ATMs per 100,000 adults at time  $t$ ;  $RMM_t$  = Number of registered mobile money accounts per 1,000 adults at time  $t$ ;  $PCR_t$  = Private credit to GDP at time  $t$ ;  $NBB_t$  = Number of bank branches per 100,000 adults at time  $t$ ;  $VMM_t$  = Total volume of mobile money transactions as a percentage of GDP at time  $t$ ;  $\beta_0, \beta_1 - \beta_5$  = Parameters to be estimated;  $\varepsilon_t$  = Error term capturing other elements not reflected in the model

**3.4 Operationalization of Variables**

The operationalizations of all the variables of the study are presented below:

**Table 3.1:** Operationalization of Variables

Variable	Type	Measurement	Source
Real Gross Domestic Product (RGDP)	Dependent	Measured in billions of local currency, adjusted for inflation (real terms)	Adedokun and Aḡa (2023)
Number of automated teller machines per 100,000 adults (ATM)	Independent	Total number of ATMs per 100,000 adults	Ibechirole (2023)
Number of registered mobile money accounts per 1,000 adults (RMM)	Independent	Total registered mobile money accounts per 1,000 adults	Ifediora et al. (2022)
Private credit to GDP (PCR)	Independent	Ratio of private credit issued by financial institutions to GDP (%)	Oyadeyi (2024)
Number of bank branches per 100,000 adults (NBB)	Independent	Total number of bank branches per 100,000 adults	Adegboyegun, et al. (2020)
Total volume of mobile money transactions as a percentage of GDP (VMM)	Independent	Total mobile money transaction volume as a percentage of GDP (%)	Ifediora et al. (2022)

*Source: Authors' compilations (2025).*

**4. Results and Discussion**

**4.1 Unit Root Testing**

The Augmented Dickey-Fuller (ADF) test was used to examine unit roots. Table 4.1 shows results at level and first difference. ADF statistics and 95% critical values appear in columns two to six. At level, all variables except NBB were non-stationary (panel 1). After first differencing, all became stationary (panel 2) which means they are

The a priori expectation for the independent variables are as follows:  $\beta_1 > 0$ : ATMs is expected to have a positive relationship with RGDP;  $\beta_2 > 0$ : RMM is expected to have a positive relationship with RGDP;  $\beta_3 > 0$ : PCR is expected to have a positive relationship with RGDP;  $\beta_4 > 0$ : NBB is expected to have a positive relationship with RGDP;  $\beta_5 > 0$ : VMM is expected to have a positive relationship with RGDP. Thus, the expected signs of the parameters are:  $\beta_1 > 0, \beta_2 > 0, \beta_3 > 0, \beta_4 > 0, \beta_5 > 0$

**3.3 Estimation Procedure**

This study utilised the Fully Modified Ordinary Least Squares (FMOLS) procedure to evaluate the impact of financial inclusion on Nigeria's economic growth. Statistical tests such as the t-test, R-squared, and F-test were used to validate the results. Time series data were analyzed for stationarity using the ADF test. A cointegration test followed to determine if non-stationary variables shared a long-run equilibrium relationship. Additionally, unit root tests confirmed the integration order suitability for the chosen model. After cointegration was established, an ECM was introduced to accommodate the short-run dynamics while upholding the long-run equilibrium among variables.

difference-stationary. This confirms the presence of unit roots implying that the variables are integrated of order one (i.e. I[1]) and achieve stationarity only after first differencing.

**Table 4.1:** Unit Root Test for Variables in Levels

Variables	At Level (Panel 1)			At First Difference (Panel 2)				
	ADF Statistic	Test	95% Critical ADF Value	Remark	ADF Statistic	Test	95% Critical ADF Value	Remark
RGDP	2.06971		-3.004861	Non-Stationary	-6.176673		-3.020686	Stationary
ATM	-0.084332		-3.004861	Non-stationary	-4.515343		-3.012363	Stationary
RMM	-3.01065		-3.104861	Non-Stationary	-5.264028		-3.020686	Stationary
PCR	-2.151163		-3.012363	Non-stationary	-4.344422		-3.020686	Stationary
NBB	-3.932976		-3.004861	Stationary	-5.663601		-3.012363	Stationary
VMM	-1.729455		-3.012363	Non-stationary	-4.947547		-3.02997	Stationary"

*Source: Authors' Computation (2025)*

### 4.2 Cointegration Analysis

After confirming that the time series in the analysis are not stationary in their levels, we proceed to ascertain whether they are cointegrated. The Johansen system of cointegration technique was employed as indicated in Table 4.2 below.

**Table 4.2:** Johansen Multivariate Cointegration Tests Results

Trace Test				Maximum Eigenvalue Test		
Null Hypothesis	Test Statistic	Critical Value	Prob.	Test Statistic	Critical Value	Prob.
R = 0*	244.5764	95.75366	0.0000*	118.1394	40.07757	0.0000*
$r \leq 1$	126.4370	69.81889	0.0000*	57.45622	33.87687	0.0000*
$r \leq 2$	68.98078	47.85613	0.0002*	41.48700	27.58434	0.0005*
$r \leq 3$	27.49378	29.79707	0.0901	13.17721	21.13162	0.4361
$r \leq 4$	14.31657	15.49471	0.0746	9.603628	14.26460	0.2393
$r \leq 5$	4.712943	3.841466	0.0299*	4.712943	3.841466	0.0299*

*Source: Authors' Compilations (2025)*

The Eigenvalue test ( $\lambda$ -max) and the trace test statistics show that there are about eight (8) significant cointegrating vectors between financial inclusion and economic growth in Nigeria. This suggests the presence of long-run connection amongst these hypothesized variables.

### 4.3 The Fully Modified Least Squares (FMOLS) Estimates

**Table 4.3:** Financial Inclusion and Economic Growth in Nigeria (FMOLS)

Variables	Coefficient	T-Ratio	Prob.
ATM	0.0001	13.67694	0.0000**
RMM	4.39E-05	1.98109	0.065
PCR	1534.784	4.080435	0.0009**
NBB	1873.779	2.260745	0.0381*
VMM	2.46E-05	8.326563	0.0000**
Constant	-1340324	-2.248105	0.039
$R^2 = 0.98; \bar{R}^2 = 0.97$			

*Source: Authors' Compilations (2025): Note: \*\*sig at 1% level; \*sig at 5% level.*

The results of the FMOLS estimation of financial inclusion and economic growth in Nigeria is shown in table 4.3. The diagnostic indicator is outstanding from the outcomes. The high R squared score of 0.98 indicates that the model has demonstrated a good capacity for prediction. This demonstrates that changes in the explanatory variables account for more

than 98% of the systematic variance in Nigeria's economic growth as measured by RGDP. The model's excellent predictive power is indicated by the equally high corrected R-squared value of 0.97%.

On the specifics, the coefficient of the volume of automated teller machines transactions (ATM) has

significant positive relationship with economic growth in Nigeria, and was significant at the 1% level, meaning that as the volume of automated teller machines rises; economic growth in Nigeria improves by 0.000100%. This suggests that the use of ATM machines by banks' customers is a significant factor for economic growth in Nigeria.

The coefficient of number of registered mobile money accounts (RMM) has a weak positive link with economic growth in Nigeria. The variable failed the 5% significance level. Thus, in determining economic growth in Nigeria, number of registered mobile money account (RMM) is not a relevant factor to be considered.

On the other hands, private credit to GDP (PCR) is seen to also exert significant and positive impact on economic growth at the 1% level of significance. The implication of this is that the total amount of credit/loans granted to the private sector of the economy as a ratio of general economic activities is a potent factor for determining or enhancing economic growth in Nigeria.

The coefficient of the number of bank branches (NBB) is positively signed passing the 5 percent significant level. Thus, with increases in rural and urban banks branches, there is a corresponding increase in economic activities by approximately 1873.779%. It reveals that financial inclusion with respect to the number of bank branches (NBB) is also a key determining factor of economic growth in Nigeria.

The total volume of mobile money transactions to GDP (VMM) exerts a significant positive association with economic growth (RGDP) and passed the 1% significance level. By implication, the result suggests that total volume of mobile money transactions to GDP (VMM) play significant role in Nigeria's economic growth during the period of investigation. This is simply a signal that financial inclusion as it relates to total volume of mobile money transactions to GDP has significantly contributed to the general growth of the Nigerian economy overtime.

## 5. Conclusion and Policy Recommendations

The growing significance of financial inclusion as a driving force for economic growth is increasingly recognized. It is now widely viewed as a fundamental right and essential for promoting social inclusion, improving living standards, and empowering the economically disadvantaged. This study investigated the association amid financial inclusion and economic growth in Nigeria from 2001 to 2023 using various indicators of financial inclusion such as ATM, RMM,

PCR, NBB, and VMM. Real GDP served as the proxy for economic growth. The analysis was conducted using the FMOLS technique. The findings revealed that ATM usage, private credit to GDP, number of bank branches, and mobile money transaction volumes positively and significantly influenced economic growth. However, the number of registered mobile money accounts did not show a significant impact. The study concludes that financial inclusion plays an essential task in propelling economic growth in Nigeria during the study period.

In light of the study's findings, the following key recommendations are offered:

- Since automated teller machine (ATM) is a significant factor of economic growth in Nigeria, regulators and indeed, management must constantly provide the enabling environment for expansion of the use and functionality of ATMs so that it will continue to provide positive impact on the Nigerian economy.
- The CBN should continue to initiate policies that will encourage deposit money banks in the country to advance loans and credit facilities to the real sector and this will in turn spur rapid growth of the economy.
- The government and relevant policy makers in the country should deliberately pursued policy of giving quality access to credits facilities, affordability of products, enhance sustainability, and outreach to the mainly financially excluded Nigerians. This will make financial inclusion to have more positive effect on economic growth in Nigeria.

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