RE-EXAMINING THE DETERMINANTS OF FINANCIAL INCLUSION IN NIGERIA

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ABSTRACT

The study examines the determinants of financial inclusion in Nigeria from 2010Q1to 2022Q4. The study applies Augmented Dickey-Fuller (ADF) test and Phillips-Perron (PP) test to check the stationarity of the data, Autoregressive Distributed Lag (ARDL) Model was used to examine the determinants of financial inclusion in Nigeria. The results indicate that literacy rate boosts financial inclusion while money supply reduces financial inclusion. Remittances positively influences financial inclusion although not statistically significant. The study also reveals that financial innovation positively impacts financial inclusion in Nigeria. Lastly, the result also shows that trade openness has a positive and statistically significant impact on financial inclusion at 1 per cent significance level in the long-run. The study recommends that The CBN and financial institutions should promote financial literacy and education by developing targeted financial literacy programs, especially in rural and underserved communities, to improve awareness and usability of financial products.

Key words: *ARDL, financial inclusion, Literacy rate, money supply, remittances,*
JEL Classification: G20, G28

1.0 Introduction

Financial inclusion is a cornerstone for economic development, poverty alleviation, and financial stability. It ensures that individuals and businesses, particularly underserved populations, have access to a broad spectrum of financial services such as savings, credit, insurance, and payment systems provided by formal financial institutions. This inclusive financial approach fosters personal and national economic growth by enabling individuals to save, invest, and engage in entrepreneurial activities (Ogwumike & Eyo, 2017)

Globally, financial inclusion is recognized as a driver of sustainable development. The United Nations' Sustainable Development Goals (SDGs), particularly Goals 8 and 10, emphasize its importance in fostering decent work, economic growth, and reducing inequalities. Similarly, international institutions such as the World Bank and IMF have integrated financial inclusion into their development agendas, underscoring its role in enhancing

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global economic equity.

Despite its recognized importance, financial inclusion in Nigeria faces significant challenges. While metrics like the number of ATMs and bank branches per 100,000 adults provide some insight into accessibility, they reveal stark regional disparities.
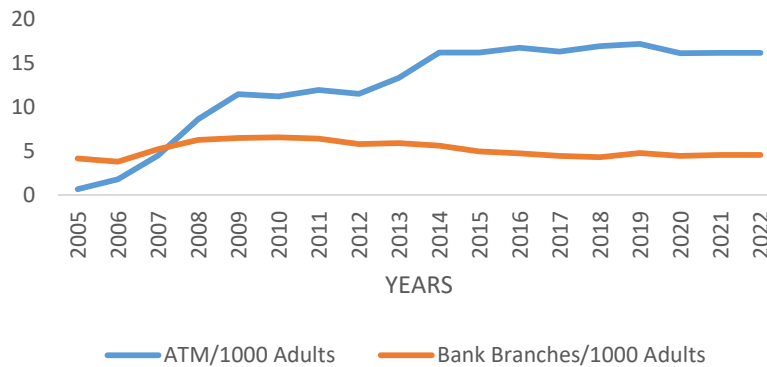

Figure 1.1. Number of ATMs and Bank Branches per 1000 Adults

Source: *Author's computation using data from World Bank (2024)*

Figure 1.1. Shows the number of ATMs and bank branches per 100,000 adults in Nigeria, it is evident that there has been an increase in both metrics over the years. The Nigerian government has prioritized financial inclusion as part of its development strategy, introducing policies such as the 2012 Financial Inclusion Strategy. However, despite these efforts, exclusion rates remain high, with approximately 40 million adult Nigerians (36%) formally excluded (Enhancing Financial Innovation and Access [EFInA], 2024) from formal financial services. Barriers such as limited access, high transaction costs, and socioeconomic challenges like poverty and illiteracy persist, particularly in rural areas. These barriers restrict wealth accumulation, hinder small business growth, and leave vulnerable households exposed to economic shocks (Victor et al., 2022). Geographical disparities and infrastructural limitations further widen the exclusion gap, while regulatory and technological advancements present opportunities for progress. Addressing these multifaceted challenges requires a nuanced and inclusive approach to ensure equitable access to financial services across all regions and demographics. Various studies have identified critical determinants of financial inclusion in Nigeria. Socioeconomic factors such as income, education, and employment status significantly influence financial service adoption. This study differs from other studies in Nigeria by including financial innovation as one of the variables in its model since it has been established that it enhances financial inclusion (Qamruzzaman, 2023). Therefore this study examines the determinants of

financial inclusion in Nigeria from 2010Q1 to 2022Q4. The rest of the paper is structured as follows: section two reviews literature, section three outlines the methodology, section four presents the results and discussion, and section five offers conclusions and recommendations.

2.0   Empirical Literature

The empirical literature presents a comprehensive examination of financial inclusion and its determinants across various regions and countries. Uddin *et,al*. (2023) examine the determinants of financial inclusion in gulf cooperation council countries, using the Probit method of estimation. The study reveals that the number of people who reported having a formal financial institution account increased by 16 percent between 2011 and 2017. At the same time, formal saving and formal borrowing were low in GCC countries compared to the average of high-income countries' average. Eldomiaty *et,al.* (2020) in their studies of Institutional determinants of financial inclusion using a fixed generalized linear model, the results reveal that control of corruption, government effectiveness, political stability and voice and accountability are the significant WGIs that influence financial inclusion significantly. Similarly, Alber (2019) examine the determinants of financial inclusion: The Case of 125 Countries from 2004 to 2017 using GMM techniques. Results indicate that GDP per capita may have a significant positive effect on financial inclusion, while each of GDP growth, and interest rate spread may have a significant negative effect. Besides, inflation rate seems to have no significant effect on financial inclusion.

In Africa, the empirical literature on financial inclusion provides insights into its determinants and implications for economic development across various countries. Eshun and Kocenda (2023) analyses the determinants of financial inclusion in Africa and OECD countries using System Generalized Method of Moments (GMM) estimator. The findings indicate that the differences in trade openness, banks' efficiency, income, and remittances are some macro-level factors that explain the variation in financial inclusion levels between SSA and OECD countries. Mhlanga and Denhere (2020) empirically examine the determinants of financial inclusion in South Africa, employing the logit model method of estimation. The study discovered that financial inclusion is driven by age, education level, and total salary proxy of income, race, gender, and marital status. The variable gender was the only factor with a negative influence on financial inclusion all other significant variables had a positive influence on financial inclusion.

Similarly, Agyapong (2020) empirically examine the determinants of financial inclusion and economic growth in Ghana employing the probit model. The study showed that independent variables like age, marital status, educational level, religious affiliation and hours worked significantly impel the chances of having a

bank account in Ghana. Using Pooled Ordinary Least Squares, Wokabi and Fatoki (2019) examine the determinants of financial inclusion in east Africa. The study found that rural population and income are significant determinants of financial inclusion with rural population being negatively related with financial inclusion. Unemployment though statistically insignificant had a negative relationship with financial inclusion. Interest rates had a positive but insignificant relationship with financial inclusion.

Furthermore, Ajide (2017) examine the determinants of financial inclusion in Sub-Saharan Africa Countries using a dynamic system of Generalized Method of Moments (SYS-GMM). The emanated findings consistently stress the importance of institutions together with other control variables like GDP per capita, inflation, bank concentration and z-score as key drivers of financial inclusion. Chikalipah (2017) investigated the determinants of financial inclusion (FI) in Sub-Saharan Africa (SSA) using OLS estimation technique. The empirical findings in this study indicate that illiteracy is the major hindrance to financial inclusion in Sub-Saharan Africa.

The empirical literature on financial inclusion in Nigeria spans various methodologies and focal points, shedding light on its determinants, challenges, and implications for economic development. Also, Ozili (2020) examine financial inclusion in Nigeria: Determinants, challenges and Achievements. The result shows that the level of financial inclusion in Nigeria is high relative to other African countries. However, the use of financial institutions to save in Nigeria remains low, which might be a result of lack of trust in financial institutions in Nigeria. Eze and Markjackson (2020) employs ordinary least square technique to ascertain the determinants of financial inclusion in Nigeria. The findings indicate that commercial bank branches and deposit interest rate exert a negative and insignificant impact on financial inclusion. Further results indicate that domestic credit to private sector (% of GDP), ratio of rural deposits to loans and lending interest rate exert a positive and significant impact on financial inclusion.

 Finally, Aina and Oluyombo (2014) used Simple data analysis technique to understand the level of financial inclusion in Nigeria. The result found that though access to bank accounts is high, a majority of the respondents operate savings accounts. The use of mobile money and insurance services is very small among account holders. The highest self-reported barrier to the use of bank account is lack of necessary documents.

3.0. METHODOLOGY

In view of the main objective of this research work which aim at assessing the determinants of financial inclusion in Nigeria. The study employed quarterly data from 2010Q1 to 2022Q4. Data on Financial inclusion was collected from international monetary fund (IMF). Data on Financial innovation (FIN) and

Broad Money Supply (MS) were collected from the central bank of Nigeria statistical bulletin (CBN). While data on Literacy Rate (LR), Trade openness (TO), and Remittances (RM) were collected from the WDI, of World Bank database. The study examined the stationarity of the variables using the Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) unit root tests to test the null hypothesis that assumes the presence of a unit root for the variables at the level by including the constant and time trend and the same at the first difference. The short run and long run relationship among financial inclusion and the independent variables are examined using Autoregressive Distributed Lag (ARDL) Model.

3.1. Theoretical Framework

The systems theory of financial inclusion was adopted as the theoretical framework underpinning this study, because it best captured the relationship between the variables of interest of this study. According to the systems theory of financial inclusion of Ozili (2020), increased financial inclusion will benefit the systems it depends on because financial inclusion outcomes are attained through the current sub-systems (whether they are financial, social, or economic systems). One component of the system, or a sub-system, can undergo substantial changes that have a substantial impact on the anticipated outcome of financial inclusion. For example, enforcing regulations on economic agents and suppliers of financial services can align their interests with those of the users of basic financial services and force them to provide users with affordable and high-quality financial services within specified guidelines that safeguard users of financial services from exploitation and price discrimination. However, because a change in a subsystem must be made at the sub-system level, a large change at the entire system level, such as replacing the current national financial inclusion plan with a completely new plan, may not always result in a change in the current sub-systems. According to the theory, financial inclusion will enhance the performance of the subsystems it depends on; determine whether a financial inclusion agenda is successful or not; and the country's current subsystems—economic, financial, and social—will ultimately benefit from financial inclusion from a systems theory perspective. In essence, the system theory acknowledges the importance of existing economic, financial, and social systems, as well as their interconnections in fostering financial inclusion (Bahiru et al., 2023).

This theory can be expressed as an equation thus:

$$FI = f\left(Es, Fs, Ss\right) \hspace{8cm} (3.1)$$

Where, FI represents financial inclusion, Es is the economic system, Fs represents the financial system and Ss is the social system.

3.2. Model Specification

In other to achieve the objective, the study formulated a linear regression model Thus, in line with previous studies and to better examine the determinant of financial inclusion in Nigeria, a slightly modified version of the model developed by Eshun and Kocenda (2023) will be employed in order to capture the relevant variable of interest for the study. Therefore, the functional form of this model is specified as follows:

$$FI = F(TO, FIN, MS, LR, REM) \tag{3.2}$$

Thus, equation 3.2 is specified into econometric form as shown below:

$$FI_t = \beta_0 + \beta_1 TO_t + \beta_2 FIN_t + \beta_3 MS_t + \beta_4 LR_t + \beta_5 REM_t + \varepsilon_t \tag{3.3}$$

Taking the natural log of equation 3.3 yields;

$$LogFI_t = \beta_0 + \beta_1 LogTO_t + \beta_2 LogFIN_t + \beta_3 LogMS_t + \beta_4 LogLR_t + \beta_5 LogREM_t + \varepsilon_t \tag{3.4}$$

Where: FI_t is Financial inclusion, TO_t is Trade Openness, FIN_t is Financial innovation, MS_t is Broad money supply, LR_t is Literacy Rate, REM_t is Remittances, ε_t is the Error Term and β are the parameters of the model.

3.3. Autoregressive Distributed Lag (ARDL) Mode

An Autoregressive distributed lag (ARDL) model will be used to examine the determinant of financial inclusion in Nigeria. Pesaran & Shin (1999) and Pesaran, Shin, and Smith (2001) developed the ARDL model. It examines potential connections between two or more variables. Given its superiority over other long-term analytical tools, the Autoregressive Distributed Lag (ARDL) model's firstness, dependability, and statistical features make it justifiable for employment (Harris & Sollis, 2003; Ramazan, 2021). The ARDL approach to cointegration is estimated using the following Unrestricted Error Correction Model (UECM) equations:

$$\Delta LnFI_t = \beta_0 + \beta_1 LnFI_{t-1} + \beta_2 LnTO_{t-1} + \beta_3 LnFIN_{t-1} + \beta_4 LnMS_{t-1} + \beta_5 LnLR_{t-1} + \beta_6 LnREM_{t-1} + \sum_{i=0}^{p} \beta_7 \Delta FI_{t-1} +$$

$$\sum_{i=0}^{P} \beta_8 \Delta To_{t-1} + \sum_{i=0}^{p} \beta_9 \Delta FIN_{t-1} + \sum_{i=0}^{p} \beta_{10} \Delta MS_{t-1} + \sum_{i=0}^{p} \beta_{11} \Delta LR_{t-1} + \sum_{i=0}^{p} \beta_{12} \Delta REM_{t-1} + ECM +$$

$$\mu_t \tag{3.5}$$

The variables remain as previously described, Δ stands for the difference (or change) in respective variables. To satisfy the long-run relationship, ARDL bound test requires a null hypothesis for no co-integration H_0: $\beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6$ 0; for equations. The letters p and g in the equation denote that the dependent and

independent variables do not necessarily have to have the same lag length (Pesaran, Shin & Smith, 2001). The ARDL model is chosen because of its relative efficiency, robustness, and benefit of helping to build inferential knowledge about the dynamic nature of the variable.

Therefore, as already specified the study will employ Autoregressive Distributive Lag Model (ARDL) developed by Pesaran et al. (2001) in order to establish the long-run and short run equilibrium relationship on factors that influence financial inclusion in Nigeria.

4.0 Results and Discussion

Stationarity Analysis

In order to avoid the issue of spurious regression, this study employed the Augmented Dickey Fuller (ADF) Test in comparison with the Phillips and Perron (PP) Test. The ADF and PP results are presented in table 1.

Table 1: ADF and PP Unit Root Tests

Panel A: Augmented Dickey Fuller (ADF) Test				
	Level		**First Difference**	
Variables	Intercept	Intercept/Trend	Intercept	Intercept/Trend
LNFI	-2.905	-2.769	-4.149**	-4.246**
LNFIN	-2.186	-2.750	-7.562*	-7.795*
LNLIT	2.608***	-2.587	-4.493*	-4.445**
LNMS	-0.407	-2.415	-8.005*	-7.974*
LNREM	-2.154	-2.135	-2.892***	-2.830
LNTOP	-4.248**	-4.009***	-2.223	-2.350
Panel B: Phillips- Perron (PP) Test				
LNFI	-1.557	-1.861	-4.267**	-4.315**
LNFIN	-2.365	-2.707	-7.575*	-7.824*
LNLIT	-2.224	-2.220	-4.622*	-4.153**
LNMS	-0.384	-2.378	-8.006*	-7.977*
LNREM	-1.867	-1.847	-2.926***	-2.856
LNTOP	-13.373*	-517.619*	-2.224	-2.373

Source: *Researcher's Computation*

(*) indicates significant at the 10%, (**) significant at the 5% and (***) significant at the 1%.

The ADF and PP results are presented in table 1. Panel A of the table shows the results of the ADF test. The variables that were subjected to the test are log of financial inclusion (LNFI), log of financial innovation (LNFIN), log of literacy rate (LNLIT), log of money supply (LNMS), log of remittances (LNREM) and log of trade openness (LNTOP). Literacy rate (LNLIT) and trade openness (LNTOP) was stationary at level with an intercept at 1 % and 5% level of significance respectively, whereas all other variables were stationary at first difference under intercept and intercept and trend level of significance .This gives us a mixture of I(0) and I(1) in the order of integration. In Panel B, the PP results show that trade openness (LNTOP) was stationary at level under intercept and trend and intercept respectively at 1 % level of significance, whereas all other variables were stationary at first difference under intercept and intercept and trend level of significance. This also shows a mixture in the order of integration in the variables hence making it appropriate for the ARDL framework to be utilized.

4.1. ARDL Model Analysis

In order to examine the determinants of financial inclusion in Nigeria, the ARDL was utilized. The structure of the model chosen with the aid of the SIC is 2,1,1,0,2,2.

Table 2: Bounds Test

Model	K	F-Stat.	Significance Level	Critical Values	
				I(0)	I(1)
FI	5	8.135	10%	2.435	3.600
			5%	2.900	4.218
			1%	3.955	5.583

Source: *Researcher's Computation*

The result of the ARDL bound test from Table 4 indicate that the F-statistic of (8.135) exceed the critical values at all conventional levels of significance. Consequently, it is possible to reject the null hypothesis which stated that there is no cointegrating relationship amongst the variables under study. Therefore, there exists cointegrating relationship among financial inclusion, broad money supply, literacy rate, remittances, financial innovation and trade openness in Nigeria.

4.2. ARDL Long Run Analysis

Table 3: Linear ARDL Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNLIT	0.129	0.144	0.904	0.371
LNMS	-0.289	0.119	-2.419	0.019
LNREM	0.121	0.085	1.434	0.158
LNTOP	0.305	0.077	3.957	0.000
LNFIN	0.112	0.027	4.155	0.000

Source: Researcher's Computation

The result of the long-run relationship is depicted in Table 3, where it can be seen that Coefficient of literacy rate shows a positive effect on financial inclusion in the long run but it is not statistically significant. This can be attributed to the low financial literacy prevalent in the country (Torsten & Jack, 2023). This tends to support the findings of Ulwodi and Muriu (2017) and Driss Tsouli (2022). The long-run relationship result shows that financial innovation has a positive and statistically significant impact on financial inclusion. Meaning that a percentage increase in financial innovation lead to about 0.11 percent increase in financial inclusion in Nigeria *ceteris paribus*. The study is in line with the results Qamruzzaman (2023) and Qamruzzaman and Jianguo (2019) whose finding suggests that further development in financial innovation (that is emergence, adaptation, and diffusion of innovative financial assets, services, and instruments in the financial system) can produce a positive progress in financial inclusion. The increased usage of internet banking, mobile banking, banking agents, mobile money accounts, and mobile wallet services is increasingly integrating unbanked populations into the formal financial system.

Money supply has a negative and statistically significant relationship with financial inclusion at 5 percent level of significance. This implies that a percentage increase in money supply leads to about 0.29 percent decrease in financial inclusion, all other things being equal. This shows that continuous increase in the amount of money in circulation will definitely decrease financial inclusion in the country. This is in line with the findings of Okoroafor et al. (2018) and Evans and Adeoye (2016). Remittances carry the expected positive sign though not statistically significant in the long-run.

Lastly, the result also shows that trade openness has a positive and statistically significant impact on financial inclusion at 1 percent significance level in the long-run. Therefore, a percentage increase in trade openness leads to about 0.31 percent increase in financial inclusion in Nigeria *ceteris paribus*. Therefore, an

increase in trade openness can lead to an increase in financial inclusion in Nigeria by making Nigerian exports/imports more competitive in international markets, thereby boosting export/imports revenues and stimulating the level of financial inclusion. This is consistent with the studies of Qamruzzaman (2023).

4.3. ARDL Short run Analysis

Table 4 illustrates the short-run dynamics among the variables. Thus, the short run dynamics describes the speed at which equilibrium is restored in the model.

Table 4: Linear ARDL Short run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNMS)	0.028	0.032	0.889	0.379
D(LNTOP)	0.080	0.029	2.818	0.007
D(LNTOP(-1))	-0.115	0.029	-3.938	0.000
D(LNLIT)	-0.265	0.039	-6.756	0.000
D(LNFIN)	0.024	0.004	6.346	0.000
D(LNFIN(-1))	-0.013	0.004	-2.983	0.005
C	-0.161	0.021	-7.501	0.000
ECT(-1)	-0.203	0.027	-7.456	0.000

Source: Researcher's Computation

The error correction term (ECT) determines the degree of adjustment when a shock occurs. The coefficient has the expected negative sign and it is also statistically significant at 1 per cent. The long run relationship is further established by the negative sign of the ECT and its significance. It shows that, about 20.3 per cent of disequilibrium that happens from shock in the short run is adjusted automatically to the equilibrium position in the long run every quarter. Money supply depicts a positive relationship with financial inclusion. However, the result is not statistically significant. Trade openness is positive and statistically significant at 1 per cent. First lag of trade openness has a negative effect on financial inclusion and it is statistically significant at 5 per cent. A percentage increase in financial innovation increases financial inclusion by 0.02 per cent. This study observed that financial innovation positively induces the process of financial inclusion.

4.4. Diagnostic Analysis

To evaluate the adequacy of the model, several diagnostic tests were performed: the Jarque-Bera test for normality, the Breusch-Godfrey LM test for serial correlation, the Breusch-Pagan-Godfrey for heteroscedasticity, and the Ramsey RESET test for model specification. The results of these tests, which are presented in Table 5, indicate the model's robustness. The Jarque-Bera result however indicates non normality of data but the basic asymptotic theory for time series does not require normality to hold true

(Aishwarya, 2022; Wooldridge, 2012). Furthermore, the stability of the model was confirmed by the plots of the CUSUM statistics, which remained within the control bounds thereby demonstrating the model's reliability over the observed period.

Table 5: Result of the Diagnostic Test

Test Statistics	Probability
Breusch-Godfrey test (Serial Correlation)	0.361
Heteroskedasticity (Breusch-Pagan-Godfrey)	0.400
Linearity (Ramsey RESET)	0.216
Normality (Jarque-Bera)	0.000
CUSUM (CUSUMSQ)	Stable (Stable)

Source: *Author's compilation*

5.0 Conclusion and Policy Implications

The following conclusion were drawn based on the findings of the determinants of financial inclusion in Nigeria from 2010Q1 to 2022Q4, using the Autoregressive Distributed Lag (ARDL) model. The study highlight the interaction between literacy rate, broad money supply, remittance, trade openness and financial innovation in Nigeria, with a complex yet crucial impact for financial inclusion. Literacy rate emerges as a double-edged sword: while it initially boosts financial inclusion, since an effective education system is essential for promoting higher levels of financial inclusion in Nigeria. This is because literacy affects people's financial behaviors, leading to improved savings rates, deposit accumulation, usage of financial products, and investments. Moreover, remittance plays a pivotal role, demonstrating a positive impact on financial inclusion in Nigeria, as excess money flows to households encourage them to transform their status from unbanked to financial integration by availing financial instruments for savings with the intention of future financial security and financial services for executing financial transactions, such as mobile banking, internet banking, and so forth. Furthermore, the trade openness proves instrumental in attracting foreign capital inflows, which are crucial for financing infrastructure projects and stimulating domestic savings. A conducive trade environment fosters investment, both foreign and domestic, leading to enhanced productivity, job creation, and overall financial inclusion expansion. Lastly, finding suggests that further development in financial innovation that is emergence, adaptation, and diffusion of innovative financial assets, services, and instruments in the financial system can produce a positive progress in financial inclusion. The policy implication for these findings is that the CBN and financial institutions should promote

financial literacy and education by developing targeted financial literacy programs, especially in rural and underserved communities, to improve awareness and usability of financial products. Another implication is that the the CBN should establish policies encouraging the formalization of remittance channels to ensure that households receiving remittances can access formal financial services.

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