

Empirical Analysis of the Determinants of Financial Inclusion in Nigeria: 1990 - 2016

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Abstract This study examined the determinants of financial inclusion in Nigeria using a time series data for the period of 1990 to 2016. The study employed Error Correction Model (ECM) after conducting unit root test and cointegration test. The estimated result revealed positive and significant relationship between the financial inclusion and the proposed variables. Specifically, the higher a country's GDP per capital, the more the financial inclusion in their financial system. Likewise the broad money given the continuous increase in the amount of money in circulation which will definitely improve financial inclusion in the country. Credit and internet users per 100 people also have positive and significant impact on financial inclusion. While the significant impacts of internet access have very vital implication for financial inclusion as the more the use of internet, the more the financial inclusion through extension of financial services to larger number of people living in the rural area without the exhaustive use of the internet, financial inclusion will be very teeny and extension who would have been excluded from the formal financial service in the country. The internet has fundamentally abridged the cost of transactions, through the use of mobile and the ATM. This has increased the capacities of credit delivery in remote areas in the country and has made it possible to provide home banking services where the accounts are operated by illiterate customers using mobiles phones.

Keywords: financial inclusion, GDP per capita, broad money, credit, internet users & ECM

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1. Introduction

The concept of financial inclusion was introduced in the early 2000s and its source could be traced to a research finding which stressed poverty and low level of economic growth as a direct result of financial exclusion. The motivation for financial inclusion is designed at ensuring all adult members of the society have easy access to extensive financial products, personalized towards their needs and provided at reasonable costs. Such products include payments, savings, credit, insurance and pensions [1].

Financial inclusion has been said to be a process that assures the ease of access, availability and usage of the formal financial system by all members of an economy. According to [2], financial access as an imperative policy tool engaged by the government in a belligerent and stimulating growth based on its aptitude to facilitate efficient allocation of productive resources which in turn reduce the cost of capital. This process as it is also known as an inclusive financing system can meaningfully improve the day-to-day management of finances, as well as diminish the growth of informal sources of credit (such as money lenders), which are often found to be unfair.

Hence, an inclusive financial system is now generally known as an important policy in many countries with

creativities coming from the financial regulators, the government and the banking industry. Legislative dealings have also been initiated in some countries leading to such monitoring frameworks in countries like United States, France, United Kingdom, South Africa etc. Countless of these regulatory frameworks were planned as a way for improving the economic welfare of low-income groups such as rural women being able to buy sewing machine and establish small businesses, artesian having access to wider financial services with the capacity to increase or stabilize income and thus build resilience against economic shocks.

A well-functioning financial system propels economic growth, builds a platform for financial intermediation by providing savings, credit, payment, and risk management products to people with a wide range of needs. Financially inclusive systems permit an easy broad-based access to financial services by making custom-built financial products obtainable at a reasonable price without rigorous documentation, mostly to the poor or other vulnerable groups within the economy. Without financially inclusive systems, the poor would rely on their inadequate savings for future investments and micro or small businesses will not be capable of pursuing favorable growth prospects because they will have to depend on their meager earnings, which is the cause of the persistent income disparity and encumbrance to the economic growth of most developing countries [1].

For over a decade, the economy of Nigeria experienced stable growth with an average growth rate of Gross Domestic Product (GDP) at 7%. The economy was also rebased and became the biggest economy in Africa, contributing 41% to the West African sub region's GDP and contributing 14% to the continent's GDP ahead of South Africa and Egypt [3].

Nigeria was rated 31st in 2012 in terms of purchasing power parity and was rated as the 8th largest producer of petroleum, with oil reserves estimated at about 36 billion barrels. Nigeria also has the 6th largest deposit of natural gas with reserves projected at a minimum of 100 trillion cubic feet [4]. About 34 solid minerals, including large deposits of uranium, have been discovered in Nigeria. Abundant arable land and over 44 exportable commodities also exist in the country. Nigeria was rated as one of the richest nations in the southern hemisphere due to her oil revenue which accounts for 95% of foreign exchange earnings and about 80% of budgetary revenues. The country is not only rich in natural resources but also in human resources. The population of the country was estimated at approximately 168 million in 2012 with a young population median age of 18.63 years and 53.83 million people in the labour force [3,4].

Regardless of all the resources, Nigeria is confronted with an uneven dispersal of income, which has widened the inequality gap between the rich and the poor. More than half of the country's affluence is encumbered by only 10% of the population [5].

In 2012, 67.1% of the Nigerian populace was said to be living below the poverty level even with increasing growth in GDP [6]. Ironically, economic analysts have defined the rise in GDP as "exclusive" because it did not transform into somewhat tangible socio-economic improvement in terms of employment opportunity, poverty reduction and improvement in the general living conditions of the people. This uneven growth has induced the exclusion of 57% of the country's adult population (50.1 million people) from formal finance services. This was recognized as a fundamental basis of poverty and limitation to economic growth, due to the lack of access to productive assets, and inadequate healthcare [7]. Therefore, Nigeria's real growth can only be certain if steps are taken to safeguard that her social and economic development is all inclusive [8]. Economic growth will be achieved at a faster rate if all segments of the populace have access to financial services.

Consequently, with the above consideration, the governments of Nigeria and other emerging economies have made financial inclusion their core concern. This is validated by the nascent strategic approach to financial inclusion, attached with regulatory improvements and new funding mechanisms, as pronounced by the Federal Government of Nigeria in 2011. The Nigerian Government did set a target of reaching full inclusion by 2020. The Financial Inclusion Strategy is considered significant in accomplishing Central Bank of Nigeria's (CBN's) goals such as safeguarding external reserves and protecting the international value of the Naira. These goals among others which are attached to achieving economic growth are assumed to be realistic, as financial inclusion brings about better access to finance for micro, small and medium scale enterprises, leading to increased productivity, greater

non-oil export and subsequently stabilize demand for the Naira.

Conversely, efforts have been made to examine the factors swaying access to formal credit in the empirical literature [9-16], but the determinants or factors influencing financial inclusion is set to be holistically examined in the literature. This is very imperative giving the assertion of Sebstad and Cohen [17] that, studying the activities of the informal financial markets is particularly important because all households, no matter how poor they are, are said to engage in a number of financial strategies to build assets, prepare for life events and emergencies, and cover daily transactions.

Giving the dearth of literatures on the determinants of financial inclusion in Nigeria, as existing studies have been devoted to the measurement and promotion of financial inclusion [18,19,20], to the detriment of the empirical evaluation of its determinants and impacts. Although, Olaniyi and Adeoye [21] examined the determinants of financial inclusion in Africa for the period of 2005 to 2014, but a country specific study need to be undertaken for Nigeria. This study therefore fills this gap by examining the determinants of financial inclusion in Nigeria from 1990 to 2016. Hence, following the introduction, the remaining parts of the study are organized as follows: section 2 reviews relevant literatures while section 3 presents the methodology of the study. Section 4 presents and discusses the results and section 5 concludes the study with some recommendations.

2. Literature Review

The growing interest on the determinants of financial inclusion has given birth to some empirical evidences. Allenet, et. al. [22] analyze these individual characteristics on a global scale using the 2012 World Bank Global Findex Database. They find that the probability of owning an account at a formal financial institution is higher for richer, more educated, older, urban, employed, married or separated individuals and that, the likelihood of saving formally is higher for the same individual characteristics. In the same vein, the probability of borrowing formally increases for older, educated, richer and married men.

Findex, Fungáčová and Weill [23] studied financial inclusion in China using the 2012 Global. Their result revealed that, richer, more educated, older men are more likely to be financially included. Concerning barriers to financial inclusion, poorer people care more about their lack of money and the fact that another member of the family has an account while more educated people are more concerned about cost and trust in the banking system. Women are less likely to be financially included because of a lack of documentation or because another member of the family has an account. Finally, older people are more concerned about lack of money, distance and religious reasons. They also find that income and education influence the choice between formal and informal credit but education does not lead to higher formal credit in China. Women seem to be discriminated as they do not substitute formal credit with informal credit.

Demirgüç,-Kunt et al. [24] used a sample of 65,000 adults from 64 economies and examined the impact of

being a Muslim on formal account, formal saving, formal credit, and barriers to financial inclusion. They find that Muslims resort significantly less to formal account ownership and formal saving than non-Muslims. However, Muslims would not be less likely to borrow, either formally or informally, than non-Muslims. The typical categories excluded from formal financial systems (the poor, the less educated, women and rural adults) are the same for Muslims and non-Muslims. Moreover, religion would be more cited as a barrier to financial inclusion by Muslims, but this result is due to respondents in Sub-Saharan Africa.

A study on the determinants of financial inclusion in China by Fungáčová and Weill [25] expose that higher income, better education, being man and being older, significantly determine the use of formal accounts and formal credits while income and education significantly borrowing in China. On the supply-side, branches and ATMs determine access to formal financial services whereas level of education, income and age, are the significant determinants of financial inclusion on the demand-side in Argentina [26]. Low income and age are the barriers to involuntary exclusion.

Clamara, Peña and Tuesta, [27] established that loans and mortgages appear to be better drivers for financial inclusion than saving products in Peru, from financial products perspective. Such factors as age, gender, education and income level seem to affect perception of the barriers to financial inclusion whilst formality and education are the significant factors for financial inclusion for enterprises.

Kostov, et al. [28] study the “Mzansi” accounts in South Africa to analyze the role of households’ behavior decision process. They find that aspirations and financial literacy are important determinants of the decision process. Gender also matters for financial inclusion. Also, using the 2012 Global Findex on 98 developing countries, Demirgüç, -Kunt et al. [29] find that a significant gender gap exists in account ownership, formal saving and formal credit. Being a woman would increase the likelihood of being financially excluded. Higher difficulties to present collateral or personal guarantees, lower financial literacy and business experience, the husband’ adverse credit history and constraints felt in the financial system are some of the main reasons for such gender gap in formal financial inclusion. However, the existence of such discriminations in informal finance is less certain. Indeed, in some countries, women are more likely to use informal financial services.

Aterido, et al. [30] analyze this issue in nine African countries but do not find significant gender discrimination. The gender gap in Africa seems therefore to be linked with women participation outside the financial sector; women would be discriminated in other areas of the economy, like formal employment, education and within the household. Moreover, they confirm that African women are more likely to resort to informal financial services. Allen et al. [22] provide evidence of country characteristics influencing financial inclusion. High-quality institutions, efficient legal rules, strong contract enforcement and political stability bring about more financial inclusion. Moreover, characteristics about the banking sector also play a key role. High costs of opening and using bank

accounts but also high distance and high disclosure requirements reduce formal inclusion. Trust in the banking sector can also influence. The existence of a deposit insurance scheme and of tax incentive schemes also lead to greater financial inclusion.

Naceur, et al [31], identified a number of determinants of financial inclusion. First are structural factors. Structural factors determine the costs of financial services provision to the population. Second are policy-related factors. Policy-related factors can create enabling environments for financial inclusion. For example, Love and Martínez Pería [32] found that countries with more competitive banking systems can enjoy greater financial inclusion as a higher number of firms will have access to loans and overdrafts. Third are some non-policy characteristics of the country. For example, Aga and Martínez Pería [32] show that inflows of international remittances to sub-Saharan Africa play a part as well since remittance recipients are more than likely to have a bank account.

Olaniyi and Adeoye [21] documents the determinants of financial inclusion in Africa for the period 2005 to 2014, using the dynamic panel data approach. The study finds that per capita income, broad money (% of GDP), literacy, internet access and Islamic banking presence and activity are significant factors explaining the level of financial inclusion in Africa. Domestic credit provided by financial sector (% of GDP), deposit interest rates, inflation and population have insignificant impacts on financial inclusion.

While, Abdu, et. al., [34] analysed the drivers of financial inclusion and its gender gap in Nigeria using The Global Findex 2011 dataset. The study employed Binary Probit Model and technique of Fairlie decomposition to realize its objectives. The empirical findings suggested that youthful age, better education and high income improve the chances for households to be financially included whereas old age, female and low income reduce the likelihoods for households to be financially included. The decomposition results confirm the existence of gender gap in financial inclusion in favour of male households, to which education (particularly secondary) and income quintiles 2 and 5, contribute significantly to the explained gap.

3. Methodology

3.1. Model Specification

For the purpose of empirical analyses of the determinants of Financial Inclusion in Nigeria, a model developed by Olaniyi and Adeoye [21] for examining the determinants of financial inclusion in Africa will be adopted. This is expressed explicitly in equation 3.1;

$$FINC = \beta_0 + \beta_1 GDPC + \beta_2 M2 / GDP + \beta_3 CREDIT + \beta_4 IUSERS + \mu_t \dots \quad (3.1)$$

Where,

FINC is financial inclusion (number of depositors with commercial banks per 1,000 adults);

GDPC is GDP per capita;

M2/GDP is money supply (% of GDP);

CREDIT is the credit to MSMEs (% of GDP). IUSERS is the number of internet users, and μ is the residuals.

3.2. Estimation Techniques

A. Unit Root Test

There are three normal techniques of unit root test such as the Augmented Dickey-Fuller (ADF), Phillips-Perron (PP), and the Kwiatkowski-Phillips-Schmidt-Shin (KPSS) tests which are considered appropriate as a prior diagnostic test before the estimation of the model. The Unit Root Test aids the researcher to evade the problems of spurious results which are connected with non-stationary time series models.

B. Co-integration Estimate

This is used to determine the number of cointegrating vectors using Johansen's methodology with two different test statistics namely the Trace Test Statistic and the Maximum Eigen-value Test Statistic. The former tests the null hypothesis in which the number of different co-integrating associations is less than or equal to 'r' in contradiction to the alternative hypothesis of more than 'r' co-integrating associations, and is defined as:

$$\theta_{trace}(r) = -T \sum_{j=r+1}^P \ln(1 - \hat{\theta}_j). \quad (3.2)$$

The maximum Eigen-value statistic is used to test the null hypothesis of at most 'r' co-integrating vectors alongside the alternative hypothesis of 'r+1' co-integrating vectors, is given by:

$$\theta_{max}(r, r+1) = -T \ln(1 - \hat{\theta}_{r+1}) \quad (3.3)$$

Where θ = the eigen values, T = total number of observations, Johansen contends that trace and statistics have nonstandard distributions under the null hypothesis, and provides approximate critical values for the statistic, generated by Monte Carlo methods.

In a condition where Trace and Maximum Eigenvalue statistics produce different results, the results of trace test should be favoured.

C. Error Correction Model (ECM)

This study applies ECM in order to assess the short run properties of the model. This arises when cointegration has been identified between series and we conclude that there occurs a long-term equilibrium association; hence

we use ECM (in case of single equation) and Vector Error Correction Model (in case of system of equation). In the case where there is no cointegration, VAR is used.

4. Analysis, Presentation and Interpretation of Results

4.1. Unit Root Test

The result from Table 1 revealed that, all the variables were not stationary at level i.e. the null hypothesis that the variables are not stationary cannot be rejected given the asymptotic critical values which are less than the calculated values of ADF, this necessitated the researcher to take their first difference. However, they were stationary at first-order difference. After all the variables have been transformed to their first difference all the variables became stationary. Hence, we reject the null hypothesis that the variables are not stationary with the asymptotic critical values that are greater than the calculated values of ADF and we conclude that the variables are said to maintain stationarity at an integration of order one, I(1).

4.2. Cointegration Test

From Table 2, the co-integration test result reveals that long run relationship exists among all the variables examined. Specifically, there exists long run relationship among financial inclusion variable, GDP per capita, broad money, credit and internet users with trace and max-Eigen statistic reporting two cointegrating equations. Hence, with the above results and for the fact that the study looks at single or direct relationship between the dependents and explanatory variables from the model, we proceed by estimating the model using Error Correction Model (ECM).

4.3. Estimation of the Error Correction Model

According to the Granger Representation theorem, when variables are cointegrated, there must also be an error correction model (ECM) that describes the short-run dynamics or adjustments of the cointegrated variables towards their equilibrium values. ECM consists of one-period lagged cointegrating equation and the lagged first differences of the endogenous variables. The result of the model is presented and interpreted accordingly as follows;

Table 1. Unit Root Test Result

VARIABLES	ADF @ LEVEL H ₀ : Variable is not Stationary	ADF @ FIRST DIFFERENCE H ₀ : Variable is not Stationary	ORDER OF INTEGRATION
FINC	-0.203145	-5.082718***	I(1)
GDPC	-2.212883	-4.141655***	I(1)
M2GDP	-1.903212	-4.479097***	I(1)
CREDIT	-1.091476	-4.024098***	I(1)
IUSERS	-1.357126	-4.375763***	I(1)
CRITICAL VALUE	1%	-3.769597	
	5%	-2.991878	
	10%	-2.635542	

Source: Authors' computation from E-views Output, Note: ***denote significance at 1% level.

**denote significance at 5% level.

Table 2. Johansen Cointegration Test

Unrestricted Cointegration Rank Test (Trace)				
Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.904108	91.02195	47.85613	0.0000
At most 1 *	0.619685	37.09772	29.79707	0.0060
At most 2	0.336253	14.86236	15.49471	0.0621
At most 3 *	0.210484	5.435705	3.841466	0.0197
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				
Unrestricted Cointegration Rank Test (Maximum Eigenvalue)				
Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.904108	53.92422	27.58434	0.0000
At most 1 *	0.619685	22.23536	21.13162	0.0349
At most 2	0.336253	9.426654	14.26460	0.2524
At most 3 *	0.210484	5.435705	3.841466	0.0197
Max-eigenvalue test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Authors' computation from E-views Output.

Table 3. Results of Error Correction Model

Dependent Variable: D(FINC)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	13.39739	14.64142	0.915034	0.3730
D(GDPC)	0.000689**	0.001497	2.174009	0.0266
D(M2GDP)	6.186919**	14.02251	2.266478	0.0224
D(CREDIT)	9.962805**	39.47631	3.962370	0.0010
D(IUSERS)	1.332305**	3.917716	2.940555	0.0091
ECM(-1)	-0.278935**	0.584282	-2.094690	0.0289
R-squared	0.646221	Mean dependent var		15.89130
Adjusted R-squared	0.542169	S.D. dependent var		72.37278
S.E. of regression	48.96976	Akaike info criterion		10.83974
Sum squared resid	40766.63	Schwarz criterion		11.13596
Log likelihood	-118.6570	Hannan-Quinn criter.		10.91424
F-statistic	6.210528	Durbin-Watson stat		2.026445
Prob(F-statistic)	0.001889			

Source: Authors' computation from E-views Output Note: **denote significance at 5% level.

The result in Table 3 depicts positive and significant relationship between the Financial Inclusion and the proposed variables that determine it. This is in line with the apriori expectation and a percentage increase in GDPC will lead to 0.00069 per cent increase in financial inclusion. Also, a percentage increase in M2/GDP, CREDIT and IUSERS will lead to 6.1869, 9.9628 and 1.3323 respectively.

At 2.026445, the Durbin Watson statistics shows the absence of auto-correlation given its value that is between 1.8 and 2.2. We can therefore reject the null hypothesis of the presence of autocorrelation among the disturbance terms in the model and accept the alternative hypothesis that there is no autocorrelation between the error terms.

The fitness of the model is confirmed by the F-statistic which is significant at 5 percent given the value of 0.001889 which led to rejection of null hypothesis that all the explanatory variables introduced in the model are not

jointly significant in explaining the variations in financial inclusion.

The error correction term, ECMt-1, was significant at 5% with a little high feedback of 28%. It is also negatively signed, showing that the adjustment is in the right direction to restore the long run relationship. This confirms also that any disequilibrium in the short run can be fixed back with a speed of 28% in the long run.

The coefficient of determination (R^2) explains 65% of the variations in the dependent variable which is above 50% and even after taking into consideration the degree of freedom, the adjusted coefficient of determination (adjusted R^2) still explains 54% variation in the dependent variable.

Also, a unit increase in gross domestic product per capital, broad money, credit to private sector and number of internet users will lead to on the average 0.0006, 6.18, 9.96 and 1.33 increase in financial inclusion respectively.

4.4. Diagnostic Test

After the analysis and presentation of the ECM result, we now consider several diagnostic tests of model adequacy to check how “good” the fitted model is. Specifically, we employed the Jarque-Bera (JB) Test of Normality, the Breusch-Godfrey (BG) test for serial correlation, White heteroskedasticity and Ramsey Reset Test. The result is presented in the table below;

Table 4. Summary of Diagnostic Tests for the ECM Model

TEST	GDP
Jarque-Bera Normality	0.82 (0.29)
Breusch-Godfrey (B-G)	.9232 (0.22)
Heteroskedasticity	0.79 (0.33)
Ramsey Reset	0.99 (0.21)

Note: The probability is given in parenthesis while the F-statistics are above the probability value.

Source: Author’s Computation from E-views Output.

The outcome of the diagnostic tests as shown above is satisfactory. Under the null hypothesis that the residuals are normally distributed, the JB test for residual normality assumption is not disrupted. The table also shows that the error process could be pronounced as normal for the relationship between financial inclusion and its determinants. The B-G test which is noted to have stronger statistical power showed the absence of serial correlation. Also, the absence of white heteroskedasticity and specification error was authenticated. The results of the tests suggest that the model is well specified, and hence the results are credible.

5. Conclusion

This study empirically examined the determinants of financial inclusion in Nigeria. As proposed in the model, GDP per capita income, broad money, credit to the private sector and number of internet users were all suggested as the determinant of financial inclusion. The estimated result depicts positive and significant relationship between the financial inclusion and the proposed variables. Specifically, it is expected the higher a country’s GDP per capital, the more the financial inclusion in their financial system. Likewise the broad money given the continuous increase in the amount of money in circulation which will definitely improve financial inclusion in the country. Credit and internet users per 100 people also have positive and significant impact on financial inclusion. While the significant impacts of internet access have very vital implication for financial inclusion as the more the use of internet, the more the financial inclusion through extension of financial services to larger number of people living in the rural area without the exhaustive use of the internet, financial inclusion will be very teeny and extension who would have been excluded from the formal financial service in the country. The internet has fundamentally abridged the cost of transactions, through the use of mobile and the ATM. This has increased the capacities of credit delivery in remote areas in the country

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