IMPACT OF FINANCIAL INCLUSION ON POVERTY REDUCTION IN NIGERIA: (1985-2019)

Abubakar Orlando Ijoko[1*], Muhammad Aminu Umar[2] and Onimisi Musari Aliyu[3***]**
[1]Department of Economics, Nigerian Army University Biu.
[2]Department of Economics, Nigerian Army University Biu.
[3]Waziri Umaru Federal Polytechnic Brinin-Kebbi.

Corresponding Author:[*]abuijoko@gmail.com +2348038118716
**alaminarg227@gmail.com +2347037701126
***musty.oneil16@gmail.com +2348065338218

Abstract
Different Governments all over the world are making concerted efforts towards poverty reduction amongst its populace and financial inclusion has been identified as one of the instruments to fight poverty. This study explored the short and long-run impacts of financial inclusion on poverty reduction in Nigeria, using Autoregressive Distributive Lag Model on a time series data spanning from 1985 to 2019, which were sourced from the Central Bank of Nigeria Statistical Bulletin. The findings obtained from ARDL revealed the long-run nexus between financial inclusion and poverty reduction. The short-run results demonstrated that the lending deposit ratio has a negativeand statistically significant effect on poverty reduction in Nigeria whereas, loan to rural areas, bank branches, and lending to deposit ratios show a positive effect on poverty reduction, but not statistically significant except loan to rural area. Thus, the study recommended that monetary authority should ensure that there are adequate bank branches and continuous granting of loan facilities to the people in order to facilitate their businesses. Finally, the facility should be affordable to the low-income earners, and easy distribution channel should be guaranteed.

Keywords: ARDL, Financial Inclusion, Poverty.
JEL Classification: C32, G2, P36

1.0 Introduction

Financial inclusion is a major phenomenon for policymakers across the world for the purpose of planning a strong policy for achieving sustainable growth. The earlier approach by Schumpeter has demonstrated that finance boosts growth, adding that financial sector, through its services, encourages innovation and accessibility of capital formation, as well as, an investment which in turn reduces poverty.

Martinez (2011) argued that to achieve economic growth, financial access is one key instrument as long as there is a reduced cost of capital and efficient allocation of productive resources in the system. Adequate financial inclusive system can significantly reduce the cost of credits within the informal sector, as well as in the day-to-day management of finances (Martinez, 2011). Financial inclusion is crucial in mobilization of funds and allocations of savings for productive purposes. It also provides arrangements for monetary authority and the foundation for managing liquidity in the economy (Sanusi, 2011).

With the increased attention and activity by both the monetary management and government, it is evident that large population of people outside the urban areas do not have access to formal financial services but resort to the costly and insufficient informal sources. The report of the EFinA Access to financial services in Nigeria 2018

survey revealed that 39.5 million adults (39.7% of the adult population) have a deposit money bank account. This represents an increase of 2.6 million adults from 36.9million in 2016. In 2018, the formally included segment increased from 46.9 million adults in 2016 to 48.4 million adults in 2018. The number of adults relying on informal mechanisms only increased significantly from 9.4million in 2016 to 14.6million in 2018, whereas, 36.6 million adults, and representing 36.8% of the adult population, are financially excluded. To consolidate on these achievements, the monetary authority needs to do more to deepen financial access in the rural area, as this will, no doubt reduces the dominance of the informal financial service providers.

The lack of access to loans remains a huge obstacle for many small and medium enterprises (SMEs) struggling to grow their businesses sustainably, which, if granted loans, will consequently, reduce poverty since the large population of the people is within the informal sector. In 2018 report, 69% of the adult population did not borrow within the year. Of those who did borrow, 4.3% took loans from the bank, 4% from other formal financial institutions, 23.2% from informal financial services providers, and 77.7% from family and friends (EFIn A2F, 2018).

Previous studies on the relationship between financial inclusion and poverty reduction and economic growth adopted the conventional measures (Ighodaro & Oriaki 2011; Ajide, 2014). Very few studies adopted the unconventional measures on the nexus between financial inclusion and poverty reduction (Onaolapo 2015; Michael et al., 2018; Okoye et al., 2015).This present study adopted both the conventional and unconventional measure because of their importance in measuring financial inclusion. In addition, this study attempted to bridge the gap in this important area and, thus, improved and complemented existing researches. It is on this basis that the study examined the short and long-run impact of financial inclusion in poverty reduction in Nigeria.

2.0 Literature Review and Theoretical Framework

Wikipedia (2020) defines financial inclusion as the delivery of financial services at affordable price and terms to the generality of the populace, especially the disadvantaged and low-income segment of the society. Ajide (2014) described financial inclusion as the process of delivering the financial system of a country to its people or businesses. Sarma (2008) defined it as the process of ensuring easy access, affordable and convenient use of formal financial service.

Poverty connotes the inability of an individual or person to meet the basic necessity of life such as food, clothes, shelter, education, e.t.c. According to World Bank (1997), poverty is seen as a condition of hunger, no shelter, poor health, and no education; not being able to read or write, no jobs, high infant/child mortality, and living in constant fear. Nigeria's poverty incidence is growing at an alarming rate despite both global and national policies to combat the heating situation. Without an iota of doubt, rising poverty has been undermining positive growth of the economy since independent in 1960.

Empirical studies that substantiate this study are discussed thus. Koomson, Villano, and Hadley (2020) examined the effect of financial inclusion on poverty and vulnerability to poverty of Ghanaian households, using three-stage feasible least squares to estimate households' vulnerability to poverty. Endogeneity associated with financial inclusion is resolved using distance to the nearest bank as instrumental variables probit techniques. Their findings showed that while 23.4% of Ghanaians are considered poor, about 51% are vulnerable to poverty. The result implied that an increase in financial inclusion has the effects of a 27% decrease in household's likelihood of being poor and it prevents a household's exposure to future poverty by 28%.

Ageme, Anisiuba, Alio, Ezeaku and Onwumere (2018) used Autoregressive Distributive Lag Model and Johansen Cointegration test to assess the effects of financial inclusion on poverty reduction in Nigeria. Their findings indicated that there is a nexus between financial inclusion and poverty reduction in the long-run. Their

results further showed that the Automated Teller Machine(ATM) inclusion channel and deposit money bank credit to the rural populace have a significant positive effect on poverty reduction in Nigeria.

Harley, Adegoke, and Adegbola (2017) used panel data analysis ranging from 2006 to 2015 to investigate the role of financial inclusion in economic growth and poverty reduction in a developing economy within a log-linear model specification framework. The result showed that records of active ATM, bank branches and government expenditures selected from three African countries are the most robust predictors for financial inclusion on poverty reduction in a developing economy. Their results further showed that one percent increase in the ratio of active ATM will lead to about 0.0082 percent increase in the gross domestic product and a reduction of poverty in developing economies like Nigeria. The study recommended that the government should invest in infrastructural development that will enhance banking services thereby reducing poverty in the country.

Gretta (2017) studied financial inclusion and growth of the economies in developing countries such as the Middle East and North Africa (MENA) and the BRICS region and tried to identify the various channels of transmission between financial literacy, financial intermediaries and growth. The study applied a VAR regression to quantify the relationship between financial inclusion in terms of financial literacy, financial activities, and growth and to study its impact on the economic growth in the MENA region. His result suggested the importance of financial inclusion in the MENA and BRICS region. Migap, Okwanya, & Ojeka(2015) examined financial inclusion as a strategy for inclusive growth in Nigeria. The study compared the Nigerian financial inclusion index with other emerging economies in the upper-middle-income strata. The study revealed that the Nigerian financial inclusion indicator is still low compared to emerging economies both within and outside Africa. The study suggested that active participation of media and educational institutions should be encouraged to promote financial literacy in Nigeria.

Nkwede (2015) used data covering the period from 1981 to 2013 to examine financial inclusion and economic growth in Africa, Nigeria as a case study. The study showed a negative relationship between financial inclusion and the growth of the Nigerian economy. The study attributed the findings to a high level of financial exclusion of adults from financial services. Joseph and Varghese(2014) investigated the role of financial inclusion in the development of the Indian economy. The study investigated the activities of five private sector banks and five state banks from June to November 2013. Onsite and offsite ATM usage, credit cards, number of bank branches, and debit cards per customer were used as proxies for financial inclusion variables focusing on rural and semi-urban areas in India. They found that quite several people are still excluded from financial services even after the introduction of inclusive banking initiatives in the country. Onaolapo and Odetayo (2012) studied financial inclusion in Nigeria from the viewpoint of microfinance banks using a survey design method. They found that access to financial services through microfinance institutions by low-income earners promotes employment generation, reduction in poverty, and overall economic growth. Joseph and Varghese.

Anzoategui, Demirguc-Kunt, and Martinez (2014) examined the role of remittances in FI in El Salvador using household-level survey data. Measuring three indicators of FI such as loans requested, deposit accounts, and loans received from financial institutions by a household. They suggested that remittances have a positive impact on FI by promoting the use of deposit accounts. They further found out that remittances do not have a robust impact on the demand for and use of credit facilities in financial institutions. The study recommended that when credit constraints are relaxed, remittances might reduce the need for external financing from financial institutions.

Financial Intermediation Theory**:** This theory stated that financial institutions bring deficit spending units and surplus spending units together within the financial system (Ndebbio, 2004). According to Diamond (1984), banks have a comparative advantage between investors and borrowers because of its ability to effectively monitor borrowers at a reduced cost, and, thus, play the role of delegated monitoring. Diamond postulated that intermediaries provide services by issuing secondary financial assets to buy primary financial assets. That is, if an intermediary

provides no services, investors who buy the secondary securities issued by the intermediary might as well purchase the primary securities directly and save the intermediary's cost. Financial intermediaries play five major roles namely: acquisition of information on borrowers, accumulating capital, improves corporate governance, provision of risk reduced agreements, and ease of the transaction processes.

The theoretical framework of this study is based on the relationship between finance and real activity which can be traced to Smith (1776) who argued that real growth in an economy is driven by the activities of the financial system because increased production is made possible with the availability of credit facilities offered by the financial system. In Bagehot (1873), to corroborate the views of Smith (1776), it was argued that the 19th century industrial revolution in Europe was propelled by the financial system which mobilized funds in unusually 'big form' for industry.

3.0 Methodology

This study is a descriptive analysis of secondary time series data, which is obtained mostly from the Central Bank of Nigeria (CBN) annual statistical bulletin, National Bureau of Statistics (NBS), online journal publications, and other relevant publications to the topic of study. The study used annual time series data from 1985-2019.

3.1 Model Specification

To achieve this study objective, the functional relationship between financial inclusion and poverty reduction expressed in equation 1.

$$POV = f(FIN) \quad (1)$$

Equation 1 is the linear functional relationship between poverty reduction and financial inclusion that this study estimated. However, poverty reduction proxy per capita income and financial inclusion measure loan to a rural area, lending to deposit ratio, and the number of commercial bank branches. The equation is rewritten as:

$$PCI = f(LRA, DR, BB) \quad (2)$$

Where: PCI is Per Capita Income, LRA denote Loan to Rural Area,DR represents Lending to Deposit Ratio and BB is the number of Bank Branches.

The variables were obtained in absolute value, for that logarithm was taken and econometric Model of the study is stated thus:

$$LPCIt = \sim + \quad 1LLRAt + \quad 2LDRt + \quad 3LBBt + «t \quad (3)$$

Where: α is the intercept of the model, $\beta_1 - \beta_3$ are coefficients estimated. The theoretical expectation of $\beta_1 - \beta_3 < 0$. By implication, the coefficients of the parameters are expected to be less than zero. That is, a negative relationship between financial inclusion and poverty is expected. That is to say, the higher the financial inclusion the lower the poverty level. μ_t is Error term (stochastic Variable). Equation (4) is the long-run estimate, shown only the long-run relationship between the regressors and regressed. Since the variables showed a mixed order of integration, there is a need to specify a short-run estimate to test the effect of explanatory variables on the explained variable. The level of adjustment to equilibrium when short-run shocks occur are also revealed. The short-run model is presented in equation (5) where ECM(-1) is an error correction mechanism:

$$LPCIt = ª0 + ª1LLRAt + ª2LDRt + ª3LBBt + Ecm(-1) \quad (4)$$

Haven, state the models, preliminary test of unit root, diagnostics, and stability tests were conducted for normality test, serial correlation test, heteroscedasticity test, Ramsey RESET test, CUSUM, and CUSUMQ to verify soundness, reliability and validity of the model.

3.2Estimation Procedure

The procedure starts with unit root testing on all variables. Given that some variables are stationary at level, while others are stationary after the first difference. The autoregressive distributive lag bounds test was applied to test whether there is a long-run relationship. Also, the error correction mechanism is carried out to check the speed of adjustment from short-run disequilibrium. Finally, various diagnostic tests were observed.

4.0 Research Findings/Results

Table 1: Descriptive Statistics

	LBB	LLDR	LLRA	LPCI
Mean	3.485714	1.810857	4.108000	5.421429
Median	3.480000	1.830000	4.070000	5.380000
Std. Dev.	0.217056	0.086445	0.867548	0.108007
Skewness	-0.054215	-1.044758	0.034199	0.331888
Kurtosis	1.635578	3.536748	3.414870	1.430349
Jarque-Bera	2.732050	6.787336	0.257826	4.235586
Probability	0.255119	0.033585	0.879050	0.120297
	35	35	35	35

Source: Authors Computation (2020)

Table 1 reveals that the mean values and deviations from the mean scores for LBB, LDR, LLRA and LPCI within the sample period are 3.486(0.217), 1.811(0.086), 4.108(0.868),and 5.421(0.108) respectively. The LPCI appeared to have the highest deviation. Likewise, the Skewness -0.054, -1.045, 0.0342 and 0.332 respectively symbolize that the data points lay on the left-hand side (negative) of the normal curve and the right-hand side (positive) of the normal curve. The Jarque-Bera test for normality shows that LDR and LPCI are normally distributed leaving out LLRA and LBB.

After ascertaining descriptive statistics, the unit root was conducted using Augmented Dickey-Fuller and Philips Perron statistics to test the Null hypothesis that the series has a unit root against the alternative.

Table 2: Unit Root Test Results

Variables	ADF	Level	PP	Level
LPCI	-6.341***	I(1)	-6.326***	I(1)
LLRA	-4.252***	I(0)	-6.924***	I(1)
LLDR	-4.505***	I(1)	-17.240***	I(1)
LBB	-2.732*	I(0)	-4.067***	I(1)

****denote 1%, ** 5%, and * 10% level of significance*

Source*:* Authors computation (2020)

Given the results in table 2, the variables were stationary at same orders except LLRA and LBB that are stationary at levels in ADF. LPCI and LDR are stationary at first different both in ADF and PP. Thus, we reject the null hypothesis and accept alternatives and conclude that the variables have no unit root at 1%, 5%, and 10% level of

significance respectively. Given that the results showed a mixture of I(0) and I(1) for the variables, the correct estimation procedure to follow is the ARDL method. First it was necessary to test for co-integration among the variables. This was done using the ARDL bound testing for co-integration and the results presented in the table.

Table 3: Bounds test

Test Statistic	**Value**	**Significant**	**I(0)**	I(1)
F-statistic	5.895	10%	2.72	**3.77**
	3	5%	3.23	**4.35**
		1%	4.29	**5.61**

Source: Authors computation (2019)

The f-statistics value (5.895) is greater than the upper boundary I (1) at 1% levels of significance. Therefore, a long-run relationship exists between financial inclusion and the poverty reduction in the model. Hence, we employed the Autoregressive Distributive Lag model to capture both short run and long run impact of financial inclusion on poverty reduction in Nigeria. The short-run and long-run estimates are presented in table 4 and 5 respectively:

Table 4: ARDL Short Run result – Dependent Variable: LPCI

Variables	Coefficient	T-Statistics
LBB	0.132	2.998**
LLDR	-0.004	-1.678*
LLRA	0.005	0.977
ECM(-1)	-0.283	-4.096***
$R^2 = 0.989$	DW stat. = 1.817	F-Stat. =273.535**

Source: Authors computation (2019)

Table 4 reveals that the log of bank branches (LBB) and log of loan to rural areas (LLRA) have a positive effect on poverty reduction (LPCI); LBB is statistically significant while LLRA is statistically insignificant. This is contrary to previous studies but in line with the discoveries of Ageme *et al* (2018) who found that financial inclusion has an appreciating effect on poverty reduction. The log of the lending to deposit ratio (LLDR) has a negative and statistically significant effect on poverty reduction. This corroborates the prior expectation and findings of Koomson, Villano & Hadley (2020).

The finding also revealed that the speed of adjustment (ECM_{t-1}) has a conventional sign (negative) and is statistically significant. This means that a short-run shock will be adjusted to equilibrium in the long-run with an average speed of 28% annually. The coefficient of determination (R^2) shows that the variables employed accounted for 99% variation in the response variable. The model is a good fit. Durbin Watson statistics revealed the absence of autocorrelation. The F-statistics is significant at a 5% level which means the explanatory variables jointly account for the variations in the response variable.

Table 5: Long Run Coefficients- Dependent variable: LPCI

Variables	Coefficient	t-Statistics
LLRA	0.053537	2.559**
LBB	0.418574	6.573***
LLDR	0.394641	2.068**
C	3.010862	7.818***

Source: Authors computation using Eview9

Table 5 shows that in the long-run the regressors (LLRA, LBB, and LLDR) have a positive and statistically significant effect on poverty reduction.

After ascertaining long-run and short-run ARDL estimates, there is need to test for the assumptions of the techniques used (Normal distribution of error term, serial correlation, and heteroscedasticity) as well the stability of the estimated model to determine whether the method of analysis adopted passed the classical OLS assumption and stability test or not, which is established in table 6 and 7:

Table 5: Diagnostic Tests

Tests	**Statistics**	**Prob.**
Normal distribution	Jarque-Bera	0.520
Serial correlation	Breusch-Godfrey	0.551
Heteroscedasticity	Breusch-Pagan-Godfrey	0.920

Source: Authors' Computation (2020)

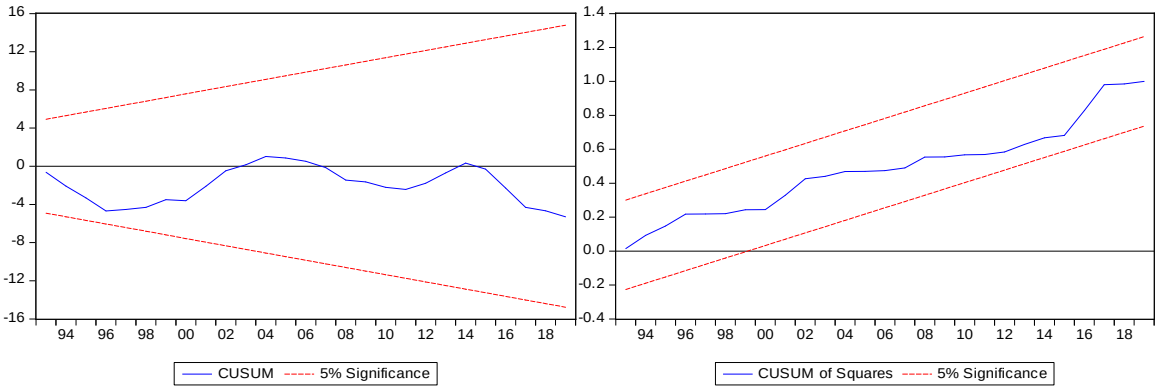
The classical assumption of the OLS method employed given the probability values in table 5 shows that the error term is normally distributed with zero mean and constant variance, homoscedastic, and not serial correlated. Thus, it concluded that the model passed the key assumptions test, the findings and policy implications of the research stand to be implemented by any relevant and concerned organizations.

Table 6: Stability tests

Tests	**Statistics**	**Prob.**
Ramsey RESET	F-statistics	0.504
CUSUM and CUSUMQ	Stable	0.05

Source: Authors' Computation (2020)

Table 6 shows results for Ramsey RESET and CUSUM and CUSUMQ. Ramsey RESET presented with a probability value greater than 5%, implying that the model is well-specify. CUSUM and CUSUMQ are stable because the probability value is within the required region of 5% (0.05). Therefore, policy recommendation from this study is valid base on the test of stability outcomes.



Source: Authors' Computation (2020)

Figure 1: CUSUM and CUSUMQ

As part of the stability diagnostic test, the Cusum and Cusum of square is stable at 5 percent significant level as the blue lines are within the red lines shown in figure 1 above.

5.0 Discussion of Results and Implication of Findings

The short-run revealed that the lending to deposit ratio is significant and has a depreciating effect on poverty reduction. By implication, 1 percent increase in the LLDR would result in an average of 0.004 percentage decrease in poverty reduction. It deduces that broad credit to rural areas to facilitate their agricultural activities due to its impact on per capita income will reduce poverty in Nigeria.

However, both in the short-run and long-run estimates, the results show that LBB, LLRA and a long-run estimate of LLDR have an appreciating effect on poverty reduction. That is, in the short-run, a percentage increase in LBB and LLRA would lead to 0.132% and 0.005% increase in LPCI respectively. Similarly in the long-run, 1% increase in LLRA, LBB, and LLDR would cause LPCI to increase by a 0.054%, 0.419%, and 0.395% respectively. The essence of bank branches is to allow people to have access to banks to access loans, open an account and deposit their money. But based on the outcome of this study results, it signifies that banks have not been performing their conventional role of credit expansion rather, they involve in mere proliferation.

6.0 Conclusion and Recommendation

This study evaluated the effect of financial inclusion on poverty reduction for the period 1985 to 2019, adopted the ARDL model and found that the Financial Inclusion measures (LLDR) are statistically significant and have a decreasing effect on poverty reduction proxy per capita income. However, the positive signs of the indicators of financial inclusion (LLRA and LBB) on per capita income imply that as they rise, PCI will increase. This is insensitive to poverty reduction. Put differently, the higher the per capita income of a country, the lower will be the rate of poverty in that country. In view of this, this research makes the following recommendations;

Financial products must be within easy and affordable reach of all segments of the population and should not have onerous requirements. Financial inclusion implies not only access but the use of a full range of financial services including, but not limited to payments, savings, credit, insurance, and pension products. In conclusion, financial products must be designed to meet the needs of clients and should consider income levels, as well as access to distribution channels.

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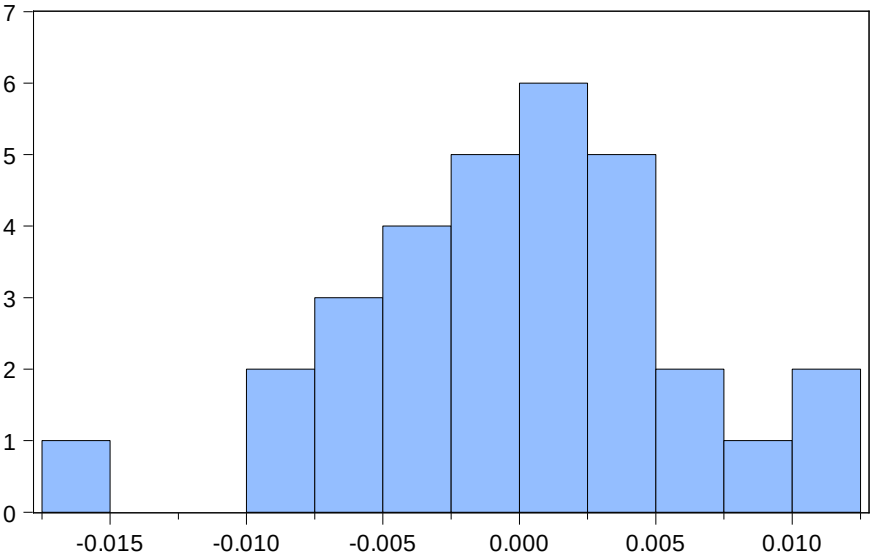
Appendix



Series: Residuals	
Sample 1989 2019	
Observations 31	
Mean	1.46e-15
Median	0.000553
Maximum	0.012094
Minimum	-0.016601
Std. Dev.	0.005988
Skewness	-0.422483
Kurtosis	3.545151
Jarque-Bera	1.306077
Probability	0.520462

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.626192	Prob. F(2,13)	0.5500
Obs*R-squared	2.724030	Prob. Chi-Square(2)	0.2561

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.473118	Prob. F(15,15)	0.9207
Obs*R-squared	9.956203	Prob. Chi-Square(15)	0.8225
Scaled explained SS	2.966445	Prob. Chi-Square(15)	0.9996

Ramsey RESET Test
Equation: UNTITLED
Specification: LPCI LPCI(-1) LPCI(-2) LPCI(-3) LPCI(-4) LLRA LLRA(-1) LLRA(-2) LLRA(-3) LBB LBB(-1) LLDR LLDR(-1) LLDR(-2) LLDR(-3) LLDR(-4) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.685719	14	0.5041
F-statistic	0.470210	(1, 14)	0.5041

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	3.50E-05	1	3.50E-05
Restricted SSR	0.001076	15	7.17E-05
Unrestricted SSR	0.001041	14	7.43E-05

Null Hypothesis: LBB has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.328990	0.6047
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LBB) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.340878	0.0000
Test critical values:	1% level	-3.646342	

	5% level	-2.954021
	10% level	-2.615817

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LBB has a unit root
Exogenous: Constant
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-1.322599	0.6077
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LBB) has a unit root
Exogenous: Constant
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.325621	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LLDR has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.252098	0.0022
Test critical values:	1% level	-3.653730	
	5% level	-2.957110	
	10% level	-2.617434	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LLDR) has a unit root
Exogenous: Constant

Lag Length: 4 (Automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.454131	0.0015
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LLDR has a unit root
Exogenous: Constant
Bandwidth: 6 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.589938	0.1048
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LLDR) has a unit root
Exogenous: Constant
Bandwidth: 10 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-6.924302	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LLRA has a unit root
Exogenous: Constant
Lag Length: 6 (Automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		0.011775	0.9520
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LLRA) has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.504854	0.0013
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LLRA has a unit root
Exogenous: Constant
Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-2.443778	0.1379
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.
Null Hypothesis: D(LLRA) has a unit root
Exogenous: Constant
Bandwidth: 29 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-17.24019	0.0001
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LPCI) has a unit root
Exogenous: Constant
Lag Length: 8 (Automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.731582	0.0829
Test critical values:	1% level	-3.724070	

	5% level	-2.986225
	10% level	-2.632604

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LPCI has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on AIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.615906	0.8537
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: LPCI has a unit root
Exogenous: Constant
Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-0.356921	0.9056
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Null Hypothesis: D(LPCI) has a unit root
Exogenous: Constant
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

		Adj. t-Stat	Prob.*
Phillips-Perron test statistic		-4.066825	0.0034
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Dependent Variable: LPCI
Method: ARDL
Date: 07/09/20 Time: 08:44
Sample (adjusted): 1988 2019
Included observations: 32 after adjustments
Maximum dependent lags: 4 (Automatic selection)

Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): LBB LLDRA LLRA
Fixed regressors: C
Number of models evalulated: 500
Selected Model: ARDL(3, 1, 0, 1)
Note: final equation sample is larger than selection sample

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LPCI(-1)	1.014899	0.175708	5.776064	0.0000
LPCI(-2)	0.112538	0.252036	0.446514	0.6594
LPCI(-3)	-0.310015	0.160082	-1.936597	0.0652
LBB	0.131745	0.043947	2.997800	0.0064
LBB(-1)	-0.085746	0.047846	-1.792123	0.0863
LLDRA	-0.004009	0.002389	-1.678138	0.1069
LLRA	0.005269	0.005393	0.977030	0.3387
LLRA(-1)	0.008629	0.005543	1.556724	0.1332
C	0.787493	0.307573	2.560341	0.0175

R-squared	0.989599	Mean dependent var	5.431239
Adjusted R-squared	0.985981	S.D. dependent var	0.106020
S.E. of regression	0.012553	Akaike info criterion	-5.685459
Sum squared resid	0.003624	Schwarz criterion	-5.273220
Log likelihood	99.96734	Hannan-Quinn criter.	-5.548813
F-statistic	273.5352	Durbin-Watson stat	1.817390
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

FINANCIAL INCLUSION INDICATORS								
YEARS	LDR	LRA	BB	PCI	LOGLRA	LOGBB	LOGPCI	LOGLDR
1985	66.90	114.90	1290	205475.21	2.06	3.11	5.31	1.83
1986	83.20	373.60	1360	200317.91	2.57	3.13	5.30	1.92
1987	72.90	492.80	1476	201371.27	2.69	3.17	5.30	1.86
1988	66.90	659.90	1659	210527.52	2.82	3.22	5.32	1.83
1989	80.40	3,721.10	1849	209035.2	3.57	3.27	5.32	1.91
1990	66.50	4,730.80	1934	227703.46	3.67	3.29	5.36	1.82
1991	59.80	5,962.10	2018	222774.89	3.78	3.30	5.35	1.78
1992	55.20	1,895.30	2269	227287.92	3.28	3.36	5.36	1.74
1993	42.90	10,910.40	2352	217157.52	4.04	3.37	5.34	1.63
1994	60.90	1,602.20	2397	207965.64	3.20	3.38	5.32	1.78
1995	73.30	8,659.30	2362	202704	3.94	3.37	5.31	1.87
1996	72.90	4,411.20	2402	206017.37	3.64	3.38	5.31	1.86
1997	76.60	11,158.60	2402	206855.51	4.05	3.38	5.32	1.88
1998	74.40	11,852.70	2180	206973.83	4.07	3.34	5.32	1.87
1999	54.60	7,498.10	1466	203050.17	3.87	3.17	5.31	1.74
2000	51.00	11,150.30	2180	207962.24	4.05	3.34	5.32	1.71
2001	65.63	12,341.00	2188	214805.38	4.09	3.34	5.33	1.82

2002	62.78	8,942.20	3005	241564.7	3.95	3.48	5.38	1.80
2003	61.85	11,251.90	3242	252816.26	4.05	3.51	5.40	1.79
2004	68.63	34,118.50	3487	269223.03	4.53	3.54	5.43	1.84
2005	70.80	16,105.50	3492	279242.5	4.21	3.54	5.45	1.85
2006	63.60	24,274.60	3233	288530.71	4.39	3.51	5.46	1.80
2007	70.78	27,263.50	4200	299558.55	4.44	3.62	5.48	1.85
2008	80.93	46,521.48	4952	311458.56	4.67	3.69	5.49	1.91
2009	85.66	15,590.50	5436	327648.05	4.19	3.74	5.52	1.93
2010	74.20	16,555.98	5809	344549.92	4.22	3.76	5.54	1.87
2011	44.77	19,980.30	5454	353250.92	4.30	3.74	5.55	1.65
2012	42.31	22,579.97	5564	358453.84	4.35	3.75	5.55	1.63
2013	37.97	739,923.34	5639	372267.69	5.87	3.75	5.57	1.58
2014	64.24	988,587.87	5526	385349.04	6.00	3.74	5.59	1.81
2015	69.58	29,169.15	5470	385236.15	4.46	3.74	5.59	1.84
2016	79.95	43,776.89	5570	369177.91	4.64	3.75	5.57	1.90
2017	78.20	530,992.24	5714	362573.95	5.73	3.76	5.56	1.89
2018	64.34	123,707.59	5301	360160.74	5.09	3.72	5.56	1.81
2019	59.85	201,182.13	5437	360430.8	5.30	3.74	5.56	1.78

Source: CBN 2019 Statistical Bulletin