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The impact of inclusive finance on economic growth in Nigeria

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Abstract
The study examined the impact of inclusive financing on Nigeria's economic growth between 2001 and 2021. Financial inclusion helps to decrease poverty and the enhancement of living conditions, making it an important indicator of economic growth in emerging nations. The unit root test result and Augmented Dickey-Fuller Test (ADF) revealed that the series becomes stationary after the first difference, making it suitable for additional Ordinary Least Square (OLS) regression model was employed, cointegration test with Johansen's formula, Cointegration and causality tests were conducted using the Granger causality techniques. According to Johansen's cointegration, the series exhibit cointegration. This indicates the presence of a lasting connection between economic growth and financial inclusion. Using Granger causality tests, it was discovered that the indices of financial inclusion and Nigeria economic growth had a statistically significant causal relationship. This further provides the suggestion that financial inclusion significantly contributes to the economic growth of Nigeria. In addition, financial inclusion has a significant relationship with economic growth. The coefficient of determination (R-squared = 0.6962) implies that the indices of financial inclusion can account for almost 69.6 per cent of the variance in economic growth. It has been demonstrated that financial inclusion contributes favorably to economic growth and national development in Nigeria. The results also revealed that the Number of Deposit Money Banks Branches (NDMBB) coefficient (= -0.683), for every thousand increases in NDMBB, Gross Domestic Product (GDP) growth will decrease by 0.683, which is consistent with the actual situation on ground. The result of the study supports the hypothesis that monetary policy would be more effective if it promote more financial inclusion. The study therefore recommends that to achieve the desired level of money supply, the monetary authorities must implement policies to ensure that a substantial proportion of the money supply is made up of the currency in circulation. This will reduce the quantity of money held outside of banks. For economic growth to continue, rural bank branches should be encouraged to make loans to private businesses and small- and medium-sized enterprises.

Keywords: Deposit money banks, economic growth, financial inclusion, gross domestic product, Nigeria

Introduction
Financial inclusion (FI) like other economic indicators is projected to accelerate the economy's growth and development by making funds available for investment and economic purposes that are now unavailable. Utilizing and amassing these resources can result in a substantial quantity of low-cost, long-term investable wealth and increase in economic and development (Adigun, 2013) [12]. It entails integrating the informal financial realm into the mainstream financial system for better result. Nwafor and Yomi (2018) [16] emphasised that because middle and low-income earners are the largest proportion of the population, they control a sizable portion of the economy's idle funds; however, because these funds are held in small amounts by the several million of this in-group members, pull together and accruing these resources provides a massive source of cheap long term capital that are investible.
Most countries that have not effectively embraced FI are constructed in such a way that a significant amount of money flows into the informal sectors, which is destructive to society and individuals (Gazdar & Cherif, 2014; Kazeem, 2017) [8, 13]. In terms of the person, the weak status of financial inclusion leads the un-banked into informal banking sector with high interest rates and a limited supply of cash. Financial sector's development helps in the poverty reduction in two mutual and reinforcing ways.

This is accomplished by the acceleration of economic growth and the provision of direct benefits to the poor. Numerous studies on economic development and/or poverty reduction indicate that financial inclusion is key to economic growth and development (Zulkhibri & Ghazal, 2017) [35].

Past researches indicates that increased access to financial benefits not only increase growth but also income disparity and poverty reduction. Appropriate financial service has been shown to promote household welfares and stimulate small business growth (Eton *et al*., 2019; Yorulmaz 2016) [34, 7]. Additionally, macroeconomic evidences indicate that the economies with a greater degree of financial intermediation expand quicker and have less income disparity. This demonstrates the critical role of institutions in the financial intermediation process (Kazeem, 2017) [13]. FI goals can be achieved mostly through the banking sector's initiative to reach across diverse strata of the society, gender, geographies and income levels and encourage the public to adopt banking habits (Akhil, 2016; Wokabi & Fatoki, 2019) [3, 33]. As a result, it is critical to act rapidly and collaboratively in pursuit of Nigeria's financial inclusion goals. Financial inclusion will increase the participation of the formal financial systems by increasing the amount of money in circulation across the bank system, increasing credit available for productive purposes, and therefore increasing the growth of the GDP.

Economic growth is the goal of FI, which also encompasses economic, political and social inclusions (Nalini & Mariappan as cited in Aina & Oluyombo, 2014) [15, 2]. The Central Bank's five years strategic plan (2019-2024) aimed at attaining a 95 per cent financial inclusion's rate by 2024. The regulators, led by the Central Bank of Nigeria (CBN), have been at the forefront of shaping the banking industry in Nigeria through direct implementation of the Nigerian Sustainable Banking Principle (NSBP), which has facilitated the establishment of the Nigerian banking indu FI is defined as the provision of affordable financial services to the poor (Akhil, 2016). El Seid *et al* (2020) [6] posited that financial inclusion can be considered households' and businesses' access to and the utilization of financial services and products, which is critical, challenging, priority in Emerging Markets (EMs) and a critical factor in financial development. Financial inclusion, economic development and growth are inextricably linked. According to Zulkhibri and Ghazal (2017) [35], FI is seen as a critical tool for addressing inequality and poverty and attaining Sustainable Development Goals (SDGs) within the broader context of inclusive development. The strengths of scholarly submissions stem from the fact that financial inclusion is necessary for the economic process of any country which include that of Nigeria as well, because it enables the policymakers to carry out sound planning for decision-making (Abbas & Atanda 2019) [1]. Financial inclusion is achieved when significant adults have very easy access to a total and comprehensive range of formal financial service(s) that can satisfy their own needs at an inexpensive rate (Nigerian Financial Inclusion Strategy (NFIS), 2018) [11].

Meanwhile, the world revolves around ICT today which also includes inclusive finance through financial technology (fintech). Fintech provides convenient and affordable financial services to meet all individual's basic needs as well as providing credit to private sectors and contributing to the currency in circulation.

This term includes the following: Access to financial services and products is made simple, as is the usage of a diverse variety of financial services and products. Financial products, more than not, are tailored to individual needs. Also, financial services must be affordable to all groups, including those with modest incomes. For this study, we examine the impact of financial inclusion variables (which include several commercial banks' branches, credits to the private sector, currency in circulation, rural banks' depositors, and bank credits to the private sector) on economic growth in Nigeria.

However, the main objective of this study is to ascertain the effect of inclusive financing on Nigeria's economic growth. According to Abbas and Atanda (2019) [1], a review of numerous scholars demonstrates that the target of financial inclusion is to improve the economic growth by enhancing the economic status of the majority of people at the bottom of the poverty pyramid and the un-banked by providing them with cheap financial services. The specific objectives of the study are to;

i. determine the level of inclusive finance on economic growth in Nigeria
ii. examine the causal relationship between inclusive finance and economic growth in Nigeria
iii. assess the impact of inclusive finance indicators on the economic growth of Nigeria.
iv. investigate the relationship between inclusive finance variables and economic growth

The study developed the following null hypotheses in line with the specific objectives;

H01: There is no relationship between inclusive finance variables on the economic growth of Nigeria

H02: Inclusive finance variables have no impact on the economic growth of Nigeria

H03: There is no relationship between inclusive finance variables and economic growth

The scope of the study cover from year 2001 up till 2021, the reason for the choice was the fact that financial inclusion was reintroduced and more pronounced in 2000 and the year 2021 was due to the fact that 2021 was the year there is availability of data in Nigeria. The variables scope was GDP growth, currency in circulation (CIC), Number of Deposit Money Banks' Branches (NDMBB), Rural Banks' Depositors (RBD), and Banks' Credit to Private Sector (CPS) which were extracted from World Bank publication and CBN Bulletin. The reason for the choice of these variables was due to the fact that they were more critical to this study. Therefore, this study examined the influence of financial inclusion on Nigerian economic growth by analyzing the impact of currency in circulation, commercial bank credit to the private sector (including loans), several commercial bank branches, and rural bank depositors.

Literature Reviews

Financial Inclusion

The systems theory of financial inclusion, which believes that the benefits of expanded financial inclusion are mediated by a complex web of interrelated elements, including the economy, finance, and society as a whole, will provide the framework for this seminar's discussion. Subtle variations in symbols can have a substantial effect on projections of financial inclusion. Fintech, or financial technology (Tasca *et al*., 2016) [31], has arisen as a new

industry that employs technology to improve financial services and cut loan costs for all borrowers, not only those with low incomes. Martin Oluba (2008) [22] analyzed the rate of financial exclusion in United States, Switzerland, Venezuela, Pakistan, Nigeria, Argentina and India over 45 years (1960–2005) with the same measure which is the ratio of currency outside the banking system to the finite money supply. There appears to be considerable diversity in financial inclusion between nations, and the implementation of certain goals and legislation has proven challenging (Anyanwu *et al.*, 2018) [4]. Despite the need to increase the rate of exclusion reduction, he concluded that Nigeria had achieved quite well compared to other nations. Supposedly, Nigeria created the NFIS in 2012 and presented it as a crucial aspect of the country's growth to become one of the largest economies in the world.

According to Nwafor and Yomi (2018) [16], there is a correlation between economic growth and financial inclusion in Nigeria. By 2020, NFIS aims to reduce the population of the country without easy access to financial services from somewhere around 46.3 per cent to as low as 20 per cent. The years 2001 to 2016 were utilized to test two hypotheses using two-stage Least Squares regression. The hypotheses were examined by regression. Due to the importance of financial inclusion, the financial services industry did not affect Nigeria's economic growth. For Nigeria's economy to grow per capita at a higher rate, it was advised that the country's banks produce products to reach the financially excluded regions.

Financial inclusion in Nigeria went from 36.3% in 2010 to 43.3% in 2012, 48.6% in 2014, and 48.6% in 2016, while the number of Nigerians with a bank account rose from 30% in 2010 to 32.50% in 2012, 36.0% in 2014, and 38.3% in 2016. (data from the World Bank). Between 2010 and 2016, the number of other service providers, such as microfinance banks, insurance companies, and pension funds, increased by 6.3 per cent. The informal sector, which includes financial cooperatives and NGOs, is predicted to have shrunk from 17.4 per cent of the economy in 2010 to 9.9 per cent of the economy in 2016. According to this study, Nigeria's economic expansion is a top priority.

Empirical Review

Serrao *et al.* (2013) [28] state that the Jack of access to finance is a primary reason for the persistence of income inequality and slower growth, as it influences resources allocation and the relative economic prospects of individuals within the economy. Those that have access to formal financial services have the opportunities to increase their incomes and productivity through the purchase and sale of services and goods, thereby increasing their chances of alleviating poverty and enhancing their standard of living.

Meanwhile, the findings of Nalini and Mariappan (2012) [15] revealed that the challenges facing financial inclusion include improper loan repayment, the inadequate employees by financial institutions, consumption of time, the difficulty of canvassing, the necessity of high costs, the burden of work, and a lack of consumer awareness. Numerous informal companies have contributed to the cash-based economy of Nigeria. This problem is made worse by the inconsistent electrical supply and the high rate of illiteracy in rural and certain urban areas. Due to deteriorating infrastructure, financial inclusion was difficult and very costly (Aube & Laidlaw, 2010). According to Dashi *et al.* (2013), lack of an appropriate range of services and products and the limitation in the institutional capacities of the financial services' providers are the two main barriers that significantly affect financial inclusions in developing nations. Financial products including checking accounts, savings accounts, rural banking, mobile banking and electronic banking could be used to enhance financial inclusion. Those with a higher level of knowledge may find mobile banking more enticing, but the frequent failure of mobile communications networks may deter consumers from signing up for the service. M-banking, or mobile banking, is the delivery of financial services to users via mobile networks and mobile devices. It can deposit, withdraw, send, and save money, as well as make payments, using the given services. M-banking, also known as mobile financial services, is a type of banking that uses mobile devices to complete transactions (MFS). In the retail industry, mobile payment refers to payments made at the point of sale using mobile phones or personal digital assistants. Mobile money is defined in terms of electronic value storage and transaction as services that allow users to access and transfer electronic values to dedicated account(s), which can then be redeemed for cash or converted to cash (Umaru, 2014). As more reliable technical solution and telecommunication infrastructures become available on the market, bank will see a growth in the number of account openings, payment services, and savings mobilization from mobile device users. Already, 14 percent of Africans who are adults use their mobile phones to make purchases; in East Africa, 35% of adults use their mobile phones to make purchases (Brian, 2014). Notably, M-banking is completely incomprehensible to illiterate people, especially those without access to government-supplied energy. Segun *et al.* (2014) on the economics of financial inclusion in Nigeria indicate that the access to banking services was already extensive.

A framework for log-linear model definition Using panel data analysis and log-linear model formulation, Harley, Adegoke and Adegbola (2017) [10] conducted a study empirically from 2006 to 2015 on the effect of financial inclusion on poverty reduction and economic growth in a developing country. The study's approach was drawn from the research literature discovered by the researchers. The most accurate predictors of financial inclusion's influence on reduction of poverty in a developing nation were records of bank branches, operable ATMs and government investment from three African countries. According to them, a one per cent increase in the proportion of operable ATMs will result in a short-term boost of roughly 0.0082 per cent in the GDP and reduction in poverty in the developing nations. An indicator, according to them, indicates that the vast majority of ATMs in developing economies are outmoded, demanding a significant technological upgrade in rural areas. Their coefficient of determination was very high, indicating that the independent variables in their model account for almost 92% of the total changes in the real growth rate of the GDP during the study period. Therefore, the researchers recommended that the government usually targets poverty reduction by emphasizing the creation of infrastructure that will improve banking services.

Gretta (2017), analyzed whether financial inclusion has impact on economic growth in developing nations like the nations in the BRICS region and Middle East and North

Africa (MENA). In addition, he aimed to identify the multiple transmission pathways between financial intermediaries, financial literacy and economic development in developing countries. In this study, a VAR model was used to evaluate the relationship between the financial inclusion, as measured by financial literacy, financial activities and economic growth, and to investigate whether financial inclusion has impact on economic growth in MENA region. The research demonstrated the critical need for financial inclusion in BRICS and MENA nations.

Okoye, Adetiloye, Erin and Modebe (2017) examined financial inclusion as a method for improved economic development and growth. They studied the impact of financial inclusion on Nigeria's economic growth and development between 1986 and 2015 using the OLS technique. Several indices of financial inclusion were applied in the study, including the loan-to-deposit ratio, indicators of financial depth, rural loan distribution and branch network. The study utilized the ratios of broad money supply to GDP and private sector credits to GDP as indicators of financial deepening. The researchers used GDP growth over successive periods as a proxy for economic growth, whereas per capita income was used as a measure of poverty and, therefore, an indicator of development. According to the conclusions of the study, credit distributions to the private sector have not significantly contributed to economic growth in Nigeria, but thefinancial inclusion has helped significantly in alleviating poverty in the country via credit distribution to rural areas. As a result of the study's findings, it was recommended that the monetary authorities increase their efforts to promote financial inclusion by increasing lending to the private sector, while simultaneously strengthening the regulatory frameworks to ensure effective and efficient resources allocation and utilization. In their 2015 article, Babajide, Adegboye, and Omankhanlem explored the relationship between economic growth and financial inclusion in Nigeria. Their research aims to shed light on the drivers of financial inclusion and its effects on economic growth. They employed secondary data obtained from global development indicators for their research, and an OLS regression model was applied to assess the received information. According to their research, Financial Inclusion is a significant predictor of total production components and capital per worker that in turn is a significant predictor of an economy's total output. According to the study's conclusions, Nigeria's monocultural, oil-dependent economy might employ its economic and natural resources as an alternate means of diversifying and revitalizing the economy.

Onaolapo (2015) [24] studied the impact of financial inclusion on Nigeria's economic growth in a study (1982-2012). According to the researcher, secondary sources such as the Statistical Bulletins of the CBN, the Federal Office of Statistics, FOS, and the World Bank were used to gather data for the study. Several bank measures, including the loan to a rural region, branch network, demand deposit, capital adequacy, liquidity ratio and GDP, were utilized as primary data for the study. For data analysis, the approach of OLS was utilized. The results of the regression analysis indicate that inclusive bank financial activities have a significant impact on poverty reduction but only a marginal impact on national economic growth and financial intermediation via expanded bank branch networks, loans to small and medium-sized enterprises ad loans to rural areas. This is because variables on both sides of the study's equations are related by around fifty per cent.

Mbutor and Uba (2013) [19] financial inclusion had a considerable impact on Nigerian monetary policy from 1980 to 2012. The outcome of the study agree with the notion that monetary policy would be more successful if financial inclusion was expanded. As a result, clusters of underutilized bank branches with a negative coefficient exist, which can be explained by banks opening branches for profit rather than financial inclusion, a governmental objective.

Methodology

The study used secondary data, the data were such as GDP growth, currency in circulation (CIC), Number of Deposit Money Banks' Branches (NDMBB), Rural Banks' Depositors (RBD), Banks' Credit to Private Sector (CPS) extracted from World Bank publication and CBN Bulletin from a period of 2001 to 2021.

The method of analysis used for this work was divided into three parts namely, descriptive statistics, OLS regression analysis and time series analysis (using unit root test, Johansen cointegration and Granger causality test). The statistical software used for this study are E-Views version 11.0 and STATA version 16.0.

The formulated hypothesis was tested using the functional description of the model, which was stated as:

GDP growth = f (CIC, NCBB, RBD, CPS)

Decision rule: Reject the null hypothesis if $p < \alpha$ and do not reject if otherwise. Where α is the significant level (1%, 5%, 10% respectively)?

The ordinary least square regression model with response or dependent variable Y and its regressors or independent variables or predictors is specified below:

$$Y = \beta_o + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_3 X_4 + \varepsilon_i$$

And can be expressed as GDP growth $= \beta_o + \beta_1 CIC + \beta_2 NCBB + \beta_3 RBD + \beta_4 CPS + \varepsilon_i$

Where Y = dependent variable or response, then X_1 to X_4 are the independent variables and ε_i is the error term. Model can be written as

$$y = x\beta + \varepsilon$$

The resulting OLS estimator of β's is expressed as;

$$\beta = (x'x)^{-1}x'y.$$

Given the OLS estimator, the study can predict the dependent variable by

$y = x'_i\beta$ and thee error term by $e_i = y_i - x'_i\beta$ where e_i is called the residual.

Goodness of fit

The goodness of fit of an OLS regression can be measured as

$$R^2 = 1 - SSR/SST = SSE/SST$$

Where $SST = \sum (y_i - \bar{y})^2$ is the total sum of squares and; $SSR = \sum e_i^2$ is the residual sum of squares (to minimize

residual error). SSE = $\sum (\hat{y}_i - \bar{y})^2$ is the explained sum of squares.
R^2 (is the coefficient of determination) and it lies by definition between 0 and 1 and reports the fractions of the sample variations in y explained by the x's.
Note: R^2 increases with every (also irrelevant) additional repressor and is so not a good condition for selection of repressor. The adjusted R^2 is a modified version that does not necessarily increase with additional regressors;

$$Adj.R^2 = 1 - [(1-R^2)\ (n-1)/n-(k+1)]$$

The constructed model for this research is regression model and it is a parametric test predicting the economic growth in Nigeria (GDP growth). Dependent variable is GDP growth, while the independent variables are inclusive finance variables which are rural banks' depositors, money in circulation and banks' credit to private sector.
The normality and multicollinearity check are necessary to ensure the model is reliable and robust. Multicollinearity usually caused a misleading R-squared and P-values (that is, misleading results) if present. The Shapiro-Wilk test (Razali, Norna diah; Wah, Yap Bee, 2011) [26] was performed to test for normality of the data set and variance inflation factor (VIF) is the indicator for the checks of multicollinearity (O'Brien, R. M, 2007) [21]. If VIF is less than 5 (VIF<5), it means the model does not suffer from the problem of Multicollinearity. However, for normality, the null hypothesis strictly state that the data is normally distributed when it is accepted (that is, *P*> 0.05) and not normally distributed if rejected. Stata 16.0 is the computer software that will be used for this seminar analysis.
For the purpose of investigating the impact of inclusive finance on economic growth in Nigeria, secondary data was needed since it was difficult to get first-hand information on the variables used. OLS was also considered suitable in view of the fact that it can also help in establishing relationship between variables, and cause and effect with support of granger causality test. In order to achieve reliability of the result, robustness tests like heteroscedasticity test. Multi-collinearity test and normality test were also conducted. Model specification is to justify that the numbers of independent variables which are continuous are regressed against the dependent variable (Continuous) and to study the independent variable that has significant effect on the dependent variable.
The unit root test indicates the presence of a unit root if the series lacks stationarity and may lead to spurious results and the absence of a unit root if the series does have stationarity. To avoid the problem of spurious results, the unit root test is accomplished through the use of the ADF test. The hypothesis to accomplish the unit test can be stated as:
H_0: there is a presence of a unit root (series is not stationary) vs H_a: there is no unit root (the series is stationary). The ADF test can be presented mathematically as:

$$\Delta Y_t = \theta + \gamma Y_{t-1} + \sum_{i=1}^{p} \beta_i Y_{t-i} + \omega_t \quad (1)$$

Where, θ is a constant, γ is the coefficient of process root, β_i coefficient in time tendency, p is the lag order and ω_t is the disturbance (error) term.
This study used Granger causality test to analyze the causal link of the variables, focusing primarily on the causal relationship among the variables of interest (Eichler, 2012) [5]. X causes Y (X→Y) or X is related to Y (X→Y) are two hypothetical examples. This research will look at whether X causes Y or not. The Granger causality test will also disclose the impact of inclusive finance on economic growth in Nigeria.
Granger causality comparison was used as shown in table 1

Table 1: Granger Causality Comparison

Models	Regressions	χ coefficients	Wald tests
Restricted	$y_t = c_2 + \sum\alpha_2, iy_{t-i} + \varepsilon_{x,t}$	$\beta_{2,1} = \beta_{2,2} = \beta_{3,3} = 0$	Null hypothesis
Unrestricted	$y_t = c_2 + \sum\alpha_2, iy_{t-i} + \sum\beta_2, ix_{t-i}\ \varepsilon_{x,t}$	At least one of $\beta_{2,1}, \beta_{2,2}, \beta_{3,3} \neq 0$	Alternative Hypothesis

Data presentation, analysis and discussion of findings

Table 1: Descriptive statistics

Variables	Obs	Means	Std
GDP growth	21	84.90	10.50
CIC	21	63.19	8.40
NCBB	21	12.71	3.00
RBD	21	11.86	2.49
CPS	21	51.38	7.23

Source: Author's computation using Stata software

Table 1 show that GDP growth (M = 84.90, SD = 10.50) implies that on average, GDP growth represent about 84.9% with variability of 10.5%, CIC (M = 63.19, SD = 8.4) means that currency in circulation represent about 64.19 billion naira on average with variability of 8.4 billion naira, NCBB (M = 12.71, SD = 3.00) indicate that number of commercial banks' branches represent about 12.71 thousand on average with variability of 3 thousand branches, RBD (M = 11.86, SD = 2.49) means that on average, rural commercial banks depositor is about 11.86 billion naira with variability of about 2.49 billion naira and CPS (M = 51.38, SD = 7.23) banks credit to private sector on average represent about 51.38 billion naira with variability of about 7.23 billion.

Table 2: Unit root test (ADF)

Differenced Variables	Test statistics	p-values	Order
GDP growth	-5.581	0.0003*	I (1)
NCBB	-7.477	0.0000*	I (1)
CPS	-7.327	0.0000*	I (1)
CIC	-6.539	0.0000*	I (1)
RBD	-8.297	0.0000*	I (1)

Asterisk * represent 1% level of significance
Source: Authors computation using E-views

Table 2 shows that GDP growth (*P*< 0.01, I(1)), NCBB (*P*< 0.01, I(1)), CPS (*P*< 0.01, I(1)), CIC (*P*< 0.01, I(1)) and RBD (*P*< 0.01, I(1)) which means that GDP, banks' credit to private sector, number of commercial banks' branches, currency in circulation, and rural banks' depositor are statistically significant at 1% and becomes stationary after the first difference which tells us that the series are integrated of order one (I (1)). This suggest that we can now proceed with further times series analysis like cointegration and causality test as specified in the methodology chapter.

Table 3: Johansen test for cointegration

Trend: constant Sample: 2003 -2021			Number of obs. = 19 Lag = 2		
Maximum Rank	**Parameters**	**LL**	**eigen value**	**Trace statistic**	**5% critical value**
0	30	-274.528	-	99.5053	68.52
1	39	-252.546	0.90113	55.5406	47.21
2	46	-240.355	0.72285	32.1600	29.68
3	51	-231.859	0.59113	14.1673*	15.41
4	54	-226.478	0.43247	3.4047	3.76
5	55	-224.775	0.16406		

Source: Author's computation using Stata software

Table 3 clearly reveal that maximum rank order (0-2) of the three cointegrating equations trace statistic value are more than the critical value at 5% significance level (trace statistic>5% critical value) which indicate that there is strong evidence of cointegration among the series (GDP growth, banks' credit to private sector, number of commercial banks' branches, currency/money in circulation, and rural banks' depositor) and this suggest that there is a long run relationship among GDP growth, number of commercial banks' branches, banks' credit to private sector, currency in circulation, and rural banks' depositor. This simply tells us that there is a long run relationship between inclusive finance and economic growth in Nigeria.

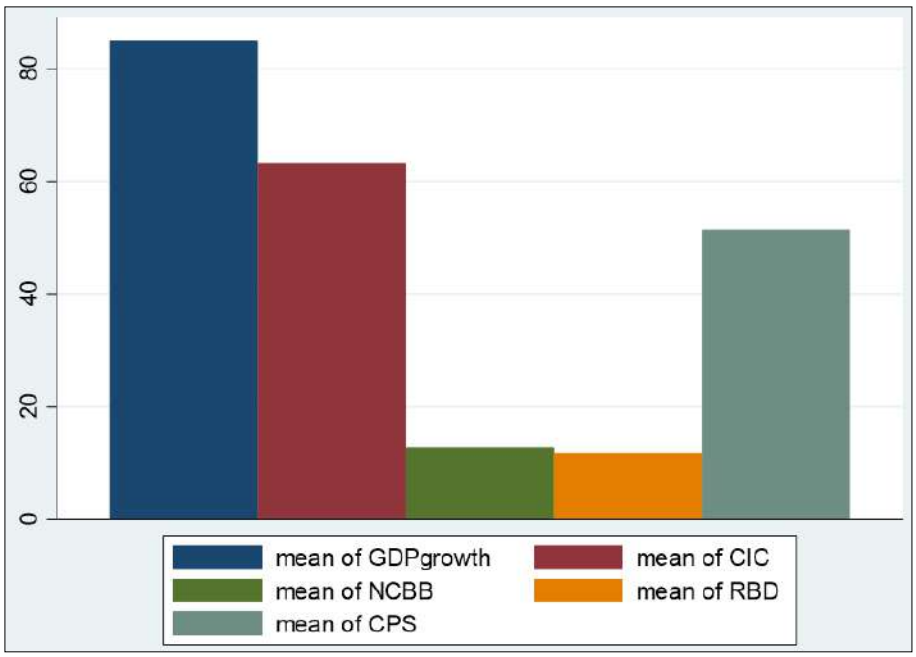

Fig 1: Bar chart showing the mean of GDP growth, CIC, NCBB, RBD, and CPS

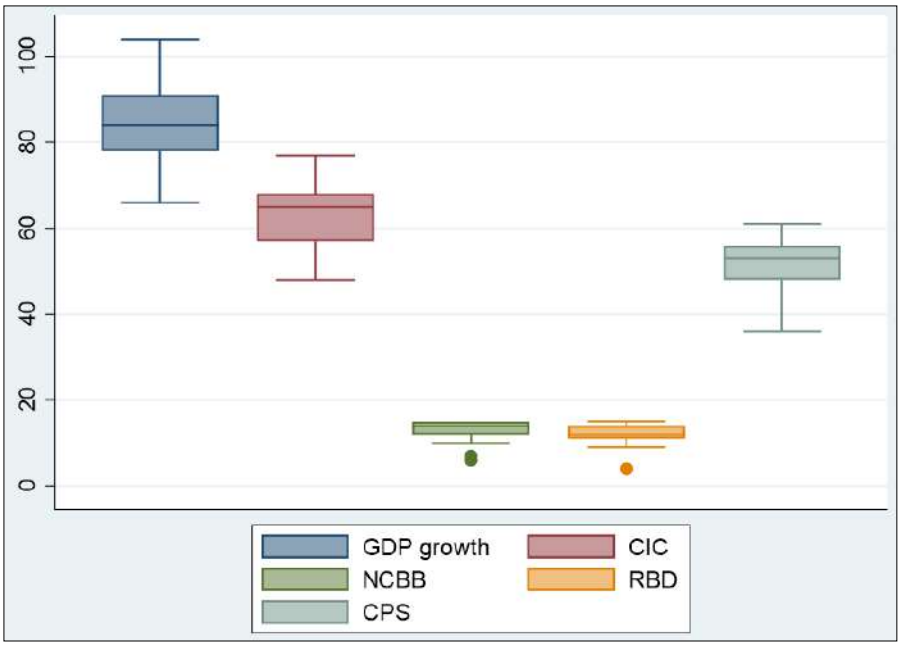

Fig 2: Box plot showing the distribution of GDP growth, CIC, NCBB, RBD, and CPS

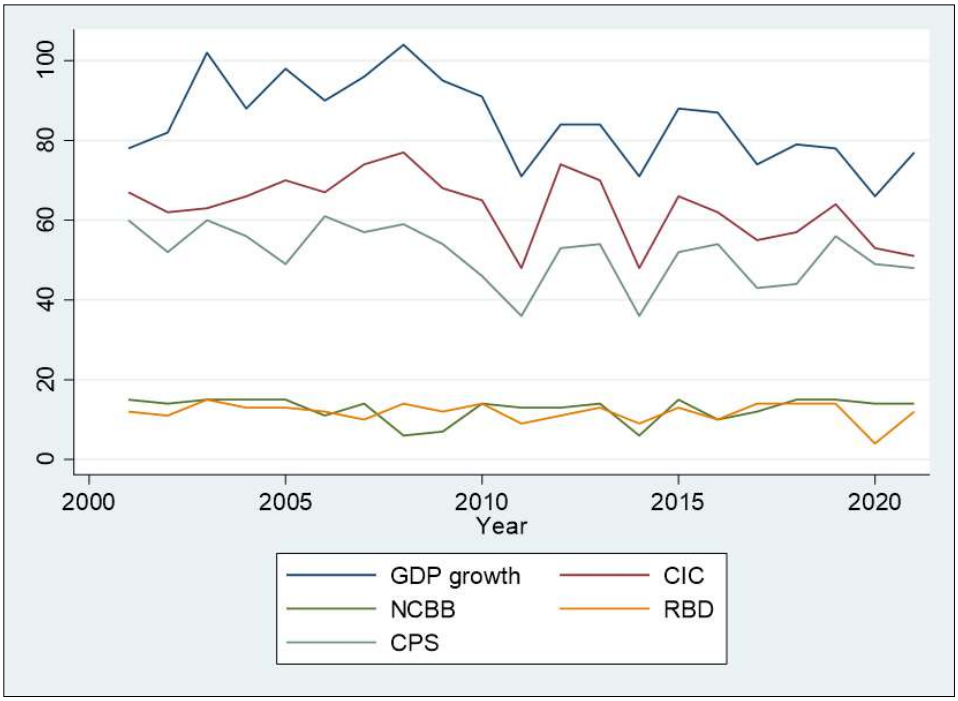

Fig 3: Line graph showing the distribution of GDP growth, CIC, NCBB, RBD, and CPS

Figure 1, 2 and 3 shows that gross domestic per capita have the highest growth level among all the five variables of interest while rural banks' depositor has the lowest growth level and this agree with the situation of ground according to the findings of EFInA survey and this contribute to high rate of unbanked among the rural residents as they lack financial education and are even not sensitive to financial technology of which they can access finance easily. Meanwhile, the line graph in figure 3 showing the distribution of gross domestic product growth, number of commercial banks' branches, banks' credit to private sector, currency in circulation, and rural banks' depositor implies that they are not stationary.

Table 4: Ordinary least square (OLS) Regression analysis

Variables	Coefficient estimate	Std errors	Test statistics	P-values
GDP growth				
CIC	0.687	0.278	2.47	0.025**
NCBB	-0.683	0.497	-1.37	0.188
RBD	1.334	0.641	2.08	0.054***
CPS	0.181	0.310	0.58	0.568
Constant	25.051	12.867	1.95	0.069
Model P-value	0.0005			
R-squared	0.6962			

Where asterisk *** and ** are 10% and 5% significant level respectively
Source: Author's computation using Stata software

Table 4 indicates that the fitted OLS regression model ($P<$ 0.01) indicate that the model is statistically significant at 1% which indicate that there is a significant relationship between GDP growth, banks' credit to private sector, number of commercial banks' branches, currency/money in circulation, and rural banks' depositor. R-squared = 0.6962 implies that about 70% variation in Economic growth (GDP growth) can be explained by financial inclusion indicators (number of commercial banks' branches, banks' credit to private sector, currency in circulation, and rural banks' depositor). The R-squared is relatively high and the model is statistically significant which suggest that the model presents a good fit for the data and is very suitable for future prediction of economic growth in Nigeria.

Meanwhile, CIC ($\beta = 0.687$, $P< 0.05$) indicate that currency in circulation is statistically significant at 5% level and have positive significant impact on GDP growth. RBD ($\beta = 1.334$, $P< 0.10$) implies that rural banks' depositor is statistically significant at 10% level and have significant positive impact on economic growth (GDP growth). Besides, the coefficient estimates of NCBB ($\beta = -0.683$) tells us that for one thousand increment in the number of commercial banks' branches, the GDP growth will decrease by about 0.683 which agrees with the work of Mbutor and Uba (2013) [19]. The study's findings supported the idea that monetary policy would be more effective if it increased financial inclusion. As a result, there are clusters of underutilized bank branches that have a negative coefficient, which can be explained by the fact that banks open branches for profit rather than financial inclusion, a policy goal.

Table 5: Granger causality

Equation	Excluded	Causal direction	P-value
GDP growth	CIC	GDP growth->CIC	0.155
GDP growth	NCBB	GDP growth->NCBB	0.518
GDP growth	RBD	GDP growth->RBD	0.316
GDP growth	CPS	GDP growth->CPS	0.148
GDP growth	ALL	GDP growth->ALL	0.289
CIC	GDP growth	CIC-> GDP growth	0.008*
CIC	NCBB	CIC->NCBB	0.113
CIC	RBD	CIC->RBD	0.267
CIC	CPS	CIC->CPS	0.459
CIC	ALL	CIC->ALL	0.058***
NCBB	GDP growth	NCBB-> GDP growth	0.834
NCBB	CIC	NCBB->CIC	0.001*
NCBB	RBD	NCBB->RBD	0.181
NCBB	CPS	NCBB->CPS	0.200
NCBB	ALL	NCBB->ALL	0.000*
RBD	GDP growth	RBD-> GDP growth	0.188
RBD	CIC	RBD->CIC	0.032**
RBD	NCBB	RBD->NCBB	0.187
RBD	CPS	RBD->CPS	0.004*
RBD	ALL	RBD->ALL	0.017**
CPS	GDP growth	CPS-> GDP growth	0.017**
CPS	CIC	CPS->CIC	0.197
CPS	NCBB	CPS->NCBB	0.094***
CPS	RBD	CPS->RBD	0.298
CPS	ALL	CPS->ALL	0.031**

Where asterisk *** ** and * are 10%, 5% and 1% respectively.
Source: Author's computation using Stata software

Table 5 indicates that currency in circulation (CIC), number of commercial banks' branches (NCBB), rural banks' depositors (RBD) and banks' credits to private sector (CPS) have a significant causal relationship with economic growth (GDP growth). This tells us that there is a direct and significant causal relationship between the inclusive finance indicators and economic growth.

Normality test

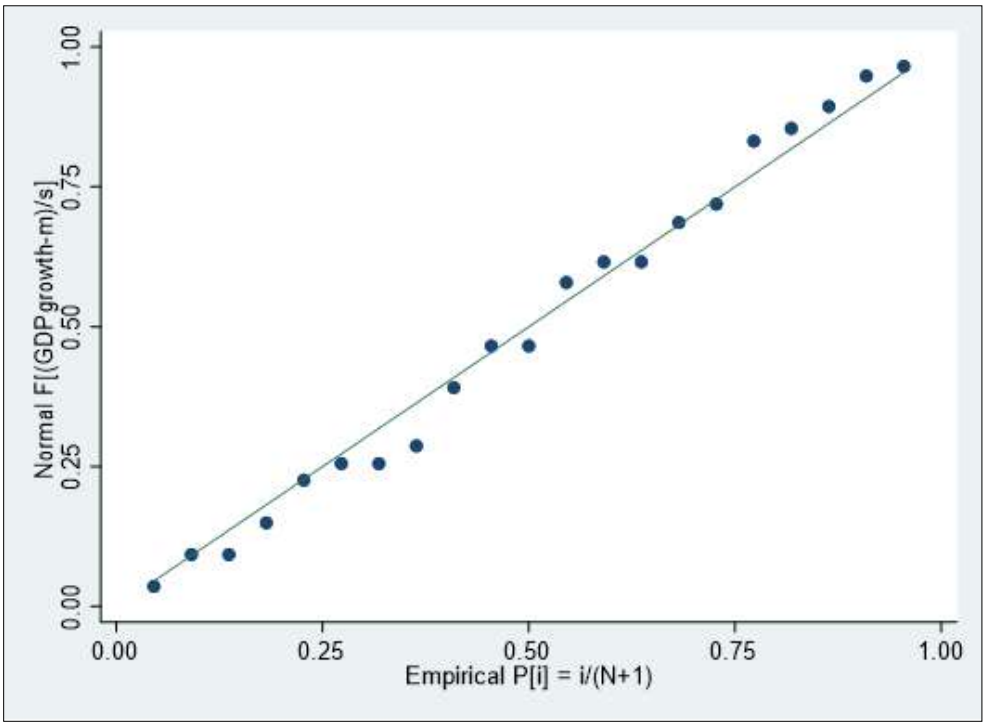

Fig 4: Shapiro-Wilk (P = 0.9574)

Figure 4 shows the normality test by Shapiro-Wilk (*P*> 0.05) and it graphical illustration which indicate that the data is normally distributed at 5% level which satisfy the normality assumption of the fitted model.

Table 6: Multicollinearity

Predictor variables	VIF	1/VIF
CIC	2.60	0.384552
CPS	2.40	0.415909
RBD	1.22	0.819560
NCBB	1.06	0.942189
Mean VIF	1.82	

Table 6 shows that all the predictor variables (banks' credit to private sector, currency in circulation, rural banks' depositor and number of commercial banks' branches) have variance inflation factor (VIF) that is less than 5 (VIF<5) which indicate that the model did not suffer from the any problem of multicollinearity and this make it a robust and reliable model.

Table 7: Heteroscedasticity and Autocorrelation

Test	Chi-square statistic	P-value
Heteroscedasticity	1.21	0.2709
Autocorrelation	0.27	0.6015

Table 7 shows that $P > 0.05$ for both the test for heteroscedasticity and autocorrelation which means that the fitted OLS model does not suffer from the problem of autocorrelation and heteroscedasticity. This also satisfies the OLS assumptions.

Discussion of Findings

Table 1 shows that GDP Per growth (M = 84.90, SD = 10.50) implies that on average, GDP growth represent about 84.9% with variability of 10.5%, CIC (M = 63.19, SD = 8.4) means that currency in circulation represent about 64.19 billion naira on average with variability of 8.4 billion naira, NCBB (M = 12.71, SD = 3.00) indicate that number of commercial banks' branches represent about 12.71 thousand on average with variability of 3 thousand branches, RBD (M = 11.86, SD = 2.49) means that on average, rural commercial banks depositor is about 11.86 billion naira with variability of about 2.49 billion naira and CPS (M = 51.38, SD = 7.23) banks credit to private sector on average represent about 51.38 billion naira with variability of about 7.23 billion.

Table 2 shows that GDP growth ($P < 0.01$, I(1)), NDMBB ($P < 0.01$, I(1)), CPS ($P < 0.01$, I(1)), CIC ($P < 0.01$, I(1)) and RBD ($P < 0.01$, I(1)) which means that gross domestic product growth, NDMBB, banks' credit to private sector, currency in circulation, and rural banks' depositor are statistically significant at 1% and becomes stationary after the first difference. This tells us that the series are integrated of order one (I (1)). This suggested that we can now proceed with further times series analysis like cointegration and causality test.

Table 3 indicated that there is strong evidence of cointegration among the series (GDP growth, banks' credit to private sector, NDMBB, currency in circulation, and rural banks' depositor) and this suggest that there is a long run relationship among GDP growth, number of commercial banks' branches, banks' credit to private sector, currency in circulation, and rural banks' depositor. This simply tells us that there is a long run relationship between economic growth and inclusive finance in Nigeria.

Table 4 shows that currency in circulation (CIC), Number of Deposit Money Banks Branches (NDMBB), rural banks' depositors (RBD) and banks' credit to private sector (CPS) have significant positive causal relationship with economic growth (GDP growth). This indicated that there is significant positive causal relationship between the inclusive finance indicators and economic growth.

Table 5 shows that there is a significant relationship between gross domestic product per capita, number of commercial banks' branches, banks' credit to private sector, currency in circulation, and rural banks' depositor. Meanwhile, CIC ($\beta = 0.687$, $P < 0.05$) indicate that currency in circulation is statistically significant at 5% level and have positive significant impact on GDP growth. RBD ($\beta = 1.334$, $P < 0.10$) implies that rural banks' depositor is statistically significant at 10% level and have positive significant impact on economic growth (GDP growth).

Besides, the coefficient estimates of NDMBB ($\beta = -0.683$) tells us that for one thousand increase in the NDMBB, the GDP growth will decrease by about 0.683 which agrees with the work of Mbutor and Uba (2013) [19]. The study's findings supported the idea that monetary policy would be more effective if it increased financial inclusion. As a result, there are clusters of underutilized bank branches that have a negative coefficient, which can be explained by the fact that banks open branches for profit rather than financial inclusion, a policy goal.

Conclusion and Recommendations

From this study's findings, it was submitted that currency in circulations and rural bank depositors have significant and positive impact on the economic growth, and as a result, it was concluded that the provision of banking services in rural areas will contribute immensely to Nigeria's economic growth. Accepting the deposits and granting loans where necessary are two of the most prominent types of financial services available. The granger causality also shows that there is significant positive causal relationship between the financial inclusion and the economic growth. Johansen cointegration indicates that there is a long run relationship between economic growth and financial inclusion of Nigeria. The currency in circulation, which is a component of Nigeria's limited money supply, has had a favorable impact on the country's economic growth. Because of the flow of currency through banking transactions, economic activities have been stimulated, resulting in an improvement in the overall state of Nigeria's economic development.

The outcomes of the study lent support to the notion that monetary policy would be more effective if it promoted greater levels of financial inclusion. The outcome is a concentration of underutilized bank branches with a negative coefficient, which can be explained by the fact that banks open branches for profit rather than to promote financial inclusion, which is a governmental goal.

Based on the results of this study, the following recommendations were made;

To achieve the desired level of money supply, the monetary authorities must implement policies to ensure that a substantial proportion of the money supply is made up of the currency in circulation. This will reduce the quantity of money held outside of banks. For economic growth to continue, rural bank branches should be encouraged to make loans to private businesses and small- and medium-sized enterprises (SMEs).

In order to encourage depositors and savers, rural bank branches should be given the ability to do so. As a result, deposits will be encouraged, and economic growth will be

improved. When creating their business models, banks should keep in mind their commitment to sustainability to ensure that they can cope with disruptions and have a good social and environmental impact in their effort to give value to their stakeholders. In order to withstand disruptive events, banks and other financial institutions must completely adopt sustainability principles, the authors argue, noting that this is especially more crucial during periods of substantial disruption, such as the coronavirus epidemic (COVID-19).

During the pandemic, the financial service industry was undergoing considerable transformation. Banks have had to adapt their business model(s) in response to changes brought about by innovation, digitization, new entrants from the Fintech sector, more regulation, and shifting needs and behavioral patterns among their clients.

The government and the monetary authorities should a matter of urgency ensure that banking services are promoted and that bank branches are established in more rural areas, as well as that these banks be given equitable assistance in order to satisfy the needs of these areas efficiently.

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