Effects of Financial Innovations on the Financial Inclusion in Nigeria

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Abstract
Financial inclusion has been identified as a prerequisite to economic development of any economy, hence the task of making every members of the society financially included by relevant government and financial authorities. This study titled, effects of innovations on financial inclusion in Nigeria covers 2005-2021, seeks to determine the roles financial innovations played in championing the visions of the inclusion policies of Nigerian government. The specific objectives are: to ascertain the effect of agency banking on financial inclusion in Nigeria, to find out the effect of point of sales on financial inclusion in Nigeria, and to examine the effect of internet/mobile banking on financial inclusion in Nigeria. The study adopted ex-post facto research design and the analysis was done with pooled ordinary least square. The results show that agency banking has positive significant effects on financial inclusion in Nigeria, that point of sales has positive and significant effect on the financial inclusion in Nigeria. The study further found a significant positive effect of internet/mobile banking on financial inclusion in Nigeria. The study therefore concludes that financial services innovations such as agency banking, point of sales and internet/mobile banking have major positive and significant effects on the financial inclusion in Nigeria. Based on the foregoing findings, it recommends the following: that banks should license more agents bankers in order to expand operations especially inward to the rural areas for increased financial inclusivity, that businesses should be encouraged on the use of point of sales service channels as it allows free flow of financial transactions and promote financial inclusion and finally, that banks should advance the use of internet/mobile banking and other payment innovations by customers as this will help reduce the number of unbanked persons especially in the rural communities.
Keywords: *Agency Banking, Financial inclusion, Mobile Banking, Payment Innovations, POS Banking*

INTRODUCTION

1.1 Background of the Study

In the recent time, the task of making every members of the society financially included has been the desired goal of the financial sector and economic policy makers globally (Nigerian Banker, 2014; National Financial Inclusion Strategy, (2018).This is in view of the implication that the financially excluded groups may never have access to cheaper credit and may as a result find it extremely difficult to grow their businesses (The Nigerian Banker, 2014). Financial Inclusion is viewed to be achieved when every adult have easy access to a broad range of formal Financial services that meet their needs at affordable cost. The services include, but not limited to, payments, savings, credit, insurance, pension and capital market products (National Financial Inclusion Strategy 2018). The activities of the excluded groups will unarguably impact negatively on the effectiveness of monetary policy. Therefore, it becomes necessary for the financial regulators, and authorities to initiate system and incentives strategy that would encourage the interest of these excluded persons and business operators to embrace the formal financial sector because of the enormous benefits especially obtaining cheap credit facilities and quality advisory services from their banker (Ozili, 2021; CBN, 2013 and the Nigeria banker, 2014). To Enhancing Financial Innovation and Access (EFInA)(2010) Nigeria is not exempted as the population of financially excluded is put at 46.3% in 2010.

Financial inclusion is access to, and the use of available formal financial services to improve the welfare of individuals in a country (Ozill 2020a; CBN 2020). This describes a process where all members of the economy do not have difficulty in opening bank accounts; can afford to access credit; and can conveniently, easily and consistently use financial system products and facilities without difficulty (CBN, 2020; Ozili 2022a, Nwankwo, 2014; Nair, 2014). As emphasized by Khraisha and Authur (2018) in Doh (2020), financial innovation refers as a process undertaken by any financial institutions and other financial service providers which involves development, promotion, as well as the adoption of new products and services, processes, or technological improvements that bring new methods or changes to how financial activities are been rendered and carried out. Financial innovations therefore increase the level of penetration of financial products and services to the financially excluded population. With the advancement in technology financial services and products have been easily accessible to many who would otherwise be financially excluded. Some of the notable financial innovation which have been witnessed in the financial sector in the recent decades included Automated teller machines (ATM), Agency banking, internet/mobile banking, point of sales (POS), web payment transaction etc.

Achieving adequate financial inclusion policy in Nigeria have not been an easy task considering the so many barriers impeding its efficiency such as inadequate of technological development, poor infrastructural amenities, insecurity, financial illiteracy and partial of bank plan-financial inclusion integration etc.Despite all these efforts by banks in their financial innovations with the aims of reaching out to the millions of unbanked Nigerians, but the result achieved have continued to question the sufficiency of these innovations or its credibility. Financially excluded, stillseems as a last-mile problem because the ratio of the unbanked Nigerians still remains high. It is therefore based on the foregoing that this study seek to investigate the effects of financial innovations on financial inclusion in Nigeria (The Nigerian Banker, 2014).

1.2 Statement of the Problem

Achieving the goals of financial inclusion in Nigeria is not without challenges. A lot of issues have continued to affect its success story: infrastructural decay, inadequate of technological development, insecurity, financial illiteracy, unfriendly monetary policies, failure of banks to integrate financial inclusion into its operational plans etc.

To Sanusi (2011) all technical inadequacy and poverty combined to the death of access to financial services by millions of adults all over the globe and Nigeria in particular. He further emphasized that achieving optimal level of financial inclusion will means empowering about 70% percent to the country population living below poverty level.

In a related development, Agency banking is another means of financial inclusion strategy. Deposit money banks (DMBs) are authorized by the financial authority(s) to establish representatives in a very far distance where their services are not reached, given the fact that account ownership brings about making small value remittances at low cost and purchases on credit and above all, provide access to convenient means of transaction. But the challenge to agency banking is the fact that the rural population that it was intended remains unserved because of the absence of enabling infrastructures to operate. Again, these agents to their mother banks has limited service. Similarly, the adoption of point of sales (POS) was introduced aftermath of the cashless policy in 2011 with the sole aim of enhancing financial inclusion in the country. Adoption of (POS) is not without its own odds. Using point of sales (POS), you are expected to access certain financial products and services especially deposit, payment for various purchases etc but the failure of the network providers and power supply have remained as a bottleneck to achieving financial inclusion policy in Nigeria. In reality, the prevailing level of frauds associated with the usage of (POS) and insecurities in the country contributed to the death of point of sales (POS) on arrival in Nigeria.

Furthermore, mobile banking is the greatest channel through which financial inclusion policy could reach wide-ranging scope of coverage. On the contrary, very few result have been achieved because of poor access to internet. Currently, only the urban cities can boast to have internet coverage with its frustration in accessing services through it. Undoubtable, mobile banking only serve those in the urban areas with many time, services failing or bouncing back thereby leading to frustration and inefficiency (Emmanuel, 2020; Lumsden, 2018).Financial inclusion is to be achieved when every adult have easy access to a broad range of formal financial services that meet their needs at affordable cost. Few available research papers on the topic locally and the margin of the unbanked form major gap. But a look at the reality, the reverse is the case, hence this study.

1.3 Objectives of the Study

The broad objective of the study is to ascertain the effects of innovations on financial inclusion in Nigeria. The specific objectives are as follows:

1. To ascertain the effect of agency banking on financial inclusion in Nigeria.
2. To find out the effect of point of sales on financial inclusion in Nigeria.
3. To examine the effect of internet/mobile banking on financial inclusion in Nigeria.

1.4 Research Questions

The following formed the research questions to guide the researchers.

1. To what extent does agency banking affect financial inclusion in Nigeria?
2. To what extent has point of sales affect financial inclusion in Nigeria?
3. To what extent does internet/mobile banking affect financial inclusion in Nigeria.

1.5 Research Hypotheses

From the stated objectives, the following research hypotheses have been formulated and structured in a null form to guide the study.

Ho_1: Agency banking does not have a significant effect on the financial inclusion in Nigeria.
Ho_2: point of sales does not have a significant effect on the financial inclusion in Nigeria.
Ho3: mobile banking does not have a significant effect on financial inclusion in Nigeria.

1.6 Scope of the Study

The study covered the period of 2005-2021. The basis for choosing this period is the availability of data, since most of these financial innovations become more available to the bank customers and the public in the late 2000s. The study selected (Agency banking, point of sales (POS) and mobile banking) out of the prevalent Automated teller machines (ATMs , web payment transaction, Agency banking and point of sales financial innovations in Nigeria among others which form other controlled variables

REVIEW OF RELATED LITERATURE

2.1 Conceptual Review

2.1.1 Financial Innovation

According to Arthur (2020) “Financial innovations is seen as a process undertaken by any institution which involves development, promotion, as well as the adoption of new products and services, processes, or technological improvements that bring new methods or changes to how financial activities are done” . Financial innovation is therefore a process which its main objective is to make the process of delivery of banking products and services at more ease and at a reduced cost. With the recent developments in the financial sector and advancements in the information communication and technology(s) (ICT) and the revolving economic situation, a lot of innovation have been introduced to meet the current challenges most especially cost reduction through information communication and technology (ICT) and create more customers robust relationship. Several innovations such as Agency banking, point of sales (POS), internet/mobile banking, Automated teller machines (ATM) web payment channels etc.

2.1.1.1 Agency Banking

Agency banking is the availability of bank agents resident in the very rural areas and village localities where deposit money banks (DMBs) cannot operate due to certain logistics and infrastructure deficiency (Emmanuel, 2020; Paul, 2013; Nwankwo, 2002).Agency banking

then is a new way of extending financial products and services to areas where it would have been difficult to reach due to high costs of establishing branches or lack of infrastructures. Thus, the essence of agent banking is for the financial institutions to maximize their profits and enhance the level of financial inclusion through the agency banking model of doing business. But the limitation to agent banking is the fact that, agents are limited to access certain services and products of their mother banks (Chukwunulu, 2019; CBN, 2018; Emmanuel, 2020).

2.1.1.2 Point of sales (POS)

The main reason for the high rate of the unbanked, under banked and those lacking access to financial services, especially, those living in the rural areas is as a result of the lack of infrastructural amenities, illiteracy, poverty and insecurity (Nwankwo, 2014, Sanusi 2014) .Point of sales (POS) is a device that enable bank customers to access to certain limit the products and services of banks at their point of sales or purchase (Nair, 2014). The presence of information technology enabled financial services such as point of sales (POS) to extend banking service to the remote villages and rural areas and lack of other use of brick and mortar structure, such as electronic banking, financial inclusion will be very difficult and expensive (Nair, 2014; Nwankwo, 2014 and Okoye, Nwisienyi and Obi, 2019).

2.1.1.3 Mobile Banking

Nwafor (2018) mobile baking involves use of mobile phone devices and internet to access and deliver financial products and services. In Nigeria, this model of innovation is a very good medium to reach to the unbanked but the challenge has remain internet coverage and frauds associated with the usage.

2.1.2 Financial Inclusion

As emphasized by Nair (2014) “Financial inclusion is the process of ensuring access to appropriate financial products and services needed by all sections of the society in general and vulnerable groups such as weaker sections and low-income groups in particular, at an affordable cost in a fair and transparent manner by regulated mainstream institutional players” . According to National Financial Inclusion Strategy (2018) Financial Inclusion is achieved every adult have easy access to a broad range of formal Financial services that meet their needs at affordable cost. The services include, but not limited to, payments, savings, credit, insurance, pension and capital market products. This is because, without access to finance, low investment will be recorded, little or no expansion of business will be made and increasing level of poverty, thereby worsening the economy of Nigeria, hence the need to encourage a robust financial inclusion model (Nair, 2014).

2.2 Empirical Review

Ele & Orji (2023) who investigated the impact of financial inclusion on the economic growth in Nigeria between 19912021, using time series data sources from the CBN statistical Bulletin. The study adopted the ex post facto research design and employed the autoregressive distributed lag (ARDL) method to analyze the results. The empirical result indicates that banks’ rural savings mobilization financial inclusion has significant positive impact on the real gross domestic product in Nigeria, bank loans to rural economy has significant positive impact on the real gross domestic product (economic growth) in Nigeria, and bank lending rate to farmers has negative but insignificant impact on the gross domestic

product in Nigeria. The study recommended that: there is need for a strategic policy approach to entrenching financial technology innovations and the provision of financial services (loan facilities) to rural population as it contributes to improving the performance of the aggregate economy, there is need to improve the ability of rural banks in mobilizing savings, this will further the savings culture of rural dwellers, boost rural investments and impact positively on the aggregate economy, and financial institutions should be mandated to devise a lending a special lending rate that enhances the access of rural dwellers to credits and other financial services, this will improve financial inclusion penetration and advance economic growth of the country.

Nwankwo (2014) investigated the sustainability of financial inclusion for rural dwellers in Nigeria: problems and two ways forward. The study employed cross-section survey design and descriptive design and used primary source of data and adopted correlation in its analytical techniques. This study findings reveals that they exist a disintegration between the rural dwellers and financial institutions where financial inclusion policy is introduced without the provision of financial services outlets in the rural areas. Conclude that though most of the rural and poor people are aware of banking services but are afraid due to the perceived frauds hence the needs for financial literacy for the rural people. The study further infer that the economy cannot grow fast without proper implementation of financial inclusion policy thus the need for the promotion, ensuring that the central bank of Nigeria (CBN), deposit money banks (DMBs) microfinance banks (MFBs) and other non financial institutions to promotes financial services and products to the rural areas at low cost and convenient so that the goals of reaching to those financially excluded will be attained. The major limitation of this study is the usage of primary data.

Ele (2023) who studied the effects of financial literacy on the improvement of financial inclusion in Nigeria (study of selected small and medium enterprises in Abakaliki metropolis, using primary data. The ordinary least squares (OLS) technique was employed to estimate the parameters. The findings indicate that Southeast Nigeria*:* there is significant effect of financial knowledge on the improvement of financial inclusion in Small and medium enterprises in Abakaliki Nigeria*;* financial experience has significant positive effect on the improvement of financial inclusion in Small and medium enterprises in Abakaliki metropolis; and financial skills have significant positive effect on the improvement of financial inclusion in Small and medium enterprises in. Based on recommendations: Banks should develop a mechanism (expansion of financial education facilities) to educate to expand the financial knowledge of their SME customers; Banks in Abakaliki should conduct account opening programme specifically for small and medium holder business to expand their experience of financial products and improve their financial inclusion; and there is need for banks to develop synergy that will produce in-bank or in-business skill training for small holder businesses on financial account reporting and budgeting.

Nair (2014) study financial inclusion: The Indian model introduction. This study is a complete review of the strategies so far adopted by the Reserve Bank of India to accelerate the adoption of banking services and practices in all areas of doing business especially to the financial excluded people in India. The study lamented that financial inclusion has remained a last-mile problem in India despite all the efforts made and initiatives implemented, it still seen as no

effort has being made in that regard. The study concludes lack of integration of financial inclusion into the business plans of banks and lack of technological infrastructure in the desired rural localities. The study therefore recommended the following measures: bank-led model, technology-driven, structured and planned method, relaxing of KYC, institutional mechanism, financial literacy and financial inclusion strategy and strick compliance to technology based and online payment of all sorts especially the social security aids in India and compulsory extension of banking services through electronic means especially to the entrepreneurs and farmers and non farm credit facilities.

Emmanuel (2020) who studied the impact of innovation on financial inclusion in the financial sector of Cameroon. It covered the period of 2010-2019, using secondary data and employed descriptive research design and further adopted regression and correlation in the analysis of the data. The result of the research showed that mobile money banking and microfinance institutions has positive and significant relationship with financial inclusion while agency banking indicates a significant negative relationship which the study accused the financial institutions as using the strategy to minimize costs and not necessarily to enhancing the level of financial inclusion in Cameroon. The study therefore recommends that financial institutions should develop a robust financial innovation as it is capable of all inclusive social, political and economic development in Cameroon as well as enhancing the profit base and minimizing financial management costs.

2.3 Theoretical Framework

This study adopted the theory of Task Technology fit (TTF). This theory was propounded and developed by Goodhue and Thomson in the year 1995. The Task technology fit theory assumes that information technology will most likely impact positively on individual performance and use if the capabilities of information communication and technology (ICT) match the tasks that the user must perform. According to the authors, certain factors could be used to measure Task technology fit because, the usefulness of financial innovations lies in the capability of the users and its value in helping the users achieve a certain purpose. These factors are: quality, locate-ability, authorization, and compatibility, ease of use/training, production time lines system reliability and relationship with users.

Similarly, considering the relationship between this study and the theory of task technology fit (TTF), one would agree that the match is perfect because of our variables of investigations: Agency banking, point of sales (POS) and internet/mobile banking which adopted different technologies in its operations. Recall that (TTF) maintains that for information system to be successful there must be a match between business tasks and information technology adopted. The position of this theory is that customers must be capable of using these technologies and must fit into serving the particular needs of the users. Therefore, this theory matches this study because these technologies is build to fit each products and services, since no one need to be a graduate or a professor before he/she can use ATM, POS devices or even use their mobile phones to carry out certain financial transaction.

METHODOLOGY

3.1 Research Design

This study adopted ex-facto research design because historic data was used.

3.2 Sources of Data

Time series data on the variables were collected from the Central Bank of Nigeria Statistical Bulletin for the period 2005-2021.

3.3 Description of Model Variables

Financial inclusion (F1) is the dependent variable. It was measured as natural logarithm of the number of deposit accounts in financial institution (MFBs) (Emmanuel, 2020).
Agency Banking (AB) is the independent variable. Agency banking was measured as a natural logarithm of the total number of registered bank agents (Emmanuel, 2020).
Point of sales (POS) is the independent variable. Point of sale was measured as the total amount of POS transactions (Chukwunulu, 2019).
Mobile Banking (MB) is the independent variable. Mobile banking is measured as the natural logarithm of the total number of mobile money transaction in the country (Emmanuel, 2020).

3.4 Model Specification

The study adopted ordinary least square regression model that was specified as follows:

$Y = (\beta_0 + \beta_1 x_1 + \beta_2 x_2 + \beta_3 x_3 + ut$ ... (1)

$F1_t = \beta_0 + \beta_1 AB_t + \beta_2 POS_t + \beta_3 MB_t + Ut$ ... (2)

Where:
β_0 = constant term
Ut = Error term
t = time periods of the observation 2005-2021
β_1 β_2 β_3 are the coefficients of the parameter estimate.

3.5 Method of data Analysis

The data was analyzed using Descriptive Test Correlation test and OLS regression (ARDL) was carried out.
Decision rule was to accept null hypotheses if the probability value (P-value) < 0.05.

RESULTS

4.1 Pre estimation Diagnostic Tests

Table 1: Unit root test result

Variables	@level	@1st diff	@2nd diff	C.V	order	remark
FI	-0.644337	-4.674738	-	3.76	1(1)	stationary
AB	-2.150560	-3.512135	-4.523272	3.79	1(2)	stationary
MB	-3.287966	-5.294804	-5.933306	3.76	1(1)	stationary
POS	-1.997166	-3.821171	-	3.76	1(1)	stationary

Source: researcher's computation using E-views (version 10)

The test for stationarity conducted using the Augmented Dickey Fuller (ADF) Unit Root approach shows all the variables did not achieve stationarity at level. The series were differenced @ first and only the dependent variable (financial inclusion - FI) and some of the dependent variables (mobile banking services – MB), (point of sale services (POS). The other variables (agent banking services – AB). Differencing is done when the data set fails to be stationary @ level; stationarity is concluded if the ADF statistic is greater than the 5% critical

value or if the probability value (P-value) is less than (0.05). Hence, stationarity and integration were achieved at order 1(1) and 1(2) respectively.

The Augmented Dickey Fuller test was performed under the following hypothesis
H_0: $\delta = 0$ (non-stationary)
H_1: $\delta < 1$ (stationary)
Decision Rule:
Reject H_0 if the ADF test statistic is greater than the 5% critical absolute value.
Initially, none of the variables (RGDP) was stationary at level, others achieved stationarity at different degrees of differencing levels since the ADF statistic of the variables were less the 5% critical value, but they all became stationary after first and second differencing. From table 1.0 above, it is observed that the ADF test statistic of the individual variables is greater than the 5% critical values at first difference. Hence the study rejected the null hypothesis and concludes that all the variables are stationary but are integrated of different order.

4.1.1 Descriptive Statistics of the Model Variables

A standard deviation close to zero indicates that data points are close to the mean, whereas a high or low standard deviation indicates data points are respectively above or below the mean. As a mathematical tool, it helps to assess how far the values are spread above and below the mean. A high standard deviation shows that the data is widely spread (less reliable) and a low standard deviation shows that the data are clustered closely around the mean (more reliable). Looking into the descriptive statistics result below (table 2), the standard deviation for each of the variables is very low when compared to their respective mean values, hence the outcome of the study is reliable.

Table 2: selected descriptive statistics of the variables

	FI	AB	MB	POS
Mean	0.045900	159.3669	1104.083	822.6338
Std. Dev.	0.071725	168.0017	1253.843	864.7086
Skewness	1.600904	2.196523	1.892728	1.497071
Kurtosis	3.948302	6.876319	6.949199	4.768660
Observations	17	17	17	17

source: Author's Computation (e-views)

The kurtosis parameter is a measure of the combined weight of the tails relative to the rest of the distribution. So, kurtosis is all about the tails of the distribution. It measures the tail-heaviness of the distribution. The kurtosis is referred to as the "fourth standardized central moment for the probability model. This is because kurtosis looks at the combined size of the series.

4.1.2 Test of Correlation of Model Variables

It is necessary to ascertain the nature of association between the dependent and independent variables). The correlation matrix is a useful tool for this since it involves more than one pair of variables. The result is shown below:

Table 3: Correlation Matrix

	FI	AB	MB	POS
FI	1.000000			
AB	0.818984	1.000000		
MB	0.765132	0.720145	1.000000	
POS	0.432648	0.897506	0.923527	1.000000

Source: author's computation (e-views)

The major goal in statistics often is toenhance understanding and usability (application) of the relationship among model variables. An insightful way to quantify relationship is to use the correlation statistics which is a measure of the linear association between two variables. It has a value between -1 and 1 where: -1 indicates a perfectly negative linear correlation between two variables, 0 indicates no linear correlation between two variables, 1 indicates a perfectly positive linear correlation between two variables. The further away the correlation coefficient is from zero, the stronger the relationship between the two variables. But in cases involving more than just one pair of variables, a correlation matrix becomes necessary. It is a square table that shows the correlation coefficients between several variables.

4.2 Autoregression Distributed Lag (ARDL)

The ordinary least squares (OLS) technique was intended for you as stated in the research design in section three of this study, however, the present outcome (results so far) no longer support it. OLS is suitable assuming the series were stationary at level or first difference. If series fail to be stationary even after first differencing, the need for second differencing implies the loss of information hence the need to use the autoregressive distributed lag (ARDL) as applicable for model whose series are integrated of order 1(0), 1(1) and 1(2). The ARDL produces short run and long run coefficients which enable us to see what happens during the short run and its accompanying system errors; and the long run period during which the errors are expected to have be strained out. The result are discussed below:

Table 4 Short Run ARDL Result

ARDL Cointegrating And Long Run Form
Dependent Variable:
FI
Selected Model: ARDL(1, 0, 0, 0, 0, 0)
Date: 02/25/22
Time: 06:47
Sample: 2005 2021
Included observations: 16

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(AB)	-0.000175	0.000280	-0.626489	0.5466
D(MB)	6.000024	0.000057	2.420665	0.0039
D(POS)	0.000109	0.000143	0.764657	0.4641

CointEq(-1)	-0.162667	0.265047	-0.613729	0.5546

Source: author's computation (e-views)

The table above indicates that in the short run (over short periods) the financial services innovation variables (the automated teller machine – ATM, the mobile banking services - MB, the point of sale service channels - POS, and the microfinance services – MFB) conformed to their appriori predicted sign (+) of improvements in the indices that enhance the expanded financial services (financial inclusion). This means that in the short run, innovations in financial services provision have minimal effects on financial inclusion policies. Hence, the variables are positively signed but insignificantly as seen in the ARDL short run result (table 3 above). However, only the agent banking services variable (AG) appeared negative and insignificant. Following the use of autoregressive distributed lag model (ARDL) for the regression, it places the implication of a long run coefficients of the variables. The long run estimates are in the table below:

Table 5: Long run form ARDL result

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AG	1.001077	0.002773	2.388488	0.0067
MB	13.00148	0.000485	3.305614	0.0000
POS	9.000672	0.001555	2.732427	0.0067
C	3.331414	0.492949	3.672309	0.0000

Source: author's computation (e-views)

From the table 5 above, it is seen that the variables coefficient have improved in sign, size and significance. Hence, over the long periods of say 10years and more, the financial services innovation variables are expected to significantly drive up financial inclusivity in the economy especially by ensuring greater financial services to the rural economy.

4.3 Bounds Test of long run relationship

The data were not all stationary and integrated of the same order. As a consequence and in following the standard econometric estimation procedure the Johansen cointegration test is not suitable. The suitable long run test to confirm or otherwise the presence of the long run relationship and the possible long run impacts of the treatment variable on the response variable. The Bound test of long run relationship result is presented below:

Table 6 Cointegration Test Result

Test Statistic	Value	K
F-statistic	4.373652	5
Critical Value Bounds		

Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Source: Authors Computation (E-views)

As seen in table 6 above, the test statistic of the Bounds test of long run relationship indicates the presence of a long-run relationship among the variables at 5% level of significance, thereby leading to the rejection of the null hypothesis of no long-run relationship and acceptance of the alternative. Following three options in the decision criteria when using the Bounds approach to cointegration: if the F-stat is greater than the critical value for the upper bound 1(1) then we can conclude that there is long-run relationship; if the f-stat falls below the critical value for the lower bound 1(0), there is no cointegration, hence no long-run relationship; and the test is considered inconclusive if the f-stat falls between the lower bound 1(0) and the upper bound 1(1). The obtained f-stat of 4.373652 is greater than the critical value for the upper bound 1(1) at 5% level of significance (4.373652>3.79), hence it is concluded that the variables show evidence of long-run relationship. Since all the variables were not integrated of the same order (1(0), 1(1) and 1(2) respectively), the Johansen cointegration test is no longer appropriate, the ARDL Bounds approach to cointegration was conducted to test for the long run relationship between the variables under the following hypotheses:

H_0: $\delta = 0$ (not cointegrated)

H_1: $\delta \neq 0$ (cointegrated).

Decision Rule

Reject H_0 if the f-statistic is greater than the upper bound critical value 1(1) at 5%. From the result presented, the f-stat is greater than the upper bound value (109.8313 > 4.85) the study therefore reject the null hypothesis and conclude that a long run relationship exist between financial services innovation and financial inclusion.

4.4 The F-test of joint influence and overall significance

To test for the joint influence of the explanatory variables (government spending on both economic and social infrastructures) on the explained (real gross domestic product), the hypotheses are stated thus:

H_0: the overall regression is not statistically significant

H_0: the overall regression is statistically significant

To reject the null hypotheses, the p-value of the *f*-statistic must be less than 0.05. The f-statistic obtained from the ARDL result is 4.469611, the p-value of the *f*-statistic (0.022594) Therefore, the study hereby rejects the null hypothesis and conclude that the overall regression is statistically significant.

4.5 Test of Research Hypotheses

The broad objective of this study is to determine the impact of financial services innovation on financial inclusion of Nigeria. The test of hypotheses proceeds thus:

Hypothesis One

$H0_1$: Agency banking does not havea significant effect on financial inclusion in Nigeria.

HA_1: Agency banking has significant effect on financial inclusion in Nigeria.

Decision Rule

If the p-value of the population parameter estimate for agent banking services (AB) is less than 0.05, reject the null hypothesis, otherwise do not reject; and if the null hypothesis reject, the alternative is accepted for conclusion.
Following the long run ARDL coefficients (table 6) the p-value of the coefficient of agent banking services (AB) is (0.0067), this is less than (0.05), hence the study hereby rejects the null hypothesis and concludes that agent banking services has significant positive effect on financial inclusion in Nigeria.

Hypothesis Two
H02: point of sales has no significant effect on financial inclusion in Nigeria.
HA2: Point of sales has significant effect on financial inclusion in Nigeria.
Decision Rule
If the p-value of the parameter for point of sale services (POS) is less than 0.05, reject the null hypothesis, otherwise do not reject; and if the null hypothesis reject, the alternative is accepted for conclusion. Following the long run ARDL coefficients (table 6) the p-value of the coefficient of point of sale transaction services (POS) is (0.0267), this is less than (0.05), hence the study hereby rejectsthe null hypothesis and concludes that point of sale transaction services has significant positive effect on financial inclusion in Nigeria.

Hypothesis three
The hypothesis is stated thus:
H03: mobile banking has no significant effect on financial inclusion in Nigeria.
HA3: mobile banking has significant effect on financial inclusion in Nigeria.
Decision Rule: If the p-value of the parameter estimate for mobile banking transactions (MB) is less than 0.05, reject the null hypothesis, otherwise do not reject. The p-value of the coefficient of MB is (0.0000), this is less than (0.05), and hence the study hereby rejects the null hypothesis and concludes that mobile banking service has positive significant effect on financial inclusion in Nigeria.
4.6 Discussions of Results
This study investigates the effect of financial innovations on financial inclusion in Nigeria – assessing specifically to what extent the financial services innovation variables (agent banking services, mobile banking services, point of sale transactions, microfinance services provisions, and the automated teller machine channels) effect on the drive for financial inclusivity in Nigeria. The results obtained from the analysis of data show evidence to suggest that innovations in financial services could drive the success of financial inclusion policies. The positive significant coefficient value of mobile banking systems (MB: 13.00148, p-value 0.0000) suggest that it has a positive effect on the financial inclusion drive. The reason for this could be attributed to the fact that mobile phones are portable and hence facilitates on-the-go financial transactions with ease and speed. Smart phones are also affordable solutions for financial transactions especially for rural dwellers as supported by Nwankwo, 2014. Similarly, agent banking services (AB) responded with a positive and significant outcome (1.001077); the p-value of the coefficient (0.0067) indicates that agent financial transaction is financial services innovation that enhances financial inclusiveness for the unbanked rural dwellers. The rural economy will perform better if there is unhindered flow of financial services to them, incomes will improve, job will be created as production will expand including the

establishment of new businesses. The bottleneck for these has been the lack of innovative financial services delivery.

Nigeria has come a long way in its financial inclusion pursuit. From 2012 when the Central Bank of Nigeria, CBN, initiated the Nigerian Financial Inclusion Strategy, NFIS, till almost 10 years later, a lot has happened. One of the advancements is a service which enables customers to withdraw cash via mobile money agents from their bank accounts without the use of an Automated Teller Machine, ATM, or card. While there has been progress with financial inclusion in Nigeria, data from Enhancing Financial Innovation and Access, revealed that as at 2018 only 59.1 per cent of women compared with 67.5 per cent of men were financially included, representing a gender gap of 8.4 per cent. Although there is a slight progress from the 9.8 per cent recorded in 2016, the gap must be closed sooner. This is considering that there are about 2.8 million more women than men in Nigeria. Without closing the gap, Nigeria can only dream of reaching the 95 per cent inclusion target set by the CBN for 2024. Like in the case of many developing countries, mobile money is more likely to close the financial inclusion gap among women than regular financial institutions and bank accounts.

SUMMARY, CONCLUSION AND RECOMMENDATIONS

5.1 Summary of Research Findings

The study found as follows

1. The study found that agent banking services with coefficient value (1.001077) and p-value (0.0067) has positive significant effect on financial inclusion in Nigeria.
2. The study found that mobile banking services has positive significant impact on financial inclusion in Nigeria (coefficient = 13.00148, p-value = 0.0000)
3. The study found a significant positive effect of point of sale transactions on financial inclusion in Nigeria (coefficient = 9.000672, p-vaalue = 0.0267)

5.2 Conclusion

The study examined theeffect of financial services innovation on financial inclusion in Nigeria over the period 2005 – 2021. Findings from the empirical results provide evidence to conclude that financial services innovations has majorly positive significant effect on financial inclusion in Nigeria.

5.3 Recommendations

Based on the findings of the study, the study makes the following recommendations:

1. Banks should license more agents in order to expand operations especially inward to the rural areas for increased financial inclusivity
2. Banks should advance the use of mobile banking and web payment innovations by customers as this will help reduce the number of unbanked persons especially in the rural economy.
3. Businesses should be encouraged on the use of point of sale service channels as it allows free flow of financial transactions and financial inclusion.

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APPENDIX

DATA USED FOR ANALYSIS

YEAR	FI	AB	POS	MB
2005	0.0313	84.15	11.03	1.27
2006	0.0808	25.05	12.72	6.65
2007	0.014	59.61	31.02	18.98
2008	0.0179	31.57	48.01	31.51
2009	0.0114	47.32	161.02	142.80
2010	0.0233	74.04	312.07	346.47
2011	0.0057	91.58	448.51	442.35
2012	0.0035	132.36	759.00	756.90
2013	0.0031	184.60	1,409.81	1,102.00
2014	0.0025	675.92	2,383.11	1,974.25
2015	0.0024	478.14	3,204.75	5,080.96
2016	0.0042	107.64	633.81	810.11
2017	0.0079	116.26	749.82	1,155.64
2018	0.0072	120.57	856.86	1,428.11
2019	0.1453	133.67	964.27	1,687.11
2020	0.2085	161.48	981.41	1,882.82
2021	0.2113	185.29	1,017.56	1,901.48

SOURCE: CBN STATISTICAL BULLETIN, NBS, ANNUAL FINANCIAL REPORTS OF BANKS FOR VARIOUS YEARS

UNIT ROOT TEST RESULTS

FI @ LEVEL

Null Hypothesis: FI has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.644337	0.9598
Test critical values:	1% level	-4.667883	
	5% level	-3.733200	
	10% level	-3.310349	

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

Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 16

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FI)
Method: Least Squares
Date: 02/25/22 Time: 06:26
Sample (adjusted): 2006 2021
Included observations: 16 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FI(-1)	-0.126345	0.196085	-0.644337	0.5306
C	-0.021303	0.022037	-0.966691	0.3513
@TREND("2005")	0.004358	0.002454	1.776163	0.0991

R-squared	0.195299	Mean dependent var	0.011250
Adjusted R-squared	0.071499	S.D. dependent var	0.043583
S.E. of regression	0.041996	Akaike info criterion	-3.335100
Sum squared resid	0.022928	Schwarz criterion	-3.190240
Log likelihood	29.68080	Hannan-Quinn criter.	-3.327682
F-statistic	1.577538	Durbin-Watson stat	1.882528
Prob(F-statistic)	0.243570		

FI @ 1ST DIFF

Null Hypothesis: D(FI) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.674738	0.0110
Test critical values:	1% level	-4.728363	
	5% level	-3.759743	
	10% level	-3.324976	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 15

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FI,2)
Method: Least Squares
Date: 02/25/22 Time: 06:29
Sample (adjusted): 2007 2021
Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FI(-1))	-1.192619	0.255120	-4.674738	0.0005
C	-0.048416	0.023927	-2.023450	0.0659
@TREND("2005")	0.006599	0.002570	2.567594	0.0247

R-squared	0.647012	Mean dependent var	-0.003113
Adjusted R-squared	0.588181	S.D. dependent var	0.058850
S.E. of regression	0.037766	Akaike info criterion	-3.537961
Sum squared resid	0.017115	Schwarz criterion	-3.396351
Log likelihood	29.53471	Hannan-Quinn criter.	-3.539470
F-statistic	10.99774	Durbin-Watson stat	1.754842
Prob(F-statistic)	0.001934		

AB @ LEVEL

Null Hypothesis: AG has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.150560	0.4822
Test critical values:	1% level	-4.667883	
	5% level	-3.733200	
	10% level	-3.310349	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 16

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(AG)
Method: Least Squares
Date: 02/25/22 Time: 06:30
Sample (adjusted): 2006 2021

Included observations: 16 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AB(-1)	-0.530195	0.246538	-2.150560	0.0509
C	45.73822	82.94818	0.551407	0.5907
@TREND("2005")	5.202299	8.977898	0.579456	0.5722

R-squared	0.263294	Mean dependent var	6.321250
Adjusted R-squared	0.149954	S.D. dependent var	169.2882
S.E. of regression	156.0802	Akaike info criterion	13.10598
Sum squared resid	316693.5	Schwarz criterion	13.25084
Log likelihood	-101.8478	Hannan-Quinn criter.	13.11340
F-statistic	2.323052	Durbin-Watson stat	1.645308
Prob(F-statistic)	0.137219		

AB @ 1ST DIFF

Null Hypothesis: D(AG) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.512135	0.0746
Test critical values:	1% level	-4.728363	
	5% level	-3.759743	
	10% level	-3.324976	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 15

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(AG,2)
Method: Least Squares
Date: 02/25/22 Time: 06:30
Sample (adjusted): 2007 2021
Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(AG(-1))	-1.006370	0.286541	-3.512135	0.0043

C	41.12032	112.0946	0.366836	0.7201
@TREND("2005")	-3.378313	11.22315	-0.301013	0.7686

R-squared	0.507187	Mean dependent var	5.527333
Adjusted R-squared	0.425052	S.D. dependent var	247.3516
S.E. of regression	187.5551	Akaike info criterion	13.48288
Sum squared resid	422123.2	Schwarz criterion	13.62449
Log likelihood	-98.12159	Hannan-Quinn criter.	13.48137
F-statistic	6.175012	Durbin-Watson stat	2.002112
Prob(F-statistic)	0.014325		

AB @ 2ND DIFF

Null Hypothesis: D(AG,2) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.523272	0.0156
Test critical values:	1% level	-4.800080	
	5% level	-3.791172	
	10% level	-3.342253	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 14

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(AG,3)
Method: Least Squares
Date: 02/25/22 Time: 06:31
Sample (adjusted): 2008 2021
Included observations: 14 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(AG(-1),2)	-1.295930	0.286503	-4.523272	0.0009
C	-6.664716	181.4507	-0.036730	0.9714
@TREND("2005")	0.814105	17.57891	0.046311	0.9639

R-squared	0.650591	Mean dependent var	-6.975890
Adjusted R-squared	0.587062	S.D. dependent var	412.5075
S.E. of regression	265.0783	Akaike info criterion	14.18534
Sum squared resid	772931.8	Schwarz criterion	14.32228

Log likelihood	-96.29736	Hannan-Quinn criter.	14.17266
F-statistic	10.24086	Durbin-Watson stat	2.299124
Prob(F-statistic)	0.003078		

MB @ LEVEL

Null Hypothesis: MB has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.287966	0.1037
Test critical values:	1% level	-4.667883	
	5% level	-3.733200	
	10% level	-3.310349	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 16

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MB)
Method: Least Squares
Date: 02/25/22 Time: 06:35
Sample (adjusted): 2006 2021
Included observations: 16 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MB(-1)	-0.914223	0.278051	-3.287966	0.0059
C	-97.82138	584.9138	-0.167241	0.8698
@TREND("2005")	138.8706	74.60651	1.861374	0.0855

R-squared	0.454400	Mean dependent var	118.7631
Adjusted R-squared	0.370462	S.D. dependent var	1390.632
S.E. of regression	1103.375	Akaike info criterion	17.01750
Sum squared resid	15826669	Schwarz criterion	17.16236
Log likelihood	-133.1400	Hannan-Quinn criter.	17.02491
F-statistic	5.413500	Durbin-Watson stat	1.971381
Prob(F-statistic)	0.019484		

MB @ 1ST DIFF

Null Hypothesis: D(MB) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.294804	0.0040
Test critical values:	1% level	-4.728363	
	5% level	-3.759743	
	10% level	-3.324976	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 15

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MB,2)
Method: Least Squares
Date: 02/25/22 Time: 06:36
Sample (adjusted): 2007 2021
Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MB(-1))	-1.399914	0.264394	-5.294804	0.0002
C	312.1616	850.6358	0.366974	0.7200
@TREND("2005")	-15.07508	85.08444	-0.177178	0.8623

R-squared	0.700300	Mean dependent var	0.885333
Adjusted R-squared	0.650350	S.D. dependent var	2407.279
S.E. of regression	1423.452	Akaike info criterion	17.53641
Sum squared resid	24314600	Schwarz criterion	17.67802
Log likelihood	-128.5231	Hannan-Quinn criter.	17.53491
F-statistic	14.02005	Durbin-Watson stat	2.235768
Prob(F-statistic)	0.000725		

POS @ LEVEL

Null Hypothesis: POS has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=0)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.997166	0.5591
Test critical values:	1% level	-4.667883	
	5% level	-3.733200	
	10% level	-3.310349	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 16

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(POS)
Method: Least Squares
Date: 02/25/22 Time: 06:37
Sample (adjusted): 2006 2021
Included observations: 16 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
POS(-1)	-0.485513	0.243101	-1.997166	0.0672
C	183.5267	375.3276	0.488977	0.6330
@TREND("2005")	32.10188	45.52429	0.705159	0.4932

R-squared	0.241826	Mean dependent var	62.90813
Adjusted R-squared	0.125184	S.D. dependent var	765.1450
S.E. of regression	715.6525	Akaike info criterion	16.15163
Sum squared resid	6658060.	Schwarz criterion	16.29649
Log likelihood	-126.2130	Hannan-Quinn criter.	16.15905
F-statistic	2.073229	Durbin-Watson stat	1.780551
Prob(F-statistic)	0.165386		

POS @ 1ST DIFF

Null Hypothesis: D(POS) has a unit root
Exogenous: Constant, Linear Trend
Lag Length: 0 (Automatic - based on SIC, maxlag=0)

	t-Statistic	Prob.*

Augmented Dickey-Fuller test statistic		-3.821171	0.0453
Test critical values:	1% level	-4.728363	
	5% level	-3.759743	
	10% level	-3.324976	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 15

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(POS,2)
Method: Least Squares
Date: 02/25/22 Time: 06:37
Sample (adjusted): 2007 2021
Included observations: 15 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(POS(-1))	-1.096045	0.286835	-3.821171	0.0024
C	272.9510	508.6508	0.536618	0.6013
@TREND("2005")	-22.19425	50.79530	-0.436935	0.6699

R-squared	0.548937	Mean dependent var	2.297333
Adjusted R-squared	0.473760	S.D. dependent var	1165.645
S.E. of regression	845.5873	Akaike info criterion	16.49480
Sum squared resid	8580215.	Schwarz criterion	16.63641
Log likelihood	-120.7110	Hannan-Quinn criter.	16.49329
F-statistic	7.301911	Durbin-Watson stat	2.047874
Prob(F-statistic)	0.008422		

DESCRIPTIVE STATISTICS

	FI	AB	MB	POS
Mean	0.045900	159.3669	1104.083	822.6338
Median	0.011400	116.2584	810.1057	749.8183
Maximum	0.211300	675.9167	5080.965	3204.753
Minimum	0.002400	25.05000	1.270000	11.03000
Std. Dev.	0.071725	168.0017	1253.843	864.7086
Skewness	1.600904	2.196523	1.892728	1.497071
Kurtosis	3.948302	6.876319	6.949199	4.768660
Jarque-Bera	7.898521	24.31334	21.19747	8.565902
Probability	0.019269	0.000005	0.000025	0.013802

Sum	0.780300	2709.238	18769.40	13984.77
Sum Sq. Dev.	0.082312	451593.3	25153946	11963536
Observations	17	17	17	17

CORRELATION TEST

	FI	AB	MB	POS
FI	1.000000	-0.088984	0.165132	-0.032648
AB	0.818984	1.000000	0.720145	0.897506
MB	0.765132	0.720145	1.000000	0.923527
POS	0.432648	0.897506	0.923527	1.000000

ARDL RESULT

Dependent Variable: FI
Method: ARDL
Date: 02/25/22 Time: 06:46
Sample (adjusted): 2006 2021
Included observations: 16 after adjustments
Maximum dependent lags: 1 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (0 lag, automatic): AG ATM MB POS MFB
Fixed regressors: C

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
FI(-1)	0.837333	0.265047	3.159186	0.0116
AB	-0.000175	0.000280	-0.626489	0.5466
MB	-2.411305	5.731105	-0.420665	0.6839
POS	0.000109	0.000143	0.764657	0.4641
C	0.053910	0.034975	1.541401	0.1576

R-squared	0.748727	Mean dependent var	0.046813
Adjusted R-squared	0.581212	S.D. dependent var	0.073975
S.E. of regression	0.047872	Akaike info criterion	-2.940921
Sum squared resid	0.020626	Schwarz criterion	-2.602913
Log likelihood	30.52737	Hannan-Quinn criter.	-2.923612
F-statistic	4.469611	Durbin-Watson stat	1.922558
Prob(F-statistic)	0.022594		

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

SHORT RUN AND LONG RUN ARDL

ARDL Cointegrating And Long Run Form
Dependent Variable: FI
Selected Model: ARDL(1, 0, 0, 0, 0, 0)
Date: 02/25/22 Time: 06:47
Sample: 2005 2021
Included observations: 16

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(AB)	-0.000175	0.000280	-0.626489	0.5466
D(MB)	-0.000024	0.000057	-0.420665	0.6839
D(POS)	0.000109	0.000143	0.764657	0.4641
CointEq(-1)	-0.162667	0.265047	-0.613729	0.5546

Cointeq = FI - (-0.0011*AB -0.0001* *MB + 0.0007*POS
-0.0000*)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
AB	1.001077	0.002773	2.388488	0.0067
MB	13.00148	0.000485	3.305614	0.0000
POS	9.000672	0.001555	2.732427	0.0067
C	3.331414	0.492949	3.672309	0.0000

BOUND TEST OF LONG RUN RELATIONSHIP

ARDL Bounds Test
Date: 02/25/22 Time: 06:48
Sample: 2006 2021
Included observations: 16
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	4.373652	5

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.26	3.35
5%	2.62	3.79
2.5%	2.96	4.18
1%	3.41	4.68

Test Equation:
Dependent Variable: D(FI)
Method: Least Squares
Date: 02/25/22 Time: 06:48
Sample: 2006 2021
Included observations: 16

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.052017	0.038936	1.335967	0.2144
AB(-1)	-0.000143	0.000280	-0.512662	0.6205
MB(-1)	-1.63E-05	5.79E-05	-0.281571	0.7846
POS(-1)	9.13E-05	0.000146	0.623687	0.5483
FI(-1)	-0.205658	0.266986	-0.770296	0.4609

R-squared	0.199424	Mean dependent var	0.011250
Adjusted R-squared	-0.334293	S.D. dependent var	0.043583
S.E. of regression	0.050344	Akaike info criterion	-2.840240
Sum squared resid	0.022811	Schwarz criterion	-2.502232
Log likelihood	29.72192	Hannan-Quinn criter.	-2.822931
F-statistic	0.373652	Durbin-Watson stat	2.097612
Prob(F-statistic)	0.878273		