

# Dynamics of financial inclusion and capital formation in Nigeria

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## Abstract

This study tested econometrically derived hypotheses concerning the link between financial inclusion and capital production in Nigeria using annual data from 1992 to 2021. Cointegration analysis and the vector error correction model (VECM) were used to capture both long- and short-term relationships between variables. Johansen co-integration tests were used to perform cointegration, and VECM was required for the result. Ex-ante and ex-post forecasting utilizing variance decomposition and impulse response were utilized to assess the research duration. The VECM Granger causality approach was utilized in the study to examine short-run causality correlations between series using an F-/Wald test simulation. According to the VECM estimation, both loans from commercial banks to rural areas and credit from commercial banks to SMEs had a somewhat favorable impact on capital creation. On the other hand, capital formation in Nigeria was significantly and diminishingly impacted by both rural commercial bank deposits and the quantity of commercial bank branches. Further evidence that the system was dynamic came from the variance decomposition and impulse response, which revealed that the impact of financial inclusion on capital formation changed over time. According to the study's findings, the government should change the lending environment to accommodate the financing needs of smaller economic entities, such as rural communities, in order to ensure their financial inclusion.

## 1. Introduction

Due to its perceived significance as a driver of investments and economic growth, financial inclusion<sup>1</sup> has recently taken on a larger level of prominence. The United Nations Conference on Trade and Development (UNCTAD) asserts that granting access to the hundreds of millions of men and women (worldwide) who are currently denied access to financial services would open up opportunities for the establishment of a sizable depository of savings, investable funds, investment, and consequently the creation of global wealth (UNCTAD, 2020). In other words, having access to financial services that are suitable for those with modest incomes encourages massive capital accumulation, the production of credit, and an investment boom. Since they often make up the greatest section of the population, low-income earners are in charge of a sizable portion of the economy's idle funds, even though each of the several million members of this category only holds a small portion of the total. Utilizing and gathering these resources opens up a sizable source of inexpensive long-term investable cash. Therefore, financial inclusion is attained when people have simple access to a wide array of financial products that are created to meet their needs and are offered at reasonable prices. Among other things, these goods include pensions, insurance, savings, and payments. People's welfare has typically been seen as a by-product of growth rather than the main goal of economic policy.

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<sup>1</sup> The National Financial Inclusion Strategy was introduced by the Central Bank of Nigeria on October 23, 2012, in conjunction with stakeholders, in an effort to further reduce the exclusion rate to 20% by the year 2020.

Prior to the concept of financial inclusion, there was financial exclusion, which, according to Kama and Adigun (2013), encompasses all categories of people who use financial services infrequently or not at all. Physical access is a result of the shifting topography of financial services. Financial exclusion is the inability of people to obtain or use financial items successfully so they can engage in the variety of social activities that make up life (Tok and Heng, 2022). Financial inclusion is multifaceted and includes having access to and knowledge of a variety of financial services. The Center for Financial Inclusion offers a rather comprehensive definition (Tissot and Gadanez, 2017). Financial inclusion, according to the center, is a condition in which everyone who can use them has access to a comprehensive range of high-quality financial services that are offered in easily accessible locations at reasonable prices. It is a state where a variety of service providers, the majority of them private sector, deliver financial services to all those who can utilize them, including the underprivileged, the disabled, rural areas, and other excluded populations (Rekha, Rajamani and Resmi, 2021; Ratnawati, 2020). It is impossible to overstate the growing significance of financial inclusion as a driver of capital formation. Today, financial inclusion is frequently viewed as a tool for enhancing the economic ability and capabilities of the disadvantaged in a country, a right of all people to social inclusion, and a means of improving quality of life (Mulungula and Nimubona, 2022).

Financial inclusion is now recognized on a worldwide scale as a powerful tool for promoting development. It stands for the procedure that guarantees that formal financial services are easily accessible, readily available, and reasonably priced for all participants in an economy (Zulfiqar, Chaudhary and Aslam, 2016). Separating between deliberate and involuntary exclusion is crucial, though. Deliberate exclusion, according to the Central Bank of Nigeria (CBN), is when a group of people or businesses decides not to use financial services because they do not need them or for cultural or religious reasons (CBN, 2018). In contrast, involuntary exclusion results from low income, a high risk profile, or from discrimination, as well as from flaws in the market. Since involuntary exclusion can be addressed by suitable economic programs and policies that are intended to raise income levels, alleviate poverty, close the income inequality gap, and solve market failures and defects, policy and research activities must therefore concentrate on this issue.

Despite this consensus, the World Bank's report on global financial inclusion in 2022 reveals that achieving financial inclusion has remained a difficulty because up to 54.0% of individuals globally are financially excluded, which was made worse by the COVID-19 pandemic in 2020. (World Bank, 2022; Ozili, 2022). For an equitable recovery from the extraordinary COVID-19 pandemic, the World Bank recommended that financial inclusion programs be supported in every nation. The issue is considerably worse in emerging economies like Nigeria, which has financial exclusion rates of more than 60%. (Olusegun, Evbuomwan and Belonwu, 2021). Nigeria is one of the nations in Sub-Saharan Africa with the lowest share of households with access to banking services, according to the African Development Bank (AfDB), despite having a sizable economy (Sarpong and Nketiah-Amponsah, 2022). Additionally, it appears that relatively few Nigerian households have deposit accounts with reputable financial institutions (Oluwasegun et al., 2021). Capital generation and economic growth in Nigeria face significant challenges as a result of the alarmingly high level of financial inclusion and access to financing.

However, relative to other countries, Nigeria's level of financial inclusion is likely to have a minimal impact on capital formation and economic growth given the nation's declining economic activity. This assumption is founded on the widely held belief that a nation's vulnerable and unbanked populace will experience capital accumulation, business expansion, and economic growth. While some research concentrated on the impact of financial access on poverty reduction and income inequality, the majority of studies examined the proper measures of financial inclusion at the household and national levels (Ifediora et al., 2022; Ozili, 2022; Migap, Ngutsav and Andohol, 2020; Onaolapo, 2015). Other publications (Sarpong and Nketiah-Amponsah, 2022; Kuznyetsova et al., 2022) have discussed the varied degrees of financial inclusion and economic growth in both advanced and emerging economies. Omojolaibi and Popogbe (2017) and Emezie (2021) are two studies that looked at the impact of financial inclusion on capital formation and investments in Nigeria. The inspiration for this study came from the conflicting opinions expressed in previous studies on financial inclusion regarding whether it is advantageous or not. By examining the dynamics of financial inclusion and capital accumulation in Nigeria, the current study fills this gap.

## 2. Literature Review

### 2.1. Financial Inclusion in Nigeria

The importance of financial inclusion has continued to grow among researchers, politicians, and development-focused organizations all around the world. Its significance stems from the potential it offers as a tool for economic growth, especially in the areas of poverty reduction, job creation, wealth creation, and enhancing welfare and general standards of living.

A development finance organization called Enhancing Financial Innovation and Access (EFInA) performed a survey in Nigeria in 2008 and found that roughly 53.0% of adults there were not able to access financial services. Nigeria saw a good impact from the worldwide push for financial inclusion as a means of economic development, with the exclusion rate falling from 53.0% in 2008 to 46.3% in 2010. Encouraged by the positive development, the Central Bank of Nigeria launched the National Financial Inclusion Strategy on October 23, 2012, in partnership with stakeholders, with the goal of further lowering the exclusion rate to 20% by 2020 (EFInA, 2021; CBN, 2018). In particular, the percentage of adult Nigerians having access to payment services is expected to rise from 21.6% in 2010 to 70% in 2020, while the percentage of adults with access to savings should rise from 24.0% to 60% over the same period.

The channels used to deliver the aforementioned financial services were equally targeted for improvement, with deposit money bank branches targeted to increase from 6.8 per 100,000 adults in 2010 to 7.6 per 100,000 adults in 2020, microfinance bank branches targeted to increase from 2.9 to 5.5 units, ATMs targeted to increase from 11.8 to 203.6 units, POSs targeted to increase from 13.3 units to 850 units, and mobile agents targeted to increase from 0 to 62 units, all per 100,000 adults between 2010 and 2020. (EFInA, 2021).

The major tools for driving the Strategy include the following:

- 1) Agent Banking
- 2) Tiered Know-Your-Customer Requirements
- 3) Financial Literacy
- 4) Consumer Protection
- 5) Linkage Banking
- 6) Implementation of the MSME Development Fund
- 7) Credit Enhancement Programmes such as:
  - Agricultural Credit Guarantee Scheme (ACGS)
  - Commercial Agricultural Credit Scheme (CACCS)
  - Nigeria Incentive-Based Risk Sharing System for Agricultural Lending (NIRSAL)
  - Refinancing and Rediscounting Facilities for SMEs
  - Small and Medium Enterprise Credit Guarantee Scheme
  - Entrepreneurship Development Centres

### 2.2. Theoretical Underpinning

According to early economic growth theories, a financial system that can tap into savings and direct funds into a wide range of corporate operations must be built and effective. However, according to contemporary development theories, financial development is essential for economic growth to take place. Modern development theories have also demonstrated that persistent income disparity and a slower rate of economic expansion are mostly caused by a lack of access to financing. Access to funds will increase when the economy has a developed financial system, and access to funds will be restricted when there is a poorly established financial system since people will be limited by the amount of money they have on hand (Kodan and Chhikara, 2013).

Although the efficiency with which saved resources are put to productive use can be improved by financial liberalization and inclusion, the impact on the amount of savings is theoretically unclear (Omojolaibi and Popogbe, 2017). Improved savings opportunities, such as better deposit interest rates, savings with a wider range, and frequently more banks and bank branches, as well as other financial intermediaries, will naturally characterize a liberalized financial sector that is competitive.

According to Campbell and Mankiw (1990), it is reasonable to assume that not all households have access to the credit markets. As a result, consumers may find it difficult to smooth their spending across time. For such households with limited liquidity, consumption choices are therefore based on current income. Theoretically, it

has been demonstrated that loosening liquidity restrictions will lead to a surge in consumption and a decline in overall saving. More specifically, it was proposed by Campbell and Mankiw (1990) that there are two categories of households in the economy: One household type  $\lambda$ , has limited liquidity and their intertemporal consumption is totally dictated by the evolution of their present income. The other household type  $(1-\lambda)$ , has unrestricted access to capital markets. The implicit McKinnon-Shaw assumptions, which were based on a homogenous household set and assumed that all relevant households had unrestricted access to capital markets within the domestic economy, were challenged by these authors as a result of this type of theoretical development (Gemeh and Struthers, 2003).

According to the McKinnon-Shaw hypothesis, the growth of the economy as a whole will be threatened if financial intermediaries do not operate to their full potential and funds are not invested effectively (mostly due to government rules and constraints). Savings are influenced by interest rates; if high interest rates are encouraged, savings will rise, boosting investment and, ultimately, promoting economic growth (McKinnon, 1973). Additionally, credit constraints will be loosened as a result of financial liberalization measures, which will also increase commercial banks' efficiency and competition.

The advantages of lessening the effect of financial repression on domestic financial systems, particularly in emerging nations, were examined by McKinnon and Shaw in 1973. Interest rates in these nations will rise toward their competitive market equilibrium once financial constraints are lifted. Interest rate ceilings that are artificial will cause savings to decline, capital accumulation to slow down, and inefficient resource allocation. Other clearing methods that are not "non-market" will occur if interest rates are not permitted to move automatically so that the market can be cleared. Some of these "non-market" forms of credit rationing include quantitative limitations, auctions, and even various bidding systems, which are frequently susceptible to dishonest tactics and bias. Not only will there be little or irregular savings and investments, but there will also be low-quality activities at all levels. It follows that if interest rates aren't permitted to fluctuate freely in the market, overall savings and investment levels will be constrained. Early McKinnon and Shaw hypotheses presuppose that liberalization will be accompanied by increased real interest rates, which will encourage saving. The core premise is that savings respond to interest rates; higher saving rates will finance a higher level of investment, which will result in faster growth. Accordingly, when financial liberalization occurs, one should anticipate seeing higher saving rates together with higher levels of investment and growth.

Schumpeter (1912), quoted by Kodan and Chhikara, disputed the idea that effective banks encourage technical innovation by finding and supporting promising entrepreneurs. As a result, the development of the financial sector contributes to the achievement of finance-led industrialization in addition to the promotion of total investment and output. Therefore, the financial market determines how much access bright poor people have to outside funding in theories that emphasize entrepreneurship.

According to Banerjee and Newman (1993), a person's employment options are constrained by the basic endowments they possess. The structure of the occupations individuals choose determines the amount they can save and the risks they may take, which has long-term effects on economic growth and wealth inequality. As a result, these models demonstrate that a lack of financial access may be a key factor in the generation of poverty traps or persistent income disparity, along with low investment levels and slow economic growth rates.

### 2.3. Empirical Literature

Ene, Amoke, Archibong, Eduno, and Ogwumu (2022) looked into how financial inclusion affected the expansion of small and medium-sized businesses in Cross River State. Purposive sampling was used in the study's cross-sectional survey of small and medium-sized companies in the Calabar Metropolitan Area. One thousand two hundred and ninety-four (1294) SMEs in the state made up the study's population, and 306 people were chosen as the sample size. The data were analyzed using the Pearson Correlation technique, and the results showed a statistically significant correlation between the growth of small and medium-sized businesses in Cross River State and financial inclusion in the form of bank loans and advances, ATM access, and internet banking. As a result, the study's policy recommendation is that banks should lower their lending rates to encourage more SMEs operators to obtain bank loans for their companies. Additionally, commercial banks and microfinance organizations must see to it that more bank branches are opened in order to increase bank penetration and give numerous SMEs operators access to ATMs for conducting business.

Using a panel of 46 nations for the years 2004–2018, Sarpong and Nketiah-Amponsah (2022) investigated the quantitative link between financial inclusion and inclusive growth in sub-Saharan Africa. The data revealed that, in contrast to availability and knowledge of financial services, consumption of financial services, among other

factors, has a quantifiable and perceptible impact on inclusive growth. Specifically, in sub-Saharan Africa, a unit increase in the use of financial products and services boosts inclusive growth by 0.03 units. The paper made a contribution to the literature by first creating a more comprehensive index of inclusive growth and then using the Arellano-Bover/Blundell-Bond system Generalized Method of Moment estimator to estimate the distinct quantitative effects of three categories of financial inclusion indicators on inclusive growth. The conclusions emphasized the necessity for policymakers to create financial institutions that are creative, sustainable, and inclusive and are capable of dispersing growth advantages fairly.

Ifediora et al. (2022) used panel data from 22 Sub-Saharan African (SSA) nations between the years of 2012 and 2018 to assess the effect of financial inclusion on economic growth. The GMM system was used in the investigation. It was determined, using a composite index of financial inclusion as well as individual financial inclusion indicators, that the financial inclusion dimensions of availability, penetration, and composite financial inclusion (all indicators combined) have a significant and positive impact on economic growth, while the financial inclusion dimension of usage has a small but positive impact on economic growth. Additionally, bank branches and ATMs had a favorable and large impact on economic growth, although outstanding loans, deposit accounts, and ATMs had a marginally negative impact on it.

Ozili (2022) used information from the global FINDEX indicators to examine the extent of financial inclusion in Nigeria. The results showed that Nigeria had development in a number of financial inclusion measures in the first years of the initiative in 2014, but the advantages were not maintained in the following years, particularly in 2017. In comparison to the global average, Nigeria's degree of financial inclusion is extremely low. In the population group analysis, it was shown that all indices of financial inclusion in 2017 were worse for women, the poorest men, older men, and people without college degrees. The implications of the reported fall in financial inclusion in 2017 point to obstacles to financial inclusion in the years following 2014.

In order to ensure financial stability, Kuznyetsova et al. (2022) concentrated on the development features of financial inclusion and offered recommendations to Ukraine. Through cross-country analysis, the idiosyncrasies of the growth of financial inclusion are investigated while taking into account various financial system models and degrees of economic development. The weak points of financial inclusion in Ukraine are a sevenfold difference in assets between banks and non-bank financial institutions, as well as 37% of the adult population who lack access to a bank account. Additionally, there is a critical level of distrust in banks (70%) with a respectably high share of users of payment applications (58%), as well as a significant gap between the levels of human capital readiness and information security of banks' digitalization compared to EU banks (by 2.5 and 1.3 times, respectively).

In the context of G20 countries, Khan et al. (2022) examined the impact of financial inclusion on financial sustainability, financial efficiency, gross domestic product, and human development. For the years 2004 to 2017, this analysis used yearly data from 15 developed and rising economies. The study used primary composite analysis to create a single index for financial inclusion, financial sustainability, and financial efficiency (PCA). The results of the ARDL Model showed that, while there was no correlation between financial inclusion and financial sustainability in the short term, inclusive finance had a significant impact on sustainability over the long term. Long-term financial efficiency was favourably impacted by financial inclusion, while short-term efficiency was unaffected. Additionally, the findings demonstrated that inclusive finance had a large long-term impact on poverty while having little immediate impact. Similar to inclusive finance, there was no correlation between GDP and GDP in the short term, but there was a strong correlation in the long run. Additionally, the results of the GMM demonstrated that inclusive finance significantly impacts financial stability, financial efficiency, poverty reduction, and economic growth.

Using panel data for the year's 2014Q1–2018Q4, Olusegun et al. (2021) investigated the relationship between financial inclusion and financial stability in Nigeria. A financial inclusion index was created to take into account usage, availability, and penetration. The study provided evidence that financial inclusion had a beneficial effect on financial stability, suggesting that more financial stability would result from having more financial inclusion. Regarding dimension, utilization was discovered to have a negative link with financial stability, whereas penetration and availability did. This suggested that policymakers had choose between concentrating on changes that would encourage financial inclusion, innovation, and financial access and concentrating on enhancing financial stability.

Oladele et al. (2021) employed time series data and the Autoregressive and Distributed Lag (ARDL) technique to assess financial inclusion, investment, and macroeconomic factors in Nigeria. The findings demonstrated that the long-term relationships between credit penetration, deposit penetration, and domestic investment and

unemployment rate were all positive and negligible. In the near term, the unemployment rate was adversely but significantly correlated with credit penetration, deposit penetration, and domestic investment penetration. In the long run, unemployment was adversely correlated with bank branch penetration, but the unemployment rate was positively correlated. This suggests that while bank penetration did not reduce unemployment in the short term, it did so over the long term. Therefore, financial inclusion has a big impact on unemployment in the short term but not so much in the long term.

The impact of financial inclusion on deposit mobilization in Nigeria was examined by Emezie (2021). Time series secondary data from 1987 to 2019 were used in the study. Due to its many benefits, the Autoregressive Distributed Lag model was used as the regression model to examine the data for rural deposits, loans to rural areas, and loans to small businesses on various deposits with commercial banks. The study's conclusions showed that loans to small businesses had a negative and substantial influence on deposit mobilization in Nigeria, whereas deposits from rural areas and loans to rural areas had a positive and significant impact. The findings of the causality test, which demonstrated a unidirectional causal relationship between deposits from rural areas and loans to rural areas and various deposits with commercial banks, highlight the critical need for banks to direct their service-providing strategies toward rural areas in order to increase their deposit base. The study came to the conclusion that financial inclusion has improved the simple access to and use of financial services in Nigeria over the study period and has a favorable long-term impact on deposit mobilization in Nigeria.

In order to investigate the potential for a causal relationship between financial inclusion and capital market expansion as well as between the capital market and economic growth in Nigeria from 1986 to 2017, Migap et al. (2020) used a vector autoregressive (VAR) model. The outcome demonstrated that there is no causal link between capital market and financial inclusion. However, it revealed a one-way causal relationship between fund mobilization through the capital market and economic expansion in Nigeria.

The effects of financial inclusion on economic growth in Zimbabwe from 2011 to 2017 were explored by Maune, Matanda, and Mundonde (2020). Financial services, information and communication technology, and mobile network variables were utilized as proxies for financial inclusion while gross domestic product was employed as a measure of economic growth in order to understand the breadth and depth of financial inclusion in Zimbabwe. The G20 Financial Inclusion, Global Financial Development, and World Development Indicators 2019 databases were used to gather secondary data for these variables. The empirical results of this study demonstrated a beneficial relationship between financial inclusion and economic growth in Zimbabwe. These findings are pertinent notwithstanding Zimbabwe's economic difficulties.

Shihadeh (2020) looked into how banks' performance and risk varied across MENAP nations based on several financial inclusion variables. The sample consists of 271 banks spread over 24 connected nations in the region, as well as micro- and macro-variables that influence the operation and risk profile of these banks. The findings suggested that raising the region's degree of financial inclusion can improve bank performance and lower risk. In terms of lowering their risks, they also identified areas where these institutions may gain more from financial inclusion.

In 20 Asian nations between 2004 and 2015, Banjere, Donato, and Maruta (2020) investigated the impact of financial inclusion on economic development, including economic growth, education, health, and income inequality. The overall financial inclusion index was created using a hybrid methodology. The findings demonstrate that overall financial inclusion positively affects all development outcomes, and that this effect is stronger in nations with lower political risk. Utilization and access both have an impact on education and income inequality at the dimension level, even though usage is the sole factor affecting economic growth and access is the only factor affecting health outcomes. Additionally, compared to the second-highest ranking indicators, the top indicators in each dimension had a much stronger positive impact on development outcomes. The results demonstrated that implementing a single overarching policy might not be suitable to fully attain financial inclusion in a less developed country. To maximize the beneficial impact on development outcomes, certain financial inclusion dimensions and indicators should be the focus of policy recommendations.

Using historical data on a few selected factors from the years 1986 to 2015, Okoye, Adetiloye, Erin & Modebe (2020) assessed the impact of financial inclusion on economic growth and development in Nigeria. The technique of Ordinary Least Squares regression was used. Loan to deposit ratio (LDR), financial deepening indicators (FDI), loan to rural areas (LRA), and branch network were used in the study to quantify financial inclusion (Bbranch). The ratios of broad money supply to GDP and private sector credit to GDP were used in the study as indicators of financial deepening. Gross domestic product (GDP) growth over time was used as a proxy for economic growth, and per capita income (PCI) was chosen as a proxy for poverty and, consequently, as a

measure of development. The major conclusions were that financial inclusion had facilitated poverty reduction in Nigeria through rural credit distribution whereas credit delivery to the private sector (a measure of financial inclusion) had not materially supported economic growth in Nigeria.

Prior research was expanded upon by Pujiharjanto & Astuti (2020) by examining the three facets of financial inclusion: access, depth, and stability. This study sought to examine the impact of financial stability, financial access, and financial depth on economic growth in 34 Indonesian provinces from 2014 to 2018. All of the financial inclusion variables utilized in this study appeared to have an impact on economic growth, according to the Fixed Effect Model of panel data. Access to finance has a detrimental impact, although financial stability and depth have beneficial impacts. This demonstrated the applicability of Indonesia's dilemma of thrift.

Anisiuba, Ezeaku, and Emengini (2020) used quarterly data from the World Bank's World Development Indicators and the Central Bank of Nigeria to determine the impact of financial inclusion on entrepreneurial growth (EG) in the retail and wholesale sub-sectors in Nigeria. Correlation analysis and an error-correcting methodology were used to analyze the data. The findings showed that FI significantly improved EG, especially when seen in the context of the contributions of the retail and wholesale subsectors to GDP (GDP). The findings also showed that whereas commercial bank branches (CMB) were found to have a substantial influence on the growth rate of the retail and wholesale sub-sectors, account ownership (ACN) did not have a significant impact on either.

In Nigeria between 2000 and 2018, Enueshike & Okpebru (2020) investigated the impact of financial inclusion on economic growth. For the estimation of the variables, historical data from the Central Bank of Nigeria Statistical Bulletin was used. The explanatory variables of loan to small and medium businesses (LSME), rural bank deposit (RBD), and control variable of inflation were regressed on the dependent variable of financial inclusion, which was measured by the contribution of financial institutions to gross domestic product (GDP) (INF). The results of Wald tests show that the loan to small and medium-sized enterprises (LSME), rural bank deposits (RBD), and inflation (INF) had a significant impact on economic growth in Nigeria. The statistical estimation of the explained and explanatory variable was carried out using auto-regressive distribution lag. The report suggested, among other things, that the Central Bank of Nigeria should promote rural bank deposits (RBD).

Van & Linh (2019) assessed how financial inclusion indicators affected economic growth. The outcome demonstrated that there are relationships between the abundance of bank branches, ATMs, domestic credit in the private sector, and the accelerated rate of economic growth. This growth will lead to a more prosperous existence for people. The article also makes suggestions for strengthening financial inclusion for governments of emerging nations.

Uruakpa, Kalu & Ufomadu (2019) looked into the effect of financial inclusion on Nigeria's economic growth from 2003 to 2015. The study used multiple regression analysis and the Ordinary Least Squares Technique (OLS). ATM transactions (ATM), deposits from rural branches of commercial banks (DRBCB), loans to rural branches of commercial banks (LRBCB), and real gross domestic product (RGDP), a proxy for economic growth, were chosen as the explanatory variables. The empirical findings demonstrated that, over the time period under research, the economic growth of Nigeria was positively and significantly impacted by deposits made at rural branches of commercial banks and by ATM activities, but negatively and insignificantly by loans made at those same branches. As a result, the study made the suggestion that rural branches of commercial banks come up with more creative ways to entice deposits from rural residents while simultaneously encouraging them to maintain effectively using ATM cards in part of their transactions due to their many advantages.

Omojolaibi & Popogbe (2017) looked at the connection between investment and financial inclusion in Nigeria. For the years 1981 through 2015, annual time series data were gathered from the CBN statistical bulletin. The autoregressive distributed lag (ARDL) bound cointegration test and error correction model are used in the investigation. The study's findings demonstrated that none of the three financial inclusion requirements—availability, accessibility, and affordability—guaranteed investment in the Nigerian economy.

Onaolapo (2015) examined the effects of financial inclusion on the economic growth of Nigeria from 1982 to 2012. The data spanning were analyzed using the Ordinary Least Squares (OLS). Deposits from rural areas as surrogate for financial inclusion was influenced by loans to rural areas and loans to small scale enterprise as surrogates for financial intermediation. The overall results of the regression analysis showed that inclusive bank financial activities greatly influenced poverty reduction but marginally determined national economic growth

and financial intermediation through enhanced bank branch networks, loan to rural areas, and loan to small scale enterprise given about 50% relatedness between variables on either sides of the equations.

According to the empirical studies evaluated, only Emezie (2021) and Omojolaibi & Popogbe (2017) sought to determine whether or not financial inclusion is promoting capital formation. The majority of the studies reviewed primarily focused on the impact of financial inclusion on economic growth. Therefore, while financial inclusion is crucial, capital formation—which is a requirement for economic growth and development—should receive more attention.

Rashid & Intartaglia (2017) claimed that endowed households will be able to borrow from the credit market when they desire to carry out investment projects, if optimal market conditions exist. Since this isn't always the case, financial services should be made available to the underprivileged so they can borrow money they couldn't before. Unfortunately, because of the danger, banks choose lending to corporations rather than individuals in order to lower the risks associated with investment initiatives.

### 3. Methodology

The Central Bank of Nigeria's (CBN) statistical bulletin served as the primary source for all of the secondary data used in the study. The time period covered by the study was from 1992 to 2021. All data were transformed to a natural-log equation for time series processing. The coefficient can therefore be viewed as elasticity. The a priori expectation for the independent variables (components of financial inclusion) is projected to be positive since it is anticipated that capital formation would be stimulated by making money available and inexpensive. The variables, their measurements, and a priori predictions are listed in Table 1.

**Table 1.** Measurement of Variables

S/N	Variable	Measurement	<i>a priori expectation</i>
1.	GFCF	This is the total value of a producer's acquisitions of fixed assets during the accounting period, less disposals, plus specific additions to the value of non-produced assets realized by the productive activity of institutional units.	Nil
2.	RCBLS	The amount of loans given by commercial banks to Nigerian rural residents serves as a proxy for this.	Positive (+)
3.	RCDPS	This is the process by which banks obtain cash or money from rural areas using their current, savings, fixed, recurring, and other specialized accounts.	Positive (+)
4.	NCOMB	The term "commercial bank branch" refers to a location that performs the functions of a commercial bank, offers customers financial services, and is physically distinct from the main office but not set up as a legally independent subsidiary.	Positive (+)
5.	CRSMES	This is determined by adding together the total amount of credit that commercial banks have given to small and medium-sized businesses.	Positive (+)

**Source:** Compilation of Researchers

#### 3.1. Model Development

The assumption that financial inclusion secured as a result of financial liberalization will lead to higher levels of investment and growth is the inspiration for this study, which borrows from McKinnon-liberalization Shaw's hypothesis as a trigger for higher saving. According to the idea, banks grant credit to people based less on predicted investment returns than on perceived transaction costs and default risk. The McKinnon-Shaw model also showed that whereas savings (S) are a positive function of real interest, investment (I) has a negative connection with a real interest rate (r). The investment ratio will rise along with the demand for money if the real return on bank deposits rises.

The long-term association between the variables was estimated using the vector error correction model (VECM). Variables stationary at the first difference can be used with this technique, but not those stationary at levels or

the second difference. VECM models have been used in econometrics for a long time, but recently they have become more widely used as a technique for analyzing cointegrating interactions between variables.

According to the literature, as the majority of those who are financially excluded live in rural regions, financial inclusion is frequently measured by bank loans and deposits there (Amakor and Eneh, 2021; Okoye et al., 2020). Additionally, the number of bank branches and the financing available to SMEs have been regarded as elements of financial inclusion (Emezie, 2021 and Anisiuba et al., 2020). Equation 1 thus presents a functional model that describes gross fixed capital formation (GFCF) as a function of financial inclusion:

$$GFCF = f(RCBLs, RCDPS, NCOMB \text{ and } CRSMES) \quad (1)$$

Equation 1 can be written in the econometric model and in its natural log form as thus;

$$LN GFCF = \beta_0 + \beta_1 LNRCBLs + \beta_2 LN RCDPS + \beta_3 LN NCOMB + \beta_4 LN CRSMES + \mu \quad (2)$$

Where,

LN = natural logarithm

$\beta_0$  = constant

$\beta_1 - \beta_4$  = coefficients of elasticities

GFCF = gross fixed capital formation

RCBLs = rural commercial banks' loans

RCDPS = rural commercial banks' deposits

NCOMB = number of commercial banks' branches

CRSMES = commercial banks' credit to SMEs

$\mu$  = error term

#### 4. Analysis and Discussion

##### 4.1. Descriptive Statistic

A descriptive statistic of the study's variables served as the foundation for the data analysis. From Table 2, the sample averages, medians, maximums, minimums, standard deviations, skewness, kurtosis, and p-values for the Jarque-Bera tests are included in the summary statistic in Table 2. One of the presumptions of a normal distribution is that the mean and median values of the data are averages of the same value. Additionally, the findings of the standard deviation, which indicates how widely the series deviate from their mean, show that all the series in the distribution, with the exception of LN RCDPS, deviate sparingly from the mean and most of the variables exhibit characteristics of a normal distribution. The skewness, which indicates that the distribution of the series is slightly skewed either positively or negatively but roughly normal in distribution and is within the acceptable threshold of -1 and +1, further supports the normal distribution of the variables. Also, the null hypothesis that "the series is normally distributed" cannot be rejected because all of the Jarque-Bera test's -values are higher than the significant level of 0.05. The findings of the standard deviation, skewness, and Jarque-Bera tests, in conclusion, support the normality of the series in the distribution.

**Table 2.** Descriptive Statistic

	LNGFCF	LNRCBLs	LN RCDPS	LN NCOMB	LN CRSMES
Mean	8.612472	3.296376	2.182072	8.231072	3.405772
Median	8.890338	2.900861	2.794859	8.250535	3.593569
Maximum	10.97325	6.896280	6.057837	8.841882	4.819717
Minimum	5.982950	0.471378	-3.912023	7.689371	2.374906
Std. Dev.	1.272379	1.591426	2.904630	0.405539	0.717561
Skewness	-0.214455	0.655208	-0.954095	-0.161614	0.147193

Kurtosis	2.376874	3.012554	3.260803	1.352778	1.793774
Jarque-Bera	0.715312	2.146685	4.636510	3.522272	1.927053
Probability	0.699314	0.341864	0.098445	0.171849	0.381545
Observations	30	30	30	30	30

Source: Authors computation using EViews 10

#### 4.2. Series Trend Analysis

In time series data, there are also increasing or falling trends as well as fluctuations. In order to identify whether the series has a unit root, trend analysis is required before unit root testing. The series appear to exhibit a random walk with drift and trend, according to the graphical representation in Figure 1, proving their non-stationary nature.

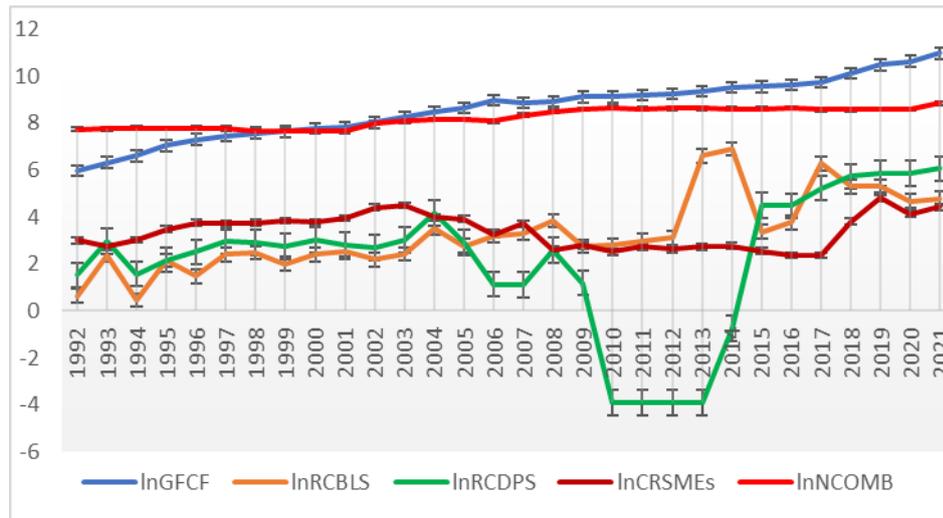


Figure 1. Trend Plot of the Series

Source: Plotted by Researchers

#### 4.3. Unit Root Tests

The results of the level, constant & trend, and first difference tests using the Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) tests are presented in Table 3.

Table 3. Unit Root Tests Result

Variable	ADF Test		PP Test		Remark
	Level	First Diff.	Level	First Diff.	
LNGFCF	-2.552831 {0.3026}	-3.733181 {0.0090}***	-1.011165 {0.7357}	-3.667456 {0.0105}**	I(1)
LNRCBLS	-1.615537 {0.4612}	-6.417646 {0.0000}***	-2.564176 {0.1117}	-14.75286 {0.0000}***	I(1)
LNRCDPS	-1.919927 {0.3188}	-3.975070 {0.0050}***	-1.578547 {0.4804}	-4.021854 {0.0045}***	I(1)
LNNCOMB	-0.344410 {0.9061}	-4.042175 {0.0043}***	-0.344410 {0.9061}	-4.042175 {0.0043}***	I(1)
LNCRSMES	-1.548923 {0.7882}	-5.310106 {0.0010}***	-1.629777 {0.4551}	-5.402783 {0.0001}***	I(1)

Note: Figures in parenthesis are the probability values of the t-Statistics of the ADF and PP. Asterisks \*\*\* and \*\* denote significance at 1% and 5% levels

Source: Authors computation using EViews

All of the variables are non-stationary when examined at the level of the ADF and PP tests. In light of the fact that data is stationary when ADF test statistics are less than critical values at the critical point of 5%, we draw the conclusion that the series for all variables are non-stationary. However, as indicated by the asterisk, the series for all the variables are stationary at the first difference. Data is stationary when the probability values of the ADF and PP test statistics are lower than the test critical values at the first difference at 0.05. Therefore, based on the results of the ADF and PP tests, it can be said that all series are non-stationary at the level but stationary at the first difference.

#### 4.4. Determination of Optimal Lags

The outcomes of the lag-order selection are shown in Table 4. The criteria for SC, FPE, HQIC, LR, and AIC all point to a one-step lag sequence. As a result, an analysis was conducted with a one-lag period.

**Table 4.** VAR Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-152.6478	NA	0.053468	11.26056	11.49845	11.33328
1	-34.18236	186.1600*	6.97e-05*	4.584454*	6.011816*	5.020813*
2	-15.29252	22.93766	0.000130	5.020894	7.637724	5.820885

\* indicates lag order selected by the criterion

LR: sequential modified LR test statistic (each test at 5% level)

FPE: Final prediction error

AIC: Akaike information criterion

SC: Schwarz information criterion

HQ: Hannan-Quinn information criterion

**Source:** Authors computation using EViews 10

#### 4.5. Cointegration Test

The cointegration test is the following step after all variables have been integrated to order I(1). Since the time series are multivariate, the multivariate cointegration technique developed by Johansen (1995) is used to ascertain if the relationship is stable over the long term. The result of the Johansen co-integration test is presented in Table 5:

**Table 5.** Johansen Cointegration Results

Hypothesized No. of CE(s)	Trace Stat.	Critical Value (5%)	Max-Eigen Stat.	Critical Value (5%)
None	84.23728	69.81889**	36.21256	33.87687**
At most 1	48.02472	47.85613**	24.65837	27.58434
At most 2	23.36636	29.79707	17.21514	21.13162
At most 3	6.151213	15.49471	6.149063	14.26460
At most 4	0.002150	3.841466	0.002150	3.841466

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

\* denotes rejection of the hypothesis at the 0.05 level

**Source:** Authors computation using EViews 10

Table 5 demonstrates the long-term relationships between the variables. The trace and Max-Eigen statistics, for the Trace and Eigen statistics, respectively, showed 2 and 1 cointegrating equation among the variables. The link between the variables is then implied to have a long-term trajectory.

Table 6 presents the normalized cointegrating coefficients that illustrate the long-term effects of financial inclusion on capital formation. From normalized cointegrating coefficients, it was observed all the components of financial inclusion such as LNRCBLS, LNRCBPS, LNRCOMB and LNRCRSMES had negative effects on LNGFCF, implying that the level of financial inclusion in the long-run did not favour capital formation in Nigeria. Also, the variables were statistically significant following their high t-values, indicating the financial inclusion has a significant effect on capital formation in the long-run. The observed decline in the level of financial inclusion suggests that there could be barriers to financial inclusion such as insufficient loans to rural

dwellers even when the banks mobilize deposits from them, poor branch network and the neglect of SMEs in credit extension by the commercial banks (Ozili, 2022).

**Table 6:** Normalized Cointegrating Coefficient

<b>Cointegrating Eq:</b>	<b>CointEq1</b>
LNRCBLS(-1)	-0.300200 (0.05414) [-5.54532]***
LNRCDPDS(-1)	-0.051242 (0.01684) [-3.04295]***
LNNCOMB(-1)	-1.955546 (0.37986) [-5.14811]***
LNCRSMES(-1)	-0.475011 (0.07013) [-6.77327]***
C	10.32621

Note: Standard errors in ( ) & t-statistics in [ ]

Source: Authors computation using EViews 10

#### 4.6. Vector Error Correction Model (VECM)

The VECM model was computed to detect the short- and long-term dynamics of the used variables.

In Table 7, the error correction term (ECT) is equal to -0.287605 which demonstrates how the imbalance between the short and long runs ultimately disappears. As a result, with an annual adjustment of roughly 29%, the short-run output values will progressively converge to the long-run direction. The ECM's outcome also shows that the estimated model is generally good, with an R-squared of 0.631642. It suggests that LNRCBLS, LNRCDPDS, LNNCOMB, and LNCRSMES (independent variables) can account for around 63% of the total variation in LNGFCF (dependent variable), with other factors not included in the model accounting for the remaining 37%. Similarly, the whole model was statistically significant at a 5% level of significance, as indicated by the F- statistic value of 4.736712 and probability (F-statistic) of 0.000736. This suggests that several aspects of financial inclusion collectively have a considerable impact on Nigeria's gross fixed capital formation (LNGFCF).

**Table 7.** VECM

	<b>Coefficient</b>	<b>Std. Error</b>	<b>t-Statistic</b>	<b>Prob.</b>
ECT(1)	-0.287605	0.110727	-2.597419	0.0168
D(LNGFCF(-1))	-0.024060	0.229392	-0.104888	0.9175
D(LNRCBLS(-1))	0.036753	0.024499	1.500228	0.1484
D(LNRCDPDS(-1))	-0.642361	0.219072	-2.932195	0.0080
D(LNNCOMB(-1))	-0.153369	0.038761	-3.956752	0.0007
D(LNCRSMES(-1))	0.023213	0.055101	0.421289	0.6778
C	0.190040	0.051390	3.698005	0.0013
R-squared	0.631642			
Adjusted R-squared	0.540682			
F-statistic	4.736712			
Prob(F-statistic)	0.000736			
Durbin-Watson stat	1.863738			

Source: Authors computation using EViews 10

According to the ECM results, all of the variables' short-run coefficients of D(LNRCBLS(-1)) were positive but statistically insignificant, suggesting that loans from rural commercial banks in Nigeria only had a minimal impact on capital creation. The computed coefficient of D(LNRCDPDS(-1)) shows that capital formation significantly decreased as deposits from the rural population rose. Additionally, even as the number of commercial banks' branches increased, the calculated coefficient of D(LNNCOMB(-1)) is negative and substantial, demonstrating that capital generation declined dramatically. Once more, D(LNCRSMES(-1))

showed a favorable but statistically insignificant effect on capital creation, indicating that the effect of commercial banks' credit to SMEs very slightly influenced capital formation in Nigeria.

#### 4.7. Analysis of Short-Run Causality

The results of the short-run causality test are presented in Table 8:

**Table 8.** Wald Tests and Short-run Causality

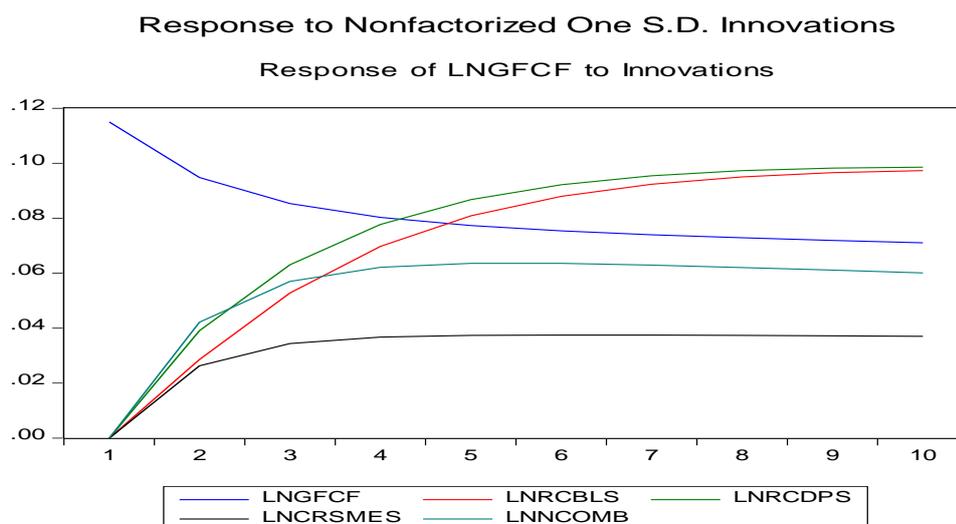
Dependent variable: D(LNGFCF)			
	Chi-sq.	df	Prob.
D(LNRCBLS)	2.186369	2	0.3351
D(LNRC DPS)	14.82581	2	0.0006
D(LNNCOMB)	3.876860	2	0.1439
D(LNCRSMES)	5.614197	2	0.0604
All	18.23269	8	0.0195

**Source:** Authors computation using EViews 10

Since the null hypothesis was rejected, there is a short-run association between LNGFCF and LNRC DPS as evidenced by its probability value (0.0006), which is less than 0.05. The other explanatory variables, LNRCBLS, LNNCOMB, and LNCRSMES, do not contribute to LNGFCF in the short run. As shown in Table 8, there is a short-term relationship between the explanatory variables and the dependent variable based on the Chi-square joint statistics probability values. Since the chi-square test's p-value for the explanatory variables (LNRCBLS, LNRC DPS, LNNCOMB, and LNCRSMES) is less than 0.05, the null hypothesis ( $H_0: \beta = 0$ ) would be rejected. It was determined that the changes in LNCFCF were collectively explained by the explanatory variables in the short run since the overall chi-square test was 18.23269 and its probability value was  $0.0195 < 0.05$ . This suggests that the combined effect of LNRCBLS, LNRC DPS, LNNCOMB, and LNCRSMES was immediate and significant within a short-term period. The following phase is *ex-ante* forecasting utilizing tests for variance decomposition and impulse response.

#### 4.8. Impulse Response Function

The impulse response function was used to quantify the impact of independent variable shocks on the dependent variable. The complicated effects of a one-standard-deviation shock from the independent variables on LNGFCF in Nigeria over a ten-year period are shown in the set of graphs contained in Fig. 2.



**Figure 2.** Response of LNGFCF to components of financial inclusion

Figure 2 shows that the response of LNGFCF (denoted by the blue line) to its own shock was decreasing over the 10-year period, implying that capital formation reacted negatively to its own shocks. It was also observed

that during the first-four period, the responses of LNGFCF to LNRCBLS and LNRC DPS (denoted by the pink and thick green lines respectively) was rising but slowed down from the fifth to the tenth period. Also, the responses of LNGFCF to LNCRSMES and LNNCOMB (denoted by the ash and light green lines respectively) trended upwards for the first – three periods but slowed down for the rest of the period. The decline in the responses of LNGFCF to the various components of financial inclusion indicates that the responses did not last for a long time probably due to the series of economic crisis such as the global financial crisis in 2008, change in government policies due to the change in governance, the 2016 economic recession and the COVID-19 pandemic that may hindered the commercial banks from serving the rural populace by closing many of their branches in a bid to reduce the cost operation. This also indicates that the expected positive impact of financial inclusion on capital formation could be undermined in the long-run if proper policies are not put in place. Also, this justifies the negative normalized cointegrating coefficients obtained in the long-run analysis (see Table 6).

#### 4.9. Variance Decomposition

For each endogenous variable in the system, the error variance effects are predicted using variance decomposition. A straightforward linear equation demonstrates that any change in a dependent variable corresponds to a change in one variable at a time. Based on the Monte Carlo approach and Cholesky's ordering, the projection in this study will be classified into three categories: short-term (two years), medium-term (five years), and long-term (ten years) (ten years). Gross fixed capital formation (LNGFCF), loans from commercial banks to rural areas (LNRCBLS), deposits from commercial banks in rural areas (LNRC DPS), the number of commercial banks' branches (LNNCOMB), and commercial banks' credit to SMEs are all logged numbers (LNCRSMES).

**Table 9.** Variance Decomposition of LNGFCF and Financial Inclusion

Period	S.E.	LNGFCF	LNRCBLS	LNRC DPS	LNNCOMB	LNCRSMES
1	0.141422	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.218963	95.89693	0.093947	0.419824	2.440604	1.148697
3	0.317141	92.90007	0.585888	0.268221	3.891574	2.354246
4	0.388005	92.38737	1.169067	0.690558	3.457466	2.295542
5	0.442950	90.92733	2.127063	1.013232	3.101785	2.830588
6	0.495441	89.97490	3.032102	0.872910	2.692192	3.427898
7	0.542727	89.03428	3.925548	0.731194	2.308694	4.000282
8	0.583462	88.16906	4.729607	0.661980	2.041991	4.397357
9	0.618849	87.22960	5.529250	0.649657	1.859275	4.732218
10	0.653085	86.39330	6.265248	0.642700	1.696088	5.002662

**Source:** Authors computation using EViews 10

The outcome of Table 9 demonstrates the variance decomposition of the forecast error variance in LNGFCF explained by its innovations and innovations in rural commercial bank deposits, number of commercial bank branches, rural commercial bank loans (LNRCBLS), and commercial bank credit to SMEs (LNCRSMES). An analysis of LNGFCF's variance decomposition reveals that, while its shock accounts for 100% of the variation in the first period, it steadily diminishes to 86.39% of the variation by the end of the horizon. LNRCBLS makes a marginally increasing contribution from the first to the tenth period. The LNRC DPS's contribution decreased during the third period of the time horizon, but it climbed during the fourth and fifth, after which it started to slightly drop until the end of the horizon. Up to the fifth period, when it stood at roughly 2.69 percent, the contribution of LNNCOMB marginally increased. After that, it started to decline until the conclusion of the period. Meanwhile, LNCRSMES negligibly follows an upward trend through the end of the horizon.

#### 4.10. Checking VAR Models

The endogenous variables were transformed to the first difference using the error correction mechanism, and the model was estimated using the VECM. Before discussing the findings, the VECM model was tested for serial correlation and stability.

*Autocorrelation residual LM test:* The autoregressive model's serial correlation was examined using the LM test. Using an auxiliary regression of the anticipated regression's residuals, the LM test statistic calculates lag order under the null hypothesis that there is no serial correlation from lag one. Table 10 displays the results of the serial correlation test.

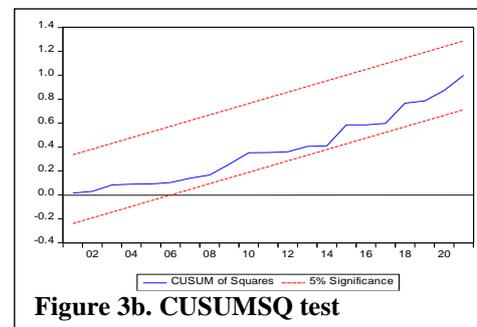
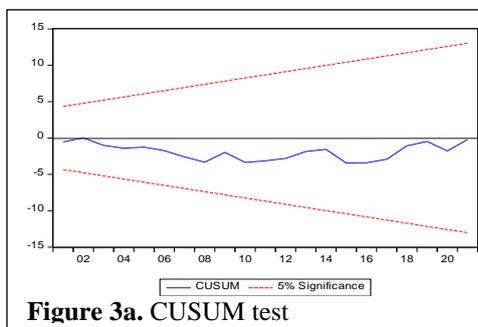
The Godfrey LM test for 1 lag accepts the null hypothesis of serial autocorrelation since both of their p-values are greater than the significance threshold of 0.05, while the Godfrey LM test for 1 lag rejects it. As a result, we can deduce that there is no serial autocorrelation because the lag accepts the null hypothesis.

**Table 10:** VEC Residual Serial Correlation LM Tests

Lag	LRE* stat	df	Prob.	Rao F-stat	df	Prob.
1	21.04221	25	0.6903	0.813132	(25, 46.1)	0.7066
2	26.90683	25	0.3606	1.097942	(25, 46.1)	0.3821

**Source:** Authors computation using EViews 10

Stability is assessed using the recursive coefficient stability test and the CUSUM test. The final performance is depicted in Figures 3a and 3b. Both tests show that the system's equation is accurate and that the results are sufficient for economic analysis. The results imply that there is no instability because the recursive coefficients and the CUSUM plot test statistics are verified to be within the 5% crucial bounds of parameter stability. As a result, we determine that our parameters are stable and, therefore, free of misspecification, and we reject the null hypothesis.



#### 4.11. Discussion of Findings

According to the ECM's findings, the observed positive but negligible impact of LNRCBLS on LNGFCF indicates that as the gross fixed capital formation grows slightly, so would the credit extended by rural commercial banks. This is true because, in theory, government measures aimed at bringing the economically excluded people into formal financial institutions should have a direct impact on capital formation. The lack of impact of LNRCBLS may indicate that rural residents do not receive enough loans from commercial banks, or that these loans are not sufficiently large to result in the expected rise in capital formation in Nigeria. This outcome is consistent with Okoye et al. (2020), but it varies with Emezie (2021), who discovered that LNRCBLS had a beneficial effect over time.

The estimated LNRCDPS coefficient, which was statistically significant and turned out to be negative, demonstrates that the capital formation was significantly reduced as a result of the deposits that rural residents mobilized. This might be the case since Nigeria's commercial banks were able to collect deposits from rural areas without providing the required interest. In contrast to the findings of this study, studies like Enueshike and Okpebru (2020) and Uruakpa, Kalu and Ufomadu (2019) revealed that rural deposits mobilized by commercial banks boosted capital formation. The period covered and the methods utilized by the various research, which happen to be different from that used in this study, may be the cause of this discordant result.

As shown by the positive and statistically significant coefficient LNNCOMB, the growth of commercial bank branches did not increase capital formation during the study period. According to the LNNCOMB's negative coefficient, a rise in the number of commercial banks' branches resulted in a decrease in capital formation. This could indicate that the commercial banks were ineffective in providing the general public with financial services. Additionally, this outcome may indicate that the distribution of these commercial banks' branches was uneven, i.e., that they were likely more concentrated in urban than rural areas, undermining capital accumulation and financial inclusion. This conclusion was contrary to Okoye et al. (2020) agrees with Anisiuba et al (2020).

From the findings, it was concluded that capital formation in Nigeria was marginally but positively impacted by commercial banks' lending to SMEs (LNCRSMES). It means that capital production has not been much aided by commercial banks' lending to SMEs. This might be explained by the difficulty of obtaining financing and the high interest rates charged by commercial banks. This finding contrasts with that of Enueshike and Okpebru (2020), who found that LNCRSMES had a significant influence on money mobilization and economic growth in Nigeria. Emezie (2021) also made a similar observation.

## 5. Conclusion

The study's objective was to determine how Nigerian capital formation will be affected by financial inclusion using annual data from the time (1992 - 2021). To do this, it was first necessary to establish the existence of cointegrating vectors and the existence of a long-term relationship between the cointegrating series. The results utilizing the trace test statistic and the Max-Eigen test statistic show that vectors indeed cointegrate. The normalized cointegrating coefficients were used to interpret the long-term relationship between the series. The results show that there is a long-term association between series.

The authors also investigated any potential short-term connections between the series. The long- and short-run links between the episodes were described in the first portion using a cointegration analysis. The outcomes show that the series are cointegrated in the same order (1), indicating a long-term link between the variables under investigation. The VECM systems model was used to validate the long-run relationship that was explained by the normalized coefficients of the cointegration simulation even if there was a transient correlation between the factors.

To achieve the goals of the study, a VECM simultaneous systems model with four endogenous variables was created. After modeling the aforementioned VECM system model, an error correction term portion indicates the long-run relationship, and the second part indicates the short-run relationship. Before the results were evaluated, the VECM systems model was validated for stability and the absence of serial correlation. The outcomes demonstrate the applicability of the VECM model for policy analysis. Gross fixed capital formation (dependent variable) and the independent variables of rural commercial bank loans, rural commercial bank deposits, commercial bank branch count, and total credit to SMEs are shown to have a long-run relationship according to the results of error correction term coefficients. The error correction term's (ECT) t-statistic value of 2.597 and associated probability value of 0.0168 suggest that the explanatory variables had an absolute long-run association.

### *Recommendations*

The following suggestions were offered in light of the study's findings:

- 1) To enhance financial inclusion through commercial bank loans to rural dwellers, the lending environment needs to be changed to accommodate the financing needs of smaller economic units like rural communities. However, in order to improve the efficiency of the commercial banks at the local level and boost capital formation, it is important to thoroughly study how they operate, including their roles in financial intermediation and the monetary environment.
- 2) To increase the amount of loanable funds available for on-lending, banks should step up their efforts to mobilize deposits in rural areas. This would encourage capital development in both the country's rural and urban sectors.
- 3) Bank branches should be staffed with energetic customer service representatives who can teach the general public financial literacy, especially in rural areas, in order to increase capital formation. The branches should also offer several discounts, promotions, and special banking services to entice people to visit their many locations through its branch network.
- 4) The monetary authorities should require banks to raise the amount of credit they are willing to extend to SMEs in the nation in order to boost funds mobilization. Banks should then implement the necessary safeguards to prevent these loans from being used for unproductive purposes. To increase capital formation in Nigeria, the government must find a means to entice banks to lend to SMEs by offering guarantees, subsidized interest rates, and other incentives.

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