

Financial Sector Development and Economic Growth Nexus in Nigeria: Evidence from Autoregressive Distributed Lag and Toda-Yamamoto Causality Techniques

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ABSTRACT: The paper investigated financial sector development and economic growth nexus in Nigeria using annual time series data spanning 1981 to 2023. The Augmented Dickey-Fuller, Phillips-Perron and Zivot-Andrews unit root tests reveal that the variables have a mixed order of integration, $I(0)$ and $I(1)$. This necessitated the adoption of the autoregressive distributed lag (ARDL) model and the Toda-Yamamoto causality test. The ARDL bounds test confirmed existence of a long-run relationship between financial sector development related variables and economic growth proxy by real gross domestic product (RGDP). Both short-run and long-run impacts were estimated. Findings indicate that financial access and financial depth made negative and insignificant impact on RGDP whereas credit to the private sector and interest rates made positive and significant impact on RGDP in both periods. Financial efficiency had a positive but insignificant impact on RGDP. A bidirectional causality between credit to the private sector and RGDP; and unidirectional causality from interest rates to RGDP were established. Financial access, financial depth and financial efficiency have no causality with RGDP. Based on these findings, the study concludes that financial sector development contributed significantly to economic growth in Nigeria within the period under review, and recommends that financial institutions and their regulatory bodies should increase credit to private sector, access, depth and ensure strict implementation of regulatory policies and use instruments such as interest rate to regulate the economy, to boost the growth of the Nigerian economy.

KEYWORDS: Financial sector development, economic growth, ARDL, Toda-Yamamoto causality, Nigeria

1. INTRODUCTION

The financial sector of any economy in the world plays a key role in the development and growth of the economy. An efficient financial system is essential for building a sustained economic growth and an open vibrant economic system. Countries with well-developed financial institutions tend to grow faster; especially the size of the banking system and the liquidity of the stock markets tend to have strong positive impact on economic growth. The evolution of Nigeria's financial sector has been a crucial aspect of the country's growth. In the 1970s, the sector was predominantly controlled by the government, which held significant shares in most banks. The financial crisis of the 1980s led to the introduction of the Structural Adjustment Programme (SAP) in 1986, aimed at reviving the financial sector through financial liberalization (Jude, Haruna, Mohammed & Richard, 2022). Reforms such as the 2004 consolidation exercise, privatization, commercialization, and recapitalization have since been implemented to strengthen the sector and sustain economic growth (Obianagwa & Eze, 2020; Akintunde & Olaniran, 2022, as cited in Jude et al., 2022). The financial sector plays a critical role in economic growth and stability by facilitating resource allocation, promoting investment, and fostering innovation. Over the past four decades, from 1981 to 2021, Nigeria's financial sector has undergone significant transformations, including regulatory reforms and technological advancements, enhancing financial intermediation and stability. Financial sector development, measured by the depth, efficiency, and accessibility of financial services, stimulates economic growth by improving credit availability, reducing transaction costs, and facilitating risk management. A well-functioning financial system promotes investment, trade, and efficient resource allocation, contributing to economic growth (Adelakun, 2011, as cited in Sennuga, Adenaike, Adedayo & Sennuga, 2021). Conversely, a poorly functioning financial sector can impede growth by restricting access to finance and increasing capital costs. The success of the financial system in promoting economic growth relies

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on reforms, such as market-based monetary control, competition promotion, and relaxed capital flow restrictions (Sennuga et al., 2021). Effective reforms create a stable system that enhances economic performance and growth (Johnston and Sundararajan, 1999, as cited in Sennuga et al., 2021). Many emerging economies, including Nigeria, have embraced financial sector reforms to improve economic growth and financial system efficiency (Jude et al., 2022).

In 2004, the consolidation exercise in the banking sector played a role in the National Economic Empowerment and Development Strategy (NEEDS), driving the government's economic agenda. Post-consolidation, the number of commercial banks decreased, but the capital requirements increased, stabilizing the financial sector while concerns about systemic risks and credit supply persisted (Sennuga et al., 2021). The Nigerian financial sector has also seen deregulation, liberalization, and technological advancements, increasing its relevance (Ibrahim & Alagidede, 2017; Valickova, Havranek, & Horvath, 2015; Hermes & Lensink, 2013; DurusuCiftci, Ispir & Yetkiner, 2017, as cited in Omiete & Titi, 2023). Scholars such as Schumpeter (1911), McKinnon (1973), and others agree that financial development fosters economic growth through technological innovation and the provision of funds to entrepreneurs (as cited in Omiete & Titi, 2023). As Nigeria continues to pursue economic prosperity, the financial sector's role as a catalyst for growth remains crucial. Targeted investments and comprehensive policy reforms can harness the transformative power of financial sector development, driving inclusive and sustainable growth for all citizens.

The Nigerian financial sector faces significant challenges due to the lack of adequate coordination and harmonization between fiscal and monetary policies, exacerbating its poor performance. High costs associated with accessing funds and credit have discouraged investors from engaging with the banking system. Furthermore, the underdevelopment of critical infrastructure, such as power supply and telecommunications (including internet access), has increased operational costs, hindering the sector's progress. The inefficiency of the payment system and excessive reliance on cash transactions have further stifled the growth of the financial sector. The liberalization of interest rates and the increased competition from new banks entering the financial system have led to sharp rises in nominal deposit and lending rates. For instance, the maximum lending rate, which averaged 12.0 percent in 1986, surged to 26.5 percent in 2003 (Nnanna, Englama & Odoko, 2004). Despite financial liberalization positively influencing interest rates, real deposit rates remained negative, averaging -13.5 percent during the reform years, compared to -7.7 percent during periods of financial repression. High inflation rates, coupled with the re-imposition of interest rate ceilings, contributed to these negative real deposit rates, thereby hindering overall macroeconomic performance (Victor & Samuel, 2014). While the reforms have stimulated growth in the Nigerian banking industry, they have not significantly fostered broader development. The banking system remains highly scrutinized, with loans and advances being difficult to obtain, even when strict collateral conditions are met (Ibi-Ajahyi, 2007). Unlike banks in developed countries, which encourage the use of loan and credit facilities, Nigerian banks often deter potential customers with stringent requirements.

Moreover, these reforms have not adequately addressed the impact of technological changes on the financial markets, particularly in terms of digital financial inclusion (e.g., mobile banking, digital payments) and their effect on economic growth, especially in rural and underserved areas. Many studies have failed to analyze the current trends in financial sector development, such as the role of financial technology (fin-tech) in driving both sector development and economic growth. Understanding how fin-tech solutions are transforming financial services and their broader economic impacts is crucial. Therefore, this research seeks to address the following key questions: What is the impact of financial sector development on Nigeria's economic growth? To what extent do financial sector reforms affect investment and capital formation in Nigeria? How do financial sector reforms influence the efficiency and stability of Nigeria's economy? This study aims to thoroughly examine these aspects to provide a comprehensive understanding of the financial sector's role in Nigeria's economic growth.

From the discussion of the above studies, it is found that studies of Jude, Haruna, Mohammed and Richard (2022), Ahmed, Alhassan and Usman (2018) and Omiete and Titi (2023) show a positive and significant impact of financial sector development on economic growth of Nigeria. Conversely, Emmanuel, Steven and David (2018) shows negative and significant impact of financial sector development on economic growth in Nigeria and other countries of Africa. However, these studies failed to analyze both the impact of financial sector development on economic growth in Nigeria and the causal direction between financial sector development and economic growth in Nigeria using the same data set, and most of the previous empirical studies on Nigeria are outdated. Therefore, the objectives of this study are to: 1. determine the impact of financial sector development on economic growth in Nigeria, and 2. investigate the direction of causality between financial sector development and economic growth in Nigeria from 1981 to 2023.

The remainder of this paper is structured into section 2 review of related literature, 3 empirical model, data and methodology, 4 results and discussion, and 5 conclusion, policy implications and recommendation.

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2. REVIEW OF RELATED LITERATURE

Over the years, scholars have sought to study the nexus between financial sector development and economic growth. Some of these studies aimed to determine if finance propels economic growth while others aimed to determine if economic growth leads to financial development.

It was Schumpeter (1911) that first discussed that technological innovation is stimulated by well-functioning banks by providing credits to entrepreneurs to fund and implement innovative production processes and products. Many economists argue in favour of finance-led economic growth, asserting that financial intermediation stimulates economic growth by providing resources and investment opportunities (Gurley and Shaw, 1955; Goldsmith, 1969; McKinnon, 1973a, Shaw, 1973). Prior to the seminal study of Atje and Jovanovic (1993), financial sector is always captured by financial intermediaries such as banks. The seminal study however considered financial markets as well as institutions and found that the stock market contributed positively to economic growth.

These assertions follow both neoclassical and endogenous growth theories that put the emphasis on the primary determinants of economic growth, such as capital accumulation and technological innovation. The theories are based on the assumption that savings are equal to investments. However, investment entities do not have enough of their own funds, but rely on loans or issue securities, such that the savings would be equal to investments in the conditions of a perfect financial market. It is argued however that because of asymmetric information and transaction costs, financial markets do not function perfectly.

There are four possible causal nexus of financial sector development and economic growth.

SLH (supply leading hypothesis) states that financial sector development is key for economic growth such that increasing the supply of financial services leads to the growth of economic activity, depicting unidirectional causality from financial sector development to economic growth.

Some studies support this hypothesis and argue that advancement in certain financial sector activities such as growth in numbers of financial sector branches; stock traded and net foreign assets; financial systems and inclusion (captured by financial access and market sophistication); and quality of financial systems such as markets, institutions and financial instruments lead to positive gains and reduce inequality that accelerate economic growth (Paun et al. 2019; Gural and Lomachynska 2017; Bittencourt 2011; Setiawan 2015; Kapingura 2017; Urgaia 2014).

DFH (demand-following hypothesis) implies that economic growth generate increase in demand for financial services, that is, robust financial sector. Economic growth induces wealth accumulation and further create adequate resources to improve technology, innovative capacity, and institutions. Thus, there is unidirectional causality running from growth to financial sector development. Chakraborty and Nandi (2003) and Ang and McKibbin (2007) support this hypothesis.

FBH (feedback-causality Hypothesis) suggests a mutual or bidirectional causality between development of financial system and economic growth. Bidirectional relationship between FSD and growth was found in some studies (Sunde 2012; Oluitan 2012; Apergis et al., 2007; Sunde, 2012; Uddin et al., 2014)

NLH (No-Causal Relationship Hypothesis) states there is no causal nexus between financial sector development and economic growth in either direction. Atindehou et al., (2005), Mukhopadhyay et al., (2011), and Singh and Mishra (2015) lend credence to this hypothesis.

Some other studies argue that the impact of Financial sector development on economic growth depends on the growing private credit ratio on real GDP growth (Ductor and Grechyna 2015). This implies that Financial sector development negatively impacts economic growth when there is fast growth in private credit without growth in real output. Thus, economic growth requires optimal level of finance development that is determined by the economy's characteristics.

McKinnon (1973b) and Shaw (1973) were first to study finance-growth nexus in developing countries. They argue that policies to develop financial services sector tend to increase economic growth, and that developed countries grow simply because they have well-developed financial services sectors. These scholars therefore conclude that if the developing countries can develop their financial services sectors, they stand the chances to grow at much faster rate.

However, the above conclusion faced some criticisms. Some scholars argued that economic growth is not only caused by financial sector development. This has led to some later studies that estimated growth models that include financial sector variables and control for other factors of growth, such education, trade openness, population etc, (King and Levine, 1993; Levine, 1997; Kilimani, 2009).

Using Nigeria data from 1980 - 2013, Chude and Chude (2016) investigated the impact of financial development on economic growth, using Vector error correction model. The study establishes a causal relationship between financial development and economic growth indicating that ratio of Domestic Credit to the Private sector contributes to growth. A similar result was found

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in Olanrewaju et al., (2015) where lending interest rate, exchange rate and real rate of interest positively impact the manufacturing sector output growth in Nigeria.

Oriavwote and Eshenake (2014) using the ratio of money supply to GDP, liquidity ratio, interest rate and the credit to private sector to represent financial sector development, shows that the capital base and liquidity ratio improve the level of economic growth in Nigeria.

There is therefore lack consensus on the exact nature of the relationship between financial sector development and economic growth. Hence, financial sector development and economic growth nexus remains open for further investigation.

3. EMPIRICAL MODEL, DATA AND METHODOLOGY

Empirical model, definition of variables and data description

Financial sector development variables of credit to the private sector (PC), financial access (FA) financial depth (FD) and financial efficiency (FE) are the major explanatory variables of economic growth proxy by gross domestic product growth rate (GDP) while interest rate is a control variable. Secondary time series data of annual frequency spanning 1981 to 2023 were utilized in the empirical analysis. The model of the study is specified following Omiete and Titi (2023) but with modification to accommodate some relevant omitted variables as follows.

$$GDP = f(PC, FA, FD, FE, INT) \quad 1$$

The log-linear econometric form of the equation is specified as:

$$GDP_t = \beta_0 + \beta_1 PC_t + \beta_2 FA_t + \beta_3 FD_t + \beta_4 FE_t + \beta_5 INT_t + \mu_t \quad 2$$

Where these variables are as defined above. Note that missing data points on some of the variables were generated by interpolation using three years moving average. The justification for choosing these variables is based on data availability, previous empirical studies and to address the objectives of the study including the discovered knowledge gap. The description of data, measurement and sources of data used in the empirical analysis is presented in Table 1.

Table 1: Description of data, measurement and sources of data

Variables	Measurements	Sources
Gross domestic product growth rate (GDP)	GDP growth (annual %)	World Development Indicators (2024)
Credit to the private sector (PC)	Domestic credit to the private sector (%GDP)	World Development Indicators (2024)
Financial access (FA)	Commercial bank branches (per 100,000 adults)	World Development Indicators (2024)
Financial depth (FD)	The ratio of broad money to nominal gross domestic product	CBN Statistical Bulletin (2024)
Financial efficiency (FE)	Profitability (return on assets, return on equity)	CBN Statistical Bulletin (2024)
Interest rate (INTR)	Lending interest rate (%)	World Development Indicators (2024)

Source: Researchers' compilation (2025)

Estimation Techniques and Procedure

The parameters of the model for this study were estimated using autoregressive distributed Lag (ARDL) model in order to achieve objective 1 and Toda-Yamamoto causality test to actualize objective 2. The Augmented Dickey-Fuller test was employed to test for unit root since the data is time series in nature and in order to avoid spurious regression. To determine the long-run relationship among the variables of the model, the ARDL Bounds test for co-integration was employed. After these, post-estimation tests were carried out to test the reliability and validity of the estimates. These tests are necessary to ensure that our estimates are good for economic prediction and policy formulation.

Autoregressive Distributed Lag (ARDL) model is a model which includes one or more lagged values of the dependent variable among the explanatory variables. The major restriction imposed for adoption of this method is that none of our series should go beyond I(1). ARDL produces both the long run and short run of the model as follows.

$$\Delta GDP_t = \beta_0 + \beta_1 GDP_{t-1} + \beta_2 PC_{t-1} + \beta_3 FA_{t-1} + \beta_4 FD_{t-1} + \beta_5 FE_{t-1} + \beta_6 INT_{t-1} + \sum_{j=1}^k \lambda_{1j} \Delta GDP_{t-j} + \sum_{j=0}^k \lambda_{2j} \Delta PC_{t-j} + \sum_{j=0}^k \lambda_{3j} \Delta FA_{t-j} + \sum_{j=0}^k \lambda_{4j} \Delta FD_{t-j} + \sum_{j=0}^k \lambda_{5j} \Delta FE_{t-j} + \sum_{j=0}^k \lambda_{6j} \Delta INT_{t-j} + \mu_t \quad 3$$

Where λ_1 to λ_6 are the coefficients of the short-run parameters, β_1 to β_k are the coefficients of the long-run parameters, Δ = first difference operator, LN denotes variables in their natural log form, K is the lag order selected by Akaike information criterion (AIC), while μ_t is the white noise assumed to be normally distributed, t is a subscript denoting time, the variables are as itemized above. Toda-Yamamoto (1995) causality test is valid for series that integrated or cointegrated and serves also as an augmented Granger causality test and is formulated as follows: Let d_{max} = maximum order of integration in the VAR system below: The VAR (a + d_{max}) shall be estimated to use the modified WALD test for linear restrictions on the coefficients of VAR which follows an asymptotic χ^2 distribution. Using the Akaike Information Criteria AIC, a is determined to be ... To increase the number of lags in the WALD model up to the maximum cointegration level of variables entered in the model is crucially fundamental in opting for the Toda-Yamamoto causality testing procedure (Igwegemma et al., 2020). The Toda-Yamamoto approach is an alternative causality testing approach based on the Granger causality equation but augmented with extra lags determined by the potential order of integration of the series causally tested. Employing the seemingly unrelated regression (SURE) framework, we estimated the VAR equation as follows;

$$\begin{bmatrix} GDP_t \\ PC_t \\ FA_t \\ FD_t \\ FE_t \\ INT_t \end{bmatrix} = X_0 + X_1 \begin{bmatrix} GDP_{t-1} \\ PC_{t-1} \\ FA_{t-1} \\ FD_{t-1} \\ FE_{t-1} \\ INT_{t-1} \end{bmatrix} + X_2 \begin{bmatrix} GDP_{t-2} \\ PC_{t-2} \\ FA_{t-2} \\ FD_{t-2} \\ FE_{t-2} \\ INT_{t-2} \end{bmatrix} + X_3 \begin{bmatrix} GDP_{t-3} \\ PC_{t-3} \\ FA_{t-3} \\ FD_{t-3} \\ FE_{t-3} \\ INT_{t-3} \end{bmatrix} + X_4 \begin{bmatrix} GDP_{t-4} \\ PC_{t-4} \\ FA_{t-4} \\ FD_{t-4} \\ FE_{t-4} \\ INT_{t-4} \end{bmatrix} + \begin{bmatrix} \varepsilon GDP_t \\ \varepsilon PC_t \\ \varepsilon FA_t \\ \varepsilon FD_t \\ \varepsilon FE_t \\ \varepsilon INT_t \end{bmatrix} \quad 4$$

In eq.(4), X_1, X_2, X_3 and X_4 are three 6 by 6 matrices of coefficients with X_0 being the 6 by 1 identity matrix, ε_s are the white noise disturbance terms with zero mean and constant variance. From eq.(4) we can empirically verify the hypothesis that credit to the private sector (PC_t) Granger causes economic growth (GDP_t) in the following hypothesis: $H_o = x_{27}^1 = 0$ where x_{27}^1 is the coefficient of the PC variable in the first equation of the system presented in eq.(4). Further, the reverse causality from economic growth to credit to the private sector can be tested in the following hypothesis: $x_{48}^1 = 0$ where x_{48}^1 is the coefficient of the economic growth variable in the second equation of the system presented in eq.(4). The remaining hypotheses can be tested in a similar manner.

4. RESULTS AND DISCUSSION

This section presents the pre-estimation tests which include descriptive statistics, correlation matrix, unit root test and co-integration test, and the ARDL short-run and long-run results and the Toda-Yamamoto causality test and diagnostics tests. The discussion of results concludes the session. Table 2 presents the descriptive statistics.

Table 2: Summary of descriptive statistics

Variables	GDP	PC	FA	FD	FE	INT
Mean	3.055844	9.626997	0.152326	0.119070	0.585116	17.24797
Median	3.449434	8.248989	0.060000	0.040000	0.510000	16.90390
Maximum	15.32916	19.62560	2.120000	2.070000	2.560000	31.65000
Minimum	-13.12788	4.957522	0.050000	0.030000	0.380000	8.916667
Std. Dev.	5.256108	3.645151	0.347219	0.342323	0.355604	4.782129
Skewness	-0.846981	0.863194	4.892151	4.966368	4.589516	0.400588
Kurtosis	4.853656	3.088623	26.61452	27.16909	24.58142	3.639917
Jarque-Bera	11.29744	5.353985	1170.636	1223.357	985.4385	1.883716
Probability	0.003522	0.068770	0.000000	0.000000	0.000000	0.389903
Sum	131.4013	413.9609	6.550000	5.120000	25.16000	741.6628
Sum Sq. Dev.	1160.320	558.0592	5.063567	4.921763	5.311074	960.4877

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Observations	43	43	43	43	43	43
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Source: Researchers' computation using Eviews; GDP = Gross domestic product growth rate, PC = Credit to the private sector, FA = Financial access, FD = Financial depth, FE = Financial efficiency, INT = Interest rate.

The closeness of the mean and median as well as small values of the standard deviation of GDP, PC, FA, FD, FE and INT implies that the data were evenly spread around the average value. The skewness which is a measure of asymmetry of the distribution indicates that all the variables are positively skewed except gross domestic product growth rate. On the other hand, the kurtosis which is a measure of the peakedness or the flatness of the distribution indicates that PC and INT are medium-tailed because their kurtosis values are around 3; while GDP, FA, FD and FE with kurtosis values greater than 3 are fat-tailed. The p-value of the Jarque-Bera indicates that RGDP, PC and INT are normally distributed because their probability values are greater than 0.05. There are 43 observations for each variable of the model.

The correlation coefficients in Table 3 show the degree of association between the variables, confirming that there is no multicollinearity among the variables.

Table 3: Correlation matrix analysis

Correlation	GDP	PC	FA	FD	FE	INT
GDP	1.000000					
PC	0.249514	1.000000				
FA	0.023210	0.369814	1.000000			
FD	0.014285	0.326065	0.797823	1.000000		
FE	-0.077340	0.266214	0.673185	0.776586	1.000000	
INT	0.436054	-0.121221	-0.207003	-0.191466	-0.321979	1.000000

Source: Researchers' computation using E views

Table 3 shows that PC, FA, FD, and INT are positively correlated with GDP whereas FE is negatively correlated with GDP; and that none of the independent variables are correlated at above 0.79 indicating absence of multicollinearity.

The Augmented Dickey-Fuller (ADF) unit root test of stationarity of the variables is presented in Table

Table 4: ADF unit root test of stationarity

At Level			At First Difference		
Variables	ADF Statistics	5% Critical Value	ADF Statistics	5% Critical Value	Order of Integration
GDP	-3.246568	-2.935001	-10.69119	-2.935001	I(0)
PC	-2.048863	-2.935001	-6.001945	-2.938987	I(1)
FA	6.366702	-2.933158	-0.183516	-2.935001	I(0)
FD	6.393703	-2.933158	-0.176996	-2.935001	I(0)
FE	4.830919	-2.933158	-0.773232	-2.935001	I(0)
INT	-2.393112	-2.933158	-5.557979	-2.936942	I(1)

Source: Researchers' computation using Eviews

Table 4 indicates that four of the variables – gross domestic product growth rate (GDP), financial access (FA), financial depth (FD), and financial efficiency (FE) are stationary at levels as their ADF test statistics are greater than the critical values at 5 percent significant level while two of the variables, credit to the private sector (PC) and interest rate (INT) are stationary at first difference. This means that the variables have a mixture of I(0) and I(1) stationarity properties. Based on the mixture of I(0) and I(1) stationary properties of the variables, the ARDL estimation technique is therefore suitable for the data analysis of this study. The study tests for cointegration among the variables which is presented in Table 5.

Table 5: ARDL bounds test to cointegration result

Test statistic	Value	K
F-statistic	8.297302	5
Critical Value Bounds		
Significant	I0 Bound	I1 Bound
10%	2.08	3

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5%	2.39	3.38
2.5%	2.7	3.73
1%	3.06	4.15

Source: Researchers' computation using Eviews

Table 5 indicates that a long-run relation exists between the dependent and independent variables because the value of the F-statistic which is 8.297302 is greater than the 5% upper bound critical value of 3.49. The study therefore estimated both short-run and long-run results since cointegration is dictated.

The Akaike Information Criterion (AIC) was the model chosen lag selection criterion. The AIC as the model lag selection criterion ranges from 2.92 to 3.16 in absolute terms and the long-run result was based on the Akaike selection criterion, ARDL(1, 1, 0, 0, 0). The short run result is presented in Table 6.

Table 6: ARDL Short Run Result (Dependent Variable: GDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)*	-1.040764	0.165123	-6.302973	0.0000
PC(-1)	2.431421	1.052637	2.309839	0.0307
FA**	-0.202684	1.055515	-0.192024	0.8495
FD**	-0.528726	1.185104	-0.446143	0.6599
FE**	1.596192	2.006792	0.795395	0.4349
INT**	0.220583	0.069548	3.171661	0.0044
CointEq(-1)*	-1.040764	0.121051	-8.597756	0.0000
R ² = 0.727948; R ² = 0.718232; F-statistic(p-value) = 2.635611(0.038691); Durbin-Watson = 1.78				

Source: Researchers' computation using Eviews

The short result in Table 6 indicates that gross domestic product growth rate at lag 1 (GDP(-1)) made significant negative impact on gross domestic product growth rate in the following period as unit increase in GDP(-1) reduced GDP by about 1.0407 unit. Credit to the private sector (PC) and its lag 1 (PC(-1)) made positive impact on GDP as 1 unit increase in PC and PC(-1) generated about 0.4153 unit and 2.4314 unit increases in GDP with the latter being significant in the short run. However, financial access made negative and insignificant impact on GDP as a unit increase in FA reduced GDP by 0.2026 unit in the short run. Similarly, financial depth made negative and insignificant impact on GDP as a unit increase in FD reduced GDP by 0.5287 unit in the short run. Conversely, financial efficiency made positive and insignificant impact on gross domestic product growth rate as 1 unit increase in FE increased GDP by 1.5961 unit in the short run. Interest rate made positive and significant impact on GDP as 1% increase in INT generated about 0.2205 unit increase in GDP in the short run.

The result shows that the error correction term is significantly negative with the value of -1.040764 implying that the speed of adjustment of GDP towards long run equilibrium is about 100% per period. This implies that all the errors are corrected in each period. The R-squared (coefficient of determination) value of 0.727948 shows that about 72.79% of the variation in GDP is jointly explained by the independent variables of the model. The remaining 27.21% may be explained by the random variables, that is other explanatory variables of GDP not included in the model. The overall model is statistically significant as indicated by the F-statistic probabilistic value of 0.038691 which is less than 0.05. The Durbin-Watson statistic of 1.78 which is approximately 2 implies absence of autocorrelation in the model. The long-run estimates are presented in Table 7.

Table 7: ARDL Long Run Result (Dependent Variable: GDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
PC	2.336189	1.096302	2.130973	0.0445
FA	-0.194746	1.016225	-0.191636	0.8498
FD	-0.508017	1.152219	-0.440903	0.6636
FE	1.533674	2.009562	0.763188	0.4535
INT	0.211944	0.078706	2.692867	0.0133
C	-8.672423	4.446593	-1.950352	0.0640

Source: Researchers' computation using E views

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The ARDL long-run result in Table 7 shows that credit to the private sector (PC) made positive and significant impact on gross domestic product growth rate (GDP) as 1 unit increase in LNPC generated about 2.3361 unit increase in LNGDP in the long-run. Financial access made negative and insignificant impact on GDP as a unit increase in FA reduced GDP by 0.1947 unit in the long run. Financial depth made negative and insignificant impact on GDP as a unit increase in FD reduced GDP by 0.5080 unit in the long-run. Financial efficiency made positive and insignificant impact on GDP as a unit increase in FE increased GDP by 1.5336 unit in the long run. Interest rate made positive and significant impact on GDP as 1% increase in INT generated about 0.2119 unit increase in GDP in the long run.

The Toda-Yamamoto causality test in Table 8 was used to achieve objective two which is to investigate the direction of causality between financial sector development variables and economic growth in Nigeria.

Table 8: Toda-Yamamoto causality test

Null Hypothesis:	Chi-Square (χ^2)	Prob.	Decision
PC does not Granger Cause GDP	12.56920	0.0019	Reject
GDP does not Granger Cause PC	11.14600	0.0038	Reject
FA does not Granger Cause GDP	0.633671	0.7285	Accept
GDP does not Granger Cause FA	0.367703	0.8321	Accept
FD does not Granger Cause GDP	5.262106	0.0720	Accept
GDP does not Granger Cause FD	3.899169	0.1423	Accept
FE does not Granger Cause GDP	0.533514	0.7659	Accept
GDP does not Granger Cause FE	4.197322	0.1226	Accept
INT does not Granger Cause GDP	12.56920	0.0019	Reject
GDP does not Granger Cause INT	0.376647	0.8283	Accept

Source: Researchers' computation using Eviews

The Toda-Yamamoto causality test indicates a bidirectional causality between credit to the private sector (PC) and gross domestic product growth rate (GDP); and a unidirectional causality flowing from interest rate (INT) to gross domestic product growth rate GDP as the P-value of 0.0019 is less than 0.05. However, the causality test shows no causality between financial access (FA) and GDP, financial depth (FD) and GDP; and financial efficiency (FE) and GDP as their respective probability values are all greater than 0.05.

The study carried out diagnostic and stability tests to ensure the reliability of the model estimates for policy formulation. The results of the test are presented in Table 9.

Table 9: Diagnostic Tests

Normality Test:			
Jarque-Bera statistic	3.261691	Prob.	0.195764
Breusch-Godfrey Serial Correlation LM Test			
F-statistic	0.236955	Prob. F(2,20)	0.7912
Obs*R-squared	0.694411	Prob. Chi-Square(2)	0.7067
Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.235783	Prob. F(7,22)	0.3259
Obs*R-squared	8.466896	Prob. Chi-Square(7)	0.2932
Scaled explained SS	4.997235	Prob. Chi-Square(7)	0.6603
Multicollinearity Test			
Variable	Coefficient Variance	Uncentered VIF	Centered VIF
LNGDP(-1)	0.027266	2.715398	1.168056
LNPC	1.080259	188.9835	4.585818
LNPC(-1)	1.440654	244.8622	6.434568
LNFA	1.749190	287.4146	7.446657
LNFD	1.440654	244.8622	6.434568
LNFE	0.005027	56.17239	2.040385
INT	0.004837	55.32617	2.009648
C	17.23477	582.4362	NA

Source: Researchers' computation using Eviews

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The result in Table 9 reveal that the data is normally distributed, and there is absence of serial correlation, heteroskedasticity, and multicollinearity among the series. This can be seen from the insignificant p-values (above 0.05) of J-B, B-G and B-P-G tests for normality, serial correlation and heteroskedasticity respectively, and the centered VIF values that are less than 10 for multicollinearity test.

From the insignificant p-values of all the tests, the estimates are satisfactory and the model is well-specified

To check the stability of the long-run coefficient and the short-run movements for the ARDL Error correction model, the Cumulative Sum (CUSUM) and Cumulative Sum of squares are adopted. The model is said to be stable if the plots of the CUSUM statistics and Cumulative Sum of squares statistics lie within the critical bounds of 5 percent significant level as shown in figure 1.

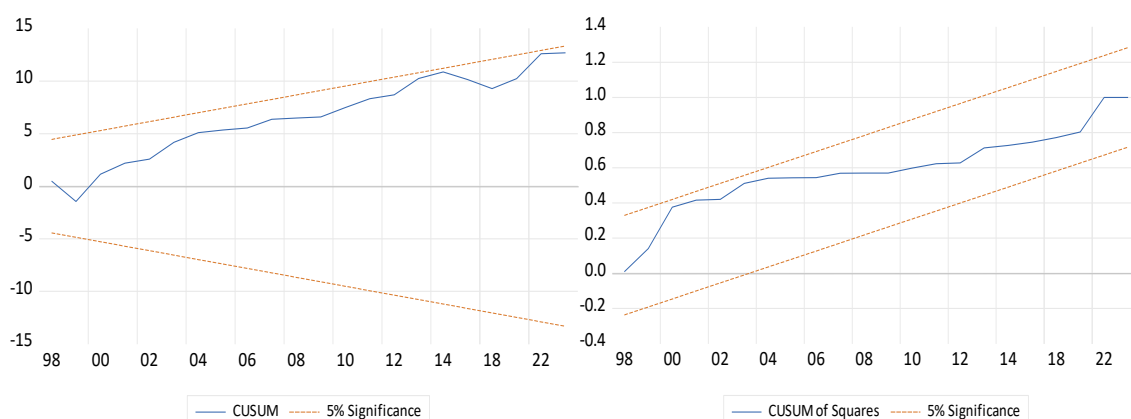


Figure 1: Cumulative sum and cumulative sum of squares of recursive residual test

Source: Researchers' computation using Eviews

DISCUSSION OF RESULTS

From the analysis, financial access, financial depth, financial efficiency had negative and insignificant impact on gross domestic product growth rate, but credit to private sector and interest rate had a positive and significant impact on Economic growth and this was in line with most studies such as of Bekele and Degu, (2021), Seri, Ismaila and Aminu, (2021), but Ahmed, Alhassan and Usman (2018) shows a positive and significant impact of financial sector development on economic growth of Nigeria, and also confirmed a positive and significant impact of credit to the private sector and interest rate has a positive and significant to LNGDP, but in this current study, financial access and financial depth remained insignificant and remained negative. Moreover, financial efficiency is positive, but did not have any significant effect on LNGDP and this was in line with the postulation by Jude, Haruna, Mohammed and Richard (2022) in their study where the degree of financial efficiency has a negative correlation although was significant. In Omiete and Titi, (2023) study, financial access and financial depth were insignificant in influencing LNGDP and also have an insignificant relationship to LNGDP. Moreover, Financial access, financial depth and financial efficiency harmed LNGDP in this study because there was low financial inclusion that helped in providing the platform for individuals and businesses to save, invest, and access funds for productive purposes. Credit access to private sector also supported economic growth by enabling investment in improving infrastructure, technology, and innovation in the health sector, and this would result in an efficient resource allocation and will also facilitate trade and commerce. Moreover, this depends on various factors such as the efficiency of investments, supportive policies, and the business environment, also, currency depreciation in the Nigerian economy could also result in a decline in the exchange rate reducing the value of the Nigerian Naira.

5. CONCLUSION, POLICY IMPLICATIONS AND RECOMMENDATIONS

The study investigated the impact of financial sector development on economic growth in Nigeria from 1981-2023 using time series data and autoregressive distributed lag model. Review of related literature was robust. The ADF unit root test result indicates that some variables are integrated of order zero, $I(0)$ and others at order one, $I(1)$. The ARDL cointegration test reveals existence of long-run relationship among the variables which necessitated estimation of both short-run and long-run results.

Based on the findings, this study concludes that financial sector development is significant determinant of economic growth in Nigeria. This implies that financial sector development has a great impact on economic growth in Nigeria in both positive and negative directions as indicated by the empirical findings. The following recommendations are made. Since credit to private sector made positive and significant impact on economic growth, it is recommended that the financial sector should encourage and increase credit to private sector, but it should be regulated in the long-run because it negatively affects the growth of the economy

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in the long-run. There should be a public sector-private sector partnership and a comprehensive financial sector policy aimed at increasing credit to private sector, financial access, financial depth, financial efficiency and financial intermediation in the Nigerian economy to promote economic growth. Further, financial regulatory bodies should use instruments such as interest rate and exchange rate to regulate the economy, to boost the growth of the Nigerian economy. The study was limited by data availability and limited time frame and finance. However, the researchers overcome these problems by collecting data from only verifiable sources, giving more time to work on the paper and sourcing funds to finance the research. Therefore, the findings of this study are plausible for forecasting and policy formulation.

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