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Introduction

The intricate relationship between banking credit dynamics and economic growth serves as a pivotal axis in understanding the trajectory of emerging economies. As the heartbeat of financial systems, bank credit pulsates through the economic veins, influencing and, in turn, being influenced by the broader economic landscape. In the context of Nigeria, a dynamic and rapidly evolving economy, an exploration of the multifaceted interplay between bank credit dynamics and output growth becomes both pertinent and timely.

Nigeria, as the largest economy in Africa, stands at the crossroads of economic transformation. With a diverse economic structure encompassing agriculture, manufacturing, services, and an oil-dependent sector, the nation navigates a complex path toward sustainable growth. In this context, the role of bank credit emerges as a critical factor shaping the contours of economic development. The dynamic nature of Nigeria's economy demands a nuanced examination of how the ebb and flow of credit within the banking sector resonates through the broader economic canvas.

Bank credit, as the aggregate sum extended by financial institutions to individuals, businesses, and the government, serves as the lifeblood of economic activities. Its efficient allocation is not merely a financial transaction but a catalyst for private investment and an engine for economic activity (Luca and Spatafora, 2012). In the Nigerian context, where economic diversification and sustainable development are imperative, understanding the nuances of how bank credit influences output growth becomes paramount.

Monetary authorities wield credit policies as potent tools in steering macroeconomic growth. Through strategic deployment, credit policies can channel investments into productive and value-added ventures, propelling real growth within the economy. However, this power is double-edged, as the mismanagement of credit can sow the seeds of financial instability (Gosh, 2010). Thus, the

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formulation and execution of credit policies demand a delicate balance to ensure sustainable economic development.

The determinants of credit growth unveil a complex interplay of domestic and foreign factors. Real variables, such as the rate of inflation and real GDP growth, exert a profound influence on credit dynamics. For instance, inflation has been identified as a significant driver of credit booms, accentuating the importance of understanding the real variables shaping credit growth (Bakker and Gulde, 2010). On the monetary front, the relationship between significant foreign capital receipts and credit booms in emerging economies underscores the interconnectedness of global and domestic financial systems (Mendoza and Terrones, 2012).

While credit expansion offers a pathway to economic growth, challenges persist, especially in ensuring equitable access. The dynamics of financial inclusion, or rather exclusion, reveal stark disparities. Despite governmental efforts to extend credit to Small and Medium Enterprises (SMEs), obstacles such as financial exclusion and limited credit access persist. A survey by Enhancing Financial Innovation and Access (EFInA) in 2016 indicated that 41.6% of adult Nigerians were financially excluded, with 55.1% being women. Although financial inclusion increased to 63.2% in 2018, challenges in credit expansion persisted, leading to 36.8% financial exclusion (CBN, 2022).

In light of these complexities, this journal article sets out with a broad objective — to meticulously examine the impact of bank credit dynamics on economic growth in Nigeria. Specifically, the study aims to investigate the intricate relationship between private sector credit and overall economic growth. The focal point is the Nigerian economy, a vibrant and evolving entity where the stakes for successful credit policies and their implementation are high.

The remainder of this article unfolds as follows: Part II delves into a comprehensive review of related literature, offering a synthesis of existing knowledge and identifying gaps that this study seeks to address. Part III outlines the meticulously designed research methodology, providing transparency in the process of data collection and analysis. Part IV presents the findings through data presentation, analysis, and a robust discussion, offering insights into the complex relationship between bank credit dynamics and output growth in Nigeria. Finally, Part V encapsulates the essence of the study through a concise summary, draws meaningful conclusions, and provides actionable recommendations for policymakers and stakeholders navigating the dynamic nexus between bank credit and economic growth in Nigeria.

In embarking on this exploration, the aim is to contribute not only to the academic discourse but also to offer pragmatic insights that can inform policy decisions and propel Nigeria towards a trajectory of sustainable and inclusive economic growth.

II. Literature Review

Economic growth is conceptually defined as the sustained increase in national income or the total output of goods and services in an economy over time. It involves the expansion of an economy's capacity to produce goods and services through technological advancements and accompanying institutional and attitudinal adjustments. Todaro and Smith (2006) describe economic growth as a

continuous process that enhances the productive capacity of an economy, leading to rising levels of national output and income. In this study, economic growth is measured by the growth rate of real gross domestic product.

Credit expansion, on the other hand, involves extending microcredit and loans to entrepreneurs in need of financial resources for their businesses. It is a component of corporate finance, providing the basis for increased production efficiency and specialization. Schumpeter (1973) emphasizes the role of credit in financing innovation, a crucial driver of economic growth. The study captures credit expansion through indicators such as credit to the private sector, commercial bank loans to SMEs, bank branch deposits, SMEs output, and interest rates on bank loans.

II.1 Theoretical Literature

This paper explores various theories related to the finance-growth nexus to anchor the study on the relationship between credit expansion and economic growth. Three key theories are reviewed: the Quantitative Easing theory, Financial Liberalization thesis, and the Supply–leading hypothesis.

Proposed by Werner (1995), the Quantitative Easing theory explains banking system credit, emphasizing true quantitative easing as an expansion in credit creation. Werner's quantity theory of credit aligns with Schumpeter's credit of money, highlighting the crucial role of the banking sector in macroeconomic models.

Introduced by McKinnon and Shaw (1973), the Financial Liberalization thesis asserts that a well-developed financial sector is a prerequisite for economic growth. It argues that financial repression, characterized by government intervention and distortions in interest rates, leads to a loss of efficiency and impedes savings mobilization and economic development.

Proposed by Patrick (1966), Supply–Leading Hypothesis posits that the financial sector precedes and induces real growth by efficiently channeling resources from surplus to deficit units. This theory suggests that well-developed financial systems contribute to economic growth by efficiently allocating resources, fostering entrepreneurship, and supporting positive economic development.

Robinson (1952), the Demand–Following Hypothesis, asserts that the development of the real sector accelerates financial development. According to this theory, as the real sector grows, the demand for financial services increases, stimulating financial development.

Endogenous growth theory Romer (1990) and Lucas (1988), posit that economic growth is primarily driven by factors inherent to the economy itself, rather than being solely influenced by external forces. This theoretical framework suggests that sustained and long-term economic expansion is a result of internal factors such as innovation, knowledge accumulation, and the development of human capital.

At its core, endogenous growth theory emphasizes the role of internal dynamics and self-reinforcing mechanisms within an economy. Unlike earlier economic theories that focused on the diminishing returns of capital accumulation, endogenous growth theory asserts that certain inputs, such as investments in education, research and development, and technological advancements, can contribute to perpetual economic growth.

Endogenous growth theory emphasizes key pillars for sustained economic growth: human capital development through education and skill investment, innovation driving technological progress, knowledge accumulation fostering efficiency, positive feedback loops amplifying investments, and the acknowledgment of positive externalities. This framework guides policies, prioritizing internal factors like human capital and innovation for sustainable economic development.

Critics of financial liberalization argue that increased interest rates draw resources from informal markets, reducing the quantity of finance available to firms. The Supply–Leading theory faces criticism for potentially neglecting viable projects in urban centers in favor of rural areas. Meanwhile, the Demand–Following Hypothesis suggests that financial institutions should be established where demand is high, potentially neglecting rural areas with untapped potential.

These theories provide diverse perspectives on the finance-growth nexus. While the Supply–Leading theory emphasizes the proactive role of financial institutions in driving economic growth, the Demand–Following theory underscores the importance of responding to existing demand. The controversies and criticisms surrounding these theories highlight the complexity of the relationship between credit expansion and economic growth, particularly in the context of developing economies like Nigeria.

This study aims to contribute to this discourse, providing insights into how credit expansion influences economic growth in the Nigerian context. The choice of theories for review sets the theoretical framework for the investigation, emphasizing the need for a nuanced understanding of the dynamics between credit expansion and economic development.

II.2 Empirical Literature

Empirical evidence on the impact of credit on economic growth remains inconclusive and subject to debate. A study involving seven Asian developing countries found no general consensus on the finance-growth relationship. Another study in Nigeria revealed a positive impact of private sector credit on economic growth but identified lending interest rates as an impediment. Other studies explored factors influencing credit growth, with mixed findings on the relationship between bank credit and economic growth.

In the Asian context, Mukhopadhyay and Pradhan's (2010) examination of seven developing countries yielded a crucial insight: no overarching consensus prevails regarding the link between financial development and economic growth. This finding underscores the complexity of the relationship within the diverse economic landscapes of these nations. Shifting focus to Nigeria, Akpansung and Babalola's (2011) study highlighted a positive association between private sector credit and economic growth. However, a counterproductive factor emerged—lending interest rates were identified as a hindrance to growth. This dual dynamic emphasizes the nuanced interplay of factors influencing the impact of credit on economic development in specific regional and national contexts.

Hassan, Sanchez and Yu's (2011) contention introduces a cautionary note on rapid bank credit expansion, asserting its adverse impact on economic growth. Their argument revolves around the notion that such accelerated credit growth may act as a deterrent to domestic savings and

investments, thus potentially impeding overall economic development. Shifting the focus to the study by Guo and Stepanyan (2011), the exploration of credit growth factors in emerging markets provides a nuanced perspective. In contrast to the apprehensions raised by Sanchez and Yu, Guo and Stepanyan identify positive contributors to credit expansion, emphasizing the roles of domestic deposits and non-residents' liabilities. This divergence underscores the multifaceted nature of credit dynamics and their differential effects on economic landscapes.

In Nuno's (2012) investigation within the European Union, the application of dynamic panel data techniques unveiled intricate relationships between bank credits and economic growth. Notably, the findings highlighted a dual influence: while savings emerged as promoters of growth, inflation and bank credits exhibited a negative impact on economic development. This nuanced analysis emphasizes the multifactorial nature of credit's role in shaping economic outcomes within the complex dynamics of the European Union.

In a related context, Note and Suljoti's (2012) examination of Central and Eastern European countries post-crisis revealed crucial determinants of credit growth. Notably, interest rates surfaced as a pivotal factor, exerting a negative influence on lending dynamics. This insight contributes to the understanding of how post-crisis economic environments in specific regions are shaped by interest rate dynamics and their consequential impact on credit expansion.

Murty, Sailaya, and Demissie's (2012) examination in Ethiopia employed a robust multivariate Johansen co-integration approach, unveiling a substantial long-run relationship between bank credits and economic growth. This finding underscores the integral role of credit in shaping Ethiopia's economic trajectory, highlighting its significance as a driver of sustained growth.

In a parallel exploration in Nigeria, Aliero, Abdullahi, and Adamu (2013) delved into the impact of private sector credit on economic growth. Their study affirmed a positive correlation, indicating that private sector credit plays a constructive role in fostering economic expansion in Nigeria. These insights contribute to the understanding of the nuanced relationship between credit dynamics and economic development in diverse African contexts.

In their exploration of the Nigerian economic landscape, Modebe, Ugwuegbe, and Ugwuoke (2014) conducted a thorough investigation into the impact of bank credit. Their findings uncovered a notable long-run relationship, revealing a negative correlation between the country's GDP and total bank credit to the private sector. This suggests a complex interplay between credit dynamics and economic performance, with potential implications for long-term growth trajectories.

Contrastingly, Marshall, Igbanibo, and Onuegbu's (2015) study offered a different perspective, revealing a robust and positive correlation between bank credit and GDP in Nigeria. This positive association underscores the potential role of credit as a catalyst for economic expansion, emphasizing the intricate dynamics at play in Nigeria's financial and economic spheres.

Garcia-Escribano and Han (2015) explored the contribution of credit growth and credit portfolio composition to economic growth in emerging market economies. They found a significant impact of credit growth on real GDP growth, with the type of credit influencing specific economic activities.

Ganiyu et al.'s (2017) empirical investigation of the Nigerian economy yielded a significant finding — that credit serves as a growth-enhancing factor, demonstrating its resilience even under challenging conditions. This insight underscores the crucial role of credit in stimulating economic development, providing a counterpoint to concerns about adverse economic conditions. In a related exploration, Akani and Onyema (2017) delved into the determinants of credit growth in Nigeria. Their study identified macroeconomic variables with substantial impacts, shedding light on the multifaceted factors influencing the dynamics of credit expansion. This nuanced understanding contributes valuable insights to policymakers and researchers seeking to navigate the complexities of credit-related phenomena in the Nigerian economic context.

Idachaba, Olukotun, and Elam's (2019) meticulous study intricately explored the interplay between bank credits and the Nigerian economy. Within this nuanced landscape, their findings uncovered a positive influence when credit was directed to the private sector. In contrast, a complex scenario unfolded as negative effects manifested in relation to credit extended to the public sector and the prime lending rate. This suggests that the impact of credit extends beyond mere availability, emphasizing the critical significance of strategic and targeted allocations. The study underscores the need for a nuanced understanding of credit dynamics, recognizing the diverse implications of its distribution across different sectors of the economy.

In their subsequent exploration, Ozili, Oladipo, and Iorember (2023) delved into the ramifications of abnormal increases in credit supply on Nigeria's economic growth. Their comprehensive investigation unveiled not only a substantial but also a statistically significant impact of such credit expansions. This revelation contributes essential insights into the intricate dynamics of credit's influence on economic trajectories in Nigeria. By specifically examining abnormal increases, the study sheds light on the potential consequences of heightened credit supply, emphasizing the need for a nuanced understanding of credit dynamics and their role in shaping the economic landscape, thereby providing valuable considerations for policymakers and researchers alike.

In summary, the literature on the relationship between credit expansion and economic growth offers diverse findings, reflecting variations in methodology, geographic focus, and temporal scope. This diversity contributes to the absence of a conclusive consensus on the complex interplay between credit dynamics and economic development. Moreover, many studies precede pivotal global events, such as the financial crisis and the COVID-19 pandemic, underscoring the need for additional research to address these gaps. This evolving understanding of the finance-growth nexus remains crucial for policymakers, economists, and scholars seeking a comprehensive grasp of the multifaceted factors influencing economic trajectories in different contexts.

III. Methodology

This study employs an ex-post facto research design to investigate cause-and-effect relationships between dependent and independent variables by observing existing conditions and retrospectively searching for plausible causal factors. The research utilizes both descriptive and econometric tools for analysis. Descriptive tools, including measures like maximum and minimum values, standard deviations, skewness, and kurtosis, assess the descriptive performance of variables. Econometric techniques, specifically multiple regression modeling, are employed to estimate relevant

equations. This dual-method approach aims to comprehensively address the study's main objective by combining insights from both descriptive and statistical analyses.

III.1 Model specification

From the theoretical postulate, the empirical model for the relationship between credit expansion and economic growth in its functional form is specified and expressed as:

$RGDP = f(CPS, DRBB, EXR, INTR, GDI, INF)$ 3.1

The econometric model of equation 3.1 in a semi-log form can be expressed as follows.

$RGDP = \alpha_0 + \alpha_1 CPS + \alpha_2 LOG(DRBB) + \alpha_3 EXR + \alpha_4 INTR + \alpha_5 GDI + \alpha_6 INF + U_1$ 3.2

Where: α_0 to α_6 are the parameters to be estimated and U_1 is the error term. The theoretical expectations about the signs of the parameters are as follows: $\alpha_1>0$, $\alpha_2>0$, $\alpha_3>0$, $\alpha_4<0$, $\alpha_5>0$, $\alpha_6<0$. Where: RGDP = Real gross domestic product; CPS = Credit to private sector; DRBB =deposit of rural branches of commercial banks; EXR = exchange rate; INF = Inflation rate, INTR = Interest rate and GDI = gross domestic investment, proxied by gross fixed capital formation in Nigeria.

This study involves the description and measurement of several key variables: Real Gross Domestic Product Growth (RGDPR): This metric gauge a country's economic growth by reflecting the value of goods and services produced in a year, adjusted for inflation; Credit to Private Sector (CPS): It represents financial resources provided to the private sector by financial corporations, including loans and securities purchases, expected to exhibit a positive relationship with the dependent variable; Exchange Rate (EXR): The price of a nation's currency in terms of another, expected to have a negative relationship with the dependent variable; Deposits of Rural Branches of Commercial Banks (DRBB): Represents funds mobilized at rural branches, expected to have a positive relationship; Interest Rate: Lending interest rate, representing the cost of capital, expected to have a negative relationship; Inflation Rate: A measure of overall price increase, expected to have a relationship with the dependent variable depending on observed rates.

III.2 Data and Estimation Procedure

This study relies on secondary sources as its primary data outlets. Data spanning from 1980 to 2022 were gathered annually from the Central Bank of Nigeria Statistical Bulletin, Central Bank of Nigeria Annual Reports and Statements of Accounts (various years), and World Development Indicators publications. The data estimation procedures involve conducting unit root and cointegration tests to examine the time series properties of the variables in the finance-growth model. The Augmented Dickey–Fuller (ADF) test, following the specifications by Dickey and Fuller (1979), will be employed to assess the stationarity of the macroeconomic variables included in the model. This test is essential for understanding the behavior of the variables over time and establishing the necessary conditions for further econometric analyses.

$$\Delta y_t = \alpha_0 + \alpha_1 \Delta y_{t-1} + \sum_{j=1}^{j} \beta_i \Delta y_{t-1} + \varepsilon_t \ldots .1$$

Where:

$\Delta Y_t = Y_t - Y_{t-1}$ is the difference of series Y_t; $\Delta Y_{t-1} = Y_{t-i} - Y_{t-2}$ is the first difference of Y_{t-1}; e_t = Stochastic error term, and α_0, α_1 and β_i are the parameters to be estimated.

If $\alpha_1 = 0$, the null hypothesis of non – stationary is accepted. But if $\alpha_1<0$ and statistically significant, the null hypothesis of non-stationarity is rejected.

The cointegration test is conducted to ascertain the presence of a long-run relationship among the variables. Cointegration suggests an equilibrium long-run relationship among integrated time-series variables of the same order, while a lack of cointegration indicates no such relationship. Various cointegration tests, such as the Johansen multivariate test for first-order integrated variables or the ARDL bounds test for mixed-order integration, may be employed. The final step involves specifying and estimating an error correction model (ECM) to capture both short-term and long-term dynamics around the stationary equilibrium. The ECM examines adjustments, with a negative and statistically significant coefficient of the residual indicating the direction and speed of achieving long-run equilibrium.

$$\Delta lnRGDP_{t} = \alpha_0 + \sum_{i=1}^{j} \alpha_{1i}\, \Delta lnRGDP_{t-1} + \sum_{i=1}^{j} \alpha_{2i}\, \Delta lnCPS_{t-I} + \sum_{i=1}^{j} \alpha_{3i}\, \Delta CMLSME_{t-I} + \sum_{i=1}^{j} \alpha_{4i}\, \Delta lnSMEQ/CPS_{t-i} + \sum_{i=1}^{j} \alpha_{5}\, \Delta lnDRBB_{t-i} + \sum_{i=1}^{j} \alpha_{6i}\, \Delta lnEXR_{t-i} + \sum_{i=1}^{j} \alpha_{7i}\, \Delta lnINTR_{t-i} + \sum_{i=1}^{j} \alpha_{8i}\, \Delta GDI_{t-i} + \sum_{i=1}^{j} \beta_{9i}\, \Delta INF_{t-i} \varphi ECM_{t-i} + U_{1t} \quad ..2$$

Where: U_t is the white noise error term; ECM is the error correction variable, and φ is the coefficient of the error correction variable, representing the speed of adjustment.

III.3 Diagnostic Test

The Normality Test assesses whether the residuals or error term, representing stochastic error, adhere to a normal distribution. The Jarque–Bera (JB) test is chosen for this study, an asymptotic or large sample test utilizing Ordinary Least Squares (OLS) residuals. A visual examination of the residual series plot can complement the test, with a bell-shaped appearance indicative of normal distribution. If the calculated Jarque Bera value is below its critical value or the p-value is less than 0.05, the error term is deemed normally distributed; otherwise, it is not.

JB statistic is given by $n(\frac{S^2}{6} + \frac{(K-3)^2}{24})$

Where:

S= Skewness which approaches zero (0) is the third moment.

K= Kurtosis which approaches three (3) is the fourth moment.

n= Sample size (Number of observations)

The mean of the residual (μ_t) = E(μ_t) is the first moment while the variance is the second moment.

The Multicollinearity Test evaluates whether there is collinearity among independent variables, indicating if they exhibit exact or inexact linear relationships. Multicollinearity can render

variables insignificant by increasing standard errors. A correlation matrix is analyzed, and if the pairwise correlation coefficient between any two regressors exceeds 0.8, multicollinearity is deemed problematic.

The Autocorrelation Test aims to identify serial correlation in errors between different observations. The Breusch-Pagan LM test is initially used, and if detected, the Newey-West HAC correction is employed to address the issue.

The Test for Heteroscedasticity assesses if the error term in the regression model has a constant variance, crucial for the efficiency of Ordinary Least Squares (OLS). The white heteroskedasticity test is employed, and if heteroscedasticity exists, the Newey-West HAC correction is applied.

The Specification Test ensures the model is not mis specified. The Ramsey RESET test is adopted to detect general misspecifications, providing assurance against specification bias. The null hypothesis is that the model is mis specified, and rejection is based on the F-statistic. If F_calculated > F_tabular at the 5% level of significance, the null hypothesis is rejected, suggesting model correctness.

These tests collectively ensure the robustness and reliability of the estimated model, addressing issues like multicollinearity, autocorrelation, heteroscedasticity, and misspecification, enhancing the credibility of the study's findings.

IV.0 **ANALYSIS AND DISCUSSION OF FINDINGS**

The descriptive statistics presented in Table 1.1a reveal a sluggish growth potential for Nigeria during the study period. Real Gross Domestic Product (RGDP) indicates low mean, median, and maximum values of 3.07%, 3.65%, and 15.33%, respectively. Similarly, the ratio of commercial banks' credits to the private sector (CPS) to GDP reflects low values with a mean, median, and maximum of 9.41%, 8.22%, and 19.60%, respectively. Deposits of rural branches of commercial banks (DRBB) show limited potential to drive the finance-growth nexus, evidenced by their mean, median, and maximum values.

Skewness results indicate positive skewness for all variables, except RGDP, suggesting a long right tail. Kurtosis results reveal leptokurtic distributions for RGDP, CPS, DRBB, lending interest rate (INTR), exchange rate (EXR), gross domestic investment (GDI), and inflation rate (INF), as their values exceed three (3). The Jarque-Bera test confirms normal distribution for all variables except interest rate.

The correlation matrix (Table 1.1b) identifies moderately high pairwise correlations. To mitigate multicollinearity issues that could compromise results' reliability, highly correlated variables are excluded from the equation. The standard deviation values reflect the variation of variables from their true values over the review period. These descriptive statistics provide a comprehensive overview of the study's variables, informing subsequent analyses and ensuring the robustness of the findings.

TABLE 1.1A

DESCRIPTIVE STATISTICS

	RGDP	CPS	DRBB	EXR	INTR	GDI	INFLA
Mean	3.073721	9.418140	64.45814	115.6640	17.11721	36.65023	18.73884
Median	3.650000	8.220000	8.810000	113.4500	16.90000	34.05000	12.88000
Maximum	15.33000	19.60000	653.2100	426.0100	31.65000	89.39000	72.84000
Minimum	-13.13000	4.950000	0.020000	0.520000	8.430000	14.17000	5.390000
Std. Dev.	5.258750	3.487744	140.8945	122.4233	4.948318	19.54249	16.31557
Skewness	-0.855289	0.973168	2.668144	1.042473	0.308975	1.011380	1.914267
Kurtosis	4.855513	3.642762	9.624743	3.201712	3.450206	3.558040	5.589380
Jarque-Bera	11.41114	7.527447	129.6507	7.861273	1.047314	7.888655	38.27460
Probability	0.003327	0.023197	0.000000	0.019631	0.592350	0.019364	0.000000
Sum	132.1700	404.9800	2771.700	4973.550	736.0400	1575.960	805.7700
Sum Sq. Dev.	1161.487	510.9031	833752.7	629474.0	1028.406	16040.18	11180.30
Observations	43	43	43	43	43	43	43

TABLE 1.1B

CORRELATION MATRIX

	RGDP	CPS	DRBB	EXR	INTR	GDI	INFLA
RGDP	1.000000	0.268882	-0.068136	0.130695	0.413390	-0.579728	-0.209425
CPS	0.268882	1.000000	0.281902	0.615439	-0.103543	-0.605582	-0.316380
DRBB	-0.068136	0.281902	1.000000	0.824934	-0.215898	-0.194712	-0.088567
EXR	0.130695	0.615439	0.824934	1.000000	-0.100291	-0.606627	-0.271605
INTR	0.413390	-0.103543	-0.215898	-0.100291	1.000000	-0.364638	0.377043
GDI	-0.579728	-0.605582	-0.194712	-0.606627	-0.364638	1.000000	0.169423
INFLA	-0.209425	-0.316380	-0.088567	-0.271605	0.377043	0.169423	1.000000

The selection of lag length is crucial for the efficiency and validity of an error correction model. This study utilized VAR lag order selection criteria, specifically the Akaike Information Criterion (AIC) and Schwarz Criterion (SC). Table 1.2 reveals that the optimal lag length for the model, based on these criteria, is three. This choice aims to minimize underestimation while maximizing the likelihood of capturing the true lag structure, ensuring robustness in the model's representation of the data.

Table 1.2
Optimal lag selection criteria for the model

Endogenous variables: RGDP CPS DRBB EXR INTR GDI INFLA

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1083.967	NA	1.16e+15	54.54835	54.84391	54.65521
1	-891.9763	307.1852*	9.43e+11*	47.39881	49.76324*	48.25372*
2	-847.9849	54.98916	1.53e+12	47.64925	52.08256	49.25219
3	-779.8184	61.34991	1.16e+12	46.69092*	53.19310	49.04190

* 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

The Augmented Dickey Fuller unit root test was employed to assess the stationarity of variables, as presented in Table 1.3. Variables DRBB, GDI, and INF exhibited stationarity at levels (I (0)), indicating no need for differencing. Conversely, other variables achieved stationarity after first differencing (I (1)). The coexistence of I (0) and I (1) variables necessitates a cointegration test to ascertain equilibrium relationships. The study opts for the ARDL bound testing technique, suitable for variables with different integration orders (i.e., order zero and order one).

Table 1.3
ADF unit root test results

Variables	**Level**	**1st Difference**	**Order of integration**
RGDP	*-2.855446*	*-12.09148***	*I(1)*
CPS	*-2.300737*	*-5.711413***	*I(1)*
DRBB	*-5.376177***	-	*I(0)*
EXR	*2.016800*	*-5.099214***	*I(1)*
INTR	*-2.310529*	*-5.512936***	*I(1)*
GDI	*-3.753188***	-	*I(0)*
INF	*-3.135036***	-	*I(0)*

Source: Researcher's computation (2023), using E-Views 9.
Note: Mackinnon critical values for ADF at 1, 5 and 10% levels are -3.60, -2.93 and -2.60 respectively. ** means significant at 5% level.

The co-integration test results in Table 1.4 indicate the presence of a long-run relationship among the variables in the estimated equation. The F-statistic value of 13.36 surpasses the critical values at the five percent level in both the upper (3.39) and lower (2.22) bounds. Consequently, the null hypothesis of no co-integration is rejected, allowing for the estimation of the long-run coefficients.

TABLE 1.4
Co-integration test results

			5% critical value		
Equation	**K**	**F-Stat**	**I(0)**	**I (1)**	**Outcome**
RGDP (CPS, DRBB, INTR, EXR, GDI, INF)	*6*	*5.14*	*2.45*	*3.61*	*Co-integration*

Note: K =number of parameters

Source: Researcher's computation (2023), using E-Views 9.

Table 1.5 presents Granger causality test results, revealing a unidirectional relationship from Exchange rate (EXR) and Interest rate to real GDP, with causality extending to gross domestic investment. Additionally, a bidirectional relationship is identified between Gross Domestic Investment (GDI) and real gross domestic product (RGDP).

TABLE 1.5
Pair wise Granger causality test results

RGDP = f(CPS, DRBB, INTR, GDI, INFLA)

Null Hypothesis:	Obs	F-Statistic	Prob.
CPS does not Granger Cause RGDP	42	0.00808	0.9288
RGDP does not Granger Cause CPS		0.23834	0.6281
DRBB does not Granger Cause RGDP	42	0.04422	0.8345
RGDP does not Granger Cause DRBB		0.00839	0.9275
EXR does not Granger Cause RGDP	42	0.58021	0.4508
RGDP does not Granger Cause EXR		0.08338	0.7743
INTR does not Granger Cause RGDP	42	1.82873	0.1841
RGDP does not Granger Cause INTR		0.14332	0.7071
GDI does not Granger Cause RGDP	42	6.94887	0.0120
RGDP does not Granger Cause GDI		2.73545	0.1062
INFLA does not Granger Cause RGDP	42	0.29670	0.5891
RGDP does not Granger Cause INFLA		0.02022	0.8877

Source: Researcher's computation (2023), using E-Views 9.

IV.2 **Presentation and Analysis of Results**

The long-run equation of the credit expansion-growth nexus, as shown in Table 4.6a, unveils several key relationships in the Nigerian context. Notably, a positive and statistically significant association exists between credit to the private sector (CPS) to GDP ratio and real gross domestic product (RGDP). The coefficient of 1.06 implies that a 1 percent increase in credit to the private sector results in a 1.06 percent rise in real GDP, substantiating financial deepening's positive impact on the real sector. However, the deposits of rural branches of commercial banks (DRBB) exhibit a positive but statistically insignificant relationship with real GDP in the long run. Interest rate (INTR) showcases a negative and significant relationship with economic growth, indicating its sensitivity to growth through investment channels. In contrast, the exchange rate (EXR) and real GDP exhibit a negative but statistically insignificant relationship. The relationship between gross domestic investment (GDI) and economic growth is negative and statistically significant, contradicting expectations and suggesting potential misreporting or diversion of investments.

The short-run dynamics, presented in Table 1.6b, reinforce some long-run trends. Credit to the private sector demonstrates a positive relationship with economic growth in the short run, particularly at the second lag period, with statistical significance. In contrast, the deposit of rural branches of commercial banks (DRBB) exhibits statistical significance only in the second lag period, indicating a negative short-run impact on economic growth. Interest rate (INTR) displays a positive relationship with economic growth in the short run, two periods afterward, with statistical significance. Exchange rate (EXR) and real GDP are negatively related in the short run, with statistical significance. Gross domestic investment (GDI) and economic growth maintain their negative relationship in the short run, aligning with the long-run findings and suggesting possible divestment or misallocation of funds. The inflation rate (INFLA) shows a negative and significant relationship with economic growth in the short run.

The error correction mechanism (ECM) aligns with theoretical expectations, indicating a 91.1 percent adjustment to long-run equilibrium within the year. The ECM's statistical significance at the 5 percent level reinforces its importance in capturing short-run adjustments. The R-squared value of 0.706762 and R-squared adjusted of 0.655415 indicate a good fit for the model, explaining approximately 66 percent of the variation in real gross domestic product (RGDP). The F-statistic of about 12.81 underscores the model's overall statistical significance, suggesting its utility for economic forecasting and policy simulations. The Durbin-Watson (D-W) statistic of 2.28 signals no autocorrelation, enhancing the model's reliability.

Furthermore, stability tests using cumulative sum (CUSUM) and cumulative sum of squares support the model's stability over the study period. The swings within the ± five percent significance level bounds indicate consistency and reliability, reinforcing the model's suitability for economic policies and forecasts.

In summary, the study's findings contribute valuable insights into the credit expansion-growth nexus in Nigeria. While long-run relationships between certain variables align with theoretical expectations, short-run dynamics unveil nuances in the timing and significance of these relationships. The model's stability and consistency, as indicated by various statistical tests, further enhance its applicability for economic policymaking and forecasting in the Nigerian context.

TABLE 1.6a

Long run coefficients of the equation

Dependent variable: RGDP

Variable	Coefficient	Std. Error	t-Statistic	Prob.
CPS	1.064934	0.483579	2.202192	0.0390
DRBB	0.042429	0.020615	2.058187	0.0522
EXR	-0.005987	0.026713	-0.224124	0.8248
INTR	-0.149026	0.222144	-0.670853	0.5096
GDI	-0.388975	0.118182	-3.291322	0.0035
INFLA	-0.064176	0.051230	-1.252698	0.2241
C	31.386991	9.923757	3.162813	0.0047

TABLE 1.6b

Short run coefficients of the equation

Dependent variable: D(RGDP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(CPS)	-0.757192	0.407249	-1.859285	0.0771
D(CPS(-1))	0.173584	0.521377	0.332933	0.7425
D(CPS(-2))	0.638852	0.302062	2.114967	0.0466
D(DRBB)	-0.038982	0.021065	-1.850551	0.0784
D(DRBB(-1))	0.029148	0.033605	0.867357	0.3955
D(DRBB(-2))	-0.066489	0.027592	-2.409739	0.0252
D(EXR)	-0.074146	0.025554	-2.901481	0.0085
D(INTR)	0.539888	0.199533	2.705761	0.0132
D(INTR(-1))	-0.373186	0.243160	-1.534731	0.1398
D(INTR(-2))	0.589471	0.216784	2.719157	0.0129

D(GDI)	-0.354391	0.110265	-3.213995	0.0042
D(INFLA)	-0.127570	0.043197	-2.953193	0.0076
CointEq(-1)	-0.911089	0.139303	-6.540347	0.0001

R-squared	0.799232		
Adjusted squared	0.658771		
F-statistic	12.49201	Durbin-Watson stat	2.126701

Source: Researcher's computation (2023), using E-Views 9.

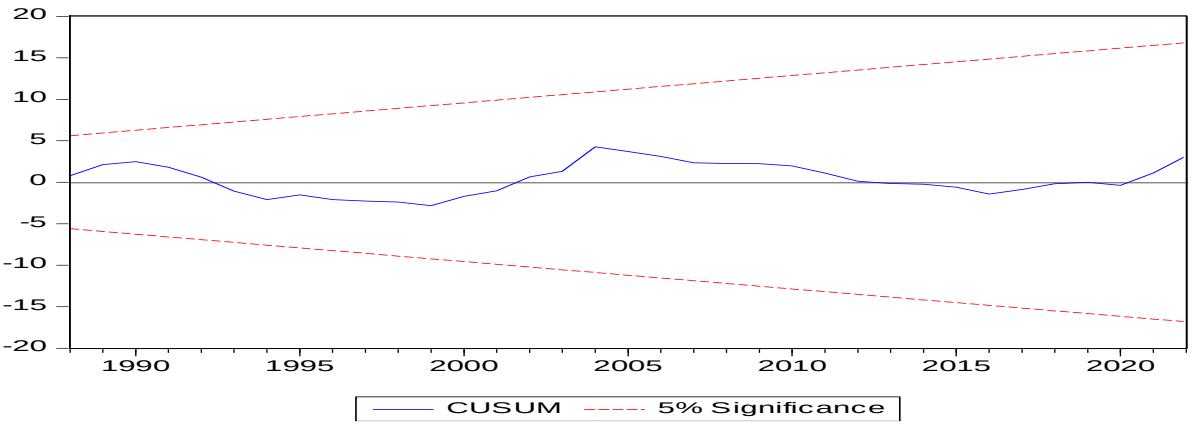

Fig. 1a: CUSUM graph for model stability

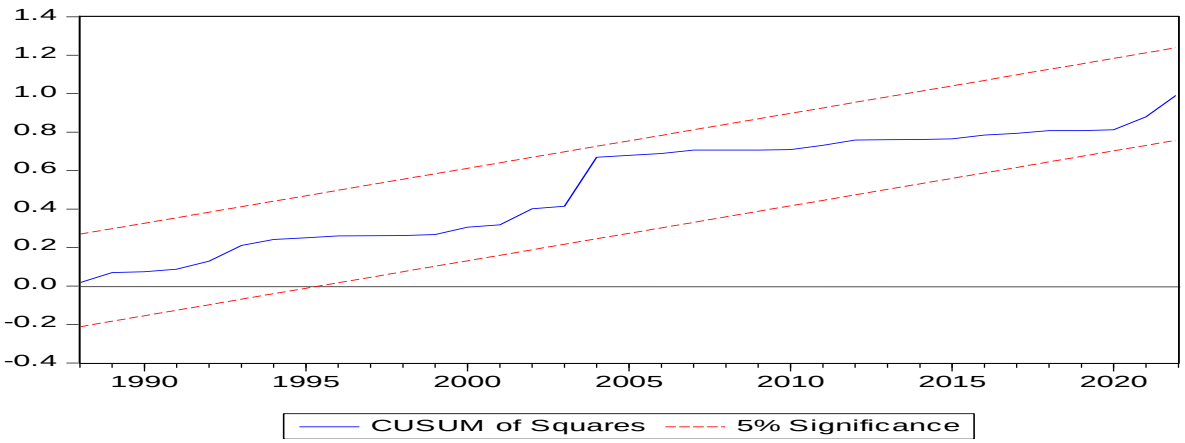

Fig. 1b: CUSUM of Square graph for model stability

The post-estimation tests conducted on the model affirm its robustness and suitability for policymaking. The diagnostic checks indicate a well-fitting model, with the dependent variables explaining over 66 percent of the variance, leaving about 34 percent represented by error terms. The model successfully passes the Breusch-Godfrey test for serial correlation, the Jarque-Bera test for normality, and the heteroscedasticity tests, affirming its reliability for informing economic policies.

Table 4.14

Residual Diagnostic Tests

	t-value	Prob.
Jarque-Bera normality test	27.4430	0.0002
Heteroskedasticity test	0.87784	0.3516
Correlogram Q-Residual	6.1681	0.8769
Breusch-Godfrey LM test	4.76644	0.0872

Source: Researcher's computation (2023), using E-Views 9.

IV.3 Discussion of Findings

The bound test results provide compelling evidence of a long-run relationship among the variables in the estimated equation, underscoring their relevance in fostering economic growth in Nigeria. The rejection of the null hypothesis of no co-integration emphasizes the significance of these variables in shaping the economic landscape.

Employing the error correction mechanism (ECM), the finance-growth equation demonstrates positive and statistically significant relationships in both the short and long run. These findings align with Ganiyu et al. (2017), asserting that credit plays a crucial role in enhancing economic

growth. Additionally, the results corroborate the insights of Idachaba, Olukotun, and Elam (2019), who argue for the positive impact of credit to the private sector on the Nigerian economy while highlighting the negative effects of credit to the public sector and prime lending rates.

The error correction coefficients in the estimated model meet the criteria for acceptability—negative, fractional, and statistically significant. This confirmation supports the presence of a long-run relationship among the model's variables, indicating a moderately high speed of adjustment. The adjusted R-squared values reflect a good fit, signifying that the independent variables possess substantial explanatory power. The Durbin-Watson Statistic suggests an absence of autocorrelation in the equation, supporting the null hypothesis of no serial correlation. This implies that the error terms from different periods are not serially correlated.

Furthermore, stability tests, conducted through cumulative sum tests, affirm the stability of the variables within the study period. The observed trends within the specified bounds indicate that the variables remain consistent, reinforcing the model's suitability for economic policy formulation and forecasting.

In conclusion, the comprehensive analysis, encompassing co-integration, error correction, and stability tests, substantiates the robustness of the finance-growth equation. These results contribute valuable insights into the dynamics of credit's influence on economic growth in Nigeria, offering a foundation for informed policymaking and strategic interventions in the financial sector.

V.0 **Summary, Conclusions and Recommendations**

This study delved into the empirical relationship between credit expansion and economic growth in Nigeria, employing a comprehensive approach to achieve its objectives. Initially, a descriptive analysis of various variables was conducted, elucidating their nature and establishing correlations. Stationarity tests using the augmented Dickey-Fuller unit root test indicated that the variables were stationary both at levels and after first differencing.

Extensive reviews of empirical and theoretical works, both in Nigeria and abroad, provided the backdrop for the study. Given that the variables were co-integrated of orders zero and one, the autoregressive distributive lag (ARDL) co-integration technique was employed for estimation. Granger causality tests revealed bidirectional and unidirectional relationships among the variables. The bound test results affirmed a long-run relationship, rejecting the null hypothesis of no co-integration and emphasizing the relevance of these variables in the finance-growth nexus in Nigeria. Stability tests, conducted through cumulative sum tests, demonstrated the stability of the included variables within the study period.

The error correction coefficients met criteria for acceptability—negative, fractional, and statistically significant. This confirmed the presence of a long-run relationship, indicating a moderate speed of adjustments in the estimated model. High adjusted R-squared values reflected a good fit, highlighting the substantial explanatory power of independent variables. The Durbin-Watson Statistic suggested an absence of autocorrelation, supporting the null hypothesis of no serial correlation, indicating that error terms from different periods were not serially correlated.

In conclusion, the study emphasizes the need for ample room for growth-enhancing credit expansion for optimal economic performance in Nigeria. To address this, the following recommendations are made:

Government Intervention: The government, through the Central Bank of Nigeria, should actively promote financial inclusion by expanding commercial bank loans. Mandating commercial banks to steadily increase their credits to the private sector can enhance credit expansion, fostering economic growth.

Commercial Bank Responsibility: Commercial banks should be morally obliged to increase loans to private sector ventures. This step is essential in making financial resources available for business growth, contributing to the overall economic development of the nation.

Policy Measures and Incentives: The government should implement policies and incentives to attract investible funds to the private sector. Providing soft and interest-free loans can be a viable strategy. Concurrently, deposit money banks need proper structuring and supervision to ensure that funds allocated for investors are utilized for their intended purposes and are not diverted to less productive ventures.

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