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Financial Deepening and Economic Growth in Nigeria: ARDL and NARDL Techniques

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Abstract Financial firms' services are considered germane to an economy's expansion universally. 2015-2016 economic and financial in Nigeria can be accredited to the hollowness of the financial firm contracting the economy by 2.06%, 63.7% market capitalization, and 67.2% in all share indexes losses. Prior empirical techniques focus primarily on finance-growth linear nexus. Which begs the question is the reported linear nexus a function of the linear assumption test power or earth evidence? The baseline ARDL and NARDL techniques are used in this research. To observe if there is a possibility of a non-linear association, for structural breaks, the Zivot and Andrews tests were used, as well as Granger causality to test for causality. From 1999Q1-2019Q4, quarterly data from the three arms of financial firms "insurance, banking, and stock market" were used. Findings revealed that economic growth adjusts non-linearly at a faster pace. A variety of macro-non-macroeconomic and financial factors can be implicated in the non-linear adjustment. A bi-directional link between the variables was revealed by causal nexus.

Keywords Financial Sector Deepening, Economic Growth, Nigeria, ARDL, NARDL

JEL Classification: E44, E51, G3, C12, F43, O16, C12, C22, O1.

1. Introduction

Over the decades, the cause-effect relationship between the development of the financial system and the economy has been an issue of controversy universally. Following the financial crisis of 2008-2010 and Nigeria's 2015-2017 recession. In 2018, the stock market lost about 63.7% of its value, all stock indexes lost 67.2%, and the economy shrank by 2.06%. following the 2005-2006 financial sector reforms to spur growth and development in Nigeria. The Nigerian financial and economic climate has witnessed substantial enhancement. Growth is boost by the development of the financial system, which makes financial products/services accessible and affordable. Through the supply-led hypothesis, financial deepening stimulates growth and demand-led hypotheses growth spurs financial deepening. Alternatively, denoted as "*finance-led growth and growth led finance hypotheses*". Fund intermediaries, institutions, markets, individuals, and regulators make up the financial system. The growth impact of the financial system is determined by its depth.

Financial depth is a multi-faceted institutional and financial markets strategy, which facilitates payment services, financial intermediation, diversification, liquidity risk reduction, and inter-temporal risk among others [1]. It is a strategy whose accomplishment has an impact on development through investments, money supply ratio to GDP, life expectancy, and standards of living among other

growth indexes.

The entrepreneurial financial intermediation process is devoid of repression. An unproductive financial intermediation process leads to "shallow financial depth" which hurts the economy, business, and the financial climate [2]. This explains why economies with shallow financial depth have low or negative growth and development. The financial sector three-fold challenge of smallness in emerging economies can be attributed to the difference in financial depth among other economies. Other hurdles include insufficient regulatory frameworks, sub-optimal intermediation services, feeble financial markets, and a lack of advanced financial instruments.

Various policy instruments such as the 1986 Structural Adjustment Programme (SAP) for financial climate liberalization, the monetary policy package as a corrective measure for the tight monetary management of 1986-1987 were implemented. To stabilized and accelerate economic and financial deepening in Nigeria. To stir domestic productivity, preserve price stability at a level that is not detrimental to the economy, curtail inflation and unemployment rates, and lessen balance of payments pressure. Increase the capital-based of financial institutions to support real investment and economic development. The Central Bank of Nigeria (CBN) in 2019 proposed a maximum capital-based of ₦100 billion and ₦15 billion for banks operating in the country classified as regional banks. Banks with a maximum capital of ₦100 billion could operate internationally, ₦25 billion for banks operating in Nigeria, and ₦15billion for regional banks operating in a minimum of 5 and a maximum of 10 connecting countries.

Financial deepening mitigates global uncertainties through the market structure and defence mechanisms. The presence of a development financial market system developed capital accumulation efficiency, saving, and investment [3]. According to the finance-leading hypothesis, the financial sector drives economic expansion without any feedback. Economic progress requires financial system resourcefulness. The empirical findings of [4], [5] [6], [7] among others, revealed a favourable and significant relation between entrepreneurial growth and financial system deepening, reducing poverty and income inequality, and lowering systemic risk.

Robinson [26] argued that the financial system deepening anchors on real economic expansion. According to the growth-led theory real sectors spurs financial system expansion. Through macroeconomic activities, necessitating the demand for financial products-services, Patrick [30] postulated "*the stage of development theory"* that combined the finance and growth-driven hypotheses.

[30] argued that finance promotes growth in the early stage of the economy and declines as the economy evolves allowing the growth-led hypothesis to triumph. Empirical emphases of [8] [9], [10] [50] in Nigeria when measuring the financial deepening-economic growth nexus uses the classical linear regression. The finance sector-market nexus was rivet in Middle-Eastern countries of; Saudi Arabia, Turkey, and the United Arab Emirates [11], [12] in Turkey, [13] in Jordan, [14] in European transition economies predominately uses the classical linear regression model and other linear models. These research findings are based on mix linear results. The empirical findings from studies in Nigeria beg the questions are the results a function of linear assumption test power or on-ground data. The statistical validity of a result based on a single model is debated [15, pp167-206].

[16] argued that using a different model to scrutinise the nexus will aid policymakers in policy formations. Similarly, most economic and financial time series data are skewed and leptokurtic according to [17]. Thus, the linear models are ineffective for wholesome and conclusive estimation due to the variations and spikes.

Intriguingly, modern methodological approaches of linear and non-linear baseline models, the Zivot and Andrews [18] test for structural breaks, and Granger causality to test for the directional causality are all needed. To solve the flaws in the aforementioned inferences and estimation patterns. This model and analysis differ from the earlier studies by including the non-financial sector "insurance" banking and the Nigerian financial market.

2. Literature of Related Review

In 1911, Schumpeter used the finance-led hypothesis to discuss the theoretical consideration between financial system development and economic growth. Based on the assumption that that finance drives growth in the real-economy sector through financial intermediation, investment, financial instruments, domestic savings, services, capital productivity, and efficient information management all influence economic growth according to [1, 19].

From 1970 to 2012, [21] in 27 medium-income countries, [20] in 28 African countries; and [22] in Namibia all confirm that finance drives growth in these economies. Asserting that finance is a driver of growth, [23] in Nigeria and Cote D'Ivoire reported mixed results of "*supply-led growth"* in Nigeria and "*demand-led growth"* in Cote D'Ivoire. [24] observed more supply-led growth in high-income economies than in low-income economies. [25] observed that geographic characteristics and income level enable heterogeneity, which supports the supply-led growth hypothesis. Financial sector stability catalyses a country's micro-macro-economic, financial and non-financial odds of embezzlement, corruption, nepotism, ethnicity among others [3,25].

Robinson [26] endorsed the demand-led-growth hypothesis of economic growth affecting financial sector

expansion through macroeconomic activities [48,27,28], refuting Schumpeter's [41] argument for supply-led growth.

[29] found that trade openness and industrial production have a strong impact on economic growth than banking sector indices in Jordan. The argument revolves around the cause-and-effect ties between finance-growth and growth finance, to mitigate internal and foreign economic and financial shocks and promote economic and financial stability and development.

[31, 32,] argued that cross-sectional research policy design ignores distinct stages of development in the policy formulation of a nation. [33] substantiate their findings, arguing that longitudinal studies are reflective of model nations and cannot explain finance-growth dynamics in other economies. Hence, a country-specific study will provide a thorough explanation of the causal link taking into account various stages of economic and financial development in each country.

[30] advocated the use of "*stages of development*" to investigate the causality in a single country rather than in cross-country investigations. The model asserted that finance support growth during the early stages of economic expansion and reduces as the economy evolves, for the growth-finance model to triumph. Causality varies according to a country's stage of development.

The Casino Model of Neutrality is supported by contemporary financial data. Financial development is vital but does not necessarily lead to economic progress. In 2011, [34, 35] observed neutrality in the Middle East and North Africa (MENA) countries, as well as in the Gulf Cooperation Council (GCC) countries. Economic growth can be aided by factors other than financial measures.

The theoretical underpinning of this study differs from those of previous authors using the linear model predominantly, and data keenly from the financial sectors ignoring the non-financial sectors and the structural breaks in those data as a result of uncertainty.

3. Methodology

The study's major goals include determining the non-linear and causal link between finance and economic growth. Using data sets drawn from the Nigerian economic, and financial climate from 1999:Q1-2019:Q4 quarterly. The ratio of credit to the private sector to GDP (CPS/GDP) and the ratio of the broad money supply to GDP (M2/GDP) are proxies for banking sector development (BSD), stock market deepening (SMD) proxy market capitalization, and insurance sector deepening (ISD) proxy total insurance assets. Gross Domestic Product (GDP) proxy the level of economic growth.

The insurance industry is one of Nigeria's fastest-growing non-financial sectors contributing considerably to economic growth through job creation, and migrating risk through indemnification. Over the decades the industry is one of the most neglected in empirical and theoretical researches. Establishing a new line of discourse, argument, a possible non-linear link, and offering proof on the form and style are among our apriori expectations.

Table 1. Empirical Review

Author	Scope	Objective	Methodology	Findings
[11]	Middle-Eastern countries of Saudi Arabia, Turkey, and the United Arab	financial deepening on economic growth	Multivariate framework	Positive relationship
[8]	Nigeria 1985-2014.	Financial deepening on economic growth	(OLS)	Positive relationship
[36]	Nigeria 1981-2012	Capital market and financial deepening on economic growth	(OLS)	Positive relationship
[37]	Nigeria 1997-2016	Financial deepening on economic growth	Two-staged Least Squares Regression	Positive relationship
[12]	Turkey1984:01-2014:12.	Financial deepening on economic growth	Granger Causality	Positive relationship
[13]	Jordan (1992-2014)	Financial deepening and economic growth	Granger causality and Johansen-Juselius cointegration	Bi-directional causality
[38]	Nigeria 1981-2012	Financial deepening on economic growth.	Engle-Granger Cointegration technique and Error correction model	Mix results
[14]	European transition economies (ETE) 2000-2010	financial deepening in ten European transition economies	Vector Error Correction Model (VECM)	Mix results

Authors Computation (2020)

On the premise of evaluating economic and financial links in previously unthinkable ways, this study contributes to the global knowledge bank by utilizing the baseline linear ARDL as described by [39] and the new Nonlinear Autoregressive Distributed Lag (NARDL) model by [40]. To determine economic growth speed of responsiveness to variations in financial indices, the ECM following the ARDL and NARDL frameworks was also employed.

To avoid specification bias, pre-tests are critical in determining the best estimation technique. When structural breakdowns in the dataset are taken into account, the traditional Augmented Dickey-Fuller unit (ADF) unit root test becomes ineffective. The break date was chosen exogenously using the Zivot and Andrews [18] unit root test. The estimations are subjected to diagnostic tests to ensure that classical assumptions underlying the econometric techniques are not violated.

Model Specification

The long-short-run nexus, as well as the ECM and dynamic profile analysis, are all presented in the linear and nonlinear models. This research takes a strategic departure from prior studies. Adding girth to the extant literature by Presenting fresh evidence using the NARDL, Error Correction Model (ECM), and the Granger Causality models. The baseline link is express in a linear form:

$$LGDP_t = \delta_0 + \delta_1 LM3_t + \delta_2 LCPSG_t + + \delta_3 SMC_t + \delta_3 TN_t + \mu \quad (1)$$

Where

LCPS: Banking Sector Development (BSD) measured Ratio of Credit to the Private Sector

LM3: Ratio of Broad Money Supply to Economic Growth (M3/GDP),

SMC: Stock Market Deepening (SMD) market capitalization to GDP and

TN: Insurance Sector Deepening (ISD) total insurance assets to GDP

GDP: Gross Domestic Product (GDP Proxy) level of economic growth

μ: error term.

Unit Root Test

The traditional and structural break unit root tests were employed to examine the stationarity properties of the series. The Augmented Dickey-Fuller unit root test was used. Endpoint values were not measured as break dates as a result of the break date extraction and trimming operations. A procedure for endogenizing the break date is the structural break test. Used as a robustness check for the unit root.

$$\Delta y_t = c + \Delta y_{t-1} + \beta_t + {}_{\Upsilon}DT_t + \sum_{j=i}^{k} d_j \Delta y_{t-j} + \mu_t \quad \text{ZAU Model 1}$$

$$\Delta y_t = c + \Delta y_{t-1} + \beta_t + \theta DT_t + \sum_{j=i}^{k} d_j \Delta y_{t-j} + \mu_t \quad \text{ZAU Model 2}$$

$$\Delta y_t = c + \Delta y_{t-1} + \beta_t + \theta DU_t + {}_{\Upsilon}DT_t + \sum_{j=i}^{k} d_j \Delta y_{t-j} + \mu_t \quad \text{ZAU Model 3}$$

Where: DU_t = indicator dummy variable for a mean shift occurring at each possible break-date (TB) while DT_t is the corresponding trend shift variable.

The ARDL Model

The ARDL model was chosen for its numerous benefits over other techniques to includes: efficiency in small samples analysis, a combination of linear variables with diverse orders of integration of; I (0); I (1), and the fact that dynamic is less prone to autocorrelation.

ARDL model is defined as following [39]-:

$$\Delta GDP_{qt} = \alpha_0 + \sum_{i=1}^{p} \alpha_i \Delta GDP_{qt-i} + \sum_{i=0}^{p} b_i \Delta L_n LCPS_{qt-2} + \sum_{i=0}^{p} c_i \Delta L_n LM3_{qt-3} + \sum_{i=0}^{p} d_i \Delta L_n SMC_{qt-4} + \sum_{i=0}^{p} e_i \Delta L_n TN_{qt-5} + \delta_1 GDP_{qt-1} + \delta_2 L_n LCPS_{qt-2} + \delta_3 L_n LM3_{qt-3} + \delta_4 I_n SMC_{qt-4} + \delta_5 I_n TN_{qt-5} + \mu_{qt} \quad (2)$$

Δ = first difference operator

Decision Rule:

The null hypotheses: $H_0 = \beta_1 = \beta_2 = \beta_3 = \beta_4 = \beta_5 = \beta_6 = 0$ (There is no con-integrating relationship).

The alternative hypotheses: $H_0 \neq \beta_1 \neq \beta_2 \neq \beta_3 \neq \beta_4 \neq \beta_5 \neq \beta_6 \neq 0$ (There is a con-integrating relationship)

Table 2. Decision Rule for the Bound Tests Process

State	Inference	Remark
Where the F-statistic is > the upper critical bound (UCB) value	Reject the null hypothesis	con-integrating relationship
Where F-statistic is < than the lower critical bound (LCB) value	Don't reject the null hypothesis	no long-run relationship
F-statistic value falls within the range of upper bound and lowers bound	Indecisive	Inconclusive results

NARDL

The NARDL procedure is a development of [40]. To examine potential long-short run nonlinear properties. In most time-series estimations, an asymmetry adjustment in the long-short run is believed to be driven by a linear combination of y_t and x_t. Where the nexus between y_t and x_t is non-linear and *x* has an uneven impact on y. Justifying the rationale for adopting the NARDL that is more flexible, with the capacity to relax the expectations of ECM regarding the properties of time series variables, in which they are required to be integrated in the same order.

The x_t is decomposed into its positive and negative

partial sums as follow:

$$Xt = x0 + x^{+}_{t} + x^{-}_{t} \quad (3)$$

$x^{+}_{t} + x^{-}_{t}$ are the partial sum processes of positive and negative changes in x_1:

$$x^{+}_{t} = \sum_{j=1}^{t} \Delta_{R}{}^{+}_{j} + \sum_{j=1}^{t} \max(\Delta Rj, 0), \quad (4)$$

$$x^{-}_{t} = \sum_{j=1}^{t} \Delta_{R}{}^{-}_{j} = \sum_{j=1}^{t} \min(\Delta Rj, 0), \quad (5)$$

The non-linear asymmetric co-integrating regression is estimated to achieve a long-run nexus with positive and negative changes [40].

4. Data Presentation and Analyses

The basic descriptive statistics presented in table 3 are the mean, median, minimum, maximum, and standard deviation. The kurtosis as well as the skewness, are indicators of normality. The variable(s) are less *platykurtic* with their respective kurtosis of less than 3 (<3). Producing fewer and less extreme outliers than the normal distribution.

4.2. Unit Root

Following multiple test methodologies, the study variables achieved stationarity at Order 1 and level of integration I (1) and I (0) as shown in Table 4. The blend of I (1) and I (0) order of integration gives our specification of the ARDL model creditability to test for a co-integrating nexus. The p-values of the variables are (< 0.05). The test meets the Gauss-Markov conditions for unbiased estimation. The test findings reveal that the break dates were endogenously selected via techniques of estimation. The break dates are predominantly in the new millennium 2000s Poor fiscal discipline, budgetary inadequacies, political instability, unimaginable public-sector misappropriation, and corruption, among other factors, caused these periods of mass volatility and economic fluctuations, according to a critical examination of the Nigerian economic and financial climate.

Table 3. Basic Descriptive Statistics

Variable(s)	LOGGDP	LCPS	LOGSMC	LOGTN	LM3
Mean	10.526	14.537	8.622	12.233	18.651
Median	10.698	17.282	9.202	12.221	20.327
Maximum	11.879	20.773	10.161	13.339	25.155
Minimum	8.576	7.689	5.703	10.822	11.845
Std. Dev.	1.007	5.320	1.394	0.916	4.744
Skewness	-0.474	-0.229	-0.796	-0.119	-0.242
Kurtosis	1.970	1.2177	2.208	1.467	1.373

Authors Computation (2020)

Table 4. Unit Root

Variable(s)	Traditional ADF (Trend and Intercept)				Zivot and Andrews Unit Root Test (Trend and Intercept)			
	ADF Stat	Critical Value (0.05)	Order of integration	ZAU Stat	Critical Value (0.05)	Break Date	Order of Integration	Inference
LOGGDP	9.058	-4.568	0	-7.526	-5.08	2004Q1	1	Stationary
LCPSGDP	-9.044	-3.465	1	-6.781	-4.590	2005Q2	0	Stationary
LOGSMCGDP	-8.054	-4.434	0	-5.936	-4.936	2007Q1	1	Stationary
LOGTNGDP	-9.014	-4.568	0	-4.930	-2.450	2009Q4	0	Stationary
LM3GDP	-9.072	-3.465	1	-6.902	-3.672	2015Q4	1	Stationary

Authors Computation (2020)

4.3. Estimation

Table 5. ARDL Regression Model

Selected Model: ARDL	**(4, 4, 4, 4, 4)**		
Variable	**ARDL**		**NARDL**	
	Coeff	**T-stat**	**Coeff**	**T-stat**
LOGGDP(-1)	0.0167	0.441**	0.197	2.189
LOGGDP(-2)	2.39	6.26	6.42	7.18
LOGGDP(-3)	-5.62	-1.47	-5.74	-6.42
LOGGDP(-4)	0.245	5.732	1.360	8.426**
LM3	-0.032	-1.17**	-0.023	-3.542
LM3(-1)	0.084	0.236	-0.086	-0.199
LM3(-2)	1.60	4.46	-4.28	-9.94
LM3 (-3)	-4.07	-1.13	3.11	7.22
LM3 (-4)	0.016	4.795	-0.024	-3.686**
LCPS	0.053	-13.438**	-0.085	-7.891**
LCPS(-1)	-0.0245	-0.081	0.093	0.957**
LCPS (-2)	9.49	3.15	2.54	2.59
LCPS (-3)	3.67	1.22	-2.39	-2.43
LCPS (-4)	0.049	14.790	0.075	5.971
LOGSMC	0.075	4.087**	-0.126	-3.398**
LOGSMC(-1)	0.0942	0.057	-0.025	-0.821
LOGSMC (-2)	8.08	4.97	-1.34	-4.32
LOGSMC (-3)	-1.89	-1.16	1.56	5.03
LOGSMC (-4)	0.343	16.308	-0.071	-2.010
LOGTN	0.276	5.707**	-0.667	-6.274**
LOGTN(-1)	-0.016**	-0.324	-0.059	-1.025
LOGTN (-2)	-3.9	-7.89	-1.29	-2.22
LOGTN (-3)	9.26	1.87	5.54**	9.54
LOGTN (-4)	-0.236	-3.756	0.664	7.384
C	3.693	11.316	-4.375	-4.615**
Other Parameter Estimate				
R-squared	0.99	R-squared	0.99	
Durbin-Watson stat	0.752	Durbin-Watson stat	1.192	
Diagnostic Tests				
F-statistic	10509.09	F-statistic	6539.365	
Prob(F-statistic)	0.0000	Prob(F-statistic)	0.0000	
BG-LM F-stat	8.958(0.0215)	BG-LM F-stat	6.542(0.038)	
RESET	642.231(0.098)	RESET	9.683(0.054)	
Het- BPG F-stat	6.244(0.0143)	Het- BPG F-stat	3.480(0.023)	
JB-Normality	2.746(0.253)	JB-Normality	2.889(0.235)	

**Significant at 0.05 level of significance.

Authors Computation (2020)

Table 6. The ARDL Baseline Testing

ARDL		NARDL	
Test Stat	Value	Test Stat	Value
F-Statistic	22.384	F-Statistic	16.532
Signif. @5% level of significance.			Signif. @5% level of significance.
I(0)	I (1)	I(0)	I (1)
2.56	3.49***	2.11	3.14***

** at 5% level of significance.

Authors Computation (2020)

Table 7. Short Run Error Correction Model Test

ARDL				NARDL		
Variable	Coefficient	t-Statistic	Prob.	Coefficient	t-Statistic	Prob.
CointEq (-1) *	-0.55	-14.299	0.0000	-0.73	-40.484	0.000

Authors Computation (2020)

Error Correction

The linear and non-linear measures of the model's goodness of fit are shown in Table 5. The linear R^2 of 0.99% and the non-linear R^2 of 0.99% show the goodness of fit and stability in the tested hypothesis, respectively. The exogenous variables account for the variability in the endogenous variable. The model's reliability is supported by the linear F-statistic of (10509.09) and the non-linear F-statistic of (6539.365) with the accompanying (p-value 0.000). The Durbin Watson Stats of (0.752 and 1.192) suggest that a first-order positive autocorrelation is likely.

The diagnostic tests reported in table 5 are reliable as such; the Breusch Godfrey Lagrange Multiplier Serial Correlation Test (BG-LM), Breusch Pagan and Godfrey (BPG) test for heteroskedasticity were conducted. The F-stat of the BG-LM rules out the autocorrelation overruling the result posted by the DW Stat "*with its inherent limitation*". The Het- BPG F-stat indicates that the model is homoscedastic.

Table (6) shows that F-statistic values of (22.384 and 16.5324), respectively, are greater than the upper and lower bound critical values for a P-value of 5% for both linear and nonlinear co-integration. The presence of a linear and non-linear co-integrating relationship is confirmed by the baseline testing results.

The RESET test verifies that the model is stable and free of errors. Co-integrating connectivity in the models has been established. To confirm the speed of adjustment to shocks and dynamics of the dependent variable to disequilibrium generated by the explanatory factors, the error correction profile of the models was explored.

The ECM CointEq(-1) for the linear and nonlinear variants are correctly signed, as shown in table (7) (negatively significant). The linear model has a 55% slower adjustment speed than the non-linear model, which has a 73% faster adjustment speed. As a result, economic growth adjusts non-linearly and at a faster rate to financial deepening shocks and dynamics than it does linearly. The inclusion of the insurance industry in the study shifts the narrative away from linearity and toward non-linearity. The linear model takes a longer pace to adjust from short-run equilibrium to long-run equilibrium, but the nonlinear model takes less time. Since the coefficient terms are between 0 and 1, the flux explosion can be predicted.

Table 8. Pairwise Granger causality tests result

Pairwise Granger Causality Tests Sample: 1999Q1 2019Q4			
Null Hypothesis:	Obs	F-Statistic	Prob.
LM3GDP does not Granger Cause LOGGDP	82	0.08805	0.9158
LOGGDP does not Granger Cause LM3GDP		2.33667	0.0005**
LCPSGDP does not Granger Cause LOGGDP	82	0.05949	0.0003**
LOGGDP does not Granger Cause LCPSGDP		1.13141	0.0019
LOGSMCGDP does not Granger Cause LOGGDP	82	0.02029	0.0099**
LOGGDP does not Granger Cause LOGSMCGDP		1.48058	0.0039**
LOGTNGDP does not Granger Cause LOGGDP	50	0.04742	0.9537
LOGGDP does not Granger Cause LOGTNGDP		0.93409	0.0004**
LCPSGDP does not Granger Cause LM3GDP	82	0.61738	0.5420
LM3GDP does not Granger Cause LCPSGDP		0.00617	0.9938
LOGSMCGDP does not Granger Cause LM3GDP	82	3.50751	0.0348
LM3GDP does not Granger Cause LOGSMCGDP		0.94072	0.3948
LOGTNGDP does not Granger Cause LM3GDP	50	1.82202	0.1734
LM3GDP does not Granger Cause LOGTNGDP		3.08205	0.0557
LOGSMCGDP does not Granger Cause LCPSGDP	82	3.39395	0.0007**
LCPSGDP does not Granger Cause LOGSMCGDP		0.59468	0.0003**
LOGTNGDP does not Granger Cause LCPSGDP	50	2.67902	0.0796
LCPSGDP does not Granger Cause LOGTNGDP		2.33826	0.0081**
LOGTNGDP does not Granger Cause LOGSMCGDP	50	0.18059	0.8354
LOGSMCGDP does not Granger Cause LOGTNGDP		1.66461	0.0007**

**Suggest causality at a given level of Significance
Authors Computation (2020)

The Decision Rule: The p-value determines the causal link. There is causation if the P-value of the two variables is < 5%. It can be deduced from the aforementioned finding that there is a two-way causal link.

5. Conclusion and Recommendations

To investigate the financial depth-economic growth nexus, this study used both a linear and a non-linear model. The need to establish plausible linearity and non-linearity relationships in empirical estimations from the short-run and long-run perspectives is the motivation for the models. It is a clear deviation from the commonly used linear model estimating method.

Within the study period, factual evidence pointed to a nonlinear nexus of financial deepening favourably and considerably influencing economic growth at a faster rate of adjustment than the linear model. The data support both the finance-led growth and growth-led finance hypotheses, contradicting prior findings by [25], [49], [52], and [53]. The findings of this study call into question the veracity of prior findings in the literature on the nexus. Previous findings may have been influenced by several restrictions, such as estimating methodologies used, data obtained, and the sector evaluated by those authors, according to this study.

According to [51], the nonlinearity nexus in the study variables and dispositions can be a function of insurance sector inclusion, as well as other factors such as insurgency, geopolitical tensions, cyclical fluctuations, and policy instability, cartwheel, the complexity of the financial system, globalization, and regulatory architecture. Both the finance-led growth and growth-led

finance hypotheses are supported by the Granger causality test results, which show a bi-directional causal relationship between economic growth and financial deepening. The findings of [42, 13, 3, 12] are supported by our findings.

Previous studies of [43, 44, 48], as well as more recent studies of [45, 25 49 46], among others, supported solely the finance-led growth and reported a unidirectional causality where financial deepening is assessed by the ratio of bank credit GDP to private sectors.

The findings support [30] argument on the developmental stage. Considering the worth of the financial sector in catalyzing economic growth, this research adds fresh evidence to the extant knowledge bank while piquing interest in revisiting earlier results based on a single model and a single sector.

This research focuses on the Nigerian economy, which is undoubtedly one of Africa's largest. The use of data from the financial and non-financial sectors aids in a better understanding of the link in an emerging economy with unique characteristics not found in developed economies. The goal of banking and insurance recapitalization is to increase their capacity to create a stable economic and financial environment for investment and innovation. To encourage savings and investment, the anchor lending rate should be modified to allow financial service providers to lend to the private sector at affordable rates.

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