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Financial Sector Development and Economic Growth in Nigeria (1990-2020)

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ABSTRACT: *In order to establish whether there is a causal relationship between the financial sector development and economic growth during the sample period of 1990–2020, the article investigates the relationship between the development of the financial sector and economic growth in Nigeria.The Autoregressive Distributive Lag (ARDL) Model is used in this work to measure and a useful tool for determining whether there is long-term relationship between economic data series. The ARDL model can be used to predict and distinguish between short-term dynamics and long-term relationships. Tests like the long-run relationship are used to determine the data's stationarity characteristics and their long-term relationship & short-run tests, bounds tests, heteroskedasticity tests, serial correlation, and co-integration tests were used. Financial intermediaries(FINIM), financial depth(FINDEPT), and market stock(MKTSTCK) all have a causal relationship with the real gross domestic product(RGDP), according to the study. Economic growth is significantly impacted by the growth of the financial industry. The public and private sectors must be informed about operations in the financial industry. The World Bank's World Development Indicators (2020) database, which covered the years 1990 to 2020, and the Central Bank of Nigeria's Statistical Bulletin were the sources for all data.*

KEYWORDS*:* economic growth, financial sector, development, financial intermediaries, financial depth, real gross domestic product and stock market

INTRODUCTION

Every economy's financial sector is essential to its growth and development. This sector's ability to perform its fundamental duty of moving money from the surplus to the deficit sectors of the economy depends on how well it grows. This sector of the economy has contributed to economic development and transaction facilitation. 2004 (Aderibigbe). A well-designed financial system offers a number of essential services that lower information, transaction, and monitoring costs while increasing the effectiveness of intermediation. A well-developed financial system will encourage investment by identifying and promoting strong firm prospects, mobilizing money, enabling risk trading, evading, and diversification, and

streamlining the movement of products and services. All of this results in more efficient resource allocation, quicker accumulation of physical and human capital, and quicker technological advancement, all of which will result in economic growth. According to Ajayi (1995), the financial sector's rate of expansion is directly impacted by the growth of the real estate sector, whereas the actual economy is affected by finance, money, and financial institutions.

An increase in population and savings rates results in economic growth, a long-term change (Jhingan 2005). It has also been demonstrated that a nation's output of goods and services has increased with time. Economic growth is measured by the increase in the measure of goods and services generated in a nation. When an economy's capacity for production increases and more goods and services are produced, it is said to be expanding (Jhingan 2003). Economic progress is often driven by technological innovation and positive external factors. According to Oluyemi (1995), the financial sector is a growth engine in any economy and may play a significant role in fostering rapid economic expansion. One could draw the conclusion that no economy can grow without a sizable increase of the financial sector. A strong financial system is necessary to create open, dynamic economies with sustainable economic growth. The size of the banking system and the liquidity of stock markets have a significant beneficial impact on economic growth; countries with well-developed financial institutions expand faster (Beck and Levine, 2002 in Nnanna, 2004). As a result, this study looked into how the financial industry has affected Nigeria's economic expansion. The financial industry reduces the cost of transactions and information in the economy.

The Nigerian financial industry, like that of many other developing nations, was heavily structured, resulting in financial disintermediation and slowing economic growth. The relationship between the financial industry and economic development has been unstable. The financial sector does not adequately and efficiently serve the actual sector of the economy, particularly the high priority industries that are also believed to be economic growth drivers. Banks are making billions of dollars in profit, yet the actual economy remains sluggish, lowering the economy's productivity level. The majority of producers are closing down due to a lack of access to credit from financial institutions or because the cost of borrowing is too high. The broad objective of the study is to examine the impact of financial sector development on economic growth in Nigeria. The following hypotheses were raised for the study:

H01: Financial intermediaries have no significant impact on Economic Growth in Nigeria.
H02: Financial depth has no significant impact on Economic Growth in Nigeria.
H03: The size of stock market has no significant impact on Economic Growth in Nigeria.

LITERATURE REVIEW

The influence of Nigeria's financial sector development on economic growth is discussed in this chapter. It includes the study's conceptual framework, theoretical framework, and empirical review. It entails gathering and analyzing data from a variety of sources, including books, newspapers, magazines, journals, and textbooks, that are relevant to the study topic.

Conceptual Review

A strong financial sector appears to enhance economic growth, according to both theoretical and empirical data. In Oluyemi (1995), Schumpeter (1934) emphasized the importance of banks as a vital factor in the growth process. As a result, the financial sector boosts economic development by increasing investment productivity, lowering transaction costs, and influencing savings. Patrick (1966) proposes a bidirectional link between financial development and economic growth (known as the supply-leading hypothesis and the demand-following hypothesis). The supply-side theory proposes that the creation of financial institutions and the ongoing availability of cutting-edge financial goods increase demand in the real economy and lead to economic growth.

Real Gross Domestic Product (RGDP)

Using the real GDP per capita as a metric of economic growth and the ratios of M2 to GDP, total domestic credit, and government spending to GDP, Bakhouche (2007) examines whether there is a one-way relationship between the development of the financial sector and economic growth in Algeria. The results show that there is no evidence of a short-term correlation and no possibility of a long-term relationship between the growth of the financial sector and economic growth. He speculated that this might be because the previous central planning system in place in the nation, under which the government made all economic choices, is still affecting economic performance. The real Gross Domestic Product (RGDP), the chosen economic growth measure, is stipulated to be dependent on the financial sector indicators, which are the ratio of M2 to GDP (M2GDP), and the ratio of Credit to Private to GDP (CPGDP). Calderon and Liu (2003) noted that a higher M2GDP ratio implies a larger financial sector and greater financial intermediary development while a CPGDP indicates more financial services and also a greater financial intermediary development. The value of all goods and services produced by an economy in a given year is referred to as the real gross domestic product (RGDP), also known as constant-price GDP, inflation-corrected GDP, or constant dollar GDP (expressed in base-year prices). The formula R=N/D, which divides nominal GDP by a GDP deflator, is used to calculate real GDP.

Financial Intermediaries (M2/GDP)

The financial sector acts as the hub of productive activity in an economy since it performs the key responsibilities of intermediation, provider of payment services, and center for the execution of monetary policy. Financial systems have long been seen as a field that is crucial to the growth of any economy. The financial sector has been described to be a catalyst of economic growth if it is developed and healthy (Adeoye, 2007). Richard Sylla (2005) in one of his hypotheses supported that financial sector development spurs economic development as the countries with the most developed financial systems became later the richest countries. Schumpeter (1934) in Oluyemi (1995) stressed the impact of banks as the key agent in the process of development. The financial sector will boost economic growth because it makes investments more productive, lowers transaction costs, and influences savings. The financial intermediaries of any economy play a determining role by ensuring that savings are invested efficiently and optimally. (Dwivedi 2006). Bencivenga and Smith (1991) Studies have shown

that countries with well-developed financial institutions tend to grow faster, particularly the size of the banking system and the liquidity of the stock market tend to have a strong positive impact on economic growth. These institutions' and intermediaries' financial services are crucial engines for innovation and economic expansion.

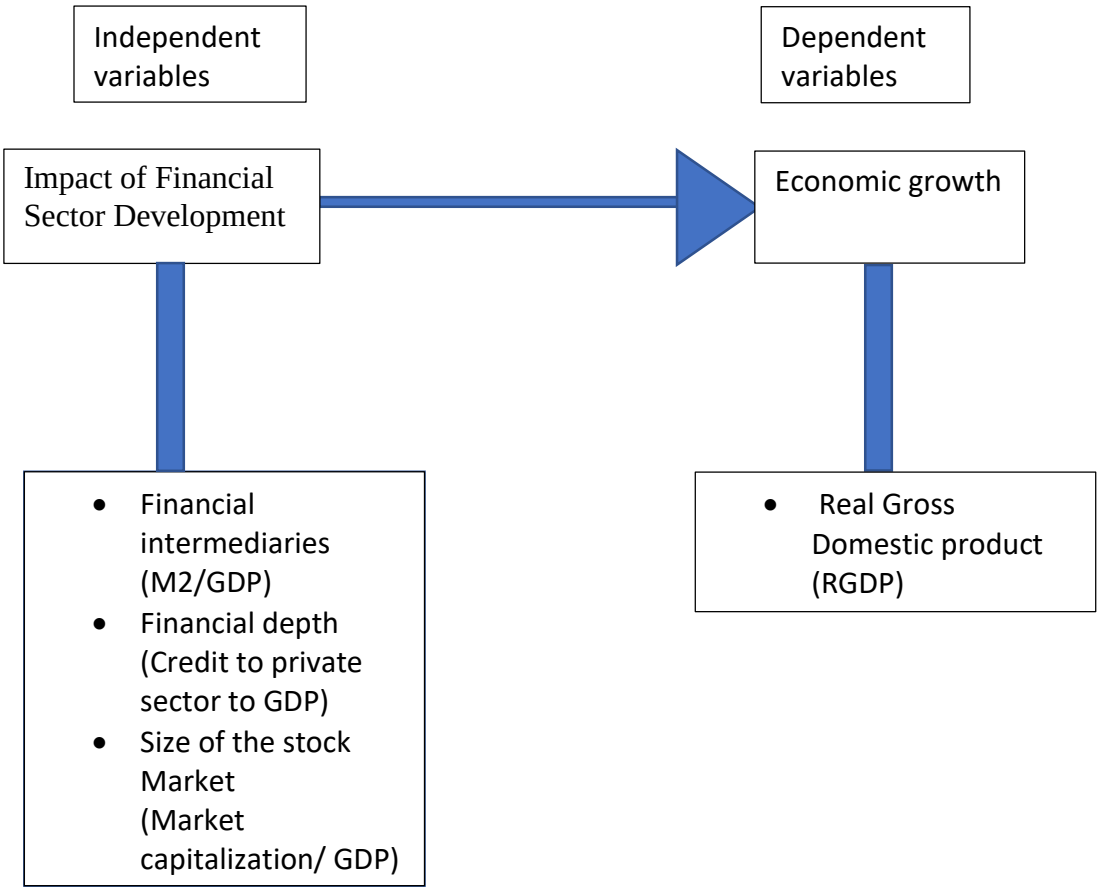
Greenwood and Jovanovic (1990), in their model, show that financial intermediation promotes growth by ensuring a high rate of returns to the capital invested and that growth realized makes it possible, in its turn, to reduce the costs of the financings. Bencivenga and Smith (1991) also underlined the positive effects that financial intermediaries have on the economy by encouraging the reallocation of savings from liquid investments to longer-term productive investments It involves switching from financial speculative investments to financial investments in production and development projects. The increase in foreign and other assets (net) of the banking system, along with the expansion of net domestic credit, were the driving forces behind the growth in M2. The expansion of both narrow and quasi-money could potentially be the cause of the growth. thanks to the private sector.

Financial Depth (Credit to the private sector to GDP)

As proven by Alejandro (1985) in his study, financial deepening is unlikely to raise savings; as a result, the major effect of financial deepening on growth should be viewed as a rise in the marginal productivity of capital rather than the volume of savings and investment. Ardic and Damar (2006) confirm the very important link between financial development and growth, but also sounds a note of caution that not all types of financial deepening is beneficial for the economy. The financial sector's position in the economy is represented by financial depth. When combined and contrasted to an indicator of economic activity, it refers to the size of banks, other financial institutions, and financial markets in a nation.

Size Of The Stock Market (Market capitalization/ GDP)

The number of shares you purchase in a single transaction is referred to as the lot size in the stock market. The total number of contracts contained in a single derivative security is referred to as the lot size in options trading. Size of the market refers to the actual number of shares that are offered and bid; unless otherwise stated, it is considered to be at least 500 to 1000 shares, depending on the stock. A portion of the stock market is measured by this. It is calculated using the prices of a few chosen equities (typically a weighted average). Investors and financial managers use it as a tool to analyze the market and contrast the return on various investments. When stock prices fall, consumer prices also fall. Corporate earnings rise when GDP exceeds estimates or the consensus, which is positive for equities. When GDP declines more than is expected or is below consensus, the opposite occurs.



Theoretical Review

There are a number of ideas linked with the study of the impact of financial sector development on Nigeria's economic growth. With diverse studies conducted by various experts, these various theories attempt to explain the type of relationship that exists between the independent and dependent variables.

The Harrod – Domar Growth Model

The Harrod – Domar model is an independent economic model created by Roy Harrod in 1939. The growth of a nation's economy is inextricably linked to its savings ratio and negatively associated with its capital-output ratio. According to the Harrod Domar Model, the degree of economic growth is influenced by two reasons: the level of savings and the level of investment. Higher savings allow for greater expenditure, and the Capital-Output Ratio improves. A lower capital- output ratio indicates that investment is more productive and that growth would be faster. According to this model, the key factors influencing economic growth are the level of savings and the activities of the financial sector. Higher savings allow for greater investment in capital stock, which increases the marginal efficiency of capital. This model also contended

that low rates of economic development and growth in developed countries are linked to low rates of saving and activities of the financial sector. As a result, a vicious cycle of low investment, low productivity, and low savings is created. To raise economic growth rates, either domestic or foreign savings must be increased. Saving more money creates a virtuous cycle of self-sustaining economic development.

Empirical Review

To examine how the rise of the financial sector affects the economy, authors have employed a variety of econometric techniques. According to Nzotta (2004), financial institutions channel resources from surplus economic units to deficit units for investment purposes. This entails giving loans and advances to the public and private sectors in order to achieve the stated goals of increasing domestic output, fostering export trade, supporting agricultural production, and building infrastructure. In a study of ten developing countries by Christopoulos and Tsionas (2004) they found long term Granger causality from finance to economic growth, but not of reverse causality. Similarly, in a study of Taiwan economy, Chang and Caudill (2005) found that financial development Granger cause growth. Beck et al (2000) considered data for a subset of 74 countries. They used GMM dynamic panel estimators as well as cross section regressions. The exogenous component of the development of financial intermediaries is positively correlated with economic growth, according to their conclusion, which is supported by both the panel and cross-sectional results. Two metrics for the growth of financial intermediaries were utilized by the authors. First, compare private credit to the deposit money bank credit to the private sector as a percentage of GDP. Second, the domestic bank deposit money asset to GDP ratio. These metrics demonstrated how closely and positively economic growth is related to the exogenous component of the development of financial intermediaries. Agarwal (2001) argued that financial sector development facilitates capital market development, and in turn raises real growth of the economy. In his study, Tharawanji (2007) observed that countries with deeper capital market face less severe business cycle output contraction and lower chances of an economic downturn compared to those with less developed capital market. In a sample of 11 countries studied, Ben and Ghazouani (2007) reported that financial system development could have adverse effect on economic growth and therefore advocated for a vibrant financial sector. Nieuwerbugh et al (2005) investigated the long-term relationship between economic growth and financial market development. The authors made the case that financial market development has a significant impact on economic growth using a new set of stock market development indicators. Their findings imply a steady long-term link between financial strength and economic expansion. Adam and Sanni (2005) examined the roles of stock market on Nigeria's economic growth using Granger- causality test and regression analysis and discovered a one-way causality between GDP growth and market capitalization and a two-way causality between GDP growth and market turnover. They also observed a positive and significant correlation between the GDP growth turnover ratios. The authors recommended that the government encourage the growth of the capital market because it has a positive effect on economic growth.

Literature Gap

The majority of studies on the impact of the financial sector's development on Nigeria's economic development have constantly stressed the significance of the effects that development will have on that country's economy. However, this study fills a gap in the literature by focusing on the effect of the country's financial sector expansion on economic growth. A healthy financial system promotes economic growth, according to a large body of prior research. Because of this, a healthy economy is said to have a strong financial system at its "heart."

METHODOLOGY

The relationship between Nigeria's financial sector development and economic growth was examined using a quantitative research design and a set of regression estimations, as measured by the real GDP (RGDP), as the independent variable, with financial intermediaries (BRD2GPD), financial depth (CPS2GDP), and stock market size (MKTCK2GDP) as the dependent variables. This study employed a random sample approach to look at data from several editions of the Central Bank's Annual Statistical Bulletin. To find answers to the study's questions, the researchers used a qualitative research design technique. This was done to improve data collecting, processing, and interpretation flexibility. The research was limited to the Nigerian economy. Our sample is justified by reasons. First and foremost, data for all variables is available. The macroeconomic and energy indicators reported in the Central Bank's Annual Statistical Bulletin and the Nigeria Bureau of Statistics were selected using the random sample approach. This gave the researchers access to their annual reports. The study involves data observations from 1990 to 2020. The data is originated from Nigeria Bureau of Statistics and the Central Bank of Nigeria's Annual Statistical Bulletin. ARDL model was used to analysed the data collected.

Model Specification

A model will be developed to forecast economic growth in the Nigerian economy by drawing conclusions from empirical data and theories that have been obtained from the theoretical exposition of exogenous growth theories and adding the development of the financial sector to the equation.

$Y = f(K. L, FSD)$ ---------- (i)

where:

Y =Economic growth

K = Capital

L = Labor

FSD = (FINIM, FINDEPT, STMKT)

$RGDP = (K, L, FSD)$ ----------(ii)

$RGDP = F(GFCF, LABPR, FINIM, FINDEPT, STMKT)$ ----------(iii)

$RGDP = (GFCF, LABPR, BRD2GDP, CPS2GDP, MKTSCK2GDP)$ ----------(iv)

$RGDP_t = (\beta_0 + \beta_1 GCFC_t + \beta_2 LABPR_t + \beta_3 BRD2GDP_t + \beta_4 CPS2GDP_t + \beta_5 MKTCK2GDP_t$ ---------- (v)

$RGDP_{i,t} = \alpha o + \beta_1 GCFC_{i,t-1} + \beta_2 LABPR_{i,t} + \beta_3 BRD2GDP_{i,t} + \beta_4 CPS2GDP_{I,t} + \beta_5 MKTCK2GDP_{i,t} + \varepsilon_{i,t}$ ……..… (vi)

ε was the error term

where: RGDP = Real Gross Domestic Product; FINIM = Financial intermediaries; FINDEPT= Financial depth; STMKT= Size of stock market; GCFC= Gross capital formation; BRD2GDP= Broad money to GDP; CPS2GDP= Capital stock to GDP; MKT2GDP= Market capitalization to GDP.

To find the value of and β, the multivariate regression model was employed. The p-value in the E-views table was then used to assess the reliability of each individual beta estimate. At a 95% level of confidence and 5% level of significance, the regression model's significance was examined.

Theoretical A Priori Expectation

It is clear that β_0 should be positive ($\beta_0 > 0$) as there can be no negative value for RGDP.

$\beta_1 > 0$; a change in Capital (GCFC) will lead to a change in Economic growth proxy by RGDP

$\beta_2 > 0$; a change Labor (LABPR) in will lead to a change in Economic growth proxy by RGDP

$\beta_3 > 0$; a change in Financial intermediaries (FINIM) will lead to change in Economic growth proxy by RGDP

$\beta_4 > 0$; a change Financial depth (FINDEPT) in will lead to a change in Economic growth proxy by RGDP

$\beta_5 > 0$; a change in Size of stock market (STMKT) will lead to a change in Economic growth proxy by RGDP

RESULTS AND DISCUSSIONS

Pre-Test Analysis

Descriptive Statistics Results For Model

Prior to choosing the best econometric tool, the properties of the data must be examined to prevent misuse. Tables 1 and 2 present the descriptive statistics of the data for the three models.

Table 1 Descriptive Statistics Results Test for Model

	RGDP	MKTSTCK	FINIM	FINDEPT
Mean	43424.21	1.165554	13.18426	12.13269
Std. Dev.	47730.52	1.335389	4.876420	6.176771
Skewness	0.947978	2.654002	0.195795	1.093208
Kurtosis	2.652778	9.854656	1.474638	4.470755
Observations	31	31	31	31

Researchers Computation (2023)

Table 1 above provides a summary of the statistics used in this empirical study. It is evident. that Market stock (MKTSTCK) has the lowest mean value of 1.165554 and Real Gross domestic product (RGDP) has the highest mean value of 43434.21 whereas the mean value of Financial intermediaries(FINIM), Financial depth (FINDEPT), are 13.18426 and 12.13269

respectively. The study shown in Table shows that the Real Gross Domestic Product (RGDP) is the largest while the Market Stock (MKTSTCK) is the lowest, indicating that the values for the operational data values are farther away from the mean on averages. The standard deviation measures how concentrated the data are around the mean. Skewness is a metric that expresses how asymmetrical a distribution can be. Positive skewness affects every variable. This has the conclusion that skewness tends to indicate whether the distribution's mean value is higher or lower than the median. Therefore, a positively skewed number denotes a mean value that is higher than the median value. The distribution is leptokurtic (too tall) since all of the variables utilized on the component of kurtosis have positive values.

Unit Root Test

This study proceeds to examine the stochastic properties of the variables considered in the model by analyzing their order of integration based on a series of unit root tests using Augmented Dickey-Fuller).

Table 2 Augmented Dickey Fuller Unit Root Test

VARIABLES	**LEVEL**		**DIFFERENCE**		**ORDER IN INTEGRATION**
	ADF Value	**Mackinnon Critical Values**	**ADF Value**	**Mackinnon Critical Values**	
RGPD	-0.983983	-2.967767	-6.355579	-2.971853	1(1)
MKTSTCK	-2.900630	-2.963972	-5.498606	-2.971853	1(1)
FINIM	-0.423939	-2.971853	-4.178368	-2.971853	1(1)
FINDEPT	-3.485601	-2.963972	-5.461197	-2.971853	1(1)

Researchers Computation (2023)

Table 3 Cointegrating Bound Testing for ARDL ECOG Model

	GDP	
Test Statistics (K)	3	
F-Statistics	6.892197	
Critical Value Bounds	I(0) Bound	I (1) Bound
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

Researchers Computation (2023)

Table 3 displays the results of the limits test to determine whether there are long-term relationships. The estimated F-statistic is 6.892197, which is much higher than the critical values for the lower and upper bound values of the test statistic at a 10% level of significance. This suggests a long-term relationship between the expansion of the financial sector and economic expansion. Following these lines of inquiry, the investigation moves on to the evaluation of the short-run and long-run situations as shown in the following tables.

Table 4 Short-run Estimates for ARDL Model

Model	**Variable**	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
ECOG Model	CointEq(-1)	0.092163	0.031957	2.883999	0.0137

Researchers Computation (2023)

Disturbance is addressed in the long-run equilibrium.On Table 4, which also lists the coefficients for the error correction model, the models' short-run cointegrating form is shown. The error correction mechanism's coefficient, which measures the rate of adjustment, is negative as anticipated and significant at a 5 percent level. In each of the three specifications, the ECM term demonstrates that 9.21% of the short-run

Table 5 Long-run Estimates for ARDL Model

Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
FINIM	7511.12	2271.93	3.306057	0.0063
FINDEPT	1627.50	1370.96	-1.187126	0.2581
MKTSTCK	29393.83	8103.11	-3.627477	0.0035
C	34960.077	221683.72	-1.613195	0.1327

Researchers Computation (2023)

Financial intermediaries (FINIM) is positively (7511.12) proportional to economic growth, but statistically significant (P(t) = 0.0063), implying that a rise in Financial intermediaries tends to enhance Real gross domestic product (RGDP) over time. However, as shown by the negative

coefficients of 1627.50 and 29393.83, both Financial depth (FINDEPT) and Market stock (MKTSTCK) have a positive and statistically significant link with economic growth in Nigeria.

Diagnostic result

Table 6: Residual Diagnostic Test

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	6.066753	Prob. F(2,10)	0.0188
Obs*R-squared	14.80130	Prob. Chi-Square(2)	0.0006
Heteroskedasticity Test			
F-statistic	0.187233	Prob. F(14)	0.9980
Obs*R-squared	4.840498	Prob. Chi-Square(14)	0.9977

Researchers Computation (2023)

From the table above, The Breusch-Godfrey Serial Correlation LM Test was used to do the serial correlation test. The likelihood of the Chi-Square (0.0006) is less than the critical value of 0.05 at the 5 percent significance level, as shown in the table above. This shows that there is no serial correlation in the short-run ADRL model's residual. Additionally, the heteroskedasticity test for the model uncovers that there is heteroskedasticity issue making a decision from the F-Statistics and the likelihood esteems are more prominent than 0.05.

Table 7 : Ramsey Reset Test

	Value	df	Probability
t-statistic	0.109380	11	0.9149
F-statistic	0.011964	(1, 11)	0.9149
F-test summary:			
	Sum of Sq.	df	Mean Squares
Test SSR	31312.09	1	31312.09
Restricted SSR	28820542	12	24017203.
Unrestricted SSR	28789230	11	2617203.

Researchers Computation (2023)

Whereas if estimated model is properly stated, it passes the Ramsey RESET Test. It evaluates the null hypothesis that the model specification is accurate. If the p-value for the F-statistic is less than the threshold of 0.05, the hypothesis is deemed invalid. Table 5 demonstrates that the p-value of 0.9149 exceeds the crucial value of 0.05. The estimated ARDL model in this study may have been properly defined, according to this.

CONCLUSION AND RECOMMENDATIONS

The study was carried out to investigate and examine if financial sector development stimulates economic growth in Nigeria. To ascertain a comprehensive and robust outcome, the study adopted secondary data approach and cover from 1990 to 2020. Due to its dynamic nature and the nature of the data which were stationary at the level or first difference, the research preferred Autoregressive Distributed Lag (ARDL) estimation technique. The dependent variable is the RGDP while the independent variables include the Financial intermediaries (FINIM), Financial depth (FINDEPT) and market stock (MTKSTCK) . The augmented dickey fuller (ADF) test. The ADF test was chosen because it is widely used and its output is said to be robust. Financial intermediaries, financial depth, and market stock are all stationary at the first difference, statistically significant at 5%, and Real Gross Domestic Product (RGDP) is also stationary at the first difference, statistically significant at 5%. This explained why the ARDL estimate technique was used for the analysis.

The models' results reveal that the dependent and independent variables are cointegrated, indicating that the data are stable. The analysis found that, in the short run, financial sector development has a favourable impact on Nigeria's RGDP, and that this impact is both resilient and statistically significant. The long-run outcome is consistent with the short-run outcome. Development in the financial industry is primarily intended to lower "costs" inside the financial system. This process of reducing the costs of obtaining information, enforcing contracts, and carrying out transactions led to the emergence of financial contracts, markets, and intermediaries.

The expansion of the financial sector helps the economy grow in a number of ways, including by improving the poor and vulnerable population's access to credit, facilitating risk management by lowering shock susceptibility, and boosting investment and productivity, all of which increase income generation.Through intermediation, the financial sector plays an essential part in the economy's operation. Simply put, the financial sector serves as a conduit between savers and borrowers, taking cash from savers (for example, through deposits) and lending them to those who need to borrow, whether they are individuals, businesses, or governments. The study's conclusion, however, is that the relationship between financial sector expansion and economic growth is a long-run one. This is proven in two ways: first, the error correction term is statistically significant, and second, the F statistics fall beyond the lower and upper bounds at a 5% significance level. The short-run outcome reveals that financial sector development has a statistically significant impact on RGDP. This means that a percentage increase in the financial sector's development will result in an increase in Nigeria's Real GDP. Finally, the coefficient is positive in the long run. This shows that, while financial sector development is important for Nigeria's economic growth, it is not sufficient.

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APPENDIX

DESCRIPTIVE STATISTICS

	RGDP	MKTSTCK	FINIM	FINDEPT
Mean	43424.21	1.165554	13.18426	12.13269
Median	22269.98	0.839125	10.77712	10.92286
Maximum	156346.5	6.298354	20.92152	30.80067
Minimum	499.6800	0.108820	6.318201	2.488777
Std. Dev.	47730.52	1.335389	4.876420	6.176771
Skewness	0.947978	2.654002	0.195795	1.093208
Kurtosis	2.652778	9.854656	1.474638	4.470755
Jarque-Bera	4.798813	97.08325	3.203428	8.968730
Probability	0.090772	0.000000	0.201551	0.011284
Sum	1346150.	36.13219	408.7120	376.1133
Sum Sq. Dev.	6.83E+10	53.49791	713.3842	1144.575
Observations	31	31	31	31

RGDP LEVEL
Null Hypothesis: (RGDP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.983983	0.7455
Test critical values:	1% level	-3.679322	
	5% level	-2.967767	
	10% level	-2.622989	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RGDP,2)
Method: Least Squares
Date: 06/11/22 Time: 21:49
Sample (adjusted): 1992 2020
Included observations: 29 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDP(-1)	-0.085422	0.086812	-0.983983	0.3339
C	838.4734	578.2848	1.449932	0.1586

R-squared	0.034619	Mean dependent var	415.1610
Adjusted R-squared	-0.001136	S.D. dependent var	2079.881
S.E. of regression	2081.062	Akaike info criterion	18.18562
Sum squared resid	1.17E+08	Schwarz criterion	18.27991
Log likelihood	-261.6914	Hannan-Quinn criter.	18.21515
F-statistic	0.968222	Durbin-Watson stat	2.236644
Prob(F-statistic)	0.333860		

RGDP 1ST DIFFERENCE
Null Hypothesis: D(RGDP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.355579	0.0000
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RGDP)
Method: Least Squares
Date: 06/11/22 Time: 21:50
Sample (adjusted): 1993 2020
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDP(-1))	-1.326404	0.208699	-6.355579	0.0000
C	613.1388	408.5632	1.500720	0.1455

R-squared	0.608395	Mean dependent var	-162.6796
Adjusted R-squared	0.593333	S.D. dependent var	3235.298
S.E. of regression	2063.164	Akaike info criterion	18.17062
Sum squared resid	1.11E+08	Schwarz criterion	18.26578
Log likelihood	-252.3887	Hannan-Quinn criter.	18.19971
F-statistic	40.39339	Durbin-Watson stat	1.824682
Prob(F-statistic)	0.000001		

MKTSTCK LEVEL

Null Hypothesis: MKTSTCK has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.900630	0.0571
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MKTSTCK)
Method: Least Squares
Date: 06/11/22 Time: 21:54
Sample (adjusted): 1991 2020
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MKTSTCK(-1)	-0.462147	0.159326	-2.900630	0.0072
C	0.547676	0.283944	1.928816	0.0639

R-squared	0.231058	Mean dependent var	-9.18E-05
Adjusted R-squared	0.203595	S.D. dependent var	1.301419
S.E. of regression	1.161406	Akaike info criterion	3.201480
Sum squared resid	37.76819	Schwarz criterion	3.294893
Log likelihood	-46.02220	Hannan-Quinn criter.	3.231364
F-statistic	8.413652	Durbin-Watson stat	1.564455
Prob(F-statistic)	0.007172		

MKTSTCK 1ST DIFFERENCE
Null Hypothesis: D(MKTSTCK) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.498606	0.0001
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(MKTSTCK,2)
Method: Least Squares
Date: 06/11/22 Time: 21:55
Sample (adjusted): 1993 2020
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MKTSTCK(-1))	-1.373811	0.249847	-5.498606	0.0000
D(MKTSTCK(-1),2)	0.390020	0.169346	2.303099	0.0299
C	-0.045301	0.224707	-0.201601	0.8419

R-squared	0.580991	Mean dependent var	0.034175
Adjusted R-squared	0.547470	S.D. dependent var	1.763753
S.E. of regression	1.186483	Akaike info criterion	3.280821
Sum squared resid	35.19354	Schwarz criterion	3.423557
Log likelihood	-42.93149	Hannan-Quinn criter.	3.324457
F-statistic	17.33229	Durbin-Watson stat	2.004846
Prob(F-statistic)	0.000019		

FINIM LEVEL
Null Hypothesis: FINIM has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.423939	0.8918
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FINIM)
Method: Least Squares
Date: 06/11/22 Time: 21:56
Sample (adjusted): 1993 2020
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FINIM(-1)	-0.029304	0.069123	-0.423939	0.6754
D(FINIM(-1))	0.725326	0.198036	3.662598	0.0012
D(FINIM(-2))	-0.532329	0.206839	-2.573639	0.0167
C	0.754652	0.949750	0.794580	0.4346

R-squared	0.386086	Mean dependent var	0.405066
Adjusted R-squared	0.309347	S.D. dependent var	1.923490
S.E. of regression	1.598526	Akaike info criterion	3.907605
Sum squared resid	61.32688	Schwarz criterion	4.097920
Log likelihood	-50.70647	Hannan-Quinn criter.	3.965786
F-statistic	5.031150	Durbin-Watson stat	1.802781
Prob(F-statistic)	0.007593		

FINIM 1ST DIFFERENCE
Null Hypothesis: D(FINIM) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.178368	0.0030
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FINIM,2)
Method: Least Squares
Date: 06/11/22 Time: 21:57
Sample (adjusted): 1993 2020
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FINIM(-1))	-0.833312	0.199435	-4.178368	0.0003
D(FINIM(-1),2)	0.558081	0.194447	2.870086	0.0082
C	0.373803	0.303088	1.233315	0.2289

R-squared	0.421132	Mean dependent var	0.119887
Adjusted R-squared	0.374823	S.D. dependent var	1.988263
S.E. of regression	1.572083	Akaike info criterion	3.843637
Sum squared resid	61.78613	Schwarz criterion	3.986373
Log likelihood	-50.81092	Hannan-Quinn criter.	3.887273
F-statistic	9.093880	Durbin-Watson stat	1.834544
Prob(F-statistic)	0.001077		

FINDEPT LEVEL
Null Hypothesis: FINDEPT has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.485601	0.0155
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FINDEPT)
Method: Least Squares
Date: 06/11/22 Time: 21:58
Sample (adjusted): 1991 2020
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FINDEPT(-1)	-0.604691	0.173483	-3.485601	0.0016
C	7.391301	2.372715	3.115123	0.0042

R-squared	0.302605	Mean dependent var	0.007777
Adjusted R-squared	0.277698	S.D. dependent var	6.888912
S.E. of regression	5.854773	Akaike info criterion	6.436732
Sum squared resid	959.7942	Schwarz criterion	6.530145
Log likelihood	-94.55098	Hannan-Quinn criter.	6.466616
F-statistic	12.14941	Durbin-Watson stat	1.906171
Prob(F-statistic)	0.001637		

FINDEPT 1ST DIFFERENCE
Null Hypothesis: D(FINDEPT) has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=7)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.461197	0.0001
Test critical values:	1% level	-3.689194	
	5% level	-2.971853	
	10% level	-2.625121	

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

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FINDEPT,2)
Method: Least Squares

Date: 06/11/22 Time: 21:59
Sample (adjusted): 1993 2020
Included observations: 28 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FINDEPT(-1))	-1.642163	0.300697	-5.461197	0.0000
D(FINDEPT(-1),2)	0.300104	0.187577	1.599894	0.1222
C	0.241546	1.265355	0.190892	0.8502

R-squared	0.665149	Mean dependent var	-0.008291
Adjusted R-squared	0.638361	S.D. dependent var	11.12965
S.E. of regression	6.692974	Akaike info criterion	6.740951
Sum squared resid	1119.897	Schwarz criterion	6.883687
Log likelihood	-91.37331	Hannan-Quinn criter.	6.784587
F-statistic	24.83008	Durbin-Watson stat	1.977082
Prob(F-statistic)	0.000001		

ARDL

Dependent Variable: RGDP
Method: ARDL
Date: 06/17/22 Time: 21:32
Sample (adjusted): 1994 2020
Included observations: 27 after adjustments
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic): FINIM FINDEPT MKTSTCK
Fixed regressors: C
Number of models evalulated: 500
Selected Model: ARDL(2, 3, 4, 2)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDP(-1)	1.736904	0.251469	6.907025	0.0000
RGDP(-2)	-0.644741	0.274034	-2.352773	0.0365
FINIM	-1578.835	395.2090	-3.994936	0.0018
FINIM(-1)	1453.792	630.8690	2.304427	0.0399
FINIM(-2)	-1077.601	592.4046	-1.819029	0.0939
FINIM(-3)	510.3988	330.9747	1.542108	0.1490
FINDEPT	-8.961736	81.28028	-0.110257	0.9140
FINDEPT(-1)	-163.6633	74.32890	-2.201879	0.0480
FINDEPT(-2)	143.6896	72.64013	1.978102	0.0713
FINDEPT(-3)	73.00592	59.54719	1.226018	0.2437
FINDEPT(-4)	105.9246	69.45226	1.525142	0.1531
MKTSTCK	1078.719	430.7943	2.504023	0.0277
MKTSTCK(-1)	756.0893	579.0529	1.305734	0.2161
MKTSTCK(-2)	874.2088	569.6843	1.534550	0.1508
C	3223.861	2090.568	1.542098	0.1490

R-squared	0.999520	Mean dependent var	49736.51
Adjusted R-squared	0.998959	S.D. dependent var	48041.70
S.E. of regression	1549.746	Akaike info criterion	17.82975
Sum squared resid	28820542	Schwarz criterion	18.54966
Log likelihood	-225.7016	Hannan-Quinn criter.	18.04382
F-statistic	1783.826	Durbin-Watson stat	2.434541
Prob(F-statistic)	0.000000		

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

Cointegration

ARDL Cointegrating And Long Run Form
Dependent Variable: RGDP
Selected Model: ARDL(2, 3, 4, 2)
Date: 06/17/22 Time: 21:37
Sample: 1990 2020
Included observations: 27

Cointegrating Form

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDP(-1))	0.644741	0.274034	2.352773	0.0365
D(FINIM)	-1578.834529	395.208991	-3.994936	0.0018
D(FINIM(-1))	1077.601216	592.404637	1.819029	0.0939
D(FINIM(-2))	-510.398836	330.974730	-1.542108	0.1490
D(FINDEPT)	-8.961736	81.280280	-0.110257	0.9140
D(FINDEPT(-1))	-143.689578	72.640128	-1.978102	0.0713
D(FINDEPT(-2))	-73.005919	59.547192	-1.226018	0.2437
D(FINDEPT(-3))	-105.924570	69.452259	-1.525142	0.1531
D(MKTSTCK)	1078.718882	430.794278	2.504023	0.0277
D(MKTSTCK(-1))	-874.208786	569.684253	-1.534550	0.1508
CointEq(-1)	0.092163	0.031957	2.883999	0.0137

Cointeq = RGDP - (7511.1165*FINIM -1627.5017*FINDEPT -29393.8314 *MKTSTCK -34980.0770)

Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FINIM	7511.116531	2271.925827	3.306057	0.0063
FINDEPT	-1627.501672	1370.959899	-1.187126	0.2581
MKTSTCK	-29393.831448	8103.106556	-3.627477	0.0035
C	-34980.077022	21683.719265	-1.613195	0.1327

Bounds test

ARDL Bounds Test
Date: 06/17/22 Time: 21:38
Sample: 1994 2020
Included observations: 27
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	k
F-statistic	2.892197	3

Critical Value Bounds

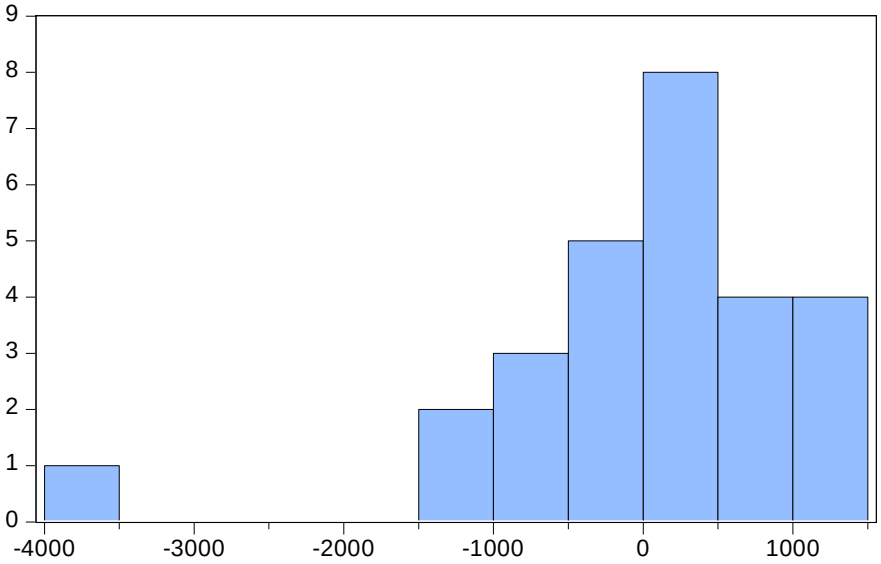
Significance	I0 Bound	I1 Bound
10%	2.72	3.77
5%	3.23	4.35
2.5%	3.69	4.89
1%	4.29	5.61

Test Equation:
Dependent Variable: D(RGDP)
Method: Least Squares
Date: 06/17/22 Time: 21:38
Sample: 1994 2020
Included observations: 27

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDP(-1))	0.644741	0.274034	2.352773	0.0365
D(FINIM)	-1578.835	395.2090	-3.994936	0.0018
D(FINIM(-1))	567.2024	385.1854	1.472544	0.1666
D(FINIM(-2))	-510.3988	330.9747	-1.542108	0.1490
D(FINDEPT)	-8.961736	81.28028	-0.110257	0.9140
D(FINDEPT(-1))	-322.6201	99.46407	-3.243584	0.0070
D(FINDEPT(-2))	-178.9305	85.97854	-2.081106	0.0595
D(FINDEPT(-3))	-105.9246	69.45226	-1.525142	0.1531
D(MKTSTCK)	1078.719	430.7943	2.504023	0.0277
D(MKTSTCK(-1))	-874.2088	569.6843	-1.534550	0.1508
C	3223.861	2090.568	1.542098	0.1490
FINIM(-1)	-692.2453	244.7831	-2.827995	0.0152
FINDEPT(-1)	149.9951	128.0246	1.171612	0.2641
MKTSTCK(-1)	2709.017	856.0451	3.164573	0.0082
RGDP(-1)	0.092163	0.031957	2.883999	0.0137

R-squared	0.946929	Mean dependent var	5743.980
Adjusted R-squared	0.885012	S.D. dependent var	4570.193
S.E. of regression	1549.746	Akaike info criterion	17.82975
Sum squared resid	28820542	Schwarz criterion	18.54966
Log likelihood	-225.7016	Hannan-Quinn criter.	18.04382
F-statistic	15.29364	Durbin-Watson stat	2.434541
Prob(F-statistic)	0.000016		

Histogram



Series: Residuals	
Sample 1994 2020	
Observations 27	
Mean	-1.66e-11
Median	78.02888
Maximum	1414.519
Minimum	-3938.769
Std. Dev.	1052.845
Skewness	-1.920635
Kurtosis	8.376922
Jarque-Bera	49.12498
Probability	0.000000

Serial correlation

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	6.066753	Prob. F(2,10)	0.0188
Obs*R-squared	14.80130	Prob. Chi-Square(2)	0.0006

Test Equation:
Dependent Variable: RESID
Method: ARDL
Date: 06/17/22 Time: 21:40
Sample: 1994 2020
Included observations: 27
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDP(-1)	0.550615	0.263754	2.087606	0.0634
RGDP(-2)	-0.611050	0.289940	-2.107507	0.0613
FINIM	-201.4264	299.0362	-0.673585	0.5158
FINIM(-1)	849.5159	536.6745	1.582926	0.1445
FINIM(-2)	-769.4727	496.8121	-1.548820	0.1525
FINIM(-3)	205.7344	251.7815	0.817115	0.4329
FINDEPT	-0.600324	63.23037	-0.009494	0.9926
FINDEPT(-1)	-26.04420	57.99075	-0.449110	0.6629
FINDEPT(-2)	75.15731	58.38056	1.287369	0.2270
FINDEPT(-3)	-27.29823	44.56399	-0.612562	0.5538
FINDEPT(-4)	-50.17465	54.59226	-0.919080	0.3797
MKTSTCK	-113.2445	319.0492	-0.354944	0.7300
MKTSTCK(-1)	-191.1684	430.3821	-0.444183	0.6664
MKTSTCK(-2)	-391.1074	448.4530	-0.872126	0.4036
C	-575.6500	1548.257	-0.371805	0.7178
RESID(-1)	-0.855190	0.331006	-2.583611	0.0272

RESID(-2)	-0.822550	0.260412	-3.158650	0.0102

R-squared	0.548196	Mean dependent var	-1.66E-11
Adjusted R-squared	-0.174690	S.D. dependent var	1052.845
S.E. of regression	1141.106	Akaike info criterion	17.18339
Sum squared resid	13021228	Schwarz criterion	17.99929
Log likelihood	-214.9758	Hannan-Quinn criter.	17.42600
F-statistic	0.758344	Durbin-Watson stat	2.790495
Prob(F-statistic)	0.700012		

Hetroskedasticity

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.187233	Prob. F(14,12)	0.9980
Obs*R-squared	4.840498	Prob. Chi-Square(14)	0.9879
Scaled explained SS	3.526714	Prob. Chi-Square(14)	0.9977

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 06/17/22 Time: 21:40
Sample: 1994 2020
Included observations: 27

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-4271644.	5314584.	-0.803759	0.4372
RGDP(-1)	-116.8721	639.2778	-0.182819	0.8580
RGDP(-2)	124.9167	696.6426	0.179313	0.8607
FINIM	-224882.5	1004689.	-0.223833	0.8267
FINIM(-1)	354132.9	1603777.	0.220812	0.8290
FINIM(-2)	702244.8	1505994.	0.466300	0.6494
FINIM(-3)	-500610.0	841394.6	-0.594976	0.5629
FINDEPT	45210.67	206628.4	0.218802	0.8305
FINDEPT(-1)	185594.0	188956.8	0.982203	0.3454
FINDEPT(-2)	1654.809	184663.7	0.008961	0.9930
FINDEPT(-3)	-60924.63	151379.2	-0.402464	0.6944
FINDEPT(-4)	27007.62	176559.6	0.152966	0.8810
MKTSTCK	467361.0	1095153.	0.426754	0.6771
MKTSTCK(-1)	-393022.3	1472052.	-0.266989	0.7940
MKTSTCK(-2)	-1264033.	1448235.	-0.872809	0.3999

R-squared	0.179278	Mean dependent var	1067427.
Adjusted R-squared	-0.778232	S.D. dependent var	2954413.
S.E. of regression	3939720.	Akaike info criterion	33.51130
Sum squared resid	1.86E+14	Schwarz criterion	34.23121
Log likelihood	-437.4025	Hannan-Quinn criter.	33.72537
F-statistic	0.187233	Durbin-Watson stat	2.554389
Prob(F-statistic)	0.997980		

Ramsey reset test

Ramsey RESET Test
Equation: UNTITLED
Specification: RGDP RGDP(-1) RGDP(-2) FINIM FINIM(-1) FINIM(-2) FINIM(-3) FINDEPT FINDEPT(-1) FINDEPT(-2) FINDEPT(-3) FINDEPT(-4) MKTSTCK MKTSTCK(-1) MKTSTCK(-2) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.109380	11	0.9149
F-statistic	0.011964	(1, 11)	0.9149

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	31312.09	1	31312.09
Restricted SSR	28820542	12	2401712.
Unrestricted SSR	28789230	11	2617203.

Unrestricted Test Equation:
Dependent Variable: RGDP
Method: ARDL
Date: 06/17/22 Time: 21:41
Sample: 1994 2020
Included observations: 27
Maximum dependent lags: 4 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (4 lags, automatic):
Fixed regressors: C

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDP(-1)	1.715667	0.326506	5.254621	0.0003
RGDP(-2)	-0.632491	0.307206	-2.058851	0.0640
FINIM	-1576.360	413.1777	-3.815212	0.0029
FINIM(-1)	1457.708	659.5359	2.210203	0.0492
FINIM(-2)	-1067.090	625.8319	-1.705075	0.1162
FINIM(-3)	526.3787	375.1224	1.403219	0.1881
FINDEPT	-10.13465	85.52329	-0.118502	0.9078
FINDEPT(-1)	-159.9591	84.66012	-1.889427	0.0855
FINDEPT(-2)	143.6601	75.82939	1.894518	0.0847
FINDEPT(-3)	72.64141	62.25048	1.166921	0.2679
FINDEPT(-4)	106.8544	72.99783	1.463803	0.1712
MKTSTCK	1108.723	526.7632	2.104784	0.0591
MKTSTCK(-1)	769.3152	616.4478	1.247981	0.2379
MKTSTCK(-2)	860.0923	608.5355	1.413381	0.1852
C	2948.050	3334.815	0.884022	0.3956
FITTED^2	4.98E-08	4.55E-07	0.109380	0.9149

R-squared	0.999520	Mean dependent var	49736.51
Adjusted R-squared	0.998866	S.D. dependent var	48041.70
S.E. of regression	1617.777	Akaike info criterion	17.90274

Sum squared resid	28789230	Schwarz criterion	18.67064
Log likelihood	-225.6870	Hannan-Quinn criter.	18.13108
F-statistic	1527.823	Durbin-Watson stat	2.437232
Prob(F-statistic)	0.000000		

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