



## EMPIRICAL ANALYSIS OF MONETARY POLICY AND ECONOMIC GROWTH IN NIGERIA

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### ABSTRACT

*The study empirically assesses the impact of monetary policy on economic growth in Nigeria. The study employed time series data ranging from 1982 to 2023. Economic growth is expressed by Real Gross Domestic Product (RGDP) with interest rate, exchange rate, money supply and foreign direct investment serving as monetary policy variables or instruments. The study adopted the ex post facto research design due to its unique quality of being able to examine the cause –and- effect relationship between dependent variables and regressors. The method of data analysis was Auto regressive distributed lag (ARDL) model. The empirical result shown, while foreign direct investment and exchange rate had positive and significant effect on real GDP, money supply (M2) had negative significant impact on real GDP and interest rate was found to be positive and insignificant to real GDP. The study concludes that monetary policy has positive impact on economic growth in Nigerian during the reviewed period. Owing to the findings, the study recommends that monetary authority should implement policy that will enhance foreign direct investment and optimize exchange rate management in the country.*

### 1.1 Introduction:

Nigeria, Africa's largest economy, has struggled to achieve sustainable economic growth despite its vast natural resources and potential. Monetary policy, a crucial tool for promoting economic growth and stability has been employed by the central Bank to regulate the economy. In Nigeria, the central bank uses monetary policy to regulate the money supply, interest rate and exchange rate. Olayemi (2015) defined monetary policy as "the actions taken by the central bank to influence the money supply, interest rates, and overall economic activity. The effectiveness of monetary policy can have a significant impact on a country's overall economic performance and growth. Monetary policy could also be seem as the actions taken by a country's central bank or monetary authority to manage and regulate the money supply, interest rates, and credit conditions in the economy to achieve specific objectives, such as controlling inflation, promoting economic growth, and maintaining stability in the financial system. Central banks use various tools, such as open market operations, reserve requirements, and setting benchmark interest rates, to influence economic activity and ensure price stability.

Olayinka (2014), viewed monetary policy as the use of monetary tools to regulate the money supply, inflation, and monetary action that cuts interest rate which lower the cost of borrowing, leading to higher investment activity and the purchase of consumer durables .The expectation that economic activity may also prompt financial institutions (deposit money

banks) to ease lending policy, which in turn enables businesses and households to boost spending. Additionally, this might lead to increased consumer spending, which would increase the rate of businesses' investment projects. These elements work together to increase investment, consumer spending, output, and employment.

The history of monetary policy in Nigeria dates back to the colonial era when the colonial government controlled the country's currency and monetary system. Following independence in 1960, the central Bank of Nigeria (CBN) was established in 1958 to manage the country's monetary policy and regulate the financial sector. Over the years, the CBN has implemented various monetary policy measures to address economic challenges and promote economic growth. These measures included setting interest rates, conducting open market operations, adjusting reserve requirements, and managing the exchange rate. The impact of monetary policy on economic growth in Nigeria has been significant, with varying degrees of success in achieving macroeconomic stability and promoting sustainable growth. However, challenges such as inflation, exchange rate volatility, and external shocks have continued to impact the effectiveness of monetary policy in Nigeria.

Schumpeter (1934) defined economic growth as a process of "creative destruction," where new technologies and innovations lead to the destruction of old industries and the creation of new ones. Sustainable economic growth is one of the macroeconomic objectives of any country and this has been at the forefront of monetary policy over the years. The central Bank of Nigeria (CBN) considers the objectives and targets of monetary policy as the attainment of price stability and sustainable economic growth (CBN, bulletin 2021). More so, the successive governments in Nigeria have embarked on policies aimed at fostering sustainable economic growth (Nwoko, IHEMEJE, and ANUMADU, 2016). ). A sustainable pace of economic growth is one that can be maintained without posing serious risks to the economy, particularly for coming generations. The neoclassical growth theory, the neo-Keynesian growth theory, and the Endogenous theory of growth are three important theories that have been used to organize ideas and perspectives about the process of economic growth (Dornbusch, Fischer & Startz, 2011).

The Nigeria growth phenomenon has been characterized by seasons of expansion and contraction. In the early period after independence, Nigeria's economy grew quite considerably (Ndubuisi, 2017), however, the sustainability of such growth remains a myth as the country was quickly hampered by a period of dwindling growth. The economic recovery and growth plan of the 2017-2020 document stressed that the general economic performance of the country is seriously weakened by deplorable infrastructure, corruption, insecurity, and poor governance (Ministry of Budget and National Planning, 2017). At present the Nigerian economy is facing problem of high inflation rate, low investment, and increasing unemployment rate. These challenges have hampered the growth of the Nation's economy. In 2015, the Nation's economic growth rate stood at 2.65%, but it contracted by -1.79% in 2020 due to Covid - 19 pandemic and rose to 2.65% in 2023. The Inflation rate which was 9.01% in 2015 increased to 24.67% in 2023. While the unemployment rate also increase from 4.14% in 2015 to 5.71% in 2023. (CBN, bulletin 2023). Through a variety of mechanisms, monetary policy influences economic growth in a stabilizing manner. To be able to fully implement monetary policies, the CBN makes use of some instruments namely: Open Market Operations (OMO), Discount rate Mechanism, Reserve Requirements, Moral Suasion, Direct Control of Banking System Credit and Direct Regulation of Interest Rates.

A sustainable growth can be influenced by monetary policy by keeping prices stable. Since a persistent rise in price levels is thought to be a monetary phenomenon, monetary policy tools can be used to successfully control the money supply in order to preserve medium- and long-term price stability. Lower price levels are linked to sustainable long-term growth, according to theory and actual data in the literature. The relationship between monetary policy and economic growth in Nigeria has been a subject of interest for policymakers, economists, and researchers. Monetary policy plays a crucial role in shaping the economic landscape of a

country by influencing key macroeconomic variables such as inflation, employment, and economic growth.

In Nigeria, as in many other countries, the central Bank plays a pivotal role in formulating and implementing monetary policy measures to achieve specific economic objectives. Despite the efforts of the central Bank of Nigeria (CBN) to stabilize the economy through various monetary policy instruments, Nigeria's economic growth has remained sluggish and volatile, experiencing fluctuations in balance of payment equilibrium, inflation rates, exchange rate dynamics. The country's economic growth rate has been largely unpredictable, making it difficult for policymakers to design effective strategies for sustainable economic development. Against these backdrops, this study seeks to investigate the relationship between monetary policy and economic growth in Nigeria.

## **1.2 Statement of the Problem**

Monetary Authorities in Nigeria especially the central Bank uses numerous tools or instruments to achieve its stated objectives and these include: Open Market Operation (OMO), Reserve Requirements, monetary policy rate, discount rate and Moral suasion as well as money supply (CBN, bulletin 2003). Over the years, there have been various monetary policy regimes in Nigeria which are either tight or loose with the overall objective of curtailing inflationary pressures and maintaining price stability (Olayinka, 2014). The Nigerian economy has faced numerous challenges, including high inflation rates, fluctuating exchange rates, unemployment and a heavy reliance on oil exports, which have hindered economic growth and development. Furthermore, the CBN's monetary policy decisions have often been criticized for being ineffective or even counterproductive, exacerbating the economic challenges facing the country. In addition, the Nigerian economy has also witnessed times of expansion and contraction with an unsustainable growth pattern. A study by Anyanwu (2016) concludes that well-coordinated monetary policy actions will bring about the desired economic growth in the country.

Despite the CBN's effort to implement monetary policies, Nigeria's economic growth has remained sluggish, with the country experiencing frequent incidents of recession, high inflation, unemployment and volatility of exchange rate. The inability of monetary policy to effectively stimulate economic growth in Nigeria raises concerns about the efficacy of the central Bank's policy framework and the underlying structural issues hindering the transmission mechanism of monetary policy. This study aims to address these concerns by examine the impact of monetary policy on economic growth in Nigeria with a view to identifying the most effective monetary policy instruments for promoting sustainable economic growth and development in the country.

## **2.1 Theoretical Literature:**

### **2.1.1 The Monetarist Approach**

The monetarist approach has its core development traceable to the works of Friedman (1970). The theory holds that a consistent supply in money supply is bound to stimulate the economy through the action of enforcing activation in aggregate demand. The monetarist school of thought opined that money supply is the primary driver of economic activities. They advocated for monetary policy framework that focuses on controlling money supply, rather than interest rate or other variables. The monetarists insisted that government invention through monetary authority on the volume of supply of money or regulation stands the best chance of attaining balance or equilibrium in the system. They further noted that economic depression is related to inadequate supply of money in the economy. If there exist an adequate volume of financial resources, interest rate will drastically fall while investment will push up, demand for labor will rise and total output will rise. To the monetarist, one of the best options of monetary policy instruments to be used in adjusting the activities of the economy is level and volume of money supply. Monetarist theory, led by Milton Friedman, emphasizes

the role of money supply in determining economic activity. On the basis of monetarist approach, Gul, Mughal, Rahim (2012) explored the impact of monetary policy on economic growth and concludes that money supply has a strong positive impact on economic growth in Nigeria. Also, on the same theoretical framework, Amassoma, Nwosa and Olaiya (2011) conducted a study on the impact of monetary policy on macroeconomic variables in Nigeria. They conclude that monetary policy actions or measures are instrumental to achieving macroeconomic objectives such as economy growth in the country. Key ideas include of the monetarist school of thought include: i) Money supply growth determines nominal GDP growth ( $MV=PT$ ); ii) Monetary policy should focus on maintaining a stable money supply growth rate and iii) Inflation is always a monetary phenomenon. Monetarist key assumptions include: Money supply is exogenous, velocity of money is constant, economic agents are rational and markets are efficient.

## 1.2 The Keynesian Approach

Keynes (1936) asserted that market imperfections and failure of forces of demand and supply to restore the economy to equilibrium necessitate government intervention to correct short run changes that would affect aggregate demand thereby reinforcing investments, job creation and real output growths. To address the issues of inflation, the monetary authorities have the option of adjusting monetary aggregates to influence the interest rate. Keynes emphasizes the role of aggregate demand in determining economic activity. Keynesians argue that monetary policy can be used to stabilize the economy during times of economic downturn. The Keynesian economists assert that the quantity of money is determined by the rate of interest and the level of national income. Keynesian theory emphasizes the importance of monetary policy in promoting economic growth and stability. According to Keynesians, monetary policy can influence aggregate demand, output, and employment. Following the Keynesian approach, Fasanya, Onakoya and Agboluaje (2013) explored the impact of monetary policy on economic growth in Nigeria; the study concludes among others that interest rate is significant monetary policy instruments that drive growth in Nigeria. The key ideas of the Keynesian theory include: i) Expansionary monetary policy of lowering interest rates, ii) Quantitative easing and iii) Pursuing higher aggregate demand that leads to increased output and employment.

## 2.2 Empirical Review

The effects of monetary policy on economic growth have been widely studied even when the conclusions reached have remained contradictory. While on one hand, some empirical findings indicate that effective application of monetary policy leads to economic growth, others showed contradictory evidence on the effect of monetary policy on economic growth. For instance, Lawal & Rabiou (2024), investigated the impact of monetary policy and inflation on economic growth in Nigeria from 1990 to 2022. The results shown that monetary policy rate, lagged values of interest rate and money supply positively impacted the growth of the economy. In a related study, Innocent et al (2024), examined the relationship between monetary policy and economic growth in Nigeria when there is evidence of structural break. The findings shown that while Money Supply (M2) has a significant positive impact on economic growth in the short run, net credit to Government (NCG) has a negative significant impact on economic growth in Nigeria. This study concludes that broad money supply contributed to economic growth in the short run.

Using Ordinary Least Square (OLS) and ex-post facto research methodology Ugwu Flora Onyinye (2024) explored the impact of monetary policy on the economic growth in Nigeria from 1981 and 2017. The result indicated that interest rates had significant impact on Nigeria's economic growth, while monetary policy rate and exchange rate have negative relationship with economic growth in Nigeria. Thus, the study advocated that monetary

authority should keep a close look on the trajectory of the crucial macroeconomic variables in order to prevent the Nigerian economy from experiencing financial shock.

Similarly, Ridwan & Muhammed (2023) analyzed the effect of monetary policy on economic growth in Nigeria. The study utilizes time series data from 1990 to 2020 and found that monetary policy significantly affects economic growth in Nigeria. It therefore recommends that monetary authority in Nigeria should improve monetary policy in order to boost economic growth in the country. Also, Eytayo et al (2023) investigated the impact of monetary policy shocks on economic growth in Nigeria for the period 1991 to 2020. The findings shown that output responded positively to the expansionary monetary policy shocks but negative to a contractionary interest rate shocks. The study concluded that expansionary monetary policy positively affects economic growth in Nigeria.

Shittu et al (2023) evaluated the impact of monetary policy variables on Nigeria's economic growth from 1981 to 2021 using autoregressive distributive lag (ARDL) as a technique of empirical analysis. The result shown that while interest rate had a significant and positive effect on Gross Domestic Product, money supply and exchange rate were found to have negative significant impact on GDP. The study advocated that central Bank of Nigeria should maintain an increase in money supply in order to boost economic growth in the country. Similarly, Austin (2022) explored the impact of monetary policy on the real sector and the effectiveness of various monetary policy transmission channels in Zambia economy. The findings revealed that exchange rate and deposit rates have positive significant impact on Zambia economic growth. The study also affirmed the effectiveness of the monetary policy transmission channels in Zambia.

Muhammed et al (2021) investigated the impact of monetary policy on the Nigerian economy. The study utilizes time series data from 1981 to 2016. The study employed Augmented Dickey-Fuller test, vector error correction mechanism (VECM) and the ordinary least squares (OLS) method as techniques of empirical analysis. The result shown that monetary policy rate has positive impact on economic growth. Base on the findings, the study thus recommends that monetary policy should facilitate a favorable investment climate through appropriate interest rates, exchange rate and liquidity management mechanism.

Shaibu & Enofe (2021) explored the link between monetary policy instruments and economic growth in Nigeria using time series data from 1986 to 2018. The empirical results showed that interest rate had a positive significant impact on economic growth in Nigeria in the short run, while one period lag of Gross domestic product and broad money supply had significant impacts on economic growth in Nigeria. They advocated for monetary authority to pursue expansionary monetary policy that will advance investment in the nation's economy. Adeniyi et al. (2020) studied the relationship between monetary policy and economic growth in Nigeria. The study found that monetary policy had a positive impact on economic growth in Nigeria in both short and long run. Specifically, the study found that an increase in money supply had a positive impact on economic growth, while an increase in interest rates had a negative impact on economic growth.

Iwedi (2019) evaluated monetary policy transmission channels and economic growth in Nigeria. The study utilizes time series data from 1960 to 2016. Based on the finding, the study concludes that interest rate and credit channels are critical channels for transmitting monetary policy impulses into the Nigeria economy.

### **3.1 Research Methodology**

### **3.2 Analytical Frame work**

The functional relationship between the endogenous variable and its explanatory variables of this study is anchored on the theory of Keynes (1936) and Friedman (1970). The model is expressed in line with the analytical framework of Fasanya et al. (2013) and Adegbite and Alabi (2013), who investigated the impact of monetary policy on economic growth in Nigeria. However, in this study, modification was done in terms of extension of scope and

inclusion of additional variables. The model is expressed as Auto Regressive Distributed Lag (ARDL) and Error Correction Mechanism (ECM) as follows:

ARDL Model:

$$\begin{aligned} \Delta \text{RGDP}_t &= a_0 + \sum_{i=1}^p a_1 \text{IR}_{t-i} + \sum_{i=1}^q a_2 \text{ER}_{t-i} + \sum_{i=1}^q a_3 \text{FDI}_{t-i} + \sum_{i=1}^q a_4 \text{MS}_{t-i} + a_5 \Delta \text{IR}_{t-i} + a_6 \Delta \text{ER}_{t-i} \\ &+ a_7 \Delta \text{FDI}_{t-i} + a_8 \Delta \text{MS}_{t-i} \\ &+ e_t \end{aligned} \tag{3.1}$$

ECM Model

$$\begin{aligned} \Delta \text{RGDP}_t &= a_0 + \sum_{i=1}^p a_1 \Delta \text{IR}_{t-i} + \sum_{i=1}^q a_2 \Delta \text{ER}_{t-i} + \sum_{i=1}^q a_3 \Delta \text{FDI}_{t-i} + \sum_{i=1}^q a_4 \Delta \text{MS}_{t-i} + \& \text{ECT}_{t-i} \\ &+ e_t \end{aligned} \tag{3.2}$$

Where:

RGDP = Real Gross Domestic Product

IR = Interest Rate

ER = Exchange Rate

FDI = Foreign Direct Investment

MS = Money Supply

&= speed of adjustment (with a negative sign, it shows convergence, while positive is no convergence).

$\alpha_1$ - $\alpha_8$  are coefficients,  $\alpha_0$  is the intercept or constant,  $e_t$  is the error term and  $\Delta$  represents the difference operator.

p and q = lag length

### 3.3 Variables in the Model:

Economic growth proxied by Real Gross Domestic product served as the dependent variables:

#### a). Dependent Variables

##### Gross Domestic product (RGDP):

Gross Domestic Product is the total monetary value of final goods and services produced within the geographical confines of a country measured yearly. The yearly GDP figures measures the level of performance an economy is witnessing. The GDP is a measure of a country's performance, and represents the total value of all goods and services produced within a country's borders over a specific period of time, usually annually or quarterly. It is used as an indicator of a country's economic health and is often used to compare the

economic performance of different countries. GDP can be calculated using three different approaches-productions (value added), income and expenditure.

**b). Independent Variables:**

Monetary policy variables of interest rate, exchange rate, foreign direct investment and money supply (M2) serve as the explanatory variables

**i). Interest Rate (IR):**

Interest rate is the return on investment for lending money, expressed as a percentage of the principal amount. Interest rates play a crucial role in the economy as they influence borrowing and lending decisions. It is expected that a decrease or reduction in prevailing interest rate will impact positively on growth in the economy through boost in investment returns. ,

**ii). Exchange Rate (ER):**

Exchange rate refers to the value of one currency in terms of another currency. Changes in exchange rate can have a significant impact on a country's economic growth like a country's trade, inflation, investment, debt and tourism.

**iii). Foreign Direct Investment (FDI):**

Foreign direct investment (FDI) is an investment made by a company or citizens of a particular country in another country in the form of either establishing business operations or acquiring business assets in the foreign country,(Lucas 1988). FDI often involves establishing a long-term presence in the foreign market, such as setting up subsidiaries, branches, or joint ventures. FDI is different from portfolio investment, which involves investing in foreign financial assets such as stocks and bonds without establishing a significant influence on the foreign business. FDI is seen as a way for a company to expand its global presence, access new markets, gain access to resources, technology, and expertise, and benefit from potential cost advantages. FDI can have various benefits for both the investing company and the host country. For the investing company, FDI can provide access to new markets, increase market share, diversify operations, gain access to resources and technology, and strengthen competitiveness. For the host country, FDI can bring in capital, create jobs, transfer technology and skills, stimulates economic growth, increase tax revenue, and foster development. Governments often encourage

**iv). Money Supply:**

Money supply refers to the total amount of money circulating in the economy at a given point in time. It includes all forms of money, such as physical currency (coins and banknotes) and digital deposits held in banks. The money supply is typically categorized into different components based on their liquidity and accessibility, such as M0 (base money or narrow money), M1 (narrow money), M2 (broad money), and M3 (broad money). Central banks often track and control the money supply as part of their monetary policy tools to achieve specific economic objectives like controlling inflation, stimulating economic growth, or maintaining financial stability. The money supply plays a crucial role in the functioning of the economy as it facilitates transactions, investments, and overall economic activity.

**3.4 Method of Data Analysis**

The auto regressive distributive lag (ARDL) technique was used to estimate the empirical relationship between monetary policy and economic growth in Nigeria. The choice of ARDL was based on its unique attributes of being able to estimate variables especially when the datasets for analysis are not all stationary and there is prospect of mixed order of integration. Although ARDL models have been used in econometrics for decades, they have gained popularity in recent years as a method of analyzing cointegration relationship between variables through the work of Pesaro, Shin and Smith (2001). In addition to ARDL, this study

also applied descriptive statistics to gain insights into the mean distribution, standard deviation and normal distribution of the variables. The study employed time series data and this necessitated stationarity tests in order to avoid false regression.

### 3.4.1 Unit Root Test

The Augmented Dickey-Fuller unit root unit procedure proposed by Dickey and Fuller (1981) was used in this study for the stationary status of the underlying economic time series. It was supportive in identifying the number of times each of the variables is being differenced before it becomes stationary. The general representation of the unit root model with constant and trend is provided as:

$$\Delta W_t = b_0 + b_1 W_{t-1} + \sum_{i=1}^n c_i \Delta W_{t-i} + u_t \tag{3.6}$$

Where:

$W_t$  = economic time series under investigation

$b_1$  and  $c_i$  = parameter estimate of the variables

$n$  = optimal lag length

$\Delta$  = First difference operator

$u_t$  = Stochastic term

The optimal lag length for each of the variables was decided using Akaike information criterion (AIC).

### 3.4.2 Cointegration test:

The cointegration test for this study focused on bound test approach proposed by Pesaro, Shin and Smith (2001). The null hypothesis of no cointegration was tested against the alternative hypothesis of cointegration at 5% level of significant interval.

The decision criteria for the bound test are as follows:

1. If calculated F-statistics is greater than that critical value at 5% for upper bound I (1), there is cointegration (existence of long run relationship), fail to accept the null hypothesis and estimate both ARDL and ECM models.
2. If calculated F-statistics is less than that critical value at 5% for lower bound I(0), there is no cointegration (absence of long run relationship), accept the null hypothesis and estimate only the ARDL model.
3. If calculated F-statistics fall between the lower bound I (0) and upper bound I (1) the test is considered inconclusive.

## 4.1 Results and Discussion

### 4.2 Descriptive Statistics

The descriptive statistics for each of the variables are summarized in table 4.1

**Table 4.1: Descriptive statistics of the series**

	RGDP	MS	INT_RATE	FDI	EXC_RATE
Mean	37466.71	9299.608	22.94714	397.5095	115.6041
Median	27112.63	1505.96	22.465	178.8	115.2551
Maximum	75768.95	48462.07	36.09	1360.3	423.4
Minimum	13779.26	14.47	10	0.3	0.61
Std. Dev.	21965.15	13375.06	6.687816	426.6593	118.8237
Skewness	0.515055	1.387724	-0.039322	0.698393	1.014271
Kurtosis	1.636145	3.794843	2.424938	2.152359	3.200711
Jarque-Bera	5.112143	14.23877	0.589541	4.671635	7.271725
Probability	0.077609	0.000809	0.744702	0.096731	0.076361



Sum	1573602	381283.9	963.78	16695.4	4855.372
Sum Sq. Dev.	1.98E+10	7.16E+09	1833.802	7463566	578882.1
Observations	42	42	42	42	42

**Source: Author’s computation from E-views 12**

Assessments from Table 4.1 reveal that growth in Real Gross Domestic Product (RGDP) averaged 37466.71 billion between 1981 and 2022. The minimum and maximum values of growth in real GDP are 13779.26 billion and 75768.95 billion respectively. More also, growth in the money supply ranged from 14.47b to 48462.07b, while movement in interest rate averaged 22.9 between 1981 and 2023 and ranged from 10.0 to 36.09. Foreign direct investment ranged from 0.3 to 1360.3, exchange rate ranged from 0.61 to 423.4. Further to this, the probability values of the Jarque-Bera statistics of all the variables except money supply are more than 0.05, indicating that at 5% level, the errors in the variables are normally distribute

#### 4.2 Unit Root Test

Considering the peculiar feature of time series data which often tend to be non-stationary, the variables under consideration were subjected to stationarity tests and the outcome of the test is showed below in table 4. 2

**Table 4.2: Summary of ADF unit root test results**

ADF Unit root test results					
Variable	Levels test results		First Difference test results		
	t-stat.	5% critical value	t-stat.	5% critical value	Order of integration
GDP	-0.727	-2.936	-3.142	-2.936	I(1)
INT. RATE	-2.367	-2.936	-7.143	-2.936	I(1)
MONEY SUPPLY	-3.716	-3.53	-1.657	-3.530	I(0)
EXC. RATE	-2.81	-2.936	-4.23	-2.936	I(1)
FDI	-2.2	-3.53	-7.589	-3.530	I(1)

**Source: Author’s computation from E-views 12**

Table 4.2 shows the unit test results for each of the variables. The leftmost part shows the test results at levels while the rightmost part shows the test results at first difference. It was found that money supply is stationary at levels. Evidences from the unit root test results indicate that the variables are mixed integrated and thus, can enter into the ARDL model upon confirmation of long run relationship among them from the cointegration test

#### 4.3 Cointegration Test

A cointegration test is a statistical test used to determine whether two or more time series variables are cointegrated. Cointegration means that the variables share a common long-term trend and do not diverge from each other over time. The fulfillment of the criteria for

stationarity for the series prompted the test for the existence of long run relationship between the variables using Bound test. The result is outlined below in table 4.3

**Table 4.3: Bound results for RGDP model**

Series: RGDP, IR,ER,FDI,MS				
F-Bounds Test		Null Hypothesis		
		No levels relationship		
Test Statistic	Value OF	SIGNIFICANT	LOWER BOUND	UPPER BOUND
	F-stat		I(0)	I(1)
F-statistic	10.35299	10%	2.2	3.09
K	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37

Source: Author’s computation from E-views 12

In RGDP model the F-statistics value is greater than the value of the upper bound at 5% critical value. It shows evidence of atleast a cointegrating equations in the model.

**4.4 Estimation of the Cointegration Model**

The ARDL (Autoregressive Distributed Lag) test is a statistical test used to examine the relationship between two or more time series variables. It is an extension of the traditional Autoregressive (AR) model and incorporates the concept of distributed lags. The ARDL test is used to: Examine the long-run and short-run relationships between variables as well to determine the presence of cointegration (a long-term equilibrium relationship) and identify the speed of adjustment to equilibrium. The ARDL test is a powerful tool for analyzing time series data and can provide valuable insights into the relationships between economic variables. The cointegration models of this study that depict the long run behavior of the variables are estimated using Auto regressive distributive lag (ARDL) model with the specification of both the short and long run short forms of equation results.

**Table 4.4: ARDL SHORT AND LONG RUN RGDP MODEL**

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Long Run Equation				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
MS	-2.89738	1.335602	-2.16935	0.0478
INT_RATE	17.79732	204.0101	0.087237	0.9317

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FDI	26.17167	4.528227	5.779672	0.0000
EXC__RATE	236.2169	68.95992	3.425422	0.0041

### Short Run Equation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(MS)	0.495906	0.127573	3.887239	0.0016
D(MS(-1))	0.994575	0.16399	6.06486	0.0000
D(MS(-2))	1.296012	0.157603	8.223288	0.0000
D(MS(-3))	0.319262	0.203116	1.571825	0.1383
D(INT_RATE)	51.6113	26.38828	1.955842	0.0707
D(FDI)	-1.065167	1.19848	-0.888765	0.3891
D(FDI(-1))	-7.048178	1.539788	-4.57737	0.0004
D(FDI(-2))	-7.099823	1.712178	-4.146661	0.001
D(FDI(-3))	-3.849185	1.412755	-2.724594	0.0164
D(EXC__RATE)	-0.813184	24.6591	-0.032977	0.9742
D(EXC__RATE(-1))	9.881981	16.53346	0.597696	0.5596
D(EXC__RATE(-2))	11.15129	14.93017	0.746896	0.4675
D(EXC__RATE(-3))	-21.47609	8.775179	-2.447368	0.0282
CointEq(-1)*	-0.177799	0.019365	-9.181661	0.0000
R-squared	0.893621	Mean dependent var		1754.548
Adjusted R-squared	0.820835	S.D. dependent var		1517.444
S.E. of regression	642.3022	Akaike info criterion		16.06441
Sum squared resid	7838490	Schwarz criterion		16.69929
Log likelihood	-251.0628	Hannan-Quinn criter.		16.27803
Durbin-Watson stat	2.076618			

**Source: Author's computation from E-views 12**

From the estimated ARDL regression in Table 4.4, it was found that foreign direct investment and exchange rate have positive significant impact on economic growth. This finding is in agreement with the a priori expectation that suggests that increase in FDI and appreciation of the nations currency will lead to economic growth. Money supply was found to exert negative significant impact on economic growth, while interest rate was found to be insignificant to economic growth during the reviewed period. The coefficient of determination (R<sup>2</sup>) reveals that the proportion of the explained variation to the total variations of the growth of real GDP model is 0.89. This is suggestive that the explanatory power of the regressors is 89 percent. Thus, the model is considered as a good fit as the observations, on the average converge to the regression. The ARDL short run result shows that the coefficient of the error correction term (COINTEQ01) is -0.177799. The result is negative and significant at the 5% level of statistical significance. This affirmed that the variables are maintaining a steady equilibrium and that in case of any shock or divergence in the system it will take the variable an average of 17.8% to return to equilibrium in the long run.

#### 4.5: Post-estimation Diagnostics Tests

The post-diagnostic tests examined in this study include: Wald test, Normality test and Stability test.

##### 4.5.1: Wald Tests

Wald test is a statistical test used to determine whether a set of constraints on a regression model are valid. It's commonly used in econometrics and finance to test hypotheses about the relationships between variables and to determine whether a variable or a group of variables is significant. The wald test result for this study is shown in Table 4.5.

**Table 4.5: Wald test result for RGDP Model**

Null Hypothesis: $C(1)=C(2)=C(3)=C(4)=0$			
<b>Wald test result for RGDP model</b>			
Test Statistic	Value	Df	Probability
F-statistic	222.4909	(4, 36)	0.0000
Chi-square	889.9637	4	0.0000

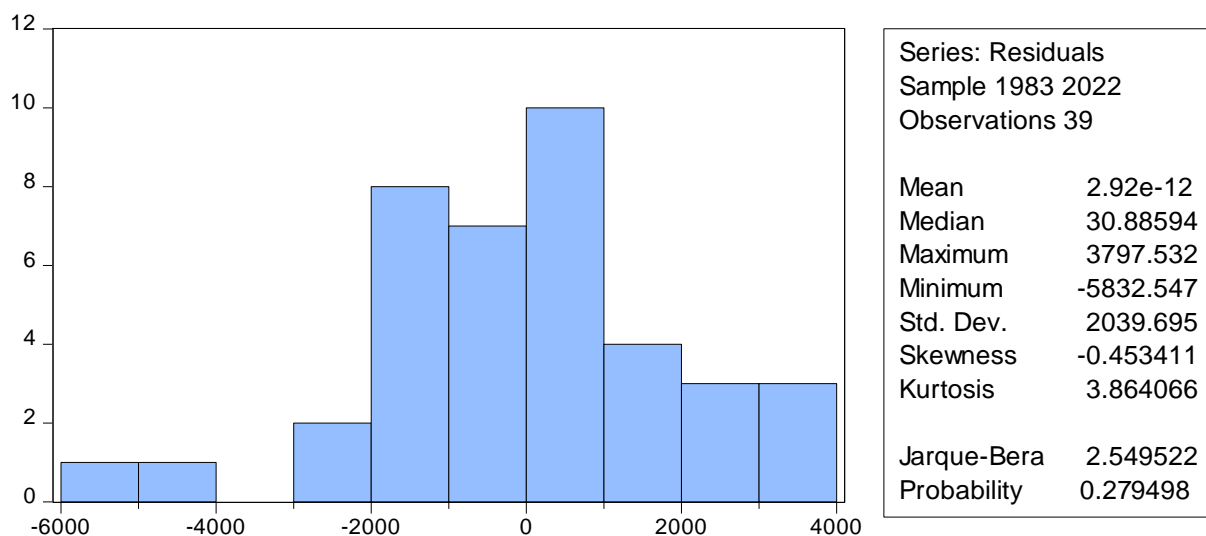
**Source: Author's computation from E-views 12**

The Wald test results in Table 4.5 shows that the explanatory variables are jointly significant in explaining changes in growth in real Gross domestic product during the study period (P-value < 5%). Hence, the regressors are vital in forecasting changes.

##### 4.5.2 Normality test:

A normality test is a statistical test used to determine whether a dataset follows a normal distribution pattern. The normality test for this study is shown Table 4.6:

**Table 4.6: Plot of normality test for Real GDP model**



**Source: Author's computation from E-views 12**

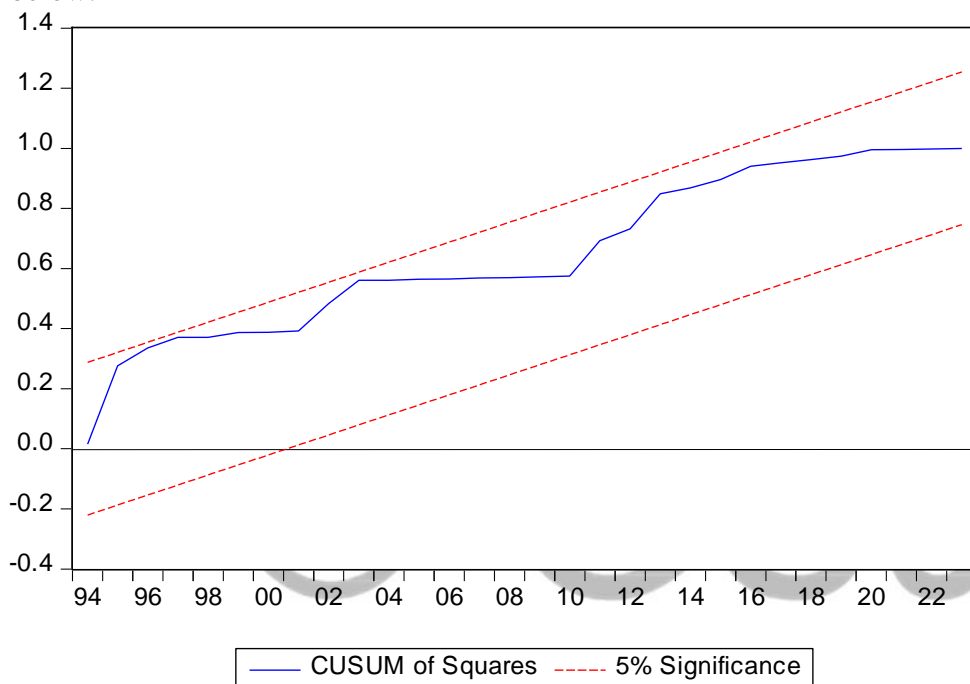
From the normality test results illustrated in Table 4.6, the error in the models is normally distributed. This is because the associated probability value of the Jarque-Bera statistics is greater than 0.05 (5%) critical value.

**4.5.3: Stability test:**

Stability test is a statistical test used to determine whether a regression model is stable over time. In other words, it checks if the relationships between the variables in the model are consistent across different time periods. The stability test result for this study is shown in Table 4.7.

**Table 4.7: Stability Test Result for real GDP Model**

The Cumulative Sum (CUSUM) of squares serves as the stability test for this study as shown below:



As shown in Table 4.7, the Cumulative Sum (CUSUM) of Squares line is within the 5% critical value bounds. Therefore, the estimate of the long-run model for the real GDP is stable.

**5.1: Conclusion and Recommendations**

**5.2: Conclusion**

The main objective of this study was to assess the impact of monetary policy on economic growth in Nigeria using Autoregressive Distributed Lag (ARDL) approach. This analytical technique allowed for the investigation of both the long-run and short-run effect. The results of the study showed several significant relationships between variables under investigation. Exchange rate and foreign direct investment were found to have a positive and significant effect on growth of real GDP. Money supply (M2) was seen to have negative significant impact on real GDP. The ARDL result also shown that real interest rate was insignificant to the growth of real GDP. On the account of the empirical findings of this study, it is concluded that monetary policy has a long run relationship with economic growth in Nigeria within the reviewed period.

### 5.3 Recommendations

The following are thus recommended for policy actions based on the findings of this study:

1. Optimize Exchange rate Management: Since the exchange rate is positive and significant to real GDP in the findings, monetary authority especially the CBN should maintain a stable and competitive exchange rate regime in order to boost economic growth.
2. Encourage foreign direct investment (FDI): The Nigerian government should implement policies that promote business friendly environment, invest in infrastructure and promote investment incentives to leverage FDI's positive impact on real GDP.
3. Reassess Monetary policy Tools: The CBN should re- evaluate the use of money supply as a monetary policy tool, as it has a negative impact on real GDP from the findings. It should consider alternative tools such as reserve requirements to stimulate economic growth.
4. Regularly review and adjust policies: CBN should periodically assess the effectiveness of monetary policy and adjust strategies as needed to ensure alignment with changing economic conditions.

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