Effects of Monetary Policy on Economic Growth in Nigeria: An Empirical Analysis

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Abstract
This study investigates the effect of monetary policy on economic growth in Nigeria from 1982 to 2022, utilizing time series data sourced from the World Development Indicators and the CBN Statistical Bulletin. The specific objectives are to analyze the effects of interest rate, exchange rate, money supply, and cash reserve ratio on gross domestic product (GDP) in Nigeria. The data analysis techniques employed include descriptive statistics, unit root tests, bounds cointegration, the autoregressive distributed lag (ARDL) estimation method, and residual diagnostics tests. The Augmented Dickey-Fuller (ADF) unit root tests reveal a mix of I(1) and I(0) series, indicating that the variables differ in their levels of integration. Evidence of cointegration was established, suggesting a long-term equilibrium relationship among the variables. The ARDL results indicate that money supply has a significant positive effect on GDP in Nigeria, revealing that a unit increase in money supply increases GDP. Cash reserve ratio, exchange rate, and interest rate all show a negative effect on GDP, suggesting that an increase in cash reserve ratio, exchange rate, and interest rates decreases GDP in Nigeria. Owing to these findings, this study concludes that monetary policy significantly influences the growth of real GDP in Nigeria. Thus, it is recommended, among other things, that the Central Bank of Nigeria should consider an expansionary monetary policy stance. This can be achieved by increasing the money supply through open market operations, reducing the monetary policy rate, or lowering the cash reserve requirement for banks. Additionally, the Nigerian government should consider gradually lowering the cash reserve ratio to free up more funds for banks to lend to businesses and consumers. This move can help spur investment and consumption, ultimately boosting real GDP.

***Key words**: Interest Rate, Exchange Rate, Cash Reserve Ratio, Money Supply and Gross Domestic Product,*

INTRODUCTION

Monetary policy plays a pivotal role in influencing the macroeconomic stability and long-term growth strategy of any economy. In Nigeria, the central bank of Nigeria employs monetary policy tools such as interest rates, money supply, and reserve requirement to stabilize prices, reduce unemployment and promote economic growth. The effectiveness of these tools in achieving sustained economic growth, however, remains a subject of debate among scholars and policy makers. While some empirical studies suggest that monetary policy significantly drives economic expansion by stimulating investment and consumption (Adeosun, 2020, Ibeabuchi 2007), others argue that structural deficiencies and policy inconsistencies limit its impact (onafowora & owoye 2007)

The Nigerian government, like that of any other developing country, uses three types of public policies to achieve its goals of income distribution and resource allocation. Monetary policy,

fiscal policy, and income policy are examples of public policy tools. In Nigeria, the government has historically relied on monetary policy to achieve specific macroeconomic objectives, such as job creation, economic growth and development, the balance of payment stability, and a reasonably steady general price level. The fact that monetary policy has very serious repercussions for both fiscal and income policy measures is the reason for picking it in this study, (Adegbite & Alabi, 2013).

The role of monetary policy on the economic growth and its effect on aggregate economic activity depends on how monetary policy is conducted and the independence of the central bank to choose the appropriate monetary tools to formulate the monetary policy of macroeconomic objectives (Alavinasab, 2016). According to Central Bank of Nigeria (2021) monetary policy is an arrangement or a purposeful measure which is designed to regulate the value, supply and cost of money in an economy in consonance with the expected level of economic activity. However, monetary authority via central bank uses various monetary policy instruments which include; monetary policy rate, money supply, lending interest rate, cash reserve ratio, discount rate, open market operation among other instrument in targeting at controlling volume of money in circulation either directly or indirectly.

Monetary policy influences the volume and direction of purchasing power in an economy and is an instrument of market intervention to achieve rationality stipulated objectives which otherwise be impossible of attainment at least in terms of volume, speed and direction (Anyanwu, in Arema & Omoniyi, 2021). Monetary policy is construed to be the actions of monetary authorities to influence a nation's level of economic activities. The policy has a central role in macroeconomic management, primarily because of the close relationship between money supply and the level of economic activities. The ultimate objective of monetary policy is to control Cash reserves ratio; hence there is a need for monetary authorities to restrain excessive money supply. The economic environment that guided monetary policy before 1986 was characterized by the dominance of the oil sector, the expanding role of the public sector in the economy and over-dependence on the external sector. In order to maintain price stability and a healthy balance of payments position, monetary management depended on the use of direct monetary instruments such as credit ceilings, selective credit controls, administered interest and exchange rates, as well as the prescription of cash reserve requirements and special deposits.

Economic growth is a key policy objective of any government because it is essential in reducing the poverty level, creation of employment opportunities and bridging the inequality gap (Anowor & Okorie, 2016). Economic growth raised the general standard of living of the populace, makes income distribution easier to achieve, enhance time frame of accomplishing the basic needs of man to a substantial majority of the populace (Uwakaeme, 2015). When stated in terms of per capital income, economic growth is defined as aggregate output of goods and services of a country produced within a given year divided by the population (Uwakaeme, 2015).

However, this output is determined by the country economic resources, the size and skill of its workforce and technological productivity of its capital stock. The growth rate of economy therefore will depend on the growth rate of these resources; physical capital and human capital as well as changes in the underlying productivity of these general inputs in the economy (Okwo, Eze and Nwoha, 2012). Although monetary policy is one of the core drivers of economic growth and development through its impact on economic variables (Anowor and Okorie, 2016), the role money in an economy is a subject of great controversy among contemporary Economists.

Despite the increased focus on monetary policy manipulation in Nigeria, the country's economic growth remains an issue. High unemployment, low investment, high Cash reserves

ratio, and an unstable foreign exchange rate are examples of such issues. These alleged issues are said to have contributed to Nigeria's rapid drop in economic growth. In 1990 the economic growth rate which was at 1.36% drop to 1.19% in 1999 as the result of the increase in the unemployment rate from 3.35% to 17.5% and the Cash reserves ratio rate was 6.62%, in 2004 and 2008 there was a drop-in growth rate from 6.58% to 6.41% with an increase in unemployment and Cash reserves ratio rate to 14.7% and 11.58% respectively. In 2019 the GDP growth rate was 2.21% when the unemployment rate increased to 8.53% and Cash reserves ratio to 11.4% (CBN, 2019). Over the years there has been an unstable exchange rate regime which also poses a threat to economic growth. As a result, it is vital to highlight Nigeria's monetary policy and assess the extent to which it has contributed to the country's economic progress.

Moreso, despite, the Central Bank of Nigeria (CBN) effort through application of monetary policy measures to stabilize the economy and stimulate growth, the Nigerian economy is still faced with mirage of problems which is linked to stock of money in circulation such as high inflation, exchange rate instability and sluggish economic growth. The effectiveness of these policies remains questionable, given the recurring cycles of economic contraction and inflationary pressures (CBN, 2022).

Empirical evidence on the relationship between monetary policy and economic growth in Nigeria has produced mixed results. Some studies indicate a positive correlation between expansionary monetary policy and output (Adewumi & Kehinde 2020; Anowor and Okorie 2016; Chipote and Makhetha-Kosi 2014; Fasanya and Onakoya (2013), while others suggest that mechanisms are weak due to structural bottlenecks, fiscal dominance and underdeveloped financial markets (Adebayo et al 2019). This study therefore investigates the effect of interest rate, exchange rate, money supply and Cash reserves ratio on economic growth using real gross domestic product (RGDP) of Nigeria from 1982-2022.

LITERATURE REVIEW

Theoretical Review

The Monetarist Theory of Money by Milton Friedman (1967)

The modern theory was propounded by Milton Friedman. Friedman’s contribution to monetary theory is precise, as he does not waste time trying to explain the motives for hording money, rather he analyzes the factors that determines how much money people will want to hold under various circumstances. This theory holds a completely different view. They believe that when the Central Bank purchases securities in open market, it sets in motion substitution and wealth effects, as the public portfolio consists of wide variety of assets such as bonds, equities, savings, mortgage, etc. These effects will ultimately increase aggregate money demand and expand output. This theory is related to monetary economics which is essentially concerned with the role of money in an economy. It specializes on the development of monetary theory and policy, and it is used in influencing the level of economic activities and money in circulation. Monetary policy affects almost every facet of the economy like Cash reserves ratio, interest rate an employment etc. Monetary economic also studies the behavior of financial institutions such as deposit money banks which are significant in determining the pace of growth and development in the economy.

According to Kimberly, (2017), Monetarism is an economic theory that says the money supply is the most important driver of economic growth. As the money supply increases, people demand more. Factories produce more, creating new jobs. Monetarists warn that increasing the money supply only provides a temporary boost to economic growth and job creation. Over the long run, it will increase Cash reserves ratio. As demand outstrips supply, prices will rise. Monetarists believe monetary policy is more effective than fiscal policy. That's

government spending and tax policy. Stimulus spending adds to the money supply, but it creates a deficit. This adds to the country's sovereign debt. That will increase interest rates. Monetarists say that central banks are more powerful than the government because they control the money supply.

Monetarists watch real interest rates rather than nominal rates. Most published rates are nominal rates. Real rates remove the effects of Cash reserves ratio. They give a truer picture of the cost of money. Today, monetarism has gone out of favour. That's because the money supply is a less useful measure of liquidity than in the past. Liquidity includes cash, credit and money market mutual funds. Credit includes loans, bonds and mortgages. But the money supply does not measure other assets, such as stocks, commodities and he equity. People are more likely to save money in the stock market as money markets. They receive a better return. (Source: "Has the Fed Abandoned Monetarist Theory?" World Economic Forum, September 23, 2015). That means the money supply does not measure these assets. If the stock market rises, people feel wealthy and are more willing to spend. That increases demand and boosts the economy. These assets created booms that the Fed ignored. They led to the 2001 recession and the Great Recession. The application of the Milton friedman's monetary theory to economic growth highlights the importance of central banks activities in the area of buying and selling of financial securities in the financial market which influences economic activities thereby stimulating economic growth in Nigeria

Keynesian theory by Prof. Meynard Keynes (1939)

The Keynesian theory was informed by the disagreement with the classical theory view that the supply of money influenced price directly and that economy always stayed at full employment level. According to Keynes the demand for money varies directly with the level of income (i.e. the higher the level of income the larger the amount of money held by transaction and precautionary purposes). The demand for money varies inversely with the rate of interest thus, the higher the rate of interest the higher the cost of holding money, and hence less money is held in idle balances.

In the Keynesians theory, monetary policy plays a crucial role in affecting economic activity. It contends that a change in the supply of money can permanently change such variables as the rate of interest, the aggregate demand, and the level of employment, output and income. In a situation of unemployment, Keynes advocated a cheap monetary policy. So, when the supply of money is increased, its first effect is on the rate of interest which tends to fall. Given the marginal efficiency of capital, a fall in the rate of multiplier effect thereby, increasing income, output and employment. Keynes analysis contends that what causes the rate of interest is determined by the demand for and supply of money (Oyeyemi, 2019).

Conceptual clarification

Monetary Policy

Conceptually, monetary policy consists of those actions designed to influence the behavior of the monetary sector (Ajibola & Oluwole, 2018). According to Thomas (2022) monetary policy is a set of tools that a nation's central bank use to promote sustainable economic growth and controlling the overall supply of money that is available to the nation's banks, its consumers, and its businesses. In other words, monetary policy is a policy employed by

Central Bank of a nation to control the supply of money in circulation (Simon & Elias, 2021). According to CBN (2021), monetary policy is a tool of general macroeconomic management, under the control of the monetary authorities, designed to achieve government economic objectives such as economic growth, price stability, employment generation and balance of payment equilibrium among others.

Empirical Review

Brown-West (2013) examined the effect of monetary policy on economic growth in Nigeria: 1990 – 2011. The study used Interest rate, Cash reserve ratio, Liquidity ratio, Exchange rate and Monetary policy rate as proxy for Monetary policy and RGDP as proxy for Economic growth. Secondary data was sourced from CBN Statistical Bulletin. Ordinary Least Square with Software Package for Social Science (SPSS) was used as data analyses method. It was revealed from the findings of the study that interest rate and liquidity ratio have negative relationship with GDP while exchange rate, cash reserve ratio and monetary policy rate has positive relationship with GDP. The findings also confirm the Classical Monetary Theories that was built on the availability of money as a means of managing the economy and controlling Cash reserves ratio. The study recommends for proper implementation, application and timing of monetary policy to achieve the macroeconomic objectives of growth.

Nkamare and Emori (2014) conducted a study to examine the relationship between fiscal and monetary policies and economic growth in Nigeria from 1986 to 2010. The study found that both government revenue and money supply had a positive and statistically significant impact on gross domestic product.

Chipote and Makhetha-Kosi (2014) examined the role of monetary policy in promoting economic growth in the South African economy between the period of 2000 and 2010. The study employed Johansen co-integration and the Error Correction Mechanism. Findings of the study reveal that a long run relationship exists among the variables. Furthermore, findings of this study show that money supply, and exchange rates are insignificant monetary policy instruments that drive growth in South Africa whilst Cash reserves ratio is significant.

Noman and Khudri (2015) conducted a study on the impact of fiscal and monetary policies on economic growth in Bangladesh, from 1979-80 to 2012-13. The research found that there was a positive correlation between narrow money, broad money, exchange rate, government revenue, and expenditure with real gross domestic product. This implies that an increase in these variables will result in a corresponding increase in the real gross domestic product.

Adigwe Echekoba and Onyeagba (2015) investigated the impact of monetary policy on the Nigerian economy between 1980 and 2010. The study found that monetary policy, as represented by money supply, had a positive impact on GDP growth. However, the same monetary policy had a negative impact on the rate of Cash reserves ratio. This implied that the effectiveness of monetary policy in Nigeria is dependent on the specific macroeconomic variables being targeted. Specifically, increasing money supply can stimulate economic growth but may also lead to Cash reserves ratio pressures.

Ayodeji and Oluwole (2018) conducted a study on the impact of monetary policy on economic growth in Nigeria. The study examined two variables, namely money supply and exchange rate, and their impact on economic growth. The study found that both variables had a positive impact on economic growth, but the impact was fair and insignificant. This implies that the effectiveness of monetary policy in Nigeria may be limited in promoting economic growth, and suggests that additional policies may be necessary to support sustained economic growth in the country.

Ajiboa and Adeyemi (2018) studied the impact of monetary policy on economic growth in Nigeria. The paper examined the impact of monetary policy on economic growth in Nigeria by developing a model that is able to investigate how monetary policy of the government has affected economic growth through the use of multivariable regression analysis. The study proxied the variables of monetary policy instruments to include: Money Supply (MS), Exchange Rate (ER), Interest Rate (IR), and Liquidity Ratio (LR). Economic growth was represented by Gross Domestic Product (income) at constant prices. Unit root test was

conducted and all the estimating variables were stationary at first difference except the component of interest rate which showed that the model interpretation would not be spurious and a true representation of the relationships that exists between the explained and explanatory variables. Error Correction Model was introduced in the estimation in order to have a parsimonious model. From the result, two variables (money supply and exchange rate) had a positive but fairly insignificant impact on economic growth. Measures of interest rate and liquidity ratio on the other hand, had a negative but highly significant impact on economic growth which supports the assertion by Busari et al. (2002) that monetary policies are better suited when they are used in targeting Cash reserves ratio rather than in stimulating growth. In addition, Engle-Granger co-integration test was done and showed the existence of a long run relationship between monetary policy and economic growth in Nigeria. Finally, granger causality test was done on the variables and the results showed the existence of a unidirectional causality between money supply and economic growth, economic growth granger causing liquidity ratio and exchange rates while a bi-directional causality exists between interest and economic growth. The study recommended that partial autonomy should be replaced with full autonomy for the central banks in Nigeria which is invariably subjected to government interference and its politics. Finally, the study suggested that monetary policies should be used to create a favorable investment climate by facilitating the emergency of market-based interest rate and exchange rate regimes that attract both domestic and foreign investments.

Ajibola and Oluwole (2018) examined the impact of monetary policy on economic growth in Nigeria between period of 1981 and 2016. The study adopted Johansen Co-integration test and Vector Error Correction Mechanism (VECM). The finding of the study revealed that, two variables (money supply and exchange rate) had a positive and insignificant impact on economic growth. Furthermore, the interest rate and liquidity ratio on the other hand, have a negative and significant impact on economic growth.

Eugene (2019) investigated the dynamic relationship between monetary policy on economic growth in Nigeria. Data for the study were collected from secondary sources. The variables on which data was collected include; real GDP, Broad money supply (BMS), Cash reserves ratio (CRR), Monetary policy rate (MPR), Liquidity ratio (LQR). The scope of the study covers the period from 1986 to 2017 and were sourced from CBN statistical bulletin. Data are analyzed using the descriptive statistics and ordinary least square regression, Johansen cointegration, VECM and granger causality approach. Findings revealed that CRR and BMS have inverse long run relationship with GDP MPR and LQR exert positive long run relationship with GDP. In the short run CRR and MPR had an inverse relationship with GDP at lag while LQR exerts positive relationship with GDP. Using granger causality, RGDP and BMS, MPR, and CRR has no causal relationship between while and NQR exerts significant cause on Real GDP. From the findings, the study recommends that the policy instrument should be a well-coordinated optimal mix of instruments to significantly influence economic stability.

Adeneye, Moses and Ezeilo (2023) examined the effect of monetary policy on economic growth in Nigeria (2004 – 2022). The study revealed that arguments against and in favor of the effect monetary policy of Central Bank of Nigeria have on economic growth in Nigeria is inconclusive with mixed outcomes led to the investigation of the effect of monetary policy on the economic growth in Nigeria between 2004 and 2022. The study employed ex-post facto design with time series data covering the period of 19 years. Econometric technique of Autoregressive distributed lag was used to analyze the study data. Findings of the study revealed that the entire explanatory variables in the study namely; Monetary Policy Rate (MPR), Money Supply (MS), and Lending Interest Rate (LNR) at level equation and period of lag one were statistically significant. In terms of the magnitude, finding of the study revealed that the ARDL coefficients of MPR, MS and LNR are 1861.613, 5.091207 and -3778.871. This

suggested that both MPR and MS have positive impact on economic growth while LNR has negative impact on economic growth. More so, one percent increase in MPR and MS led to approximately, 186 and 509 percent increase in economic growth. In the same vein, one percent increase in LNR will affect -3778 percent decrease in economic growth. As manifested from the findings of this study, the following recommendations are suggested: that monetary policy authority should ensure that status quo should be maintained on both MPR and MS while adjustment should be made on lending rate (LNR) by reducing the rate to encourage investors to borrow for the purpose of investment and subsequently, economic growth.

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Nyeche (2024) Assessed the effects of monetary policy on price stability in Nigeria (1981-2021). The objectives were to determine how money supply, lending rate, monetary policy rate and exchange rate affected the consumer price index, proxy for inflation. Time series data were obtained from the central bank of Nigeria statistical bulletin, national bureau of statistics and world bank development indicators and analyzed using econometrics method of unit root, bounds cointegration and ARDL estimation. The study found that money supply had a positive and insignificant effect on consumer price index while lending rate had a negative and insignificant effect on consumer price index. In addition, monetary policy rate had a positive and significant effect on consumer price index while exchange rate had a negative and significant effect on consumer price index in Nigeria. The study recommended among others that government should implement policies that will stabilize exchange rate, through export diversification and the promotion of local production to boast the economy.

Value addition

This study reviewed empirical literature related to monetary policy and economic growth in Nigeria. Empirical evidence and results of various studies show a mixed trend on the effect of monetary policy on economic growth in Nigeria. While some established a negative relationship between monetary policy and economic growth in Nigeria, other found a positive relationship which was due to differences in data sets used by different researchers. This study utilized a different data set with the inclusion of cash reserve ratio that has not been used by other studies to the best of the researcher's knowledge to proxy monetary policy. Consequently, the study examined the effects of monetary policy on economic growth in Nigeria using interest rate, exchange rate, money supply and cash reserve ratio as proxies of monetary policy while economic growth was proxied by real gross domestic product covering the period 1982-2022, thus filling the gap in literature.

3. METHODOLOGY

The study adopted the Ex-post facto research design. Time series data utilized were obtained from World Bank indicators and CBN Statistical Bulletin covering the period 1982-2022.

Model Specification

To facilitate the analysis of the specific objectives of this study, the theoretical foundation of the model was specified based on the monetarist theory as propounded by Milton Friedman. The theory believes that when the Central Bank purchases securities in open market, it sets in motion substitution and wealth effects, as the public portfolio consists of wide variety of assets such as bonds, equities, savings, mortgage, etc. These effects will ultimately increase aggregate money demand and expand output. Therefore, in specifying the analytical model for this study, the selected monetary policy measures are expected to be regressed on real gross domestic product.

The functional specification of the model was stated as follows:

$RGDP = f(MS, CRR, EXR, INTR)$ (3.1)

Where:

$RGDP$ = Real Gross Domestic Product
$INTR$ = Interest rate
EXR = Exchange rate
MS = Money supply
CRR = Cash reserves ratio.

The linear regression equation for this study is specified as follows:

$$RGDP = \beta_o + \beta_1 MS + \beta_2 CRR + \beta_3 EXR + \beta_4 INTR + \mu_t \quad (3.2)$$

Specifically, the ARDL model for this study based on the variables in equations (3.2) is provided below:

$$\Delta RGDP_t = \alpha_0 + \sum_{i=1}^{p} \alpha_1 \Delta MS_{t-1} + \sum_{i=1}^{q} \alpha_2 \Delta CRR_{t-1} + \sum_{i=1}^{q} a_3 \Delta EXR_{t-1} + \sum_{i=1}^{q} a_4 \Delta INTR_{t-1} + \lambda_1 RGDP_{t-1} + \lambda_2 MS_{t-1} + \lambda_3 CRR_{t-1} + \lambda_4 EXR_{t-1} + \lambda_5 INTR_{t-1} + \varepsilon_{1t} \quad 3.3$$

Where:

α0 = constant parameter to be estimated, α1 – α4 = short run parameters, λ_1 - λ_4 = long-run multipliers, p = optimal lag for each of the dependent variables, q = optimal lag of the independent variables, Δ = first difference operator, ε_{1t} = error term

A priori Expectations: β1 > 0, β2 - β4 < 0

4. RESULTS ANALYSIS AND DISCUSSION

Unit Root Test

As a precondition to time series analysis, the unit root test was conducted using the ADF method to ascertain the stationary process of the series. The results are presented in Table 4.3.

Table 1: ADF unit root test results

Variables	ADF statistics at levels	% critical value	ADF statistic at 1st difference	% critical value	Order of integration
CRR	3.937	2.93	NA	NA	(0)
EXR	2.032	2.93	4.042	2.93	(1)
INTR	5.727	2.94	NA	NA	(0)
MS	1.497	2.94	6.673	2.94	(1)
RGDP	4.203	2.93	NA	NA	1(0)

Source: Author's computation from Eviews 12 software

The ADF unit root test results from this study are reported in Table 1 indicates that EXR (-2.032), and MS (-1.497) are non-stationary at their levels form, as their ADF statistics do not exceed the 5% critical value. Upon differencing the data, the variables became stationary, confirming that EXR, and MS are integrated of order I(1), meaning they require differencing once to achieve stationarity. This implies that their series are non-stationary at levels but become stationary after differencing. On the other hand, CRR, INTR and RGDP are stationary at levels with an ADF statistic of -3.937, -5.727 and -4.203, which exceeds the ADF critical values. This suggests that CRR, INTR, and RGDP are integrated of order I(0), meaning it is already stationary without differencing. Overall, the results show that the variables are mixed integrated, thus, necessitating the application of the bounds cointegration test method.

Bounds Cointegration Test

The bounds cointegration test followed the evidence of mixed integration from the unit root test The results are presented in Table 2.

Table 2: Summary of bounds cointegration test results

			Asymptotic: n=1000	
F-statistic	4.691904	10%	3.03	4.06
K	4	5%	3.47	4.57
		2.5%	3.89	5.07
		1%	4.4	5.72

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

Note: K denotes the number of regressors

The results of the bounds cointegration in the table 2 shows that the computed F-statistic (4.69) is greater than the lower bound value of (3.47) and the upper bound critical value of (4.57) at the 5% significance level. This finding necessitates the rejection of the null hypothesis that no long-run relationships exist among the variables at the 5% significance level. Therefore, it follows from the results that real GDP has a long-run relationship with the independent variables used. Based on this finding, this study adopted the ARDL method of analysis.

ARDL Model Estimation

The ARDL model was estimated following the evidence of mixed integrated and cointegrated series. The results are presented in Table 3.

Table 3: ARDL short and long run analysis

Short-run results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.916374	0.978748	-0.936271	0.3581
@TREND	-0.393842	0.081485	-4.833335	0.0001
D(MS)	-0.976043	0.362686	-2.691150	0.0125
D(MS(-1))	-1.761052	0.544932	-3.231691	0.0034
D(MS(-2))	-1.019288	0.399758	-2.549765	0.0173
D(CRR)	-0.010049	0.031067	-0.323448	0.7492
D(CRR(-1))	-0.018853	0.033757	-0.558483	0.5817
D(EXR)	-2.665134	0.501047	-5.319127	0.0000
D(EXR(-1))	2.275333	0.818012	2.781538	0.0101
D(INTR)	-0.176508	0.215494	-0.819085	0.4205
CointEq(-1)*	-0.669684	0.128375	-5.216612	0.0000

Long-run results

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MS	1.990784	0.822235	2.421188	0.0231
CRR	-0.039824	0.029826	-1.335242	0.1938
EXR	-0.404425	1.462889	-0.276457	0.7845

INTR	-1.201243	0.566616	-2.120029	0.0441

R^2 = 0.767999; adjusted R^2 = 0.703999

The ARDL model estimation provides a comprehensive analysis of the impact of various monetary policy variables on economic growth in Nigeria, specifically focusing on real GDP growth (RGDP). In the short run, the money supply at the current period, lag 1, and lag 2 shows a negative and statistically significant effect, indicating that a unit increase in the money supply decreases real GDP in Nigeria by 0.976043 units, 1.761052 units and 1.01928 units, respectively. Conversely, the long-run results show a positive and statistically significant impact on real GDP, suggesting that a 1unit increase in the money supply raises real GDP in Nigeria by 1.99078 units in the long run. These findings align with the results of Nkamare and Emori (2014), Adigwe, Echekoba, and Onyeagba (2015), Ayodeji and Oluwole (2018), and Noman and Khudri (2015), which reveal that money supply contributes to GDP growth. However, the study contradicts the findings of Chipote and Makhetha-Kosi (2014), which showed an insignificant impact on GDP.

Additionally, the short-run analysis indicates that the cash reserve ratio at the current period and lag 1 has a negative but not statistically significant impact on real GDP in Nigeria, implying that a 1 unit increase in the cash reserve ratio reduces real GDP by 0.010049 units and 0.018853 units respectively, in the short run. Similarly, the long-run results for the cash reserve ratio show a negative but statistically insignificant impact on real GDP in Nigeria, implying that a unit increase in the cash reserve ratio decreases real GDP by 0.039824 units in the long run. This finding does not align with Eugene (2019), Chipote and Makhetha-Kosi (2014), and Brown-West (2013), who found that the cash reserve ratio positively contributes to GDP.

Moreover, the short-run econometric analysis shows that the exchange rate at the current period has a negative but statistically insignificant impact on real GDP, indicating that a unit increase in the exchange rate decreases real GDP in Nigeria by 2.665134 units in the short run. However, the short-run analysis reveals that the exchange rate at lag 1 has a positive and statistically significant impact on real GDP in Nigeria, suggesting that a unit increase in the exchange rate raises real GDP by 2.275333 units in the short run. In the long run, the exchange rate has a negative but statistically insignificant impact on real GDP in Nigeria, indicating that a unit increase in the exchange rate decreases real GDP. This finding is consistent with the results of Brown-West (2013) and Chipote and Makhetha-Kosi (2014), who found that the exchange rate reduces GDP. However, the study disagrees with Ayodeji and Oluwole (2018), Ajibola and Adeyemi (2018), and Noman and Khudri (2015), who found that the exchange rate positively affects GDP.

In addition, the short-run results show that the interest rate has a negative but not statistically significant impact on real GDP in Nigeria, suggesting that a unit increase in the interest rate decreases real GDP by 0.669684 units in the short run. In contrast, the long-run results reveal a negative and statistically significant impact on real GDP in Nigeria, showing that a unit increase in the interest rate reduces real GDP by 1.201243 units in the long run. This finding does not align with Brown-West (2013), who found that the interest rate positively influences GDP.

The error correction term, CointEq(-1), has a significant negative coefficient (-0.6697, $p < 0.01$), signifying a strong speed of adjustment back to long-term equilibrium after short-run deviations.

This coefficient implies that approximately 66.9% of the disequilibrium from the previous period is corrected in the current period, suggesting a rapid adjustment rate.

The R-squared value of 0.7680 indicates that about 77% of the variation in RGDP growth is explained by the model, while the adjusted R-squared accounts for the number of predictors and confirms a strong model fit. This high explanatory power suggests that the selected monetary policy variables are well-suited for capturing the dynamics of economic growth in Nigeria, offering robust insights for policymakers aiming to balance short-term adjustments with long-term growth stability.

Residual Diagnostics Tests

Residual analysis is presented in Table 4.- 5 and figure 1 to 2.

Serial Correlation LM Test

The Breusch-Godfrey Serial Correlation LM test assesses whether serial correlation is present in the residuals of the ARDL model.

Table 4: Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.011359	Prob. F(2,23)	0.3793
Obs*R-squared	3.071739	Prob. Chi-Square(2)	0.2153

Source: Author's computation using Eviews12 software

According to Table 4, the F-statistic is 1.0114, with an associated probability (p-value) of 0.3793. Similarly, the Chi-Square statistic (Obs*R-squared) is 3.0717, with a p-value of 0.2153. Since both p-values are above the 0.05 significance level, we fail to reject the null hypothesis, suggesting that there is no statistically significant serial correlation in the residuals. This result supports the reliability of the model's coefficients, as serial correlation could otherwise bias the results.

Heteroskedasticity Test

The Breusch-Pagan-Godfrey Heteroskedasticity Test examines whether the residuals have constant variance (homoskedasticity) or whether they vary across observations (heteroskedasticity).

Table 5: Breusch-Pagan-Godfrey

F-statistic	0.924388	Prob. F(12,25)	0.5385
Obs*R-squared	11.67885	Prob. Chi-Square(12)	0.4718
Scaled explained SS	6.126732	Prob. Chi-Square(12)	0.9096

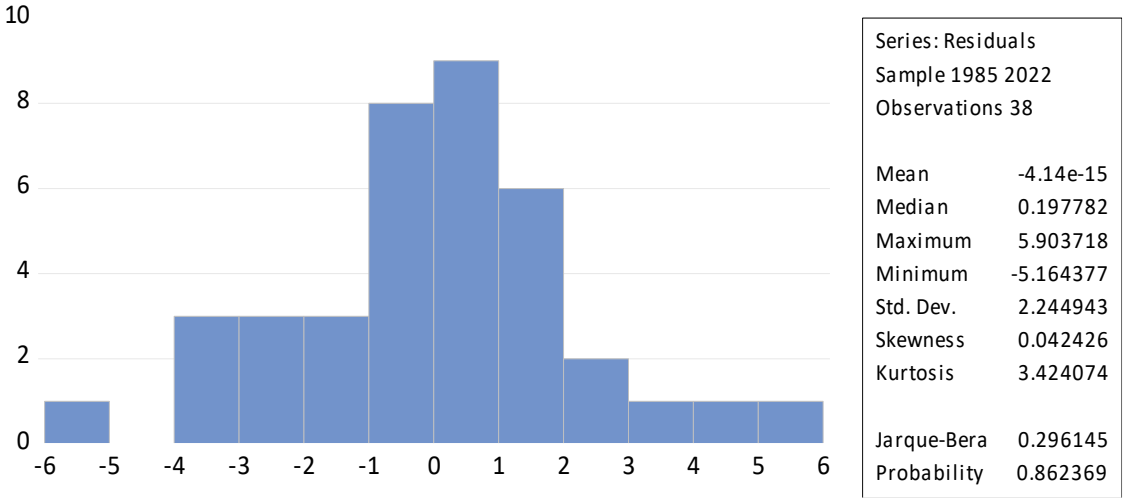
Source: Author's computation using Eviews12 software

In Table 5, the F-statistic is 0.9244 with a p-value of 0.5385, and the Obs*R-squared value is 11.6789 with a p-value of 0.4718. Both p-values exceed the 0.05 threshold, suggesting that we fail to reject the null hypothesis of homoskedasticity. This outcome implies that the residuals exhibit constant variance, meaning the model does not suffer from heteroskedasticity issues, thus providing more reliable inference.

Normality Test

The Jarque-Bera test is used to check if the residuals of the model follow a normal distribution, an assumption that aids in hypothesis testing and inference.

Figure 1: Jarque Bera



Source: Author's computation using Eviews12 software

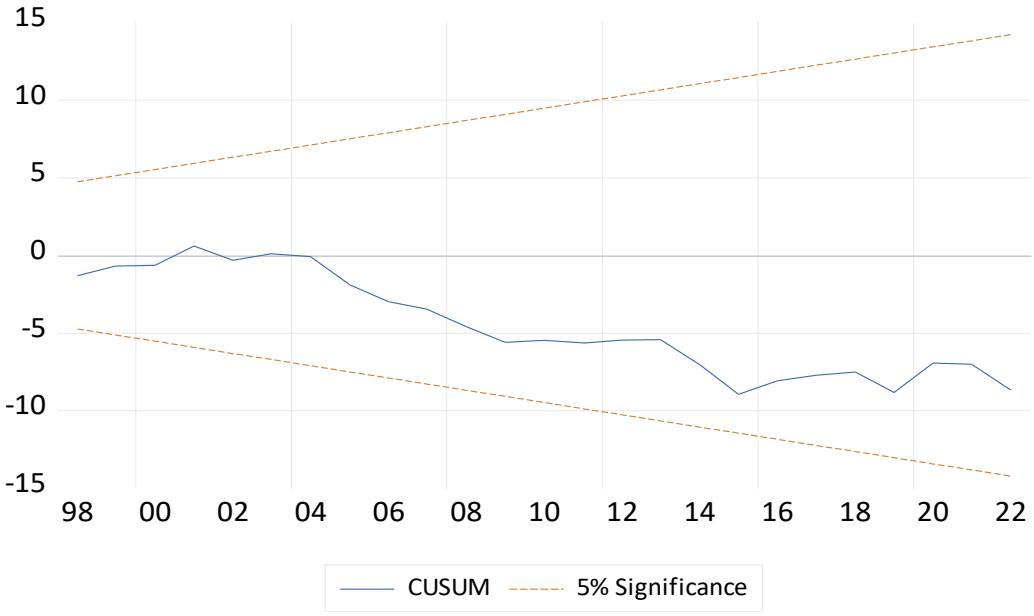
The Jarque-Bera statistic of 0.296145 with a probability of 0.862369 indicates that the residuals are normally distributed. The high p-value allows us to retain the null hypothesis of normality, confirming that the error terms do not deviate from a normal distribution, which is crucial for the validity of various statistical tests used in the analysis.

Stability Test

The CUSUM plot demonstrates that the cumulative sum of residuals stays within the 5% significance boundaries throughout the sample period from 1982 to 2022.

This indicates no structural breaks in the model, suggesting that the relationship between monetary policy and economic growth in Nigeria is stable over the analyzed period.

Figure 2: CUSUM



Source: Author's computation using Eviews12 software

Discussion of Findings

The ARDL model estimation in this study provides a thorough analysis of the effects of various monetary policy variables on economic growth in Nigeria, with a specific focus on real GDP growth (RGDP). The findings reveal distinct dynamics in the short and long runs, illustrating how policy adjustments can yield different impacts depending on the timeframe.

In the short run, the analysis finds that increases in money supply have a negative and statistically significant effect on real GDP at the current period and at lags 1 and 2. A 1% increase in money supply reduces RGDP by 0.976%, 1.761%, and 1.019%, respectively. This suggests that, in the immediate and short-term context, expanding the money supply may lead to inflationary pressures, which could suppress economic activity. However, in the long run, the impact of money supply becomes positive and statistically significant, with a 1% increase in money supply raising RGDP by 1.991%. This finding aligns with research by Nkamare and Emori (2014), Adigwe, Echekoba, and Onyeagba (2015), Ayodeji and Oluwole (2018), and Noman and Khudri (2015), who similarly observed that money supply growth supports GDP growth over time. This divergence between short-run and long-run effects underscores the complexities of money supply management in fostering sustainable growth.

Regarding the cash reserve ratio (CRR), the study finds that a 1% increase in CRR negatively affects RGDP in the short run at both the current period and lag 1, although these effects are not statistically significant. Similarly, in the long run, CRR exerts a negative but statistically insignificant effect on RGDP, with a 1% increase in CRR decreasing RGDP by 0.040%. These results suggest that, while raising the cash reserve ratio may constrain banks' lending capacities, the overall impact on GDP is minimal. This finding contrasts with studies by Eugene (2019), Chipote and Makhetha-Kosi (2014), and Brown-West (2013), who identified a positive association between CRR and GDP. The discrepancy may be due to differences in economic structure, regulatory environments, or the sensitivity of the Nigerian economy to credit restrictions.

The exchange rate analysis also presents an intricate relationship with RGDP. In the short run, a 1% increase in the exchange rate (indicating depreciation) results in a 2.665% decrease in RGDP, although this effect is statistically insignificant. Interestingly, the effect becomes positive and significant at lag 1, where a 1% increase in the exchange rate boosts RGDP by 2.275%. This shift suggests that while initial depreciation may contract economic output, subsequent improvements in competitiveness may lead to growth. In the long run, the exchange rate has a negative but statistically insignificant impact on RGDP, indicating that persistent depreciation could be detrimental to long-term economic stability. These findings align with those of Brown-West (2013) and Chipote and Makhetha-Kosi (2014), who found that exchange rate depreciation reduces GDP. However, they differ from Ayodeji and Oluwole (2018), Ajibola and Adeyemi (2018), and Noman and Khudri (2015), who observed a positive relationship.

Finally, the study examines the role of interest rates in economic growth. In the short run, a 1% increase in the interest rate has a negative but statistically insignificant impact on RGDP, reducing it by 0.670%. However, in the long run, the effect becomes both negative and statistically significant, with a 1% increase in the interest rate reducing RGDP by 1.201%. This suggests that while short-term interest rate changes may not immediately influence economic activity, higher long-term interest rates can suppress growth by increasing borrowing costs and deterring investment. This finding is contrary to Brown-West (2013), who identified a positive impact of interest rates on GDP, indicating that the relationship between interest rates and growth may vary considerably based on economic conditions and the responsiveness of investment demand.

5. CONCLUSION AND RECOMMENDATIONS

Conclusion

This study explores the connection between monetary policy and economic growth in Nigeria economy, specifically examining the roles of money supply, cash reserve ratio, exchange rate, and interest rate on real GDP in Nigeria. The findings indicate that both cash reserve, exchange rate had negative and insignificant effect on real GDP while interest rate had a negative but significant effect on real GDP, However, money supply had a positive but significant effect on real GDP in Nigeria. Based on these results, the study concludes that monetary policy significantly affects the growth of real GDP in Nigerian.

Recommendations

The recommendations proffered for this study based on the findings are as follows:

1. Given the positive and significant effect of money supply on real GDP, the Central Bank of Nigeria should consider an expansionary monetary policy stance. This can be achieved by increasing the money supply through open market operations, reducing the monetary policy rate, or lowering the cash reserve requirement for banks. This policy should help stimulate economic growth by increasing real GDP.
2. The negative effect of the cash reserve ratio on real GDP suggests that the current policy may be overly restrictive, limiting banks' ability to lend and support economic growth. The Nigerian government should consider gradually lowering the cash reserve ratio to free up more funds for banks to lend to businesses and consumers. This move can help spur investment and consumption, ultimately boosting real GDP.
3. To address the exchange rate's negative effect on GDP, the government should work to stabilize the naira through targeted foreign exchange policies and encouraging export growth, thereby mitigating currency depreciation risks.
4. The Central Bank of Nigeria should consider lowering interest rates to reduce the cost of borrowing for businesses and consumers. Lower interest rates can encourage investment and consumption, thereby supporting economic growth. Additionally, the government should promote policies that enhance the transmission of lower interest rates to the broader economy, such as improving financial market efficiency and reducing credit market frictions.

REFERENCES

Adegbite, T. A. & Alabi, W. O., (2013). "Monetary Policy and Economic Growth: The Nigerian experience (1970 -2010)," *Prime Journal of Business Administration and Management,* 3(1): 822-833.

Adeneye, O. A., Moses O. A. & Ezeilo, F. I. (2023). The effect of monetary policy on economic growth in Nigeria (2004 – 2022). *International Journal of Research and Innovation in Social Science (IJRISS),* 7(2), 566-577.

Adeneye, O.A. (2021) Interest Rate and Exchange Rate Volatility on the Performance of Industrial Sector in Nigeria. Lafia Journal of Economics and Management Sciences, 6(1), 1- 12: ISSN: 2550-732X. *Published by Department of Economics, Federal University of Lafia, Nigeria*

Adeosun, O.T (2020) Monetary policy and economic growth in Nigeria: An empirical analysis. Journal of Economics and policy studies, 13(1), 45-59

Adebayo, O.S, Adewale, A.A, & Aliko, O.A (2019). Monetary policy and economic growth in Nigeria: Evidence from ARDL approach. *Journal of economic and sustainable development*, 10 (12), 56-65

Adeniyi, O., Omotosho, B. S. & Akanbi, T. A. (2020). Monetary policy and economic growth nexus in Nigeria: A Time Series Analysis. *Journal of Applied Economic Sciences*, 15(3),59-68.

Adigwe, P. K, Echekoba F.N, and Justus B.CO.(2015).Monetary policy and economic growth in Nigeria: A critical evaluation. IOSR Journal of Business and Management, 17(2),110-119. e-ISSN:2278-487X, p-ISSN: 2319-7668 (www.iosrjournals.org)

Adigwe, P. K., Echekoba, F. N. & Onyeagba, B. C. (2015). Monetary policy and economic growth in Nigeria: A Critical Evaluation. *IOSR Journal of Business and Management (IOSR-JBM),* 17(1), 110-119.

Aghion, P., Bacchetta, P., Ranciere, R., & Rogoff, K. (2009). Exchange rate volatility and productivity growth: The role of financial development. J. Monet. Econ. **56**(4), 494–513

Ajiboa, A. and Adeyemi, O. (2018). Impact of monetary policy on economic growth in Nigeria. Department of Economics, Chrisland University, Abeokuta, Nigeria

Ajibola, A and Oluwole, A. (2018). Impact of monetary policy on economic growth in Nigeria. *Open access library journal, 5(e4320): ISSN print: 2333-9705,*

Akujobi, L. E. (2012). Monetary Policy and Nigeria"s Economic Development. African Research Review, 4(4): 153-161.

Alavinasab, S.M. (2016).Monetary policy and economic growth: A case study of Iran. *International journal of economics, commerce and management, 6(3),2016 ISSN 2348 0386.*

Anowor, O.F. & Okorie, G.C (2016). A reassessment of the impact of monetary policy on economic growth: Study of Nigeria, *International Journal of Developing and Emerging Economies,* 4(1), 82-90

Anowor, O.F., & Okorie, G.C. (2016). A reassessment of the impact of monetary policy on economic growth: Study of Nigeria. *International journal of developing and emerging economies*, 4(1):82-90.

Ayodeji, A. & Oluwole, A. (2018). Impact of monetary policy on economic growth in Nigeria. *Open Access Library Journal*, *5*(02), 1-12.

Ayodeji, A., & Oluwole, A. (2018). Impact of monetary policy on economic growth in Nigeria.Open Access Library Journal, 5(e4320), 1-13. CBN (1992).

Brownn-West, I. M. (2013). Effect of monetary policy on economic growth in Nigeria: 1990 – 2011. *A research project submitted to the department of banking and finance, faculty*

management science, Rivers State University Of Science and Technology Nkpolu-Oroworukwo, Port Harcourt. in partial fulfillment for the award of bachelor of science degree (B.Sc.) in banking and finance.

Central Bank of Nigeria (2021) Monetary Policy Review, CBN, Abuja

Central Bank of Nigeria (2010). Statistical bulletin. Online edition. *Available from www.cenbank.org.*

Central Bank of Nigeria, (2022). Annual reports and statement of accounts. https://www.cbn.gov.ng.

Chipote, P & Makhetha-Kosi, *P.*(2014). Impact of monetary policy on economic growth: A case study of South Africa. *Mediterranean journal of social sciences, MCSER publishing, Rome-Italy. 5(15):76-84.*

Chipote, P., & Palesa, M. (2014). Impact of monetary policy on economic growth: A casestudy Of South Africa. *Mediterranean Journal of Social Sciences*, 5(15), 76-84.

Fasanya, I.O. & Onakoya, A.B.O. (2013) Does monetary policy influence economic growth in Nigeria? Asian economic and financial review, 3,(5) 635-646.

Friedman, M. (1968). The role of monetary policy. *The American Economic Review*, 58(1), 1-17.

Gbosi, A.N. (2012). Financial sector instability and challenges of Nigeria monetary authorities. Ibeabuchi, S.N. (2007) Overview of monetary policy in Nigeria. *CBN Economic and financial review*, 45(4), 15-30

International Monetary Fund, IMF (2011). International monetary fund-world economic outlook (Nigeria Cash reserves ratio rate) accessed from www.indexmundi.com/factbook/countries/Nigeria/economy in February, 2013.

Khan, M.S & Senhadji, A.S (2001), Threshold effects in the relationship between Cash reserves ratio and growth, *IMF Staff Papers*, 48

Kimberly, A. (2017). *Monetarism and how it works when Milton Friedman and the monetarists ruled.* Pearls Publishers

Nyeche, E (2024) Assessing the effects of monetary policy on price stability in in Nigeria. *International journal of applied Economics, Agriculture and management sciences*, 2(2), 71-84.

Olayemi, S.O (2016) Monetary policy and economic performance of west African countries: The Nigerian evidence. *International journal of Economics and finance*, 8(10), 120-130

Onafowora, O., & Owoye.O (2007) Monetary policy and economic growth in Africa: Evidence from Nigeria. *Journal of economic development*, 32(2) 1-18

Oyeyemi, D. O. (2019). Effectiveness of monetary policy instruments in Nigeria (time series approach). *A project submitted to the Department of Economics, Faculty of Social sciences, in partial fulfillment of the requirements for the award of barchelor of science (b.sc) degree in economics, Lagos State University, Ojo*.

Pesaran, M.H., Shin, Y., and Smith, R.J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16, 289–326. /(ISSN)1099-1255

Simon N.N and Elias I.A.(2021). Effects of monetary policy measures on Nigeria‟s economic growth. Journal on banking financial services & insurance research. 11(5), ISSN:(2231-4288) www.skirec.org.

Thomas, B. (2022) in Investopedia Team. (2022). What is monetary policy https://www. investopedia.com/terms/m/monetarypolicy.

Timothy, I. A. (2022). Effectiveness of Monetary Policy in Stimulating Economic Growth in Nigeria. *International Journal of Research in Social Science and Humanities (IJRSS*), 3(2),43-33

Twinoburyo, E. N., & Odhiambo, N. M. (2017). Monetary policy and economic growth: A review Of International Literature. *Journal of Central Banking Theory and Practice*, 2, 123-137.

U.S. Bureau of Economic Analysis (2017). "Real Gross Domestic Product". FRED, Federal Reserve Bank of St. Louis. Retrieved 2 April 2024.

UNCTADstat (2019). Table view". Unctadstat.unctad.org. Retrieved 20 February 2024.

"GDP (constant 2010 US$) - Data". Data.worldbank.org. Retrieved 2 April 2019

Uwakaeme O.S. (2015). Economic growth in Nigeria: An empirical investigation of determinants and causal relationship (1980-2012). *American Journal of Economics*, 5(1): 9-20