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Monetary Policy Variables and Economic Growth in Nigeria

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Abstract
This study aimed to find out the impact of monetary policy variables on economic growth in Nigeria, the specific objectives were to: examine the extent to which a rise in liquidity ratio impacts economic growth in Nigeria, investigate the magnitude by which interest rate contributed to economic growth in Nigeria, and determine if an increase in the exchange rate has a significant impact on economic growth in Nigeria. The methods used in the study were unit root tests and ARDL tests. The empirical result showed liquidity ratio impacted positively on economic growth in the long run in Nigeria; interest rate impacted negatively on the economic growth in Nigeria; whereas exchange rate impacted negatively on economic growth in Nigeria. The study recommends that the Central Bank of Nigeria should ensure that deposit money banks maintained an adequate liquidity ratio that is needed for economic growth in the country. They should maintain a low and stable interest rate that will encourage investment in the country, and CBN should maintain a favorable exchange rate to attract foreign investors to invest in the country.

1.1 Introduction

"Monetary policy is concomitant with interest rates and credit availability (Ahiabor, 2013)". Monetary policy is the method by which the financial power of a nation manages the quantity of cash and frequently aims at the interest rate to stimulate economic growth and stability. The various forms of monetary policy which include adjustment of the amount of money in rotation are normally applied in practice. The exercise of varying the flow of money through the open deals and acquisitions of obligations issued by the government and credit instruments is known as open market operations (OMO). "The continuous market dealings by the monetary power alter the amount of money in circulation, and this influences other market variables which include exchange rate and interest rates (Ahiabor, 2013)". Twinoburyo and Odhiambo (2018) concluded in their review of existing international empirical studies that, "the nexus between monetary policy and economic growth tends to be weaker in emerging economies with operational flaws and unfledged financial markets that are feebly incorporated into international markets".

An effective monetary policy is expected to enhance economic growth and development, unlike Nigeria's economy where the impact of monetary policy on economic growth is yet to be felt in the country. As changes in the liquidly ratio, interest rate, exchange rate, and other monetary policy variables concerning the increase in economic growth in the country have raised a question on the impact of monetary policy variables on economic growth in Nigeria? Therefore, based on this backdrop, this study seeks to know the actual impact of monetary policy on economic growth in Nigeria.

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1.2 Statement of the Problem

A report from the National Bureau of Statistics (NBS) shows that Nigeria's monetary policy variables vis-à-vis her economic growth have been unstable over the years; data from NBS (2022) showed that there has been an increase in liquidity ratio and exchange rate in Nigeria from 38.5% and 0.62% in 1981 to 65.1% and 0.76% in 1984 respectively while there was a decrease in interest rate from 3.2% in 1981 to 1.9% in 1984 whereas, within this period, there was a decrease in the economic growth from 13.1% in 1981 to 1.11% in 1984. This shows that within this period the economy suffered from recession in the country, which means that the monetary policy variables used in this study have no positive effect on the economic growth in Nigeria whereas there was an increase in inflation within this period.

From 1993 to 1995 the liquidity ratio, interest rate, and exchange rate dropped from 42.2%, 8.4%, and 22.1% to 33.1%, 6.7%, and 21.8% respectively, at this period, there was a negative growth in the economic growth from 2.04% in 1993 to 0.07% in 1995. This implies that the decrease in monetary policy in Nigeria does not bring about an increase in economic growth in the country. From 2000 to 2015 shows that the liquidity ratio, interest rate, and exchange rate have been unstable whereas economic growth within this period was also growing at a decreasing rate till in 2016 and 2020 the economic growth recorded a negative growth with the values of 1.6% and 1.7% respectively whereas, at these periods, the liquidity ratio increased from 45.9% to 65.4% and exchange rate increase from 253.4% to 358.8% respectively.

Based on the above analysis of this study, disclosed that changes in monetary policy variables vis-à-vis economic growth in Nigeria have been unstable over the years, and there is a doubt if monetary policy variables have been able to improve the economic growth in the country. Hence, this study intends to assess the impact of monetary policy variables on economic growth in Nigeria.

1.3 Objective of the study

The main objective of the study is to investigate the impact of monetary policy variables on economic growth in Nigeria. The specific objectives of this study are to:

(i) examine the extent to which a rise in liquidity ratio impacts economic growth in Nigeria

(ii) investigate the magnitude by which interest rate contributed to economic growth in Nigeria.

(iii) determine if an increase in the exchange rate has a significant impact on economic growth in Nigeria

1.4 Significance of the Study

This study will be beneficial to the government since it will help the monetary authorities such as the central bank of Nigeria to choose the desired monetary policy ratios that are needed for the economic growth in the country. This study will be a source of research materials for researchers and students who intend to carry out similar studies on the impact of monetary policy on economic growth in Nigeria. More so, the findings from this study will add to the existing body of literature, especially on the recent contributions on the impact of monetary policy variables on economic growth in Nigeria.

2.1 Literature Review and Hypothesis

This section focuses on works carried out by previous studies on the impact of monetary policy on economic performance in both developing and developed countries; such studies include Hlongwane and Daw (2022) who

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examined monetary policy in South Africa: a VECM Approach. The study used annual time series data from 1966 to 2020. The study used a VECM model and Granger causality tests to analyze the variables' short, long run, and causal relationships. The study revealed that “actual interest rates had a modest positive correlation with economic growth in the short term but a significant negative correlation in the long run; M2 was found to negatively correlate with money supply whereas M3 had a positive correlation in the short and long run; M1 has an inverse association with economic growth in South Africa in the short run but a positive link in the long run”. As a result, the study suggested that “SARB must implement expansionary and contractionary monetary policies in the short and long run, respectively, to enhance South Africa's economic growth”. However, the study did not use ARDL methodology, and the time frame used in the study was not good enough for econometric analysis, unlike our study.

Everlyne, Erickson, and Naftaly (2022) carried out work on the effect of fiscal and monetary policy on gross domestic savings in Kenya. Yearly time series data was used and sourced from Economic surveys, World Bank reports, and Statistical abstracts from 1990 to 2017. The time frame was viewed as the economic reform period; this was started in the country in the 1990s. Johannes's co-integration methods were applied together with its vector error correction estimation approach to determine coefficients that define the relationship between variables under study and the gross domestic savings. The Augmented Dickey-Fuller test was applied for the unit-root test. The results obtained from the regressions were spurious-free. The regression result revealed that “monetary and fiscal policy variables explained domestic savings in Kenya”. The study recommended that “monetary and fiscal policy implemented by the government should promote a favorable investment atmosphere through appropriate stabilization of lending rates, inflationary rates, and promoting income growth to ensure an increase in national savings for economic sustainability in Kenya”. However, despite the study has created a geographical gap since it was carried out in Kenya and its findings may not apply to Nigeria’s economy, the time frame used in the study lack currency on the subject matter, and the ARDL methodology was not used in the study, unlike our study.

Umar, Al-Hussain, Issa, Moosa, and Mundhir (2022) examined the “analysis and impact of monetary policy during covid-19 and pre covid-19 on economic growth: a case of the Sultanate of Oman”. Descriptive, correlation and simple regression analysis were used for data analysis in the study. The data were collected from the monthly statistical bulletin and other sources and collected data from January 2016 to November 2021. The result shows that “the lag Fiscal ratio, Change in IBIR, and Change in MS have a significant relationship with economic growth”. The study recommended that “the application of VAT in the country will help Oman to breathe out some pandemic damages; the Central bank of Oman should give an order to the private banks to reduce the interest rate for the small and medium and the public to get out from the pandemic business closure effect, which damaged their business for Twelve-month in raw”. However, the study has created a geographical gap since it was carried out in Oman and its findings may not apply to Nigeria’s economy. The study did not employ ARDL methodology and the annual time series data was not used in the study, unlike our study.

Anu, Oluwatoba, Francis, Anayo, Friday, and Isaac (2022) examined “monetary policy shocks and economic growth in Nigeria”. Economic growth was the dependent variable while money supply, inflation, and interest rate were the explanatory variables, and time series data from 1986 to 2018 were sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin and World Bank Development Index (WDI) were used for data analysis using Vector Autoregression (VAR) techniques. The result showed that “money supply exerts a significant positive effect on economic growth in Nigeria while inflation and interest rate exert an insignificant positive effect on economic growth in Nigeria”. The study recommended that “the CBN should ensure the downward review of the Monetary Policy Rate of 12% to 9 percent to enhance financial accessibility”. However, the study

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did not use ARDL methodology, unlike our study. More so, money supply as one of the variables of monetary policy was included in their study unlike our study, and also the time frame used in the study lacked currency and need to be updated to the current events on the impact of monetary policy shocks on economic growth.

Nwankwor, Ikeora, and Ogini (2022) examined "the impact of Monetary policy on manufacturing sector output in Nigeria". Time series data covering 33 years, from 1987 to 2019 were used in the study and the data were analyzed using Ordinary Least Square (OLS). The findings among others revealed that "money supply, monetary policy rate, and treasury bill rate have positive significant policy effects on manufacturing sector output in Nigeria while cash reserve ratio had negative and insignificant policy effects on manufacturing sector output in Nigeria". The study recommended amongst others that "the Central Bank of Nigeria should employ an expansionary monetary policy that can increase the money supply to the real sectors to boost economic development in Nigeria, and banks should negotiate a reduced cash reserve ratio with the Central Bank of Nigeria to improve performance". However, the study did not use ARDL methodology in their study unlike our study and again, the scope of the study was limited to the impact of monetary policy on the manufacturing sector, unlike our study which covered the impact of monetary policy on Nigeria's economy.

Timothy (2022) examined "the effectiveness of monetary policy in stimulating economic growth in Nigeria between 1990 to 2019". Time series data were used in the study and the data were analyzed using ARDL Bounds Test, and Error Correction Mechanism (ECM). The result revealed that "there is a long-run relationship among the variables with the lower bound and upper bound less than the calculated 5% level of significance". The study recommended that the "Nigerian government through its monetary authorities should unveil other policies that will stimulate economic growth not only in the long run but also, in the short-run period". However, despite the methodology used in the study being similar to our study, the monetary variables differ in both studies, the study employed a monetary policy rate whereas our study did not. More so, the time frame used in the study was not large enough unlike our study which covered the period from 1981 to 2020.

Khaysy, Thiphavanh, Vaiyoth, Phiengsanith, Visanu, and Vonsy (2022) investigated "the dynamic effect of monetary policy on economic growth in Lao PDR". The study used "The Vector Autoregressive Model (VAR)" and quarterly data from the first quarter of 1995 to the last quarter of 2018. The results showed a notable effect of monetary policy on economic growth in the Lao economy. An expansionary monetary led to a lower interest rate and increased aggregate credit and prices in the Lao economy. However, economic growth is found to be negative in responding to expansionary monetary policy. Therefore, despite economic growth responding negatively to expansionary monetary policy instead of positive, the study did not employ ARDL in their study, unlike our study. More so, the study did not use annual time-series data but quarterly data unlike our study, and the time frame used in the study lack currency and need to be updated to the current events on the impact of monetary policy shocks on economic growth.

Gideon, Gylych, Paul, Bilal, and Onyinye (2020) examined "the asymmetric effects of monetary policy shocks on output growth in Nigeria" using quarterly data from 1981Q1 to 2018Q4. The study employed the recently developed Lee and Strazicich unit root test with structural breaks, Nonlinear ARDL, and the Hatemi-J causality tests. The result revealed the presence of "long-run and short-run asymmetries" in the effect of monetary policy shocks on output growth in Nigeria. The results of the long-run effect showed that "both positive and negative monetary policy rate shocks have a positive, elastic, and statistically significant effect on output growth". In the short run, the results indicated that "the effect of negative monetary policy shocks dominates the effects of positive monetary policy rate shocks, while the effect of positive money supply shocks dominates the effect of negative money supply shocks". Furthermore, the study found evidence in support of the expansionary monetary policy in the long run. Hence, the recommendations for "expansionary monetary policy decisions to

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enhance output growth". However, despite the study employing ARDL but the study does not use annual time-series data, unlike our study. More so, the time frame used in the study lack currency and needs to be updated to the current events on the impact of monetary policy shocks on economic growth.

2.2 Hypothesis formulation

The hypotheses of the study were as follows

(i) Liquidity ratio has no significant impact on economic growth in Nigeria

Oyakegha and Arepo (2022) carried out a study on "the impact of monetary policy and private sector performance in Nigeria" from the period 1995-2019 using time series data. The study used Private Sector Output as a proxy for Private Sector performance and employed it as the dependent variable; whereas broad money supply, liquidity rate, and Credit Ratio respectively were used as the explanatory variables to measure monetary policy. The study revealed a significant effect of credit ratio on private-sector output in Nigeria. The liquidity ratio had a significant effect on private-sector output in Nigeria. The broad money supply had a significant effect on private-sector output in Nigeria. Hence, there is a long-run equilibrium effect on monetary policy and the private sector economy in Nigeria; and the result confirms that about 73% short-run adjustment speed from long-run disequilibrium. The study recommended that "strong macroeconomic policies should be employed to maintain and stabilize the economy and CBN should lay down strict prudential guidelines to stabilize and strengthen the private sector-led economy". However, even though, the study was on the impact of monetary policy variables on private sector performance, unlike our study that studied the whole economy not a subsector of the economy. More so, the time frame used in the study was very short and may not be good enough for econometric analysis.

Ekechukwu, Mbah, Ozoko, Diele, and Iwu (2021) examined money supply, liquidity ratio, and economic growth in Nigeria from 1986 to 2018 using the OLS method. The results showed that narrow money, broad money, and liquidity ratios were statistically significant to influence growth in Nigeria's economy. However, despite that the study lack currency, the study does not use ARDL in their study.

(ii) Interest rate has no significant contribution to economic growth in Nigeria.

Saghir, Hadiqa, and Syed (2022) investigated the "impact of the interest rate, credit, and risk channel on the monetary policy of Pakistan", using data set from 1995 to 2020, and the data were analyzed using the "Autoregressive Distributed Lag (ARDL) model". The study found an insignificant association between the independent and dependent variables, suggesting no long-term relationship between the model's variables. The interest rate coefficient was negative, but its relationship with the dependent variable was significant. Similarly, the credit channel's coefficient was negative, but its association with the dependent variable was statistically significant at the 90% confidence level. However, despite the study employing ARDL techniques, the geographical location where the study was conducted has created a geographical gap since the findings of the study cannot be applicable in Nigeria, and the time frame used in the study was not large enough unlike our study which covered the period from 1981 to 2020.

(iii) Increase in the exchange rate has no significant impact on economic growth in Nigeria.

Ashamu (2020) investigated the "impact of monetary policy on foreign trade in Nigeria during the period 1981 to 2017". The study used secondary data which were collected from the Central Bank of Nigeria, Statistical Bulletin (2017), and the data was analyzed using Error Correction Model (ECM) which relates the dependent variable (net import) to several predictor variables such as money supply, interest rate, exchange rate, foreign direct investment, and trade openness. The result of the study stated that "monetary policy in Nigeria has a positive

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influence on foreign trade within the period, except for interest rates that have a negative coefficient and are not significant". The study further revealed that "an increased exchange rate directly affects the prices of imported commodities and an increase in the price of imported goods and services contributes directly to an increase in inflation". However, some of the monetary policy variables such as liquidity ratio and others were not included in the study which our study considered very critical, again the timeframe used in their study started from 1981 to 2017, but our study encompass from 1981 to 2020

Ufoeze, Odimgbe, Ezeabalisi, and Alajekwu (2018) investigated the "impact of monetary policy on economic growth in Nigeria" from 1986 to 2016 using OLS techniques. The result of the study showed that "monetary policy rate, interest rate, and investment have insignificant positive effects on economic growth in Nigeria". Money supply however has a significant positive effect on growth in Nigeria. The exchange rate has a significant negative effect on GDP in Nigeria. However, despite that the study lack currency, the study does not use ARDL in their study.

3.1 Data and Method

Time series data were used for the study and the data were sourced from the World Bank and Central Bank of Nigeria statistical bulletin covering the period from 1981 to 2020. The variables used for the study are described as follows

(i) Gross Domestic Product (GDP)

This is defined as the total value of all the goods and services produced in a country, usually in a year. It is concerned with domestic production and does not, include net income from abroad. GDP was chosen because being an indicator of growth we could use. It is to show the impact of monetary policy on economic growth.

(ii) Liquidity Ratio

The liquidity ratio is the ratio of a bank's cash holdings to its total deposit liabilities. It is often referred to as the Cash Ratio. This is a minimum level of cash reserves commercial banks must keep with the central bank. A change in this minimum level of cash reserve will affect commercial banks' lending to their customers. Therefore, if the central bank raises the minimum cash ratio, the commercial bank will have to reduce its lending and vice versa. This is because an increase in the minimum cash ratio will reduce the deposit base of the commercial banks and consequently their lending capacity. In another word, the cash ratio is inversely related to economic growth.

(iii) Interest Rate (IR): Interest Rate (INT) is the cost at which commercial banks lend credit facilities to their customers. It is expected that the higher the interest rate, the lower the investment and the lower the economic growth, but the lower the interest rate, the higher the investment and the higher the economic growth. This implies that interest rate and economic growth are inversely related.

(iv) Exchange Rate (EXR)

An exchange rate is the value of one nation's currency versus the currency of another nation or economic zone. Therefore, it measures the rate at which one naira is exchanged with other countries' currency such as the dollar.

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(v) Inflation Rate (INF): Inflation rate is a persistent increase in the prices of goods and services in a country over some time. For an increase in prices of goods and services to be regarded as inflation, it must be continuously rising over a long period time usually more than a year. INF becomes paramount to this study as part of the data to be used because it has a direct relationship with GDP.

3.2 Model Specifications

The study adopted and modified the model used by Khaysy et al (2022) in their study which was based on the assumption of the Keynesian IS-LM function which was specified as

GDP = f (M2, IRL, Credit, CPI) (1)

Where GDP is the Gross domestic product, M2 is money supply growth, IRL is the interest rate, Credit is a total credit to the economic sector growth, and CPI is the inflation rate. Therefore, the model is modified as follows

RGDP = f (LR, IR, EXR, INF) (2)

Whereas the econometric form of the model specified in equ (2) is stated as thus

$$LRGDP_t = b_0 + b_1 LR_t + b_2 IR_t + b_3 EXR_t + b_4 INF_t + \varepsilon_t \quad (3)$$

Where : LRGDP = Log of Real Gross Domestic Product; RL = Liquidity Ratio; IR = Interest Rate; EXR = Exchange Rate; INF = Inflation Rate; $_t$ = Error term; and b_{is} = Parameters estimates

(i) ARDL Bounds Tests

The ARDL Bound test is used to check for the presence of a long-run relationship between monetary policy and economic growth in Nigeria. The model is specified as follows

$$\Delta LRGDP_t = a_0 + \sum_{i=1}^{k} b_1 \Delta LRGDP_{t-1} + \sum_{i=1}^{K} b_2 \Delta LR_{t-i} + \sum_{i=1}^{k} b_3 \Delta IR_{t-i} + \sum_{t=1}^{k} b_4 \Delta EXR_{i-1} + \sum_{i=1}^{k} b_5 \Delta INF_{t-} \quad (4)\delta_1 LRGDP_{t-1} + \delta_2 LR_{t-1} + \delta_3 IR_{t-i} + \delta_4 EXR_{t-i} + \delta_5 INF_{t-1} + e_{1t}$$

Where all the variables were as defined above, the coefficients from β1 to β4 represent the short-run coefficients whereas the coefficients from δ1 to δ4 represent the long-run coefficients of the ARDL model. Also, β0 is the drift component; "k" is the maximum lag length while et is the stochastic error term.

The bounded F-statistic test is used to check for the existence of a stable, long-run relationship among the variables in the model. Therefore, since it is expected that the bound test shows evidence of co-integration among variables specified, then the short-run (including the Error Correction Model (ECM)) and long-run models were specified as follows bellows

(ii) Short-run and ECM model

The short-run model of monetary policy and economic growth is specified as thus

$$\Delta LRGDP_t = a_0 + \delta_1 LRGDP_{t-1} + \delta_2 LR_{t-1} + \delta_3 IR_{t-i} + \delta_4 EXR_{t-i} + \delta_5 INF_{t-1} + \varnothing ECM_{t-1} + e_{1t}$$

Where Ø is the error correction term that measures the speed of adjustment toward the long-run equilibrium, and the remaining coefficients in the short-run dynamics were as defined above. (5)

(iii) Long-run model

The long-run model of the monetary policy and economic growth is specified as thus

$$\Delta LRGDP_t = a_0 + \sum_{i=1}^{k} b_1 \Delta LRGDP_{t-1} + \sum_{i=1}^{K} b_2 \Delta LR_{t-i} + \sum_{i=1}^{k} b_3 \Delta IR_{t-i} + \sum_{t=1}^{k} b_4 \Delta EXR_{i-1} + \sum_{i=1}^{k} b_5 \Delta INF_{t-i} + e_{1t} \quad (6)$$

4. Results

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4.1 Descriptive Analysis of the Variables

The descriptive statistics of the study were as follows

Table 1: Descriptive statistics

	LRGDP	LR	IR	EXR	INF
Mean	10.38826	48.70991	6.393178	100.7601	18.93527
Median	10.17245	46.09236	6.959584	106.4643	12.38637
Maximum	11.18573	104.2024	11.06417	358.8108	72.83550
Minimum	9.693476	26.39276	0.316667	0.617708	5.388008
Std. Dev.	0.525254	14.65755	2.764670	100.7283	16.89554
Skewness	0.313149	1.548887	-0.639183	0.888717	1.824139
Kurtosis	1.541790	6.699875	2.673287	2.994774	5.154992
Jarque-Bera	4.197711	38.80881	2.901604	5.265499	29.92320
Probability	0.122597	0.056014	0.234382	0.071881	0.000000
Sum	415.5303	1948.396	255.7271	4030.406	757.4108
Sum Sq. Dev.	10.75978	8378.911	298.0926	395701.7	11132.91
Observations	40	40	40	40	40

Source: Researcher's Estimate from Eview 9.0 (2022)

Table one above shows the descriptive statistics of the variables used in this study. It disclosed the results of common statistics of the variables used in this study such as the mean, median, standard deviation, Jarque-Bera, etc. Among all the descriptive statistics presented in table one, the interest of this study is in the mean, the skewness, and the Jarque-Bera statistics which measure the normality of the distribution of the variables used in the study against unexpected outliers. To this point, the summary statistic disclosed that the mean value of interest rate (IR) has the lowest average score with the value of 6.3%, followed by the mean value of the real gross domestic product (RGDP), inflation rate (IFR), and liquidity ratio (LR) with the values of 10.3%, 18.9%, and 48.7%, respectively, whereas exchange rate (EXR) has the largest average score with the value of 100.7%. However, based on skewness, the summary statistic of the skewness disclosed that real gross domestic product, liquidity ratio, exchange rate, and inflation respectively were positively skewed whereas interest rate was negatively skewed. More so, based on the normality test of the variables used in the study, the Jarque-Bera statistic disclosed that all the data used in the study were normally distributed except that for inflation. This is because, table one, disclosed that Jarque-Bera's probability values of real gross domestic product, liquidity ratio, interest rate, and exchange rate respectively were statistically insignificant whereas that of the inflation rate was statistically significant which is required for a variable to be normally distributed, the probability value of the Jarque-Bera statistic is expected to be statistically insignificance. To this end, the values of the inflation rate are checked for any possible outliers and treaded when necessary.

4.2 Unit Root Test Result

The Augmented Dickey-Fuller (ADF) unit root test with trend and intercept is employed to test for the stationarity of the time series data used are presented in table 2 below:

Table 2: ADF Unit Root Test of Stationarity of Time Series Data

ADF tests at Level				ADF tests at 1st Difference			
Series	ADF Statistic	5% Critical Level	p-Values	ADF Statistic	5% Critical Level	p-Values	Order of Integration

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LRGDP	-1.768228	-3.548490	0.6978	-3.565525	-3.533083	0.0466	I(1)
LR	-3.655290	-3.529758	0.0378	-	-	-	I(0)
IR	-2.998792	-3.533083	0.1458	-6.431442	-3.536601	0.0000	I(1)
EXR	-0.443647	-3.529758	0.9822	-4.715484	-3.533083	0.0028	I(1)
INF	-4.077246	-3.533083	0.0142	-	-	-	I(0)

*NB: I(0) stands for stationary at a level while I(1) stands for stationary at first difference.
Source: Researcher's Estimate from Eview 9.0 (2022)

Table 3: Phillips-Perron Unit Root Test of Stationarity of Time Series Data

PP tests at Level				PP tests at 1st Difference			
Series	PP Statistic	5% Critical Level	p-Values	PP Statistic	5% Critical Level	p-Values	Order of Integration
LRGDP	-3.928240	-3.529758	0.0201	-	-	-	I(0)
LR	-3.655290	-3.529758	0.0378	-	-	-	I(0)
IR	-3.255350	-3.529758	0.0889	-6.934554	-3.533083	0.0000	I(1)
EXR	-0.443647	-3.529758	0.9822	-4.715484	-3.533083	0.0028	I(1)
INF	-4.033895	-3.529758	0.0156	-	-	-	I(0)

*NB: I(0) stands for stationary at a level while I(1) stands for stationary at first difference.
Source: Researcher's Estimate from Eview 9.0 (2022)

The Augmented Dickey-Fuller (ADF) unit root test presented in table 2 of section 4.1.2 disclosed that the liquidity ratio and inflation rate respectively were stationary at a level whereas real gross domestic product, interest rate, and exchange rate respectively were stationary at the first difference. On the other hand, the Phillips-Perron test results presented in table 3 of the same section, 4.1.2 also indicated the liquidity ratio, inflation rate, and real gross domestic product respectively were stationary at the level whereas interest rate and exchange rate respectively were stationary at the first difference.

Therefore, both the ADF and the Phillip-Perron unit root tests results agreed that there was mixed order of integration (such as at level and first difference) among the variables used in the study, but none of the variables were integrated at the second difference.

4.3 ARDL Bounds Test

Table 4: ARDL Bounds test result.

Test Statistic	Value	K
F-statistic	5.394043	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.50%	3.25	4.49
1%	3.74	5.06

Source: Researcher's Estimate from Eview 9.0 (2022)

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The ARDL Bound test result presented in table 4 of section 4.1.3 disclosed that there is a presence of a long-run relationship existing at a 5% level of significance between monetary policy variables and economic growth in Nigeria during the period under review. On the other hand, it means that monetary policy variables and economic growth in Nigeria are co-integrated in the long run. The long-run relationship existing between monetary policy variables and economic growth is a result of the fact that the value of the F-statistic the value of 5.394043 as presented in table 4 of section 4.1.3 is greater than the value of the upper bound boundary of 4.01 at 5% level of significance. To this end, the hypothesis of no long-run relationship existing between monetary policy variables and economic growth in Nigeria is rejected at a 5% level of significance. Therefore, there is a long-run relationship existing between monetary policy variables and economic growth in Nigeria during the period under review.

4.4 Short-Run Impact of Monetary Policy Variables on Economic Growth in Nigeria.

Table 5: ARDL Short-Run Effects and the coefficient of ECM

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LR)	-0.001193	0.000506	-2.355735	0.0278
D(IR)	0.003532	0.003542	0.997329	0.3294
D(IR(-1))	-0.005392	0.003347	-1.611226	0.1214
D(EXR)	-0.000737	0.000321	-2.294135	0.0317
D(EXR(-1))	-0.000256	0.000560	-0.456792	0.6523
D(EXR(-2))	-0.000599	0.000459	-1.304182	0.2057
D(INF)	-0.001102	0.000443	-2.490061	0.0208
D(INF(-1))	0.000159	0.000559	0.284266	0.7789
D(INF(-2))	0.001083	0.000448	2.415932	0.0244
CointEq(-1)	-0.464707	0.055151	-2.986467	0.0068

Source: Researcher's Estimate from Eview 9.0 (2022)

The short-run coefficients and the Error Correction Mechanism (ECM) results presented in table 5 shows as follows:

(a) Liquidity ratio impacted negatively on economic growth in Nigeria in the short run, that is, a percentage increase in liquidity ratio brought about a 0.001% decrease in economic growth in Nigeria, at the time of the study.

(b) Exchange rate impacted negatively on economic growth in Nigeria in the short run, that is, a percentage increase in the exchange rate brought about a 0.0007% decrease in economic growth in Nigeria, at the time of the study. This result agrees with the findings of Ufoeze et al (2018), Ezeaku et al (2018), and John and Udoye (2018) among others.

However, the result further shows that the sign of the co-integration coefficient also recognized as Error Correction Mechanism (ECM) was negative, fractional, and also statistically significant. On the other hand, the value of ECM being negative and statistically significant means that monetary policy variables and economic growth in Nigeria are cointegrated in the long run. The result of the error correction mechanism indicates that approximately 46% of the discrepancy between the short-run and long-run values will be corrected annually.

4.5 Long Run Impact of Monetary Policy Variables on Economic Growth in Nigeria

Table 6: Long Run Coefficients

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Variable	Coefficient	Std. Error	t-Statistic	Prob.
LR	0.015178	0.003312	4.582725	0.0001
IR	-0.054324	0.020340	-2.670797	0.0140
EXR	-0.005235	0.000629	-8.324082	0.0000
INF	-0.015416	0.005229	-2.948501	0.0074
C	10.918592	0.280292	38.954361	0.0000

Source: Researcher's Estimate from Eview 9.0 (2022)

The long-run coefficients of the variables used in the study as presented in table 6 of section 4.1.5 generally show as follows:

(a) A percentage rise in liquidity ratio in the long run brought about a 0.015% increase in economic growth in Nigeria. The increase in economic growth as a result of a rise in liquidity ratio in Nigeria is in line with the a priori expected relationship existing between the liquidity ratio of the monetary authorities and the Nigerian economic growth. It simply means that the higher the liquidity ratio of the Nigerian monetary policy, the healthier Nigeria's economic growth.

(b) One percentage increase in interest rate brought about a 0.05% decrease in economic growth in Nigeria. This result implies that interest rate and economic growth are inversely related in Nigeria.

(c) One percentage increase in the exchange rate in the country brought about a 0.005% decrease in economic growth in Nigeria. This result implies that exchange rate and economic growth are inversely related in Nigeria.

(d) A percentage rise in the inflation rate in the country brought about a 0.01% decrease in economic growth in Nigeria. This implies that the high inflation rate is against economic growth in the country.

4.6. Post-diagnostic Tests

The post-diagnostic tests of the result are presented below:

4.6.1 Serial correlation Test

Table 7: Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.055722	Prob. F(2,20)	0.3665
Obs*R-squared	3.533167	Prob. Chi-Square(2)	0.1709

Source: Researcher's Estimate from Eview 9.0 (2022)

The post-diagnostic result of serial correlation in table 7 above revealed that there is no presence of serial correlation because both the probability values of F-statistic and observed R-square respectively are more than 5% level of significance.

4.6.2 Heteroskedasticity Test

Table 8: Heteroskedasticity –Godfrey Test

F-statistic	1.126999	Prob. F(14,22)	0.3894
Obs*R-squared	15.45306	Prob. Chi-Square(14)	0.3479
Scaled explained SS	5.053630	Prob. Chi-Square(14)	1.9851

Source: Researcher's Estimate from Eview 9.0 (2022)

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The Breusch-Pagan-Godfrey test of Heteroskedasticity in table 8 also revealed that there is no presence of Heteroskedasticity because the probabilities of the F statistic and that of the observed R square respectively are higher than the 5% level of significance.

4.6.3 Ramsey RESET Test

Table 9: Ramsey RESET Test of Specification

	Value	df	Probability
t-statistic	0.870702	21	0.3938
F-statistic	0.758122	(1, 21)	0.3938
F-test summary:			
	Sum of Sq.	df	Mean Squares
Test SSR	0.000694	1	0.000694
Restricted SSR	0.019913	22	0.000905
Unrestricted SSR	0.019219	21	0.000915

Source: Researcher's Estimate from Eview 9.0 (2022)

The Ramsey RESET test of model specification presented in Table 9 shows that there is no presence of model misspecification in this study, that is, that the model used in this study is appropriate. It is well specified and there are no omitted variables.

4.7 Test of Research Hypotheses

Test of hypothesis is the use of statistics to determine if a given claim or proposition is true or false. Therefore, in testing the hypotheses of this study, the researcher used a 5% level of significance with the probability values of the estimated coefficients of the variables used in this study as a basis for rejecting or accepting the null hypothesis. To this point, a hypothesis is rejected if the probability value of its estimated coefficient is less than a 5% level of significance and accepted if otherwise.

4.7.1 Test of Hypothesis One: Liquidity ratio has no significant impact on economic growth in Nigeria.

Having a look at the long-run result presented in table 6 of section 4.1.5 of this study, it disclosed that the long-run estimated coefficient of liquidity ratio was 0.015178 with its probability value of 0.0001. Therefore, since the probability value of the estimated coefficient of liquidity ratio is less than a 5% level of significance, the study concludes that the liquidity ratio was statistically significant and impacted positively the economic growth in Nigeria during the period under review.

4.7.2 Test of Hypothesis Two: Interest rate has no significant contribution to economic growth in Nigeria.

Having a look at the long-run result presented in table 6 of section 4.1.5 of this study, it disclosed that the long-run estimated coefficient of interest rate was -0.054324 with its probability value of 0.0140. Therefore, since the probability value of the estimated coefficient of interest rate is less than a 5% level of significance, the study concludes that the interest rate was statistically significant and contributed negatively to the economic growth in Nigeria during the period under review.

4.7.3 Test of Hypothesis Three: increase in the exchange rate does not have any significant impact on economic growth in Nigeria.

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Having a look at the exchange rate long-run result presented in table 6 of section 4.1.5 of this study, it disclosed that the long-run estimated coefficient of the exchange rate was -0.005235 with its probability value of 0.0000. Therefore, since the probability value of the estimated coefficient of the exchange rate is less than a 5% level of significance, the study concludes that the exchange rate was statistically significant and negatively on the economic growth in Nigeria during the period under review.

5. Discussion

The discussion of the study was made vis-à-vis the objectives of the study as follows below

5.1 Liquidity Ratio and Economic Growth in Nigeria

Our investigation of the long-run impact of the liquidity ratio on economic growth in Nigeria from 1981 to 2020 disclosed that the liquidity ratio was statistically significant and impacted positively on the economic growth in Nigeria during the period under review. This finding portrayed that, every one percentage or a unit increase in liquidity ratio brought about a 0.015% increase in economic growth in Nigeria. This result is of the view that liquidity ratio and economic growth were positively related in Nigeria during the period under review. However, this result agrees with the findings of Ekechukwu et al (2021) and Oyakegha and Arepo (2022).

5.2 Interest Rate and Economic Growth in Nigeria

This study found that the interest rate was statistically significant and impacted negatively economic growth in Nigeria during the period under review. This result implies that interest rate and economic growth were inversely related in Nigeria. This finding agreed with the expected a priori relationship existing between interest rate and economic growth and is also in agreement with the findings of Saghir, Hadiqa, and Syed (2022) and Hammed (2020), and others.

5.3 Exchange Rate and Economic Growth in Nigeria

Our findings on the exchange rate disclosed that the exchange rate was statistically significant and impacted negatively economic growth in Nigeria. This finding implies that exchange rate and economic growth were inversely related in Nigeria during the period under review. Therefore, this result agreed with the findings of Ufoeze et al (2018) and disagreed with the findings of Ashamu (2020).

6. Conclusion

The effectiveness of monetary policy variables as economic stabilization tools has continued to generate mixed reactions within the academia in Nigeria. Some maintained that monetary variables spur economic growth while some argued that it has not yielded the desired result. It is based on this dichotomous assertion that this study examined the impact of monetary policy variables on economic growth in Nigeria.

To this end, the empirical evidence from the ARDL – Bound test analysis disclosed that there was a long-run equilibrium relationship existing between monetary policy variables and economic growth in Nigeria during the period under review. On the other hand, the coefficient of ECM was statistically significant, fractional, and negatively signed indicating the sign of a return to long-run equilibrium. However, the long-run impacts of monetary policy variables on economic growth are stated as follows:

(i) A percentage increase in liquidity ratio in the long run brought about a 0.015% increase in the economic growth in Nigeria, and vice versa. This implies that an increase in liquidity ratio increases economic growth in Nigeria.

(ii) One percentage increase in interest rate brought about a 0.05% decrease in economic growth in Nigeria, and vice versa. This implies that an increase in interest rate in Nigeria decreases economic growth in the country.

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(iii) One percentage increase in the exchange rate in the country brought about an approximately 0.005% decrease in economic growth in Nigeria, and vice versa. This implies that an increase in the exchange rate increases economic growth in Nigeria.

Recommendation

Recommendations were as follows

(i) The Central Bank of Nigeria (CBN) should ensure that deposit money banks maintained the adequate liquidity ratio that is needed for economic growth in the country.

(ii) The CBN should maintain a low and stable interest rate that will encourage investment which will invariably promote economic growth in the country.

(iii) The study also recommends that the CBN should maintain a favorable exchange rate to attract foreign investors to invest in the economy which will invariably promote the production of goods and services which will also increase the economic growth in the country.

Limitations

The limitations of the study were the inconsistency and discrepancy of data from different sources on the subject; however, the researcher was able to overcome the challenges by obtaining reliable data used for the study from reliable and trusted sources such as CBN statistical bulletin and World Bank dataset. Lack of sponsorship was also another factor.

References

Ahiabor, G. (2013). The impact of microfinance on the development of small-scale enterprises in the Ledzokuku-Krowor Municipality in the Greater Accra Region of Ghana. European Journal of Business Management, 5(2), 165-172.

Anu, K. T., Oluwatoba, O. A., Francis, O. L., Anayo, V. E., Friday, C. N., & Isaac, A. (2022). Monetary policy shocks and economic growth in Nigeria. Indonesian Journal of Contemporary Education, 4(2), 71-79

Ashamu, S. (2020). The effect of monetary policy on foreign trade in Nigeria. Australian Finance & Banking Review, 4(2), 1-8

Ekechukwu, C., Mbah, P. C., Ozoko, E. E., Diele, F. C. O., & Iwu, F. (2021). Money supply, liquidity ratio , and economic growth: the Nigeria experience. International Journal of Disaster Recovery and Business Continuity, 11(1), 1811-1820

Everlyne, M., Erickson, M. & Naftaly, M. (2022). Effect of fiscal and monetary policy on gross domestic savings in Kenya. Journal of Economics and Sustainable Development, 13(2), 44-52

Gideon, G. G., Gylych, J., Paul, T. I., Bilal, C., & Onyinye, M. D. W. (2020). Asymmetric effects of monetary policy shocks on output growth in Nigeria: Evidence from nonlinear ARDL and Hatemi-J causality tests. Wiley, 6(3), 1-11

Hlongwane, N. W. & Daw, O. D. (2022). Monetary policy in South Africa: A VECM approach. International Journal of Economics and Finance Studies, 14(1), 1-28.

Khaysy, S., Thiphavanh, S., Vaiyoth, L., Phiengsanith, C., Visanu, B., & Vonsy, D. (2022). The effect of monetary policy on economic growth in Lao PDR. International Journal of Economics and Financial Issues, 12(1), 67-74.

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NBS (2022). National Bureau of Statistics statistical bulletin. Abuja

Nwoko, P. N., Ihemeje, J. C., & Anumadu, E. (2016). Impact of monetary policy on economic growth in Nigeria. African Research Review: An International Multidisciplinary Journal, Ethiopia, 10 (3), 23-34.

Oyakegha, E. S., & Arepo, L.A. (2022). Monetary policy and private sector performance in Nigeria. African Journal of Accounting and Financial Research 5(1), 35-44.

Saghir, P. G., Hadiqa, H., & Syed, I. Z. (2022). Analyzing various channels of monetary policy transmission mechanism: the case of Pakistan. College of Management Sciences, 17(1), 103-120

Timothy, I. A. (2022). Effectiveness of monetary policy in stimulating economic growth in Nigeria. International Journal of Research in Social Science and Humanities, 3 (2), 34 42

Twinoburyo, E. N., & Odhiambo, N. M. (2018). Monetary policy and economic growth: A review of international literature. Journal of Central Banking Theory and Practice, 2(1), 133-137.

Ufoeze, L. O., Odimgbe, S. O., Ezeabalisi, V. N., & Alajekwu, U.B. (2018). Effect of monetary policy on economic growth in Nigeria: An empirical investigation. Annals of Spiru Haret University, Economic Series, Universitatea Spiru Haret, 9(1), 123-140.

Umar, A. K., Al-Hussain, S. A., Issa, R. A., Moosa, A. A., & Mundhir, H. A. (2022). Analysis and impact of monetary policy during covid-19 and pre-covid-19 on economic growth: a case of Sultanate of Oman. International Journal of Innovative Research in Technology, 9(1), 278-287

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