

# Analysis of Monetary Policy and Economic Growth in Nigeria

Mohammed Modu, Mustapha M.Kime & Buba M. Yunusa

Department of Economics Umar Ibn Ibrahim El-Kanemi College of Education Science and Technology, Bama Borno State, Affiliate University of Maiduguri

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## ABSTRACT

This study investigates the relationships between monetary policy and economic growth in Nigeria for the period spanning from 1990 to 2022. Time series data on Gdp, money supply, interest rate and exchange rate are sourced from WDI and CBN. The study used ADF and PP unit root test. cointegration test is performed with Johansen cointegration test. The short and long run relationship are tested using ARDL Bound test approach while Granger causality test for the determining the direction of causality. Unit root test result indicates that variables attained stationarity at level and first difference  $I(0)$  and  $I(1)$ . cointegration test result reveal the presence of at least two Cointegrating vectors. Findings on ARDL bound test shows the existent of long run relationships among the variable. The error correction analysis for short run also indicate the presence of short run relation with 95% adjustment speed towards long equilibrium Granger causality test is conducted to ascertain the directions of causal relations among the variable and findings indicates unidirectional causality is running from interest rate to exchange rate The study recommends that Central Banks of Nigeria should strengthen the monetary policy accountability and credibility to maintain a short, medium, and long-run focus on improving their Monetary Policy frameworks. This can be done by obtaining the optimal money supply that would sustain economic growth in these countries

**Keywords:** Analysis, Monetary Policy, Economic Growth, Nigeria

## BACKGROUND TO THE STUDY

The role of monetary policy in economic growth cannot be over emphasized. Central banks on behalf of the government play a pivotal role toward achieving macroeconomic policy objective most importantly the monetary policy. For many countries, the objectives of monetary policy are explicitly stated in the laws establishing the central bank, while for others they are not. The objectives of monetary policy may vary from country to country but there are two main views. The first view calls for monetary policy to achieve price stability, while the second view seeks to achieve price stability and other macroeconomic objectives. Central Bank of Nigeria, like other central banks in developing countries, achieve its monetary policy goal through the amount of money supplied which is often aimed at achieving full employment, rapid economic growth, price stability, and external balance. (see CBN, 2006. Aliu, 2022)

According to Adigwe, P.A et.al. (2015), Monetary policy as a technique of economic management brings about sustainable economic growth and development has been the pursuit of nations while formal articulation of how money affects economic aggregates dates back to the times of Adam Smith and latter championed by the monetary economists (Adigwe, P.A et.al., 2015). according to Palesa and Precious (2014) The pursuit of price stability invariably implies the indirect pursuit of other objectives such as economic growth, which can only take place under conditions of price stability and allocative efficiency of the financial markets.

Dzisah (2019) stresses that effective monetary policy mechanism ensures general macroeconomic stability which can foster private sector development an engine of growth. A sustained economic growth provides employment, income and tax revenues, which reduces poverty.

Despite the number of studies on monetary policy and economic growth, there are however disagreements with regards to the impact of monetary policy on economic growth. While some researchers argue that money supply determines economic growth at certain times, others believe that some other factors are significant contributors to economic growth hence are doubtful of the role money supply play in economic development. Endogenous growth theory argues that economic growth is facilitated by fixed capital accumulation (Barro, 1991). Fixed capital accumulation, which is believed to stimulate productivity, is also facilitated by a developed and efficient financial system. A financial system is well-developed if it is resilient and able to withstand asset price fluctuations that result from substantial increases in uncertainty and demand and supply conditions (Fiador, 2015), Ishkin (2007) argues about the importance of monetary policy for the financial stability and health of any economy. In a related development Nwoko et.al. (2016) Nigerian government has adopted various monetary policies through Central Bank to achieve economic growth. Despite the increasing emphasis on policy synchronization, the challenges bordering its economic growth still persists. Such problems include high unemployment rate, low investment, high rate of inflation and unstable foreign exchange rate. These perceived problems are being claimed to have caused a fast decline in the economic growth of Nigeria. It, therefore, becomes necessary to highlight the monetary policy in Nigeria and examine the extent to which it has actually contributed to the growth in the economy.

Discussion about an efficient and developed financial system that can promote growth will therefore be incomplete without investigating the role of monetary policy. While this conceptual link between monetary policy, capital accumulation and economic growth seems obvious, the transmission dynamics between financial factors such as monetary policy and the real economy is still plagued with a lot of empirical and ideological issues (Fiador, 2015). Most empirical literature on monetary transmission has primarily concentrate on developed economies. The most noticeable feature is that monetary transmission mechanism in developed countries is focused on prices (interest rate, exchange rate, and other asset prices) rather than quantities (money, credit, base money, bonds, foreign assets, etc.) In contrast, the prevailing orthodoxy of monetary transmission mechanism in low-income countries has been its focus on quantities rather than prices (Kamaan, 2014). This difference is often attributed to weak institutional frameworks, oligopolistic banking structure, shallow financial markets, and extensive central bank intervention in foreign exchange markets in low income countries. Furthermore, some economists hitherto, not in agreement about how monetary policy affects the economy Davoodi, Dixit & Pinter (2013).

This study is basically aimed at analyzing the relationship between monetary policy and economic growth in Nigeria. Many theoretical arguments were advance in the past and continue searching for the real cause of economic growth both in developed and developing countries. However, our study may not far away from the theoretical perspective about the policy and its impact on economic growth as well as some documented literature relevant to elsewhere around the globe. Therefore, it imperative here to advance a similar study in Nigeria

Monetary policy for number of years becomes the most popular macroeconomic policy measure used world over in controlling the flow, availability and circulation of money within an economy. According to Bolaji, (2014) The choice of instrument use to achieve this policy objective would depend on these a circumstances. These are the issues confronting monetary policy makers.

There are diverge views and lack consensus among macroeconomist on whether monetary policy influencing economic growth Most research finding shows conflicting results in both the developed and developing nation. It is against this background that this study seeks to ascertain the extent and magnitude to

which monetary policy has influence on economic growth in Nigeria.

The study is divided into five. the introduction, reviews the empirical evidence and theoretical frameworks Methodological, Data analysis and presentation and lastly the summary conclusion and recommendation.

## **LITERATURE REVIEW**

This chapter reviews the theoretical framework and empirical literature on the relationship between monetary policy and economic growth.

### **Conceptual views**

Monetary Policy refers to the specific actions taken by the Central Bank to regulate the value, supply and cost of money in the economy with a view to achieving Government's macroeconomic objectives. Mendalohn-Mtshalin, (2016) viewed monetary policy as a

According Jhingan (2011) monetary policy refers to a policy of monetary authority of a country with regards to monetary matters it may also be defined as that policy which deals with the control of financial institution, active purchases and sales of paper asset by monetary authority as deliberate attempt effects change in money conditions. Passive purchases and sales of paper assets resulting from maintenance of a particular interest rate structure. The stability of security price, meeting other obligation and commitment

The term economic growth denotes growth in the production of goods and services within a particular period, commonly assessed by using indicators such as Gross Domestic Product. (Tamplin,2023). It is a critical indicator of a country's economic health and can lead to higher employment rates, improved living standards, and increased investment. Economic growth is influenced by several factors, including technological advancements, increases in productivity, investment in capital, improvements in infrastructure, and government policies that promote entrepreneurship and innovation.

### **Monetary Policy in Nigeria**

Monetary policy in the Nigerian context refers to the actions of the Central Bank of Nigeria to regulate the money supply, so as to achieve the ultimate macroeconomic objectives of government. Several factors influence the money supply, some of which are within the control of the central bank, while others are outside its control. The specific objective and the focus of monetary policy may change from time to time, depending on the level of economic development and economic fortunes of the country. The choice of instrument to use to achieve what objective would depend on these and other circumstances. These are the issues confronting monetary policy makers (Bolaji, 2014). Nigerian's apex bank was saddled with the responsibility of formulating and implementing monetary policy by Central Bank Act of 1958. This role has facilitated the emergence of active money market where treasury bills, a financial instrument used for open market operations and raising debt for government has grown in volume and value becoming a prominent earning asset for investors and source of balancing liquidity in the market. There have been various regimes of monetary policy in Nigeria sometimes, monetary policy is tight and at other times it is loose mostly used to stabilize prices. The economy has also witnessed times of expansion and contraction but evidently, the reported growth has not been a sustainable one as there is evidence of growing poverty among the populace (Britanica, 2023).

economic growth, the process by which a nation's wealth increases over time. Although the term is often used in discussions of short-term economic performance, in the context of economic theory it generally refers to an increase in wealth over an extended period. (Cornwall, JL 2023)

## Monetary Policy Transmission

Easy Money Policy	Tight Money Policy
Problem: Unemployment and Recession	Problem: inflation
Federal reserve buy bonds, lower reserve ratio or lowers the discount rate	Federal reserve sells bonds, increases reserve ratio or increases the discount rate
Excess reserve increase	Excess reserves decrease
Money supply rise	Money supply falls
Interest rate falls	Interest rate rises
Investment spending increases	Investment spending decreases
Aggregate demand increases	Aggregate demand decreases
Real GDP rises by a multiple of the increase in investment	Inflation declines

Source: McConnell & Bruce 2005

## Theoretical Framework

### The Classical Theory

The classical economists decided upon the quantity theory of money as the determinant of the general price level. Theory shows how money affects the economy. It may be considered in terms of the equation of Exchange.

$$MV = PY$$

Two very similar quantity theory formulations were used to explain the level of price viz; the transactions formulation or the Cambridge equation. In the transaction version – associated with Fisher and Newcomb, some assumptions were made: that the quantity of money (m) is determined independently of other variable, velocity of circulation (V) is taken as constant, the volume of transactions (T) is also considered constant. Thus of price (p) and the assumption of full employment of the economy, the equation of exchange is given as;  $MV = PT$ , which can readily establish the production that – the level of price is a function of the supply of money. That is,  $p = F(m)$  which implies that, any change in price changes money supply. In cash balances version – associated with Walras, Marshall, Wicksell and Pigou, the neoclassical school (Cambridge school), changed the focus of the quantity theory of without changing its underlying assumptions. This version focuses on the fraction (K) of income, held as money balances. The Cambridge version can be expressed as:

$$M = kpy$$

Where K= Fraction of income, M =Quantity of money, P= price level, Y = value of goods and services. The K in the Cambridge equation is merely inversion of V, the income Velocity of money balances, in the original formulation of quantity theory. This version directs attention to the determinants of demand for money, rather than the effects of changes in the supply money (Anyanwu, 1993).

### The Monetarist Theory

The monetarist essentially adopted Fisher’s equation of exchange to illustrate their theory, as a theory of demand for money and not a theory of output price and money income by making a functional relationship between the quantities of real balances demanded a limited number of

Variables. Monetarists like Friedman emphasized money supply as the key factor affecting the wellbeing of

the economy. Thus, in order to promote steady of growth rate, the money supply should grow at a fixed rate, instead of being regulated and altered by the monetary authorities. Friedman equally argued that since money supply is substitutive not just for bonds but also for many goods and services, changes in money supply will therefore have both direct and indirect effects on spending and investment respectively such that demand for money will depend upon the relative rates of return available or different competing assets in which wealth can be.

## Empirical Review

There are several studies investigates the relationship between monetary policy and economic growth both in developed and developing countries. (Prasert, et.al, 2015). Victoria et.al. (2016) in their recent study examined the effectiveness of monetary policy on economic growth used ordinary least square multiple regression. Time series data including GDP, Inflation Exchange Rate and Money Supply were obtained and analyzed. The result reveals that all the explanatory variables significantly impacted economic growth with the exception of inflation. Using Ordinary Least Square Method (OLS) in analyzing data between 1980 and 2010, Adigwe, et.al. (2015) Examines the impact of monetary policy on the Nigerian economy. The result of their analysis shows that monetary policy represented by money supply exerts a positive impact on GDP growth but negative impact on the rate of inflation.

In a related development, Nwoko, et. al. (2016) analyzed the effectiveness of Monetary Policies in promoting economic growth, covering the period of 1990-2011. The impact of money supply, interest rate, labour force and inflation were tested on Gross Domestic Product using the multiple regression models as the tool of analysis. results of the findings show that inflation and labour force have significant influence on GDP, nevertheless, money supply is insignificant. Interest rate was negative and statistically significant. Palesa & Precious (2014) investigates the impact of monetary policy in promoting South African economy over the period 2000-2010. The study employs the Augmented Dickey-Fuller and Phillips Perron unit root tests to test for stationarity in the time series. The Johansen co-integration and the Error Correction Mechanism are employed to identify the long-run and short-run dynamics among the variables. The study shows that a long run relationship exists among the variables. Also, the core finding of this study shows that money supply, repo rate and exchange rate are insignificant monetary policy instruments that drive growth in South Africa while inflation is significant. Omolade et.al. (2013) carried out a study on the impact of monetary policy and economic growth in Nigeria 1970–2005. The study employed cointegration and error correction model. Time series variable includes GDP while independent variables were represented by Bank rate, Bank credit monetary policy rate and Exchange rate. The result shows that all the variables are integrated of the same order and there is long run relationship between economic growth and monetary policy. Error correction model result shows that all the variables jointly dictate the pace of Nigeria economy.

Ahmed, et.al (2016) analyzed importance of monetary measures in promoting economic growth of Pakistan with an annual time-series data of 1973 to 2014. Variables Gross domestic product, Money supply, Inflation and Interest rate are stationary at level while exchange rate measured stationary at first difference. Autoregressive Distribution Lag (ARDL) Cointegration approach applied in determining the short and long-run. Findings reveal a long-run association occurs among the variables

In another development, Nasko (2016) uses time-series data covering the range of 1990 to 2010. Multiple regressions were employed to analyze data on variables such as money supply, interest rate, financial deepening and gross domestic product. They were all found to have marginal impact on the economic growth of Nigeria. Baljit (2000) examine monetary policy specifically on developing economy by using special deposit, return on bonds, returns on equity and inflation rate as explanatory variables against GDP. He employed ordinary least square method. The result shows that the  $R^2$  satisfy the necessary condition and the parameters in the estimated model fulfil the a priori expectation. However, it concluded monetary policy

has significantly impacted economic growth. Agbonlahor (2014) conducted a study on the influence monetary policy on economic growth in United Kingdom 1940-2012. Vector error correction model was used in the estimation Findings confirmed connection occurs between money supply and Inflationary rate, which consider prominent instrument to economic growth in United Kingdome. Oseni & Oyelade (2023) examines the effects of monetary and fiscal policies on economic growth in Nigeria. The findings showed that broad money supply, and lending interest rate are significant factors in determining economic growth in Nigeria. The study found broad money supply have a positive and significant effect on gross domestic product (GDP), while lending interest rate has a negative and significant effect on GDP.

In a related development Kaaman, (2014) assess the impact of monetary policy on economic growth in Kenya. Findings of the study shows that one standard deviation monetary policy shock has a negative and insignificant effect on the output in the first two months which then becomes positive and insignificant in the next four months. nevertheless, a one standard deviation shock of the interbank rate to inflation is positive and significant for the first two and a half months. The effect continues to be positive and insignificant up to the sixth month.

Fasanya, et, al. (2013) analyses the effectiveness of monetary policy on economic growth in Nigeria. The study uses time series data of 1975-2010. The effects of stochastic shocks of each of the endogenous variables were explored using Error Correction Model (ECM). Findings of the study reveal a long run relationship among the variables. Also, finding of the study indicates that inflation rate, exchange rate and external reserve are significant monetary policy instruments that driving economic growth in Nigeria for the period under consideration

Ufoeze, et, al. (2018) carries out an empirical studies of the relationships between monetary policy on economic growth in Nigeria. Time series data for the study covers 1986 to 2016. The study employed an Ordinary Least Squared technique, ADF and PP unit root test for stationarity and co-integration tests are equally performed. The result of the findings showe the existence of long run relationship among the variables. In other finding of the study indicates that monetary policy rate, interest rate, and investment have an insignificant positive effect on economic growth in Nigeria. Money supply has significant positive effect on growth. however, Exchange rate has significant negative effect on GDP in Nigeria. The granger causality test result revealed that Money supply and investment granger cause economic growth, while economic growth causes interest rate in Nigeria.

Dzisah, (2019) conducted an empirical investigation into the effect of monetary policy on economic growth in ECOWAS countries for the period covering 2000-2017. The study sources it data from World development indicators, Model for the study was estimated using the panel regression techniques. The study found that money supply, exchange rate, interest rate and gross fixed capital formation has a significant effect on economic growth of ECOWAS countries.

## **METHODOLOGY**

The study is basically aimed at analyzing the impacts of monetary policy on economic growth in Nigeria. This chapter has to with methodological aspect of the study. It covers areas such as research design, Sources and types of data, method of data collection, methods of data analysis, description of variables and model specification.

### **Data type and Source**

This study uses secondary annual time series data that covers 32 years ranging from 1990-2022. The purpose of choosing this period is to empirically test the significance or the extent to which monetary policy

instruments are stimulating economic growth since 1990 to date; Data for the period under review are collected from Central Bank of Nigeria (CBN), World Development Indicator(WDI) and International Monetary Fund (IMF). These sources of data are believed to have internationally recognized for accuracy and up to data availability. Therefore, this study relies on their data gallery to ascertain the stated objective of this study.

Data on Gross Domestic Product, Interest Rate, Exchange Rate are duly collected and for analyses. The data was obtained from the CBN statistical bulletin of various editions.

### Techniques of Data Analysis

The analysis of the data began with testing for properties of the time series using ADF and PP test. ARDL model is appropriate for the study because it is suitable for variable which are integrated of different order or if the variables are integrated of the same order. The cointegration and granger causality test are also used.

### Unit root Test

This is the pre Co-Integration Test. It was used to determine the order of integration of a variable. That explain, how many times a variable should be differenced or not to become stationary. Unit Root test is necessary to guard against analysis of spurious relationship among the variables. Non stationarity of variables will produce spurious results if used in analysis: that is, result that is not valid for forecasting or prediction. In this study, Augmented Dickey-fuller (1981), Phillip Peron (1987) and Kwiatkowski~ Philips Schmidt shin KPSS tests of Unit Root tests were conducted. Augmented Dickey-Fuller test involves rejecting a null hypothesis of unit root (the series is non stationary) and accepting of alternative hypothesis of stationarity of a given variable. The null hypothesis is that the variable under investigation has a unit root against the alternative that it does not. The decision rule is to reject the null hypothesis if the: absolute value of the Augmented Dickey-Fuller (ADF) statistics exceeds the critical value at chosen level of significant. The test is specified in the following forms:

This technique considers the following three different regression equations to test for the presence of unit root:

$$\Delta Y_t = \alpha_1 Y_{t-1} + \text{lags of } \Delta Y_t + \mu_t \dots\dots\dots 1$$

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \text{lags of } \Delta Y_t + e_t \dots\dots\dots 2$$

$$\Delta Y_t = \alpha_0 + \alpha_1 Y_{t-1} + \alpha T_t + \text{lags of } \Delta Y_t + e_t \dots\dots\dots 3$$

Equation (1) is a random walk; equation (2) is a random walk with intercept only; equation (3) is a random walk with intercept and time trend.

From the above equations we look at the critical value of rejecting null hypotheses of  $\alpha_1$ . However, in the equations, the first difference of  $Y_t$  is regressed against a constant term, a time trend ( $t=1,2, T$ ), the first lag of  $Y_t$  and the lags of  $\Delta Y_t$ . it is important to include sufficient lags of  $\Delta Y_t$  to ensure no autocorrelation in the error term. Sometimes, one lag or more lags are suitable (Gujarati and Sangeetha, 2007). To test for the suitable number of lags, we will use the Schwarz or Baye's information criterion to confirm the number of optimum lags to be included in each of the three equations.

The test is based on the value of t-statistics for the coefficient of the lagged dependent variable compared

with special calculated critical values. If the calculated value in absolute terms is greater than the critical value then we reject the null hypotheses of a unit root test, meaning that unit does not exist and our variable is stationary.

### **Co-integration analysis**

It is also possible to have a situation where the variables have long run relationship, in which case, the variables are tied together in the long run, a situation that will make it impossible to separate their individual impact on each other. Johansen and Juselius (1990) approach for testing and correction of co-integrated variables. In line with the ADF unit root test and Johansen and Juselius (1990) approach to co-integration verification, the applied data were examined for integration and long-run relationship.

### **ARDL Bound Test**

ARDL is used in analyzing short and long run dynamic interaction among the variable of interest. Autoregressive distributed lag model was developed by Pesaran & Shin (1990) and Pesaran et al. (2001). The new approach deals with the problem of testing for the existence of a level relationship between a dependent variable and a set independent variable in a situation when it is not clear with certainty whether the regressors are trend or difference stationary. This approach is known as Autoregressive Distributed Lag (ARDL) bound testing.

This method by Pesaran et al. (2001) is applicable irrespective of whether the series variable are purely stationary at their level values, purely difference stationary or mutually co integrated. According to Freidun et al. (2009) the result of the ARDL estimation remains valid irrespective of the order of integration of the explanatory variables. The ARDL methodology thus has an advantage over co integration techniques which require the underlying series to be both  $I(1)$ . The bound test does not impose restrictive assumption that all the variables under study must be integrated of the same order. Its asymptotic distribution for the F statistic is nonstandard under the null hypotheses of no co integration relationship among the variables, irrespective whether the explanatory variable are purely  $I(0)$  or  $I(1)$ , or mutually co integrated.

The short and long run dynamic relationship between money supply growth and inflation in Nigeria was estimated by the use of the Autoregressive Distributed Lag (ARDL) bound testing approach which was initially introduced by Pesaran and Shin (1996) Specification of unrestricted Error Correction Mechanism (UECM)

The approach has three advantages when compared with the traditional cointegration approach. Basically it does not need that all the variables must be of the same order. It is relative more efficient in the case of small and finite sample data size. It also provides unbiased estimate of the long run model (Harris & Sollis, 2003; Bellomi, 2010).

### **Granger Causality Test**

According to Gujarati (1995), It is the responsibility of a researcher to specify based on the priori knowledge he has, which variables are endogenous and which are exogenous. Therefore, it is possible for one to develop a statistical test of exogeneity. However, before causality is carried out, if the data set is time series one, the properties of the variables must be checked. If the variable are not stationary, causality test cannot be done (Hee Ng, 2006). Though non stationary, if series variables are integrated of the same order, Granger causality test can be applied through vector autoregressive model with the differenced values of the variables. Vector error correction model should be used when causality is established for non-stationary series variables (Beck, 2008). For one to know the direction of causality if the variables are stationary, Granger causality test can be run through the use of vector autoregressive (VAR) model.



## Justification of variables

### Economic growth

Economic growth is measured here as the rate of change of nominal GDP. It is the dependent variable of the study. The nominal version of GDP is adopted because, the explanatory variables in this study are in their nominal form. The variable is a continuous. As used in studies of (Nibeza & Tumusherure, 2015; Ahmed et al., 2016), the variable is driven by money supply (M2), interest rate, inflation rate and exchange rate.

### Money Supply

The money supply measures the amount of money in the general public. It includes money in deposits accounts and money in the hands of the general public. Broad money supply (M2) is used for the study. It is defined as narrow money plus savings deposits, time deposits, and certificates of deposits. Nibeza & Tumusherure (2015) maintains that M2 is the appropriate monetary aggregate in explaining economic growth in Nigeria and other Sub-Saharan Africa due to the relatively undeveloped money markets of these countries. The variable is included to capture the contribution of monetary policy on economic growth.

### Nominal Exchange rate

The exchange rate is simply the price of a foreign currency. A fall in the price of a foreign currency in relation to a domestic currency is termed as exchange rate appreciation. While a fall in the price of the domestic currency relative to a foreign currency is termed as exchange rate depreciation. Business transactions that take place among countries is done in terms of the exchange rate, therefore a depreciating exchange rate makes foreign products unattractive in a domestic country. In economic sense, this discourages imports and promotes exports. However, if the exchange rate is appreciating, foreign goods become cheaper and therefore make importation laudable whilst exportation of domestic goods is restricted. Based on the dynamics of the exchange rate, its impact on economic growth is ambiguous. (Dzisah, 2019)

## Model Specification

This statistical expression denotes the relationship between variables (dependent and independent variables) to be studied in a mathematical form. The model specification enables empirical exploration of the economic phenomenon. It is also called formulation of mathematical hypothesis.

The functional relationship between variables (dependent and independent variables) for the period under can be stated below:

$$GDP = f(MSL, ITR, REXR, \dots) \dots\dots\dots(4)$$

Econometrically, the model is specified as follows:

$$GDP_t = \beta_0 + \beta_1MSL + \beta_2ITR + \beta_3REXR + \mu \dots \dots\dots(5)$$

Where,

GDP<sub>t</sub> = Gross Domestic Product

MSL= Money Supply

ITR<sub>t</sub> = Interest Rate

EXR<sub>t</sub> = Exchange Rat

### Autoregressive Distributed Lag (ARDL) Model

The model used in the analyses of the data is an Autoregressive Distributed Lag (ARDL) model as in Pesaran et al. (2001). The ARDL model is of the form

$$\Delta GDP = \alpha_0 + \sum_{i=1}^n \alpha_{1i} \Delta GDP_{t-1} + \sum_{i=0}^n \alpha_{2i} \Delta MSL_{t-1} + \sum_{i=0}^n \alpha_{3i} \Delta ITR_{t-1} + \sum_{i=0}^n \alpha_4 \Delta EXR_{t-1}$$

$$+ \beta_1 GDP_{t-1} + \beta_2 MSL_{t-1} + \beta_3 ITR_{t-1} + \beta_4 EXR_{t-1} + \ell_t \dots \dots \dots (6)$$

Where:  $\Delta$ = First Difference Operator,  $\alpha_0$  = Drift Component,  $\ell_t$  = White Noise.

### Granger Causality Tests.

Causality test is use to determine the direction of causal relationship among the variables. This study therefor employed the standard granger causality test Granger, (1969). The test is based on error correction (ECM), which suggest that while the past cause or predict the future, the future cannot predict or cause the past. Thus, according to the granger (1969), X granger causes Y if the past values of X can be used to predict Y more accurately than simply using the past value of Y. the test is based on the following regression

$$y_t = \alpha_o + \sum_{i=1}^n \alpha_i^y y_{t-1} + \sum_{i=1}^n \alpha_i^x X_{t-1} + \mu_t \dots \dots (7)$$

$$x_t = \alpha_o + \sum_{i=1}^n \beta_i^y y_{t-1} + \sum_{i=1}^n \beta_i^x x_{t-k} + v_t \dots \dots (8)$$

Where  $x_t$  and  $y_t$  are the variable to be tested while  $\mu_t$  and  $v_t$  are white noise disturbance terms. The Null hypothesis  $\alpha_i^x = \beta_i^y = 0$  for all  $i$ 's is tested against the alternative hypothesis  $\alpha_i^x \neq 0$  and  $\beta_i^y = 0$ . If the coefficient of  $\alpha_i^x$  are statistically significant but that  $\beta_i^y$  are not , then X causes Y if the reverse is the case then Y causes X where both of  $\alpha_i^x$  and  $\beta_i^y$  are significant then causality is bidirectional

## RESULTS AND DISCUSSION

The results are presented and discussed in the following sequence.

**Table 1: Descriptive Statistics**

Variables	Mean	Minimum	Maximum
gdp	42853.90	21680.20	72094.09
mssl	17.70504	9.063329	27.37879
Itr	3.199465	-31.4526	18.18000
exr	108.0661	49.73381	272.9240
Observations	31	31	31

**Source: Authors Calculation EVIWS 10, 2023**

The result of descriptive statistics is presented in table 1. The mean, minimum and maximum value of rgdp is estimated as 42853.90, 21680.20 and 72094.09 respectively. The mean value of money supply (mssl) is 17.70504, minimum 9.063329 and 27.37879 as maximum. Interest rates mean, minimum and maximum

values accounted for 3.199465, -31.45257 and 18.18000 respectively. meanwhile, exchange rate mean and maximum value estimated as 108.0661 and 272.9240 but its minimum estimated figure stood as 49.73381

**Table 2: Unit Root Test Result**

Variables	Augmented Dickey-Fuller		Phillips-Perron	
	At level	First Diff	At level	First Diff
gdp	-4.648990**	-5.174642***	-1.44016	-5.174642***
mssl	-1.87505	-5.908708***	-1.87564	-6.091723***
itr	-2.13697	-4.182253**	-3.27747	-13.48111***
exr	-2.25935	-5.301833***	-2.47314	-5.306247***

**Source: Authors Calculation EVIWS 10, 2023** Notes: \*, \*\*, and \*\*\* denote significant at 10%, 5%, and 1% levels, respectively.

The stationarity process of the series variables is analysed and presented in table 2. Unit root test result shows that variables attained stationary at difference level of stationarity. Some variable becomes stationary at level value while others at first difference. Using Augmented Dickey-Fuller unit root test, Gdp becomes stationary at level but otherwise in the case of Phillips-Peron test. However, it attained stationarity in both tests after the first difference. Money supply interest rate and exchange was not stationary at level values neither in ADF nor PP test but it become stationary in both after differencing. These indicates

**Table 3: Cointegration Test Result**

Hypothesized No. of CE(s)	Eigenvalue	Trace statistics	0.05 Critical Value	Prob**
None *	0.615654	62.97735	47.85613	0.0010
At most 1 *	0.539025	35.24717	29.79707	0.0107
At most 2	0.320856	12.78924	15.49471	0.1228
At most 3	0.052650	1.568522	3.841466	0.2104

**Source: Authors Calculation EVIWS 10, 2023**

Table 3. presents Johansen cointegration test result. Test result shows that there are two Cointegrating vector. This is too show that the trace statistic value is greater than the critical value at 0.05. This negate the null hypothesis of no cointegration relation among the variable. Therefore, it clears to say that there exist a cointegration relation.

**Table 4: Optimal Lag-length Selection**

Model	AIC*	BIC	HQI	Specification
92	16.521440	17.198877	16.716517	ARDL(5, 1, 1, 3)

**Source: Authors Calculation EVIWS 10, 2023**

Table 4 present the lag length selection criterion for conducting ARDL. Result of the lag to be included in the model is identified by Akaike information criteria (AIC). This criterion gives the smallest value among all the criterion. There for it suggests 2 lag to be included in the model.

**Table 5: ARDL estimation result**

Dependent Variable: GDP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
GDP(-1)	1.746823	0.182209	9.586929	0.0000
GDP(-2)	-0.760246	0.178971	-4.247863	0.0004
MSL	-254.0399	114.0799	-2.226860	0.0370
MS(- 1)	466.0073	135.0918	3.449559	0.0024
MSL (-2)	-227.2357	114.8211	-1.979042	0.0611
ITR	28.78577	29.04771	0.990982	0.3330
EXR	-1.551323	4.952995	-0.313209	0.7572
C	1308.963	1166.522	1.122108	0.2745
R2	99.0%			
Adj. R2	98.8%			
F-Value	435.94			
P- Value	0.000			

**Source: Authors Calculation EVIWS 10, 2023**

ARDL estimation result is presented in table 5. The regression result reveals that first and second year lagged values of GDP are significantly influence economic growth in Nigeria. The coefficient of first lag value is positive and the second year was negative this shows that GDP has both positive and negative influence on self. Money supply has a negative current year coefficient value, a positive and significant first year lagged value and negative and insignificant second year lag value. These result shows that money supply influences GDP positively and negatively. Interest rate has a positive coefficient value this shows that it affects GDP positively but insignificant similarly exchange rate has a negative coefficient value which affect economic growth passively but insignificant. Generally, the results suggest that lag values of money supply and GDP itself plays crucial roles in influencing level of economic growth in Nigeria

The  $R^2$  in the model is 0.99, this means that about 99% of the variation of the dependent variable GDP is explained jointly by all the independent variables in the model. The explanatory power of the model is very high and is a good fit, leaving about 1% for the unexplained variable. The F- statistics of 1193.094 with probability of 0.000 is highly significant. This means that the independent variables in the model are jointly significant. Durbin Watson statistics of 2.049766 indicates that there is no autocorrelation, since the value 1.80 approximately is within the range of 1.8 and 2.2. It, therefore, implies that the result will be reliable for prediction and policy making.

**Table 6: ARDL long run Bound Test**

Model	F-statistics	
Model 1: $GDP = f(MSL, ITR, EXR)$	6.549531	
Narayan (2005)	K=3, n=32	
Critical Value	Lower bound	Upper bound
1%	2.618	3.53
5%	3.164	4.19
10%	4.428	5.81

**Source: Authors Calculation EVIWS 10, 2023** Notes: \*, \*\*, and \*\*\* denote significant at 10%, 5%, and 1% levels, respectively. Critical values are obtained from Narayan (2005) Table.

ARDL bound test result in table 6 shows that The F-statistic > critical upper bound value at all significance level. This shows that there is a long-run cointegration relationship among GDP per capita and its determinants, namely Broad money supply, interest rate and Exchange rate. The interpretation of the result indicates that dependent variables collectively influence economic growth in the long run.

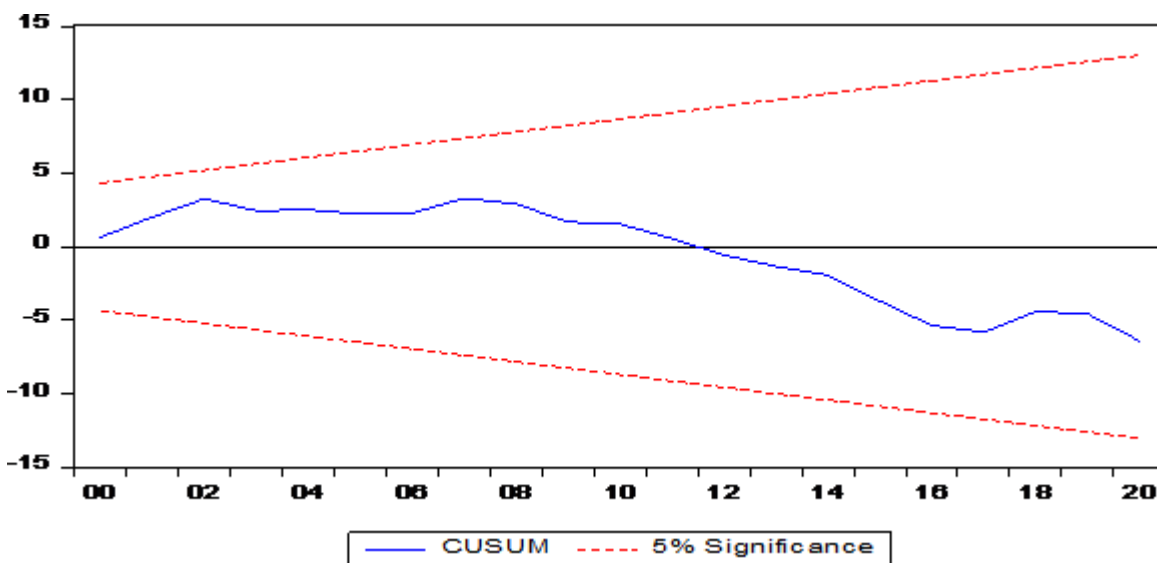
**Table 7: ARDL short run Dynamic Test**

CoIntEq(-1)*	Coefficient	Std Error	t-statistics	Prob
ECM(-1)	-0.09505	0.015223	-6.24393	0
			F-statistics	
d(gdp(-1))d(msl(-1))d(itr(-1)) d(exr(-1))			7.797337	
Narayan (2005)			K=3, n=32	
Critical Value			Lower bound	Upper bound
1%			2.72	3.77
5%			3.23	4.35
2.50%			3.69	4.89
10%			4.29	5.61

**Source: Authors Calculation EVIWS 10, 2023** Notes: \*, \*\*, and \*\*\* denote significant at 10%, 5%, and 1% levels, respectively. Critical values are obtained from Narayan (2005) Table.

The result of short run dynamic analysis is presented in table 7. The presence of short run relationship among the variable is indicated by the greater f statistic's critical values against all the significant level. This result shows that 7.79 f-calculated value is greater than 5 percent critical value both at lower and upper bound. More so, the coefficient of error correction term is signed negative with -0.95. This indicates the presence of short run dynamic with 95% adjustment speed toward long run equilibriums.

**Diagnostic Tests**



**Fig:1 CUSUM test**

Figure 1 presents CUSUM stability test result for model analyzing the determinant of economic growth in Nigeria. The model consists of GDP, MSL, ITR and EXR. The results of the test indicate the absence of any instability of the coefficients because the plots of the CUSUM statistics fall inside the critical bands of 5 percent confidence intervals of parameter stability. Therefore, there exists stability in the coefficients over

the sample period

**Table 8. Granger Causality Test Result**

Null Hypothesis:	Obs	F-Statistic	Prob.
MSL does not Granger Cause GDP	31	0.30334	0.7409
GDP does not Granger Cause MSL		1.36525	0.2730
ITR does not Granger Cause GDP	29	1.04827	0.3660
GDP does not Granger Cause ITR		3.05312	0.0124
EXR does not Granger Cause GDP	31	0.13138	0.8775
GDP does not Granger Cause EXR		0.48752	0.6197
ITR does not Granger Cause MSL	29	0.28263	0.7563
MSL does not Granger Cause ITR		0.35254	0.7065
EXR does not Granger Cause MSL	31	0.49514	0.6151
MSL does not Granger Cause EXR		0.31231	0.7345
EXR does not Granger Cause ITR	29	1.25718	0.3025
ITR does not Granger Cause EXR		7.12187	0.0037

**Source: Authors Calculation EVIWS 10, 2023**

Table 8 presents Granger causality test result. Result of the findings based on the direction Causality indicates the absence of causal relationship among most the variable except among exchange rate and interest rate. This shows that a unidirectional causality running from interest rate to exchange rate. Therefore, the null hypothesis of interest rate does not granger cause exchange rate is rejected and accept the otherwise. The results also proved the absence of bidirectional causality running from either of the variable under review.

The analysis of causation among the variable shows that monetary policy variables were not significantly causing each other for period under review. The significant relationship of Average Price and exchange rate on Gross Domestic Product, suggest that monetary policy as a policy option had been active in influencing these macroeconomic variables to achieving economic stability and sustainable growth in the long run. While the insignificant effect of Broad Money Supply and Interest Rate indicates that the adoption of monetary policy measures such as cash reserve ratio or open market operation by the monetary authority has no significant impact on the variables to regulate interest rate and mitigate price instability in Nigeria. Therefore, the interaction among the considered variable wasn't significantly influence economic growth within the time of this study.

## FINDINGS

The study analyzed the relationships between economic growth and monetary policy in Nigeria. The Findings of the study begins with the stationary test of the variable where all the variable assumes stationary process at first difference level. This to show that the variables are integrated of order one i.e. I (1). This result is in line with the work of Ahmed, et.al (2016) who studied Pakistanis economy. Finding based on cointegration analysis reveals that there exists presence of cointegration relations. This is to show that there is a cointegration relation among economic growth and monetary policy. this finding is in tandem with study carried out by. Palesa & Precious (2014), Ahmed, et.al (2016) and Omolade et.al. (2013). Findings on the analysis of ARDL bound test indicates the existence of long run relationship between economic growth and monetary policy. Such finding is in conformity with Fasanya, et, al. (2013) & Palesa & Precious (2014), Other findings based on granger causality test shows the absence of causal relation among most of the

variable except a unidirectional causality running from interest rate to exchange rate. This finding made the study to be believed that the interactions among monetary policy variable in influencing economic growth is not significant. And the monetary policy option of the CBN wasn't yield the desired objective.

## CONCLUSION

The study is specifically conducted to investigate the relationships between monetary policy and economic growth in Nigeria for the period spanning from 1990 to 2022. Due to differences in the order of integration of the variable, the study opt to employed ARDL. Result of the findings shows a long run relationships do exist among the variable. Cointegration test result also reveal that variable are cointegrated. Granger causality test is conducted to ascertain the directions of causal relations among the variable and findings indicates unidirectional causality is running from exchange rate to interest rate.

1. The study concludes that monetary policy is impacting economic growth in the long run.
2. There is cointegration relationship among economic growth, money supply, interest rate and exchange in Nigeria for the period under review
3. Unidirectional Causality is only running from exchange rate to interest rate. Therefore, it is concluded that there is no bidirectional causality relationship among the variable
4. On the overall, monetary policy explains 98% of the changes in economic growth in Nigeria. Thus, the study concluded that monetary policy can be effectively used to control Nigerian economy and thus a veritable tool for price stability and improve output.

## POLICY IMPLICATION

The imperative of the study is born out of the contention that over the decades the central bank of Nigeria on behalf of the government of the federation embarked on monetary policies aimed at bringing back the economy to equilibrium level of employment. It emphasis are of moderating the rate of inflation, exchange rate stability, employment generation and poverty alleviation. This effort has been for long time however the desire objective is not yet archived. The implication of the finding of this study is that monetary policy has a long and short run relationship with economic growth. This is to show that money supply, interest rate and exchange rate are effective means of policy regulations that propel economic growth in Nigeria.

The CBN has been trying in maintaining price stability through controlling money supply and the rate on interest feasible for investors.

## RECOMMENDATIONS

The study recommends that Central Banks of Nigeria should strengthen the monetary policy accountability and credibility to maintain a short, medium, and long-run focus on improving their Monetary Policy frameworks. This can be done by obtaining the optimal money supply that would sustain economic growth in these countries.

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