Quest Journals
Journal of Research in Business and Management
Volume 12 ~ Issue 4 (2024) pp: 288-303
ISSN(Online):2347-3002
www.questjournals.org

Research Paper

Assessment of the Impact of Monetary Policy on Economic Growth in Nigeria (1986 – 2021): Evidence from Autoregressive Distributed Lag

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Abstract
This study investigates the effects of monetary policy on economic growth in Nigeria from 1986-2021 using autoregressive distributed lag (ARDL) as methodology. Findings from the study indicate thatthe monetary policy's short- and long-term effects on Nigeria's economic growth were estimated using Autoregressive Distributed Lag (ARDL) bound co-integration, which revealed a long-term association. Additional estimation results indicated that Nigeria's economic growth was impacted by monetary policy. The Vector Error Correction Model (VECM) result indicates that LM2 and LEXC have a little greater effect on GDP growth in a shorter amount of time than LBCP and INT. Similarly, over a longer period, LM2 and LEXC have a much greater impact on GDP growth than INT and LBCP. The examination of the results indicated that the monetary policy measures implemented by the Central Bank of Nigeria had a noteworthy effect on the economic growth of the country. Thus, it is advised that the Central Bank of Nigeria lift the limitations on lending to the private sector, which can support an economy. By promoting the creation of interest rate and currency rate regimes that are based on the market, monetary policies should be used to promote investment from both domestic and international sources.

Keywords: ***Monetary Policy, Economic Growth and Autoregressive Distributed Lag.***

R*eceived 18 Apr., 2024;* ***R****evised 28 Apr., 2024;* ***A****ccepted 30 Apr., 2024 © The author(s) 2024.*
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I. Introduction

According to Onwuteaka, Okoye, and Molokwu (2019), monetary policy is essential to ensuring financial stability and long-term economic growth in Nigeria. In Nigeria, the process of economic growth has been unstable due to monetary policy's incapacity to stabilize prices. To achieve low and stable inflation, monetary policy tools are manipulated. Therefore, monetary policy ought tobe seen as a guiding idea or procedure for developing, controlling, and upholding monetary factors in an economy that support growth. The central bank carries out monetary policy by altering the amount of money that is readily available, typically through open market operations. For instance, a central bank may reduce the amount of money if it sold government bonds as part of a "sale and repurchase" agreement to raise money from commercial banks.

Macroeconomic factors that are assumed to be impacted by monetary policy in developing nations include the creation of jobs, price stability, GDP growth, and the balance of payments (Adigwe, Echekoba, &Onyeagba, 2015). An instrument of economic management, monetary policy seeks to encourage the growth and development of an economy. The policy has an impact on the availability of credit, credit interest rates, the

amount of money in circulation, inflationary rate control, and external debts (Musa, Magaji & Salisu, 2022). Since maintaining domestic price and exchange rate stability is a requirement for achieving sustained economic growth and external viability, monetary policy has come to be considered a key tool that a country can use (Adegbite & Alabi, 2013). Monetary policy today has a central place in the macroeconomic policy framework of every modern economy (Magaji & Yahaya, 2012). It elicits prompt responses that lead to the necessary modifications required to meet the policy aim. Because of this, it serves as a real tool for achieving stability in the financial and economic markets and preventing large swings in these markets and economies (El-Yaqub, Musa & Magaji, 2024). As a tool for controlling the economy, monetary policy aims to promote the expansion and development of an economy.

The task of developing and implementing monetary policy belongs to a country's monetary authority. In Nigeria, the Central Bank of Nigeria (CBN) is in charge of carrying out this obligation. Since its establishment in 1959, the CBN has continued to play the traditional role of an apex bank by regulating the amount of money in circulation, the rate of inflation, the accessibility of credit, the interest rate on that credit, and external loans. The use of monetary policy, which frequently aims to achieve full employment, quick economic growth, price stability, and external balance, is the cornerstone of this position. The two last goals have frequently served as the primary goals of monetary policy over the years. Inflation targeting and exchange rate policy have predominated the CBN's monetary policy focus since it is believed that these are essential tools for ensuring macroeconomic stability (Fasanya, Onakoya&Agboluaje, 2013). Nigeria's monetary history can be divided into two distinct periods: the fixed regime and the market mechanism regime. These regimes were in place in the years following and before 1986. Before market liberalization in 1986, direct monetary management was used to maintain price stability in Nigeria; however, after that year, the emphasis shifted to market mechanisms (Ufoeze, Odimgbe, Ezeabalisi&Alajekwu, 2018). Before 1986, direct monetary measures, such as selective credit controls, managed interest and exchange rates, credit restrictions, cash reserve requirements, and special deposits, were employed to combat inflation and preserve price stability (Musa, El-Yaqub & Magaji, 2024). The main reason interest rates were kept so low was to promote investment and economic expansion. The banks' capacity to extend credit and their excess reserves were occasionally restricted by special deposits (Uchendu, 2009; Chinedu, Magaji &Musa, 2022).

Ufoeze, Odimgbe, Ezeabalisi, and Alajekwu (2018) claim that because the monetary targets' execution became less effective over time, the monetary control system appears to have failed to fulfil the predetermined monetary targets over the aforementioned timeframe. The rigidly controlled interest rate regime and the lack of alignment between fiscal and monetary policies may have had a significant impact on the detrimental effect of restricting the growth of the money and capital markets (Igwe, Magaji & Darma, 2021).This is evidenced by the failure of derivative instruments, demutualization, and other initiatives. However, the market mechanism system that has been in place since then appears to have worsened the nation's economic situation, raising concerns among the populace about the legitimacy of the government's policymaking (Okoroafor, Magaji & Eke, 2018).

It is suggested that the reason for this apparent asymmetry between the two known monetary regimes in the country is that the monetary policy has not been successful in reducing inflation, despite Nigeria having the strongest economy in Africa and then abruptly entering a recession, a situation that has negatively impacted the growth and development of the economy through rising unemployment rates, skyrocketing poverty levels, and enormous external debt. According to Magaji, Ayo &Musa, (2019) despite the different monetary regimes the Central Bank of Nigeria has used over the years, inflation still constitutes a significant threat to Nigeria's economic growth. The inflation rate in Nigeria has been highly erratic. Since the early 1970s, there have been more than three notable periods of high inflation of more than 30%. There is a connection between the expansion of the money supply and this period of high inflation since money expansion regularly outpaced real economic development. The dualistic nature of the financial and goods markets in Nigeria is another significant barrier to the development and efficient execution of monetary policy.

The unorganized sector makes for around 30% of Nigeria's GDP, so the enormous unregulated credit and exchange rate markets there have a big impact on how monetary policy is communicated (Eke et al, 2023). The payment system also plays a crucial role in bridging the gap between the real and financial economies. The majority of transactions in Nigeria's payment system are cash transactions, which raises the amount of money and currency in circulation and makes maintaining monetary management difficult (Musa & Idris, 2024). According to Magaji, Darma & Eke (2021) ensuring adequate banking system liquidation and sectoral credit allocation to the economy's vulnerable sectors requires effective administration of monetary policy. This indicates that, depending on the state of the economy and the stance taken by policymakers in pursuit of price stability, the Monetary Authority uses its discretion to influence the money supply and interest rate to make money either more expensive or cheaper (El-Yaqub, Musa & Magaji, 2024). Unquestionably, one of the macroeconomic goals the government strives to achieve is the maintenance of sustainable economic growth through prudent monetary policy. This goal is pursued to avoid the risks of inflation or deflation as well as the uncertainty that follows from incorrectly managed monetary policy. The effects of monetary policy on

economic growth have thus been examined because a country (like Nigeria, for instance) will experience faster real economic growth if the interest rate, exchange rate, and credit to the private sector are all properly controlled by the monetary authority in Nigeria.

II. Literature Review and Theoretical Framework

2.1 Conceptual Issues

2.1.1 Monetary policy

To achieve predetermined macroeconomic goals, monetary authorities, typically the central bank, must govern and regulate the supply of money and the flow of credit. This is known as monetary policy (Dwivedi, 2005). Macroeconomic stability is attained through the intentional use of monetary instruments (direct and indirect) available to monetary authorities, such as the central bank. The main tool for carrying out the mission of monetary and price stability is monetary policy.

The monetary authorities utilize monetary policy as one of their tools to ensure price stability in an economy to achieve the desired level of economic growth. Most governments believe that the rate of expansion of the money supply affects the rate of inflation, so they work to control it. Financial and monetary markets that are well-developed, as they are in the industrialized economies of the world, are a major factor in the effectiveness of monetary policies. Here, a purposeful change in one monetary variable can affect the movement of numerous other monetary variables. As a result, monetary policy has come to be recognized as a crucial tool that a nation can use to maintain domestic price and exchange rate stability, which is a necessary prerequisite for achieving sustained economic growth and external viability (Adegbite & Alabi, 2013).

Depending on the nation's economic situation, monetary policy may be inflationary or deflationary. Contractionary policies are put into place to limit the money supply and fight inflation, while expansionary policies are used to boost the economy and fight unemployment during recessions (Shane Hall, 2010). A monetary authority's efforts to control the amount of money in the economy to achieve certain economic goals defined by the Fiscal authorities constitute monetary policy. Decisions affecting the quantity of money in circulation, the rate of interest, and the roles of the credit markets and the banking system are the three fundamental categories of monetary policy decisions that can be made (Ahmad, Afzal, & Ghani, 2016).

The sum of these actions is intended to control the price, supply, and availability of money in an economy by the amount of economic activity. A surplus of money will lead to an overabundance of demand for goods and services, which will drive up prices and worsen the balance of payments. The responsibility for managing monetary policy rests entirely with the monetary authorities, who have vowed to effectively address the difficulties over time. Recent years have seen a significant improvement in the effectiveness of monetary policy, with moderate inflation and rapid domestic output growth. To continue the efforts, it is vital to work effectively with the fiscal authorities, build interbank market trust, and create the required infrastructure for the financial markets.

2.1.2. Economic Growth

According to Ogbulu and Torbira (2012), economic growth is a steady increase in the production of goods, services, and employment opportunities with the primary objective of raising the economic and financial well-being of the populace. According to Anazor (2015), economic growth is the expansion of a nation's capacity for production, which may be shown in a consistent increase in real national income. Economic growth is a significant topic and is viewed as one of the prerequisites for improving social welfare outcomes, which is the major goal of economic policy. As a result, it is a crucial component of sustainable development. Gross Domestic Product (GDP) serves as a proxy for economic growth in a nation. As a result, GDP is defined in this study as the total monetary value of all commodities and services generated in an economy over a given period, often one year.

2.2 Theoretical Review

So many theories have been adduced to explain the role that monetary policy plays in nations' economic growth.To underpin this study, classical monetary policy has been selected.

2.2.1 Classical View of Monetary Policy.

The term "classical economists" was coined by Karl Marx economists who put out various economic theories between 1776 and the 1870s, according to Nwaru (2006). However, in general, all work produced before 1930 is categorized as classical school. The quantity theory of money is the foundation of the traditional approach to monetary policy. According to this theory, a rise (or decrease) in the amount of money causes a corresponding increase (or drop) in the price level, given the level of actual output. According to the traditional theory of money, the supply of money affects the level of prices. In discussions about it, the exchange equation is frequently used. The Fisher and Newcomb expression provides it algebraically.

$$MV = PT \quad \text{..... (2.1)}$$

Where M = Money supply over which the CBN has some control
V = Velocity of circulation (that is, the average number of times a naira is spent on final goods over a year).
P = Price level
T = Volume of transaction (total output).

The equation states that the supply of money multiplied by the average number of times a naira is used in a transaction in a given year is equal to the total value of output (nominal GDP) in the economy.

Since T in the equation is fixed, at least in the near run, the classical economist makes this assumption. They also consider V to be fixed by assuming that it will never change. Assuming T and V remain constant, it follows that the only change that would occur if the Central Bank of Nigeria adopted an expansionary (or contractionary) monetary policy would be an increase (or drop) in P in direct proportion to the change in M. The idea that money serves as a means of exchange underlies this. In conclusion, according to classical economists, monetary policies that are expansionary (or contractionary) can only result in inflation (or deflation).

2.3 Empirical Review

By fostering a model that can utilize multi-variable relapse examination to look at what the public authority's money-related strategy has meant for financial development, Ayodeji and Oluwole (2018) investigated the effect of money money-related approach on monetary development in Nigeria. The mistake rectification model was acquainted together with a meagre model. The outcomes showed that the cash supply and conversion scale unimportantly affected the financial turn of events. The estimations of loan fee and liquidity proportion, then again, to a great extent affected monetary development.

Dauda, R. O. & Abdulkareem, M. (2023) Investigate the Impact of Monetary Policy on Economic Growth in Nigeria from 1990-2020 using Augmented Dickey-Fuller Test and an ARDL bond test to examine the presence of a long-run relationship between monetary policy and economic growth in Nigeria. Findings from the study of the short-run regression conducted using the ARDL regression method showed that monetary policy is an important determinant of economic growth in Nigeria. The two indicators of monetary policy used (Monetary Policy Rate, MPR, and Money Growth Rate, M2) exert a significant impact on economic growth in Nigeria. Based on the findings, this study concludes that monetary policy significantly affects economic growth in Nigeria. It is recommended that policymakers in Nigeria should improve the monetary policy in such a way as to increase the economic growth in Nigeria.

Musa & Idris (2023) Examine the Empirical Analysis of monetary policy and economic growth in Nigeria from 1910 to 2022 using the autoregressive distributed lag (ARDL) bound cointegration. Results indicate the long-term statistical significance of the money supply (MS), inflation rate (INF), and exchange rate concerning their impact on the Growth Rate of RGDP. In the short run, it was seen that the MS exhibited statistical significance and exerted a positive influence on RGDP. Conversely, both INTR and EXR were statistically significant and were associated with a negative and significant association with RGDP. Consequently, the study suggests implementing monetary policy to cultivate a conducive investment climate. This may be achieved by promoting market-driven interest and currency rates, stimulating domestic investment, and enticing foreign direct investment.

To look at the impact of the financial approach on monetary growth in Nigeria for the market-controlled period crossing 1986 to 2016, Ufoeze, Odimgbe, Ezeabalisi, and Alajekwu (2018) involved the normal log of the Gross domestic product as the reliant variable against the illustrative money related arrangement factors: financial strategy rate, cash supply, conversion scale, loaning rate, and speculation. The unit root and co-reconciliation tests likewise proceeded as a feature of the review utilizing the Standard Least Squares technique. The exploration showed a reliable connection between the factors. The main consequence of this concentrate additionally shows how little impact speculation, loan fees, and financial strategy rates had on monetary development in Nigeria. Be that as it may, the accessibility of cash impacts Nigeria's monetary development. The Gross domestic product of Nigeria is altogether affected adversely by trade rates. An ascent in the cash supply, an expansion in venture, and increasing loan costs all add to financial development in Nigeria.98% of the varieties in Nigeria's financial development might be attributed to changes in money-related approaches.

Onwuteaka, Okoye, and Molokwu (2019) utilized auxiliary information from the National Bank of Nigeria's measurable announcement that covered the years 1980-2017 to analyze the effect of money-related arrangements on financial development in Nigeria. To decide the effect of the cash supply, credit in the economy, financing costs on layaway, foundation, inflationary rate, outside obligations, and cost record on development in Nigeria, the models were assessed utilizing different econometric models of the conventional

least square. The outcomes demonstrate that foundation, outside obligation, credit financing costs, and cash supply all meaningfully affected monetary development, as opposed to other review factors, which were undeniably displayed to significantly affect the development pace of the Nigerian economy. They recommended, in addition to other things, giving the National Bank of Nigeria complete independence over its money-related arrangement obligations for the financial approach measures to find lasting success in the Nigerian economy. For national banks in immature nations by and large, which are as often as possible defenseless to administrative control and its governmental issues, fractional independence ought to be supplanted with fullindependence.

Nwoko, Ihemeje, and Anumadu (2016) researched how successfully the National Bank of Nigeria's money-related arrangements energized financial development somewhere in the range of 1990 and 2011. Different relapse demonstrating was the vitally measurable investigation procedure used to inspect the impacts of cash supply, normal cost, loan fee, and workforce on Gross domestic product. As indicated by studies, the money-related arrangement instruments utilized by the National Bank of Nigeria are effective at controlling both financial and genuine area qualities, like business, costs, yield level, and pace of monetary development. As indicated by observational discoveries, the workforce and average cost significantly affect the total national output, while the cash supply doesn't. There was a negative financing cost that was measurably critical. To research the impact of money-related arrangements on monetary development in Nigeria, Nasko (2016) utilized time-series information covering the years 1990 to 2010 to concentrate on information on factors, for example, cash supply, loan cost, monetary extension, and GDP. They generally seemed to insignificantly affect Nigeria's financial development. The concentrate additionally fills in to act as an illustration of the points and targets of money-related arrangement, which incorporate advancing financial development, supporting full business, and safeguarding balance-of-installments dependability. The investigation discovered that development was not fundamentally influenced by money-related arrangement execution.

Ultimately, monetary policy has been seen as a tool for controlling the economy to promote long-term, sustainable growth. Since Adams Smith's time, nations have been striving to explain how money impacts economic statistics. Later, this cause was supported by monetary economists. Monetary authorities are tasked with employing monetary policy to improve their economies because of the expositions of the significance of monetary policy in influencing macroeconomic goals including economic growth, price stability, balance of payments equilibrium, and a host of other purposes. Since the Central Bank of Nigeria Act of 1958, which granted it authority over developing and implementing it, monetary policy has been utilized in Nigeria. Treasury Bills, a financial instrument used for open market operations and raising government debt, have seen a surge in volume and value as a result of this function, making them an important earning asset for investors and a source of balanced liquidity in the market (Amazon, 2015). A review of the literature suggests a strong connection between monetary policy and economic growth. Despite the several monetary regimes the Central Bank of Nigeria has used over the years, inflation and adverse exchange rate volatility continue to pose a serious threat to Nigeria's economic growth and stability. In Nigeria, there have been considerable changes in both inflation and exchange rates (Anazor, 2015). This study's primary objective is to assess the effectiveness of the CBN's monetary policy over time by examining how it affects Nigeria's economic growth. Determining the impacts of the money supply, exchange rate, loans to the private sector, and credit interest rates on Nigeria's economic growth are the study's specific goals.This would help determine how much the monetary policies have affected Nigeria's growth process by using the major monetary policy objectives as a baseline.

III. Methodology

3.1 Research Design

This project aims to examine the Impact of Monetary Policy on Economic Growth in Nigeria. The secondary data to be used include the Money supply, economic growth, Credit to the private sector, Interest rate, and Exchange rate. The macroeconomic time series data were sourced from the Central Bank of Nigeria, Statistical Bulletin. Based on this concern, the present study applies the unit root test first to uncover the true nature of stationary properties of all the variables under consideration.This is necessary in order not to run into the problem of spurious regression since unit root problems are common features encountered in most of the time series studies. Johansen Cointegration test will be applied if all the variables are integratedof the same order, such as at the first differencethat is I (1)]. Following the cointegration test, depending on whether the variables are cointegrated or not, either the Vector Autoregressive (VAR) model or the Vector Error Correction (VEC) model will be adopted as the estimation technique of the study. It is also important to note that if any of the variables are integrated of order two, that is ., I (2). The Toda Yamamoto will be used.

3.2 Model Specification

We aim to examine the impact of monetary policy on economic growth. To achieve this, the study adapts a model from Ezeaku, Ibe, Ugwuanyi, Modebe, andAgbaeze (2018). Their model is specified in their functional form as:

Y = f(M2, INT, EXR) ……(3.1)
where :
Y is the real output (measured by the Gross Domestic Product (GDP),
CRDT is the credit channel (measured as the ratio of private sector credit to GDP),
INT is the interest rate channel (this is the real lending rate), and
EXR is the exchange rate channel.
Equation 3.1 is our baseline long-run model for determining the industry effects of monetary policy transmission in Nigeria. It has been vastly buttressed in recent literature on financial econometrics that upon the establishment of a long-run relationship, there is a need to integrate a model which accommodates
for the short-run dynamic adjustment process, which is the speed of adjustment from short-run disequilibrium to long-run equilibrium.
However, credit to the private sector is missing in equation (3.1), hence, our new model will be:
GDP = f(M2,BCR, INT,EXC) ……..…… (3.2)
Where:
M2=Money supply
BCR=Bank credit to the private sector
INT= Interest rate
EXC=Exchange rate
Specifying the model in econometric form, we have:
GDPt = αo+ α1M2t+α2BCRt+α3INTt+ α4EXCt + Ut ……..……...(3.3)
GDP is the Dependent while M2, BCR, INT, and EXC are the independent variables.
Equation (3.3) is meant to explain the impact of exchange rate and inflation on economic growth in Nigeria. αo, α1, α2, α3, α4, are the parameters to be estimated in equation.

3.3 Estimation and Evaluation Techniques and Procedure

This study uses a unit root test, coin-integration test, causality test, stability test, and the impulse response function to estimate and evaluate the result.

4.1 Data Presentation, Analysis, And Interpretation Of Results

4.1 Data Presentation

Essentially, this project covers five variables namely economic growth (GDP), Money supply (M2), Credit to the private sector (BCP), Interest rate (INT), and Exchange rate (EXC). The macroeconomic time series data were sourced from the Central Bank of Nigeria, Statistical Bulletin over the annual period of 1986 to 2021. The data and their log form are presented in Appendix I.

4.1.1 Descriptive Statistics of Data

The mean, minimum, and maximum values, standard deviation, skewness, kurtosis, and the Jarque-Bera test for the data are included in Table 4.1 below, which also describes the fundamental statistical characteristics of the data under examination. These descriptive statistics provide our data's behavior in a historical context.

Table 4.1: Descriptive Statistics

	GDP	M2	BCP	INT	EXC
Mean	31721.53	5931.465	5554.594	13.77273	101.9850
Median	11332.25	1505.964	930.4939	13.50000	118.5669
Maximum	127762.5	25079.72	22521.93	26.00000	306.0802
Minimum	202.4362	23.80640	15.24745	6.000000	2.020600
Std. Dev.	38875.29	7805.683	7709.006	3.895291	86.01953
Skewness	1.085134	1.135610	1.125150	0.705133	0.658010
Kurtosis	2.843531	2.910403	2.710298	4.748653	2.894125
Jarque-Bera	6.509998	7.103897	7.078196	6.939126	2.396790
Probability	0.038581	0.028669	0.029040	0.031131	0.301678
Sum	1046811.	195738.4	183301.6	454.5000	3365.507
Sum Sq. Dev.	4.84E+10	1.95E+09	1.90E+09	485.5455	236779.5
Observations	**36**	**36**	**36**	**36**	**36**

Source: Author's computation using E-views 9, 2024

Source: Author's computation using E-views 9, 2024

From Table 4.1, the Skewness measures the asymmetry of the distribution of the series around its mean. The skewness of a symmetric distribution, such as the normal distribution, is zero. Positive skewness means that the distribution has a long right tail and negative skewness implies that the distribution has a long

left tail. Regarding the research's variables. The data series' skewness suggests that the data distribution is asymmetric or non-normal since the series deviates from normalcy while still maintaining a positive skewness, which suggests that the distribution has a long left tail.

Kurtosis measures the peakedness or flatness of the distribution of the series. The kurtosis of the normal distribution is 3. If the kurtosis exceeds 3, the distribution is peaked (leptokurtic) relative to the normal; if the kurtosis is less than 3, the distribution is flat (platykurtic) relative to the normal. The kurtosis statistic equally shows that the variables were platykurtic while INT on the other hand is leptokurtic. The reason for this is that the prices are not arbitrarily determined and are based on market forces.

A test of normality is the Jarque-Bera test. The test's null hypothesis is that the series under investigation has a normal distribution. None of the variables had a normally distributed P-value based on our findings utilizing the Jarque-Bera statistics. However, it is important to note that the multivariate framework does not require the normality assumption.

4.1.2 Correlation matrix

The correlation matrix is a table showing the correlation coefficients between the variables used in this project. Each cell in the table shows the correlation between two variables. This correlation matrix is usedas a way to summarize data, as input into a more advanced analysis, and as a diagnostic for advanced analyses.

Table 4.2 Correlation coefficients between the variables

	GDP	M2	BCP	INT	EXC
GDP	1.00000				
M2	0.996454	1.00000			
BCP	0.991135	0.99608	1.00000		
INT	-0.33972	-0.33408	-0.32177	1.00000	
EXC	0.905679	0.892741	0.867476	-0.2783	1.00000

Source: Author's computation from E-views 9, 2024

From Table 4.1.2, there is a positive and strong relationship between GDP and M2, GDP and BCP, GDP and EXC, M2 and BCP, M2 and EXC, and BCP and EXC. There is also a negative and weak relationship between GDP and INT, GDP and M2, M2 and INT, BCP and INT, INT and EXC.

4.1. 3 Trend Analysis

The graphical representation of the four series in their observation form is shown and analyse below:

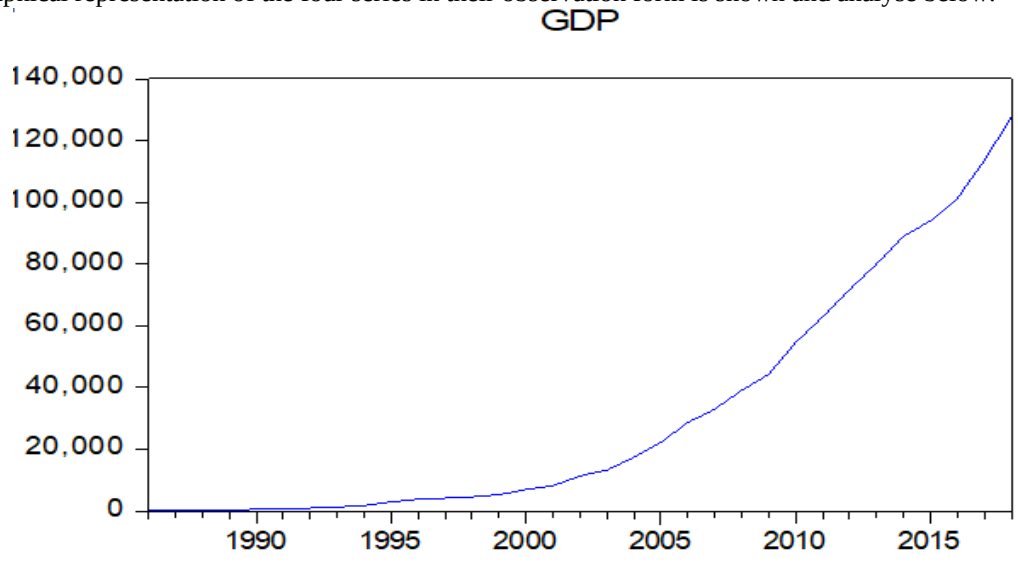


Figure 4.1: Graph of the GDP

Source: Author's computation from E-views, 2024

Gross Domestic Product, shows a smooth upward trend during the period of study. The maximum figure of GDP was attained in the year 2019 and the value was N144210.5 billion.

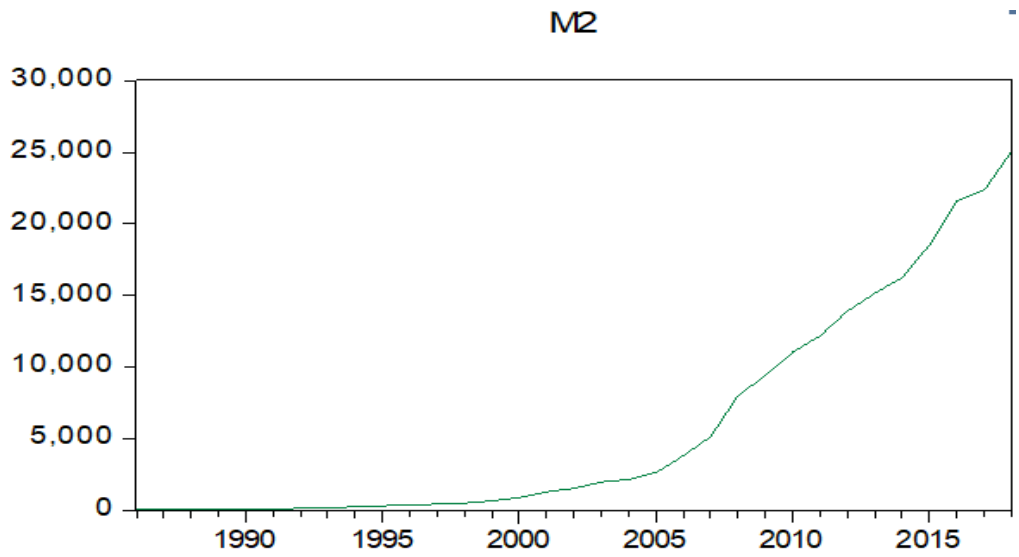


Figure 4.2: Graph of the Money Supply (MS2)

Source: Author's computation from E-views, 2023

The broad money supply (MS2) reflects an upward trend during the period of study with some level of fluctuations, the variable rose from ₦26.2776 billion in 1985 to its peak value of ₦29137.8 in the year 2019.

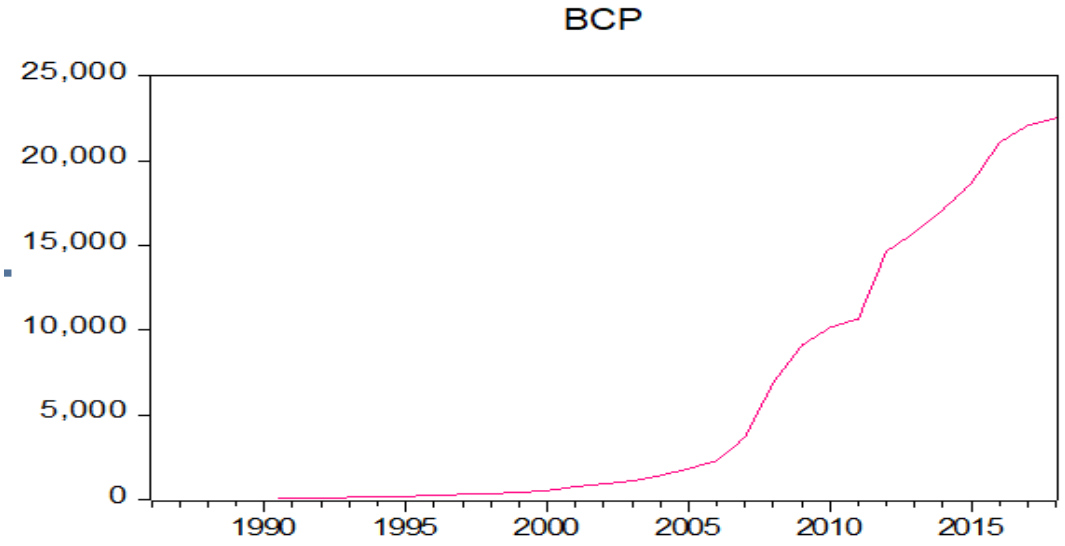


Figure 4.3: Graph of the BCP

Source: Author's computation from E-views, 2024

The BCP data shows a random upward trend during the period of study with a high level of fluctuations, the variable rose to its peak with the observed value of about 25% in 1994 and this also drives the investment in the economy within the period of study.

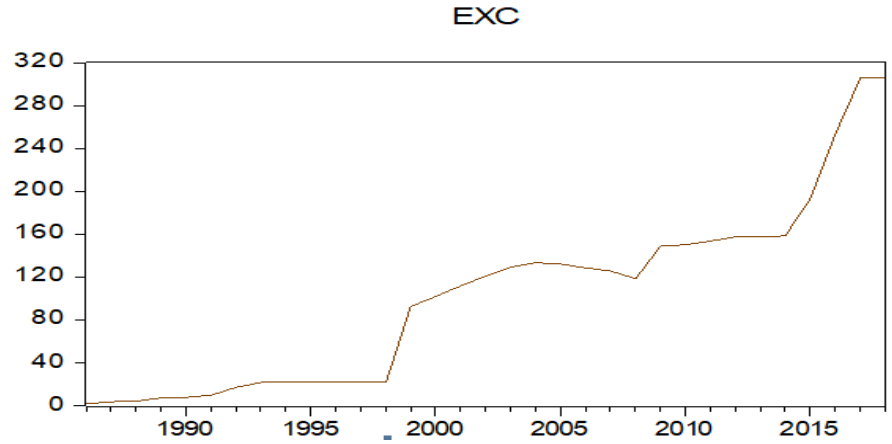


Figure 4.4: Graph of the Exchange rate (EXC)

Source: Author's computation from E-views, 2024

The EXC data shows an upward trend during the period of study with some level of fluctuations, the variable rose from N0.88/$ in 1985 to N306.92/$ in December 2019. During the global fall in the price of crude oil in late 2014, the value of the dollar started rising while Naira was falling. This has also affected the economy negatively as the projected economic growth rate keeps falling short of the targeted figure since the year 2014.

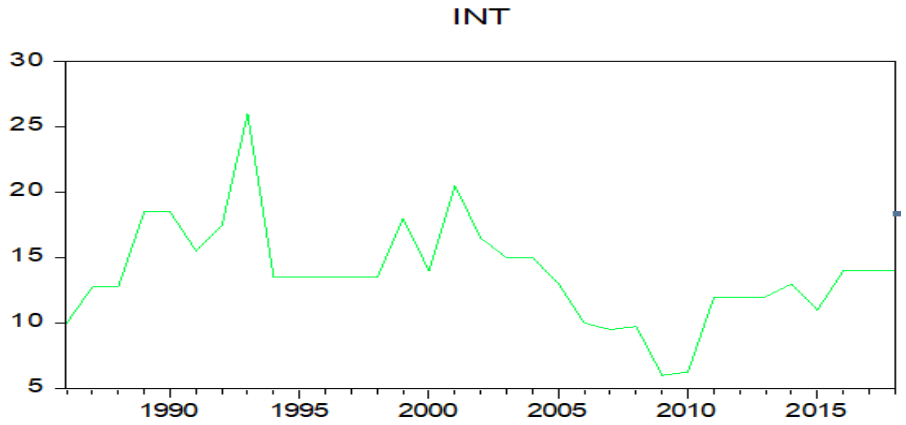


Figure 4.5: Graph of the Interest rate (INT)

Source: Author's computation from E-views, 2024

The INF data shows a random upward trend during the period of study with a high level of fluctuations, the variable rose to its peak with an observed value of about 25% in 1994 and this also drives the domestic price hike for goods and services, afterwards, the variable falls and the price continues to fluctuates.

4.2 Analysis of Results

4.2.1 Unit Root Test

We use the Augmented Dickey-Fuller (ADF) test to examine the stationarity of the variables to avoid the problem of spurious regression. The table below shows the unit root result.

Table 4.3: Stationarity Tests Result

	Critical Values	At level	Critical Value	At 1st Difference	Decision
LGDP	-3.65373	-3.720387	-4.28458***	-4.151018	I(1)
LM2	-3.653730***	-2.490854	---	---	I(0)
LBCP	-3.661661	-1.346107	-4.284580***	-4.156860	I(1)
INT	-3.557759**	-3.746099	---	---	I(0)
LEXC	-4.273277	-2.435754	-3.215267*	-5.830855	I(1)

Note: * Statistical significance at 1% level; ** statistical significance at 5%; * Statistical significance at 10%**

Source: Authors' computation using E-views 9

The outcome of the unit root tests using the Augmented Dickey-Fuller (ADF) test presented in Table 4.3 reveals that all the variables were not stationary at level. While M2 and INT were stationary at level i.e. I (0), the LGDP, LBCP, and LEXC were stationary at first difference i.e. I (1) and were either significant at 1%, 5%, or 10% as the case may be. Thus, the Vector Error Correction Model (VECM) will be employed to estimate the model.

4.2.2 Lag Length Selection Criteria

Before the VECM procedure is examined, the optimum lag length selection criteria were carried out to determine the number of lag(s) to be included in the model before the Johansson cointegration test. The optimum lag selection must be consideredas this may result in the problem of misspecification and the problem of autocorrelation (Giles, 2016). The result is presented in the

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-282.8095	NA	12642344	19.18730	19.42083	19.26201
1	-260.1163	36.30917	2983695.	17.74109	18.02132	17.83074
2	-257.2503	4.394483*	2643376.*	17.61669*	17.94363*	17.72128*
3	-257.0008	0.365973	2791395.	17.66672	18.04037	17.78625

Source: Author's computation using E-views 9, 2024

*** indicates lag order selected by the criterion, LR: sequential modified LR test statistic (each test at 5% level), FPE: Final prediction error, AIC: Akaike information criterion, SC: Schwarz information criterion and HQ: Hannan-Quinn information criterion**

From Table 4.4, the Akaike information criterion (AIC), Hannan-Quinn information criterion(HQ), and other criteria except for the Schwarz information criterion(SC) indicated that two maximum lag are to be included in the model. Hence our model will be based on the Akaike information criterion (AIC).

4.2.3 Johansen Co-integration test

The long-term relationships between integrated variables are made more understandable by co-integration analysis. In this investigation, the maximum likelihood method developed by Johansen (1999, 1991) will be utilized because it is simple to calculate for finite-order vector auto-regressions (VARS). The result is presented in Table 4.5:

Table 4.5: Johansen Co-integration test result

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.755849	93.10273	69.81889	0.0002
At most 1 *	0.568630	49.39371	47.85613	0.0356
At most 2	0.315105	23.32921	29.79707	0.2302
At most 3	0.278944	11.59605	15.49471	0.1774
At most 4	0.045939	1.457846	3.841466	0.2273

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.755849	43.70902	33.87687	0.0025
At most 1	0.568630	26.06450	27.58434	0.0772
At most 2	0.315105	11.73316	21.13162	0.5742
At most 3	0.278944	10.13821	14.26460	0.2030
At most 4	0.045939	1.457846	3.841466	0.2273

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Source: Author's computation from E-views 9, 2024

In the VAR model, the Johnsen (1988) and Juselius (1990) approach is typically used to examine the cointegration connection between the variables. Economic growth (GDP), money supply (M2), credit to the private sector (BCP), interest rate (INT), and exchange rate (EXC) were all subjected to the Johansen cointegration test. Table 5 above demonstrates that under the 5% level, test results in both the maximum eigenvalue test and the trace test accept the null hypothesis and at least one cointegrating equation exists.This indicates that the variables have enduring and stable equilibrium relationships. VEC modelling can proceed under the assumption that cointegration linkages exist.

4.2.4 Vector Error Correction Model (ECM)

It must be noted, that the error correction mechanism (ECM) is meant to tie the short-run dynamics of the cointegrating equations to their long-run static dispositions. To capture the short-run fluctuation, the Vector Error Correction Method (VECM) was employed and the result is presented below.

Table 4.6: Vector Error Correction Estimates

Vector Error Correction Estimates
Date: 08/01/24 Time: 23:19
Sample (adjusted): 1989 2018
Included observations: 30 after adjustments
Standard errors in ( )& t-statistics in [ ]

Cointegrating Eq:	CointEq1
GDP(-1)	1.000000
M2(-1)	19.00500
	(7.96092)
	[2.38729]
BCP(-1)	-22.73750
	(6.76811)
	[-3.35951]
INT(-1)	1541.958
	(570.647)
	[2.70212]
EXC(-1)	-139.2498
	(53.3457)
	[-2.61033]
C	-24168.45

Error Correction:	D(GDP)	D(M2)	D(BCP)	D(INT)	D(EXC)
CointEq1	0.053379	0.006908	0.032274	-0.000193	-0.001401
	(0.03531)	(0.01581)	(0.01138)	(0.00011)	(0.00047)
	[1.51191]	[0.43691]	[2.83599]	[-1.70665]	[-2.97964]
D(GDP(-1))	0.267930	-0.025566	-0.179502	-0.000312	-0.000796
	(0.17509)	(0.07841)	(0.05644)	(0.00056)	(0.00233)
	[1.53020]	[-0.32604]	[-3.18050]	[-0.55503]	[-0.34153]
D(GDP(-2))	0.312267	0.248173	0.358436	0.000257	-0.000709
	(0.17432)	(0.07807)	(0.05619)	(0.00056)	(0.00232)
	[1.79137]	[3.17898]	[6.37924]	[0.45899]	[-0.30550]
D(M2(-1))	-0.615337	0.035739	0.330401	0.002683	0.041218

	(0.77334)	(0.34633)	(0.24927)	(0.00248)	(0.01030)
	[-0.79569]	[0.10319]	[1.32547]	[1.08066]	[4.00328]
D(M2(-2))	1.324814	0.376330	0.305169	0.001628	0.012885
	(0.88766)	(0.39753)	(0.28612)	(0.00285)	(0.01182)
	[1.49249]	[0.94667]	[1.06658]	[0.57109]	[1.09030]
D(BCP(-1))	0.876860	-0.049262	-0.025011	-0.002821	-0.026872
	(0.71743)	(0.32129)	(0.23125)	(0.00230)	(0.00955)
	[1.22223]	[-0.15332]	[-0.10816]	[-1.22452]	[-2.81331]
D(BCP(-2))	0.504849	-0.250450	-0.152959	-0.001361	-0.016018
	(0.60308)	(0.27008)	(0.19439)	(0.00194)	(0.00803)
	[0.83712]	[-0.92731]	[-0.78687]	[-0.70279]	[-1.99501]
D(INT(-1))	-86.73150	-38.54092	-5.963767	-0.264138	1.166621
	(69.9020)	(31.3052)	(22.5316)	(0.22444)	(0.93066)
	[-1.24076]	[-1.23114]	[-0.26468]	[-1.17690]	[1.25354]
D(INT(-2))	-85.15133	-7.642640	6.865187	-0.230339	0.799354
	(68.2884)	(30.5825)	(22.0115)	(0.21925)	(0.90918)
	[-1.24694]	[-0.24990]	[0.31189]	[-1.05056]	[0.87921]
D(EXC(-1))	42.63462	3.256225	-6.026230	-0.070744	-0.169751
	(18.3961)	(8.23858)	(5.92963)	(0.05906)	(0.24492)
	[2.31759]	[0.39524]	[-1.01629]	[-1.19774]	[-0.69308]
D(EXC(-2))	22.37179	0.720157	-0.547401	0.063510	-0.192078
	(18.5545)	(8.30951)	(5.98068)	(0.05957)	(0.24703)
	[1.20574]	[0.08667]	[-0.09153]	[1.06608]	[-0.77755]
C	83.62834	-28.10830	-56.82141	0.436505	9.671569
	(374.536)	(167.734)	(120.725)	(1.20253)	(4.98649)
	[0.22328]	[-0.16758]	[-0.47067]	[0.36299]	[1.93956]
R-squared	0.943684	0.791332	0.909728	0.381647	0.569768
Adj. R-squared	0.909268	0.663812	0.854562	0.003765	0.306848
Sum sq. resids	26738438	5362767.	2778048.	275.6372	4739.555
S.E. equation	1218.798	545.8310	392.8562	3.913206	16.22679
F-statistic	27.42038	6.205580	16.49074	1.009963	2.167078
Log likelihood	-248.0744	-223.9751	-214.1091	-75.83648	-118.5057
Akaike AIC	17.33829	15.73167	15.07394	5.855765	8.700378
Schwarz SC	17.89877	16.29215	15.63442	6.416244	9.260857
Mean dependent	4248.074	834.7121	749.8202	0.041667	10.05145
S.D. dependent	4046.249	941.3853	1030.137	3.920593	19.49029

Determinant resid covariance (dof adj.)	1.26E+20
Determinant resid covariance	9.77E+18
Log likelihood	-868.7347
Akaike information criterion	62.24898
Schwarz criterion	65.28491

Source: Author's computation from E-views 9, 2024

In econometrics analysis, it is practically difficult to interpret the results of multivariate models. We estimate these models to be able to test for Causality and compute Variance Decomposition and Impulse Response Functions. As suggested by Salisu (2015), before we proceed to the Causality Test, Variance Decomposition&Impulse Response Functions, we have to verify that the estimates of the chosen multivariate model are reliable. This will require diagnostic checks such as the residual serial correlation.

4.2.5 VEC Residual Serial Correlation LM Tests

Table 4.7: Serial Correlation LM Tests

Lags	LM-Stat	Prob
1	10.63855	0.9945
2	18.69581	0.8115

Probs from chi-square with 25 df.

Source: Authors' computation using E-views 9

From Table 4.7,The null hypothesis is that the no serial correlation in the error terms versus its alternative hypothesis of serial dependence among error terms. The probability of the LM test in the result has the values 0.9945 and 0.8115 for the two-lag period which is greater than the 5% level of significance, hence the null hypothesis of no serial correlation is accepted and we conclude that the result of this analysis is reliable and free from serial correlation.

4.2.6 Granger Causality Test

The cointegration test shows a long-term equilibrium relationship between the two variables, but additional testing is required to determine whether there is a causal relationship. The explanatory power of the regression can be significantly improved if variable A is useful in predicting B, i.e., the regression of B is based on previous values of B, and past values of A are added. Ten A can be referred to as the Granger cause of B if it is not the non-Granger cause. The null hypothesis—that Granger causality exists—must be accepted because the P value is less than the significant level of 5%.

Table 4.8: Granger Causality Test Result

Null Hypotheses (H_0)	**Chi-Square**	**Probability**	**Remarks**
GDP does not Granger Cause M2	5.231427	0.0731	
M2 does not Granger Cause GDP	1.290967	0.5244	Unidirectional Causality
GDP does not Granger Cause BCP	0.700074	0.7047	
BCP does not Granger Cause GDP	0.206427	0.9019	No Causality
GDP does not Granger Cause INT	3.773634	0.1516	
INT does not Granger Cause GDP	0.757022	0.6849	No Causality
GDP does not Granger Cause EXC	0.788548	0.6742	No Causality
EXC does not Granger Cause GDP	3.523732	0.1717	
M2 does not Granger Cause BCP	2.673093	0.2628	
BCP does not Granger Cause M2	15.30696	0.0005	Unidirectional Causality
M2 does not Granger Cause INT	2.572873	0.2763	
INT does not Granger Cause M2	3.336124	0.1886	No Causality
M2 does not Granger Cause EXC	1.625084	0.4437	
EXC does not Granger Cause M2	3.006053	0.2225	No Causality
BCP does not Granger Cause INT	0.360278	0.8352	
INT does not Granger Cause BCP	11.14408	0.0038	Unidirectional Causality
BCP does not Granger Cause EXC	7.478361	0.0238	
EXC does not Granger Cause BCP	2.630721	0.2684	Unidirectional Causality
INT does not Granger Cause EXC	0.154921	0.9255	No Causality
EXC does not Granger Cause INT	0.795670	0.6718	

Source: Author's computation from E-views 9, 2023

In summary, as the results are shown in Table 4.8 above, there is no bidirectional granger causality among any of the variables. There are Unidirectional Causality GDP and M2, M2 and BCP, BCP and INT,

BCP and EXC. while there are no Granger causality GDP and BCP, GDP and INT, GDP and EXC, M2 and INT, M2 and EXC, INT and EXC.

4.3 Interpretation and Discussion of Results

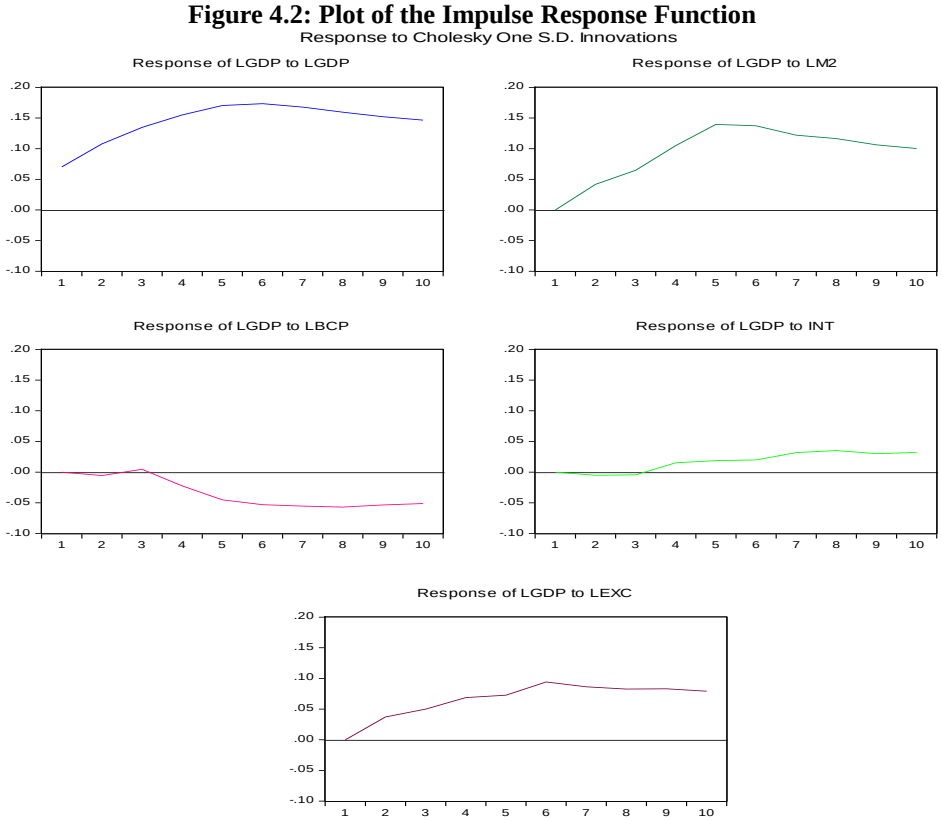
Individual coefficients from the error correction model for the vector-auto-regressive model are difficult to interpret, according to the literature. In light of this, Chuku (2009) contends that the construction of an impulse response function (IRF) and the Variance Decomposition are superior methods for understanding and discussing results.

4.3.1 Impulse Responses

Further analysis is performed using impulse response function and variance decomposition based on VECM, and the results for 10 periods are acquired. This analysis is done to study the dynamic impacts of the model responding to certain shocks as well as how the effects are among the four variables.

It has been pointed out in the literature, that individual coefficients from the error-correction model are hard to interpret in the case of the vector-auto-regressive model. VAR models are difficult to interpret. One solution is to construct an impulse response function (IRF). The IRF traces the response of the endogenous variables to one standard deviation shock to one of the disturbance terms in the system. This shock is transmitted to all of the endogenous variables through the dynamic structure of the VEC models (Lutkepohl, 2001). Consequently, the dynamic properties of the model are analyzed by examining the impulse response functions and the variance decompositions. The impulse response functions trace the dynamic responses to the effect of shock in one variable upon itself and on all other variables i.e. it is a tool that portrays the expected path over time of the variable to shocks in the innovations. These impulse response functions are plotted in Figure 4.2:

Figure 4.2: Plot of the Impulse Response Function



Source: Author's own computation using E-views 9, 2023

As shown in Figure 4.2, a one standard deviation shock applied to gross domestic product produces a positive effect on GDP throughout the period.What this seems to suggest is that there is evidence in support of the positive effect of GDP on its shocks in Nigeria.

A one standard deviation shock to M2 initially has a positive discernible effect on GDP in the short as well as for a lengthy period and reduces output.

A one-standard-deviation shock to BCP has a huge and negative effect on GDP in the short run. The effect becomes noticeable in the long run. Lastly, A one standard deviation shock to INT and EXC has a positive but low effect on GDP. Between periods 1.5 and 3.5, INT has relatively no effect on GDP. However, the effect becomes noticeable again as the subsequent period shows that INT and EXC shock respond positively to GDP.

4.3.2 Variance Decomposition of GDP

Table 4.9: Variance Decomposition of GDP result

Period	S.E.	LGDP	LM2	LBCP	INT	LEXC
1	0.070278	100.0000	0.000000	0.000000	0.000000	0.000000
2	0.140516	83.82449	8.829122	0.163477	0.132600	7.050307
3	0.211271	77.78324	13.28085	0.121658	0.101052	8.713196
4	0.291909	68.98453	19.93363	0.655485	0.324262	10.10210
5	0.376104	62.11726	25.77403	1.846402	0.441956	9.820352
6	0.449954	58.24735	27.32130	2.684090	0.503957	11.24331
7	0.507028	56.84358	27.30525	3.310044	0.790879	11.75025
8	0.554488	55.81254	27.24573	3.823556	1.066115	12.05206
9	0.593735	55.23983	26.95693	4.147764	1.186224	12.46925
10	0.627687	54.87803	26.67238	4.377942	1.324287	12.74737

Cholesky Ordering: LGDP LM2 LBCP INT LEXC
Source: Author's own computation using E-views 9, 2024

In Table 10, the results for 4.9 periods were obtained. For the first period, we see that a shock in GDP in the first period is responsible for a 100%variation in the GDP (own shock), whereas there is no contribution of the shock in LM2, LBCP, INT, and LEXC for the variation of GDP during that period. In a shorter period, LM2 and LEXC affect GDP growth slightly more than the LBCP and INT. In a similar vein, in the longer period, LM2 and LEXC also affect GDP growth significantly more than the LBCP and INT. The shock to M2 can better explain the variation in GDP growth with the increase in the length of the period. In other words, the Money supply is responsible for over 25% variation in the GDP starting from period 5 and the subsequent periods.

4.4 Implications of Findings

Overall, the study found evidence that monetary policy innovations have both real and nominal effects on economic parameters depending on the policy variable selected.

First, it is observed that monetary innovations are not all neutral in the short term, depending on the monetary policy instrument used. Since M2 proved to have the most influential impact on output and prices, the Central Bank should place more emphasis on the quantity-based nominal anchor (M2) for managing the economy. This implies that effective monetary policy should focus on manipulating instruments like the Money supply (M2), Credit to the private sector (BCP), Interest rate (INT), and Exchange rate (EXC) which directly affect the economic growth in Nigeria. More emphasis should be placed on the use of interest rates, Credit to the private sector (BCP), and exchange rates to manage the economy. This is because they have virtually essential and significant effects on output.

V. Conclusions And Recommendations

5.1 Conclusion

Based on the result of this study, it was concluded that there is a long-run relationship among the variables used for the study. The result obtained from the Vector Error Correction Model (VECM),shows that in a shorter period, LM2 and LEXC affect GDP growth slightly more than the LBCP and INT.In a similar vein, in the longer period, LM2 and LEXC also affect GDP growth significantly more than the LBCP and INT. The outcome analysis showed that the Central Bank of Nigeria's implementation of various monetary policy measures had a considerable impact on the nation's economic growth. The outcome may also imply that Nigeria's issue with bank credit to the private sector (BCP) is not a function of monetary factors but rather the country's inflexible structural framework. This is comprehensible given that Nigeria operates well below the full employment equilibrium and that the worsening of the poverty index over time prevents the rise in GDP from translating into improved buying power. To properly position the market for the challenges that lie ahead, much work needs to be done in the areas of raising public awareness, upgrading banking operations, expanding the depth and breadth of the market, and building regulatory capability.

5.2 Recommendations

In the light of the above, the following recommendations were made:

The monetary authority should correctly control the monetary policy rate to encourage FDI (foreign direct investment), enhance domestic investments, and ultimately foster sustainable economic growth.

The Central Bank of Nigeria should remove the restrictions on lending to the private sector that can help a country's economy.

Monetary policies should be utilized to encourage both domestic and foreign investment by supporting the establishment of market-based interest rate and currency rate regimes.

Changes in the transient market and financing cost should ultimately convert into changes in other loan fees all through the economy (that is, financing cost changes should be gone through to retail financing costs for credits and stores), which will then, at that point, affect the degree of monetary movement and costs by and large.

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