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RESEARCH ARTICLE

Effect of Interest Rate Policy on Some Selected Macroeconomic Variables in Nigeria

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ABSTRACT

This study investigated the effect of interest rate policy on selected macroeconomic variables in Nigeria, focusing on GDP and inflation. The specific objectives of the study are to determine the effect of interest rate on gross domestic Product and ascertain the effect of interest rate on inflation. The study adopted an ex post facto research design, relying on published data sourced from the CBN statistical bulletin and World Bank Reports for the periods which span from 2010-2022. Regression and cointegration analysis were employed to analyze the study. The formulated hypotheses were tested using ordinary Least Square (OLS) Regression Analysis. The findings revealed that Interest Rate does not have a statistically significant impact on both GDP and the Inflation Rate. The coefficients for the Interest Rate variable are positive but nonsignificant, indicating that changes in interest rate policy do not exert a significant influence on economic output or inflation dynamics in Nigeria. Based on these results, the study recommends diversifying policy tools beyond interest rate adjustments. Policymakers should consider employing a broader range of measures, such as fiscal policy interventions, exchange rate management, and targeted sector-specific policies, to stimulate economic growth and manage inflation effectively. It is also crucial to enhance coordination between monetary and fiscal policies to achieve better macroeconomic outcomes. By considering these recommendations, policymakers in Nigeria can improve their understanding of the complex dynamics between interest rate policy and macroeconomic variables, leading to more robust and effective policy measures for sustainable economic growth and inflation management.

Keywords: *Interest Rate Policy; Gross Domestic Product; Monetary Policy; Fiscal policy; Macroeconomic Variables*

Introduction

Interest rates play a critical role in the monetary policies of countries and are driven by certain macroeconomic indicators. The interest rate policy is crucial for the allocation and mobilization of financial resources, ensuring the efficient utilization of resources to promote economic growth and development (CBN, 2021). There are two types of interest rates charged by banks: deposit and lending rates. Deposit rates are paid to savers, while lending rates are the interest rates charged on loans to customers and vary according to the cost of loanable funds and maturity. Therefore, the level of savings determines the level of interest rates. Resource mobilization required for small, medium, and enterprise (SME) entities is influenced by the interest and inflation rates in these countries. In this way, the economic behaviors of individuals, sectoral activities, and policymakers are affected.

Tyona, Ucherwuhe, and Awuzie (2021) defined interest rates as the price of money or the amount paid for borrowing, expressed as a percentage. The interest rate is the amount paid when money is borrowed from a financial institution. In accounting parlance, it is viewed as the cost of borrowing—a fixed percentage of loanable funds or money that the concerned institution is willing to part with for a particular period.

Correspondingly, macroeconomic variables, seen as long-term instruments, have a consequential influence on the behavior of interest rates in varying economic environments. Prominent among these indicators are inflation, investment, Gross Domestic Product (GDP), taxation, government spending, gross income, and the volume of savings. As the interest rate fluctuates, the patterns of movement determine the nature of monetary policy to tighten or loosen the economy to achieve set targets. Usually, changes in the structure of interest rates and the resulting relative rates of return induce shifts in the asset portfolios of banks and public institutions. Therefore, the magnitude and direction of changes in interest rates are of primary importance to economic agents and policymakers.

The relevance of interest rates lies in their capacity to stimulate economic growth and critical infrastructural development through the instrumentality of monetary regulation by policymakers. Specifically, most countries prefer a low-level interest rate to achieve certain targets or objectives (Tumwine, 2018). However, achieving this can be challenging when problems related to inflation and foreign exchange rates arise. In this context, (Endrop, 2017) argued that the Central Bank of Nigeria (CBN), most often, changes interest rates to combat anomalies arising from market mechanisms to achieve stability.

Gross Domestic Product refers to the aggregate value of goods and services generated by the economy in a given year. An increase in real Gross Domestic Product (economic growth) is bound to exert upward pressure on average interest rates in an economy, just as the reverse situation would tend to have a moderating effect. An increase in real Gross Domestic Product represents economic growth and sustainability (Asma, 2009). The private sector is a major driver of the economy and contributes to the growth of Gross Domestic Product (GDP) and industrialization.

Inflation reflects a period of high-level changes in prices of goods and services in a specific economic situation. It is widely believed that price stability promotes long-term macroeconomic growth, whereas high inflation is inimical to growth (Sani and Ismaila, 2009). With higher interest rates, the cost of borrowing is increased, which, in turn, dampens demand across the economy, resulting in excess supply and lower inflation. Inflation stifles economic growth, causing disinvestment, low production, and disruption of the supply chain. The cost/value of money shrinks because of high prices of goods and services in the market. The decision to increase interest rates or not is the primary role of Central Banks of all nations in the world. The actions of policymakers are often aimed at improving the economy as well as the quality of life of the citizenry.

Nevertheless, the interest rate regime in the Nigerian economy has been highly volatile and fragile (CBN, 2021). Adewunmi (1997) argued that, apart from the high volatility, the monetary instrument exhibited a number of inconsistencies in the economy. Between 2010 and 2022, interest rates rose from a positive value of 6.25% to an all-time high double-digit impact of 16.50% in 2022. Prior years witnessed a number of policy measures in Nigeria with a focus on stabilizing and achieving a sustainable economy, but all failed to correct the obvious policy blunders that would have lifted Nigeria from an economic valley. Prominent among these measures are financial reform (Obamuyi

and Olorunfemi, 2011), Structural Adjustment Program (SAP) 1986, Banks recapitalization Program 2005, Deregulation of the economy, and the change of Nigerian currency color in 2022. Even the control of interest rates on borrowing by banks and the introduction of a market system to determine interest rates have yet to provide an acceptable solution to Nigeria's protracted and nagging economic problems.

Beyond that, Nigeria is blessed with numerous natural and human resources. Many have expressed their reservations about the nation's economic woes, largely caused by political divide, institutional factors, and endemic interference by Western countries. A review of some economic indicators reveals the need to change the narrative. Nigeria is presumed to be the Giant of Africa, with a population of over 140 million people and a per capita income of USD in 2010 and USD in 2022. Gross Domestic Product for the same period is USD in 2010 and USD in 2022. In 2022, the interest rate stood at 16.50%, the inflationary rate at 21.34%; thus, the economy is negative, with spending and investment squeezed to strengthen the economy. Importantly, an increase in the gross domestic product of an economy is a reflection of real economic growth and an indication of improvement in foreign reserves.

So far, many research studies have shared views on the impact of interest rates on inflation and gross domestic product. While some studies have shown that interest and inflation rates have a strong relationship with gross domestic product, others have shared mixed results. Given the various studies, the influence of interest rates on inflation and gross domestic product has been the subject of long debates in developed and developing economies, which hitherto is inconclusive on the best optimum level of interest rate to achieve maximum resource mobilization for sustainable development.

It is on this premise that this study was embarked upon to contribute to the existing knowledge base and assist in future policy formulation and implementation. This study is unique and differs from prior literatures as it focuses on the impact of monetary policy and interest rates that affect or determine the level of macroeconomic variables

Objectives of the Study

The core objective of the study is to evaluate the effect of interest rate on some selected macroeconomic variables in Nigeria. The specific objectives of the study are to:

i. Determine the effect of interest rate on gross domestic Product.
ii. Ascertain the effect of interest rate on inflation.

Statement of Hypotheses

The research hypotheses are formulated in Null Hypotheses form.

I. Ho: Interest rate has no significant effect on gross domestic product
II. Ho: Interest rate has no significant effect on inflation

Review of Related Literature

Conceptual Review

Monetary Policy

Monetary policy is essentially the way in which the quantity of money in the economy and the avenues through which new money is injected into it are controlled (CBN, 2020). The central bank's motivation in conducting monetary policy is to fulfill three goals: maximize employment, stabilize prices, and moderate long-term interest rates. This objective is satisfied when citizens seeking work are gainfully employed, and when prices for goods and services are relatively stable.

Interest Rate Policy

Tiar Lina Situngkir and IsroiyaatulMubarokah (2021) assert that interest rates represent the opportunity cost of capital or assets forgone. It is the amount of using wealth today, expressed as a percentage of the amount of wealth whose use is postponed. Interest rates are not uniformly charged; their values depend on tenor or maturity, which is the time bound for repayment. Interest rates affect the cost of borrowing money over time. Low-interest rates

reduce the cost of borrowing, thus encouraging investment and stimulating economic activities, albeit the free flow of money (Bader and Malawi, 2010). Besides, interest rate policy cannot stand alone; it is more effective and efficient considering the trend of macroeconomic variables. Unfortunately, the realization of economic stability in Nigeria has been hampered by inconsistencies, instability, and volatility of interest rates in the economy.

Inflation

Inflation refers to a period of high prices of goods and services, which often stifles economic growth by reducing aggregate demand (Frimpong and Oteng-Abayie, 2010). It is an increase in the level of prices of the goods and services that households buy (Fabayo and Ajilore, 2006). Typically, it is measured as the rate of change of those prices. The price of goods and services also fluctuates over time. A rise in prices denotes inflation, while deflation connotes a fall in the general prices of goods and services in a country (Asanov, 2010). The level of inflation in a country is attributed to a drop in the supply chains of goods (Saxena and Bhadauriya, 2013). A high inflation rate in Nigeria is attributed to a sudden drop in the supply of agricultural products to the marketplace. Higher inflation could generate low consumption and bring real sector activities to a very low ebb, thus moderating growth in GDP (Omotosho and Doguwa, 2012). According to a study done by Malik and Chowdhury (2001), they inferred that moderate inflation is helpful for faster economic growth and a rise in general spending in a country. Understanding the interaction between interest rates and inflation helps in investment decisions. Changes in interest rates could trigger both positive and negative effects on the market prices of goods and services. Often, the Central Bank of Nigeria changes its target interest rates in response to economic activity, raising interest rates when the economy is overly strong and lowering rates when the economy is sluggish. In this way, economic activities are brought under control.

Gross Domestic Product

Ljupco and Nikolas (2015) defined Gross Domestic Product (GDP) as the total monetary or market value of all the finished goods and services produced within a country's borders in a specific time. Typically, it functions as a holistic scorecard of a country's economic health. Every economy is driven by the real sector, which is the major contributor to the GDP. The interest rate structure has a great impact on the level of GDP. Usually, an increase in interest rates makes money more expensive and investment-sensitive to variations in interest rates (Romer and Romer, 1989). This could activate a decrease in aggregate demand and a lower wealth effect on the private sector, leading to lower consumption. Also, higher interest rates could initiate an increase in savings and attract foreign investment that could lead to a currency appreciation. Therefore, a high-interest rate could lead to a moderating effect on the gross domestic product of an economy given the structure of interest rates in the economy.

Theoretical Framework

Since the Keynesian theory on economic wealth, several groups of economists have sprung up with different views. Ironically, the controversy surrounding interest rates is yet to be put to rest. Gollardays (1978) explains the classical view, defining interest rates as a price, which Keynesians, in their own view, define as a reward. Furthermore, they concluded that interest rates are affected by a number of factors in the development of financial markets: volume of savings, investment decisions, and freedom of capital movement from country to country.

Empirical Review

Chimaobi (2010) examined the relationship between inflation and growth in Nigeria; however, no attempt was made to provide an optimal inflation rate for policy decisions.

Hussain and Mubarik (2005) studied inflation and growth in Pakistan using annual time series data for the periods 1973-2005 and 1973-2000, respectively. They estimated the threshold levels of inflation to be 4-6 percent and 9 percent, beyond which inflation would deter economic growth.

Barro (1995) also explored this issue and found a significant negative relationship between inflation and GDP. The study utilized a large sample dataset from more than 100 economies for the period 1960-1990. To assess the effects of inflation on growth, a system of regression equations was employed, holding many other determinants of growth

constant. This framework is based on an expanded view of the neoclassical growth model, as stated by Barro and Sala-i-Martin (1995). The study indicates a statistically significant negative relationship between inflation and gross domestic product. Specifically, an increase in the average annual inflation by 10 percentage points per year lowers the real GDP growth by 0.2 to 0.3 percentage points per year.

Khan and Senhadji (2001) examined the effects of inflation on growth separately for industrial and developing countries. The dataset covers 140 countries from both groups, and non-linear least square (NLLS) and conditional least square methods are used. The empirical results show the presence of a threshold beyond which inflation exerts a negative effect on growth and GDP. This study strongly supports the assessment of low inflation for sustainable growth.

In another study, Hobijn and Steindel (2009) showed that GDP can be seen as a major dimension for economic activity because its movements on the short and long run are correlated with factors that influence the level of GDP, among which are inflation rate and income. Bruno and Easterly (1995) reported on the issue of inflation and growth and found no evidence of any consistent relationship between these variables up to a certain level of inflation. They evaluated that growth falls during distinct high inflation crises, above 40 percent, and recovers after inflation falls. Their empirical analysis shows a sequential negative relationship between these two variables beyond a 40% increase in inflation. They conclude that there is no significant influence on economic growth due to discreet high inflation crises.

Using co-integration and error correction models, Malik and Chowdhury (2001) found a long-run positive relationship between GDP growth rate and inflation for four South Asian countries. According to their results, moderate inflation is helpful for faster economic growth and a rise in general spending prices in a country.

Ljupco and Nikolas (2015) examined the impact of interest rates on the gross domestic product of Bulgaria and Romania from 2000-2014, using correlation, unit roots, co-integration, and Granger Causality for data analysis. From the correlation matrix, they concluded that in Bulgaria, the interest rate has a small negative correlation against the GDP of the country. The interest rate in this country has a positive correlation, revealing a relatively strong relationship between the two variables, in accordance with basic monetary policy. While interest rates in Romania have a negative correlation against GDP, they are at significantly larger values than in Bulgaria. Furthermore, they observed that the correlation between interest rates and inflation is strong and perfect, which they believe could be a sign of monetary policy closely following the changes in price levels in the country in today's world.

Methodology

Research Design

This research utilized an *ex-post facto* research design, which is implemented after events have occurred and the data are already available. This design is employed to establish cause-and-effect relationships between variables by analyzing previous events or data.

Area of Study

The study was conducted in Nigeria, primarily emphasizing deposit money banks within the nation.

Sources of Data

This study employed secondary source of data collection which were extracted from CBN Statistical Bulletin and World Bank Reports for the periods which span from 2010-2022.

Model Specification

The ordinary least square regression model was used in this study to evaluate the effect of interest rate on some macroeconomic players so as to understand the level of economic growth in Nigeria. The Ordinary Least Square Regression Model was represented as:

$GDP = \beta 0 + \beta 1\ INRit + \varepsilon it$ i
$IFR = \beta 0 + \beta 1\ INRit + \varepsilon it$ ii

Where:

GDP	=	Gross Domestic Product
INR	=	Interest Rate
IFR	=	Inflation Rate
β	=	Coefficient
Ɛ	=	Error term

Analytical Techniques

The study utilized ordinary least square regression model, unit roots test and co-integration for the analysis of data

Results

Table 1: Log Transformation

YEAR	*INR*	*INF*	*GDP*
2010	0.79588	1.071882	2.564654
2011	1.079181	1.012837	2.617493
2012	1.079181	1.079181	2.66649
2013	1.079181	0.90309	2.716104
2014	1.113943	0.90309	2.759048
2015	1.041393	0.980003	2.692873
2016	1.146128	1.268344	2.60708
2017	1.146128	1.186674	2.574899
2018	1.146128	1.058426	2.625045
2019	1.130334	1.078457	2.676255
2020	1.060698	1.197281	2.635685
2021	1.060698	1.193959	2.644271
2022	1.217484	1.329194	2.678873

Source: E-view 10.0 Statistical Output, 2023

Table 1 depicts the log transformation of the series; interest rate, inflation rate and gross domestic product. This was done in order to control the large variances in the variables and made the data fit for additional analysis.

ADF Unit Root Test

Table 2: ADF Test output for INR

Null Hypothesis: INR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.532342	0.0011
Test critical values:	1% level	-4.121990	
	5% level	-3.144920	
	10% level	-2.713751	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 12

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INR)
Method: Least Squares
Date: 01/01/23 Time: 13:01
Sample (adjusted): 2011 2022
Included observations: 12 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INR(-1)	-0.924749	0.167153	-5.532342	0.0003
C	1.027611	0.180038	5.707737	0.0002

R-squared	0.753736	Mean dependent var	0.035134
Adjusted R-squared	0.729109	S.D. dependent var	0.101161
S.E. of regression	0.052651	Akaike info criterion	-2.899238
Sum squared resid	0.027722	Schwarz criterion	-2.818420
Log likelihood	19.39543	Hannan-Quinn criter.	-2.929159
F-statistic	30.60680	Durbin-Watson stat	1.769792
Prob(F-statistic)	0.000250		

Source: *E-views 10.0 Statistical Output, 2023*

Table 2 depicts the unit root test conducted on the interest rate variable. It indicates that the null hypothesis of a unit root is rejected. This suggests that the interest rate variable does not have a unit root and is stationary. The augmented Dickey-Fuller test statistic is -5.532342, with a corresponding p-value of 0.0011, indicating strong evidence against the presence of a unit root.

Table 3: ADF Test output for INF

Null Hypothesis: INF has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.249753	0.6153
Test critical values:	1% level	-4.121990	
	5% level	-3.144920	
	10% level	-2.713751	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 12

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INF)
Method: Least Squares
Date: 01/01/23 Time: 13:09
Sample (adjusted): 2011 2022
Included observations: 12 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INF(-1)	-0.399241	0.319456	-1.249753	0.2398
C	0.451733	0.346162	1.304975	0.2211

R-squared	0.135089	Mean dependent var	0.021443
Adjusted R-squared	0.048598	S.D. dependent var	0.127341
S.E. of regression	0.124208	Akaike info criterion	-1.182709
Sum squared resid	0.154276	Schwarz criterion	-1.101891
Log likelihood	9.096253	Hannan-Quinn criter.	-1.212630
F-statistic	1.561883	Durbin-Watson stat	1.615405
Prob(F-statistic)	0.239847		

Source: E-view 10.0 Statistical Output, 2023

Table 3 revealed the unit root test conducted on the inflation rate variable. It indicates that the null hypothesis of a unit root cannot be rejected. This suggests that the inflation rate variable may have a unit root and is not stationary. The augmented Dickey-Fuller test statistic is -1.249753, with a p-value of 0.6153, indicating that there is insufficient evidence to conclude that the inflation rate series is stationary.

Table 4: ADF Test output for GDP

Null Hypothesis: GDP has a unit root
Exogenous: Constant
Lag Length: 1 (Automatic - based on SIC, maxlag=2)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.508230	0.0296
Test critical values:	1% level	-4.200056	
	5% level	-3.175352	
	10% level	-2.728985	

*MacKinnon (1996) one-sided p-values.
Warning: Probabilities and critical values calculated for 20 observations
and may not be accurate for a sample size of 11

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(GDP)
Method: Least Squares
Date: 01/01/23 Time: 13:18
Sample (adjusted): 2012 2022
Included observations: 11 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDP(-1)	-0.756017	0.215498	-3.508230	0.0080
D(GDP(-1))	0.666861	0.213675	3.120910	0.0142
C	2.008681	0.571867	3.512495	0.0079

R-squared	0.668887	Mean dependent var	0.005580
Adjusted R-squared	0.586109	S.D. dependent var	0.052147
S.E. of regression	0.033548	Akaike info criterion	-3.724649
Sum squared resid	0.009004	Schwarz criterion	-3.616132
Log likelihood	23.48557	Hannan-Quinn criter.	-3.793053
F-statistic	8.080463	Durbin-Watson stat	1.972539
Prob(F-statistic)	0.012020		

Source: E-view 10.0 Statistical Output, 2023

Table 4 is the unit root test conducted on the GDP variable suggests that the null hypothesis of a unit root can be rejected. This indicates that the GDP variable is likely stationary. The augmented Dickey-Fuller test statistic is -3.508230, with a corresponding p-value of 0.0296, suggesting strong evidence against the presence of a unit root. The coefficient for the lagged GDP variable (-1) is -0.756017, and it is statistically significant with a t-statistic of -3.508230 and a p-value of 0.0080. This coefficient suggests that there is a negative relationship between the current GDP and its lagged value. In other words, a decrease in the previous GDP is associated with a decrease in the current GDP. Hence, the results suggest that the GDP variable is stationary

Table 5: Summary of Augmented Dickey-Fuller

Variables	At Level		1st Differences		2nd Differences		Order of Integration
	t-Stat	5% Critical Value	t-Stat	5% Critical Value	t-Stat	5% Critical Value	
INR	-5.532342	0.0011					1(0)
IFR	-1.249753	0.6153	-3.269427	0.0493			1(1)
GDP	-3.508230	0.0296					1(0)

Source: E-view 10.0 Statistical Output, 2023

Table 5 which is the summary of the Augmented Dickey-Fuller test provides information about the stationarity of the variables: Interest rate, Inflation rate and GDP.

For the Interest rate, the test statistic (t-Stat) is -5.532342, and the critical value at the 5% significance level is smaller than the test statistic. This indicates that the null hypothesis of having a unit root (non-stationarity) is rejected. Therefore, Interest rate was stationary at level.

The Inflation rate, however, does not exhibit stationarity at the level, as the test statistic (-1.249753) is smaller than the critical value at the 5% significance level. However, when differenced once (1stDifferences), the test statistic (-3.269427) exceeds the critical value, suggesting that the null hypothesis of non-stationarity is rejected. Therefore, Inflation rate attained stationarity after taking the first difference.

GDP shows a similar pattern to the Interest rate variable. The test statistic (-3.508230) is larger than the critical value at the 5% significance level at the level, indicating rejection of the null hypothesis of unit root. Hence, GDP attained stationarity at level.

In summary, the Interest rate and GDP variables are likely stationary at level, while the Inflation rate variable becomes stationary after taking the first difference.

Hence, since the series (interest rate, inflation rate and GDP) became stationary at level and first difference respectively, regression analysis will be employed typically to examine the relationship between the variables.

Table 6: Regression Analysis Result (Interest Rate and Gross Domestic Product)

Dependent Variable: GDP
Method: Least Squares
Date: 01/01/23 Time: 16:48
Sample: 2010 2022
Included observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INR	0.189480	0.157514	1.202940	0.2543
C	2.445215	0.171459	14.26126	0.0000

R-squared	0.116258	Mean dependent var	2.650675
Adjusted R-squared	0.035917	S.D. dependent var	0.055205
S.E. of regression	0.054205	Akaike info criterion	-2.851450
Sum squared resid	0.032320	Schwarz criterion	-2.764535
Log likelihood	20.53443	Hannan-Quinn criter.	-2.869315
F-statistic	1.447065	Durbin-Watson stat	0.848646
Prob(F-statistic)	0.254252		

Source: E-view 10.0 Statistical Output, 2023

In the regression output in table 6 above, the p-value for the coefficient of the Interest Rate variable is given as 0.2543. Since the p-value (0.2543) is greater than the significance level of 0.05, there is no sufficient evidence to reject the null hypothesis that the coefficient of the Interest Rate variable is equal to zero. In other words, the Interest Rate variable is not statistically significant at the 0.05 level of significance. Therefore, based on the result above it can be depicted that Interest Rate exerts a positive and nonsignificant effect on GDP.

Table 7: Regression Analysis Result (Interest Rate on Inflation)

Dependent Variable: INF
Method: Least Squares
Date: 01/01/23 Time: 16:49
Sample: 2010 2022
Included observations: 13

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INR	0.398569	0.382626	1.041667	0.3199
C	0.664927	0.416499	1.596467	0.1387

R-squared	0.089786	Mean dependent var	1.097109
Adjusted R-squared	0.007039	S.D. dependent var	0.132138
S.E. of regression	0.131672	Akaike info criterion	-1.076365
Sum squared resid	0.190713	Schwarz criterion	-0.989450
Log likelihood	8.996373	Hannan-Quinn criter.	-1.094230
F-statistic	1.085069	Durbin-Watson stat	0.984622
Prob(F-statistic)	0.319920		

Source: E-view 10.0 Statistical Output, 2023

Table 7 is the regression output which pertains to the relationship between the dependent variable (Inflation rate) and the independent variables (Interest rate). The coefficient for the Interest rate variable is 0.398569, with a standard error of 0.382626. The t-statistic for this coefficient is 1.041667, and the corresponding p-value is 0.3199. Comparing this p-value to the significance level of 0.05, it was found that it was greater than 0.05. Therefore, the study do not have sufficient evidence to reject the null hypothesis that the coefficient of the Interest rate variable is equal to zero. Consequently, the Interest rate variable is not statistically significant at the 0.05 level of significance. This implies that interest Rate exerts a positive and nonsignificant effect on inflation rate.

Table 8: Cointegration Analysis Result

Date: 01/01/23 Time: 17:21
Sample (adjusted): 2012 2022
Included observations: 11 after adjustments
Trend assumption: Linear deterministic trend
Series: INR INF GDP
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.897066	34.80739	29.79707	0.0122
At most 1	0.566737	9.797004	15.49471	0.2967
At most 2	0.052783	0.596500	3.841466	0.4399

Trace test indicates 1 cointegratingeqn(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 *	0.897066	25.01039	21.13162	0.0135
At most 1	0.566737	9.200504	14.26460	0.2699
At most 2	0.052783	0.596500	3.841466	0.4399

Max-eigenvalue test indicates 1 cointegratingeqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

INR	INF	GDP
17.16066	-4.911902	14.70814
21.66884	-8.192142	-23.91093
-9.457001	-23.91391	-49.43565

Unrestricted Adjustment Coefficients (alpha):

D(INR)	-0.025354	-0.037141	-0.001950
D(INF)	0.030271	-0.062013	0.019575
D(GDP)	-0.032808	0.008828	-0.004251

1 Cointegrating Equation(s): Log likelihood 64.67978

Normalized cointegrating coefficients (standard error in parentheses)

INR	INF	GDP
1.000000	-0.286230	0.857085
	(0.20728)	(0.45474)

Adjustment coefficients (standard error in parentheses)

D(INR)	-0.435099

	(0.35584)	
D(INF)	0.519469	
	(0.83338)	
D(GDP)	-0.563009	
	(0.17209)	

2 Cointegrating Equation(s): Log likelihood 69.28003

Normalized cointegrating coefficients (standard error in parentheses)

INR	INF	GDP
1.000000	0.000000	6.968021
		(1.46402)
0.000000	1.000000	21.34971
		(4.78256)

Adjustment coefficients (standard error in parentheses)

D(INR)	-1.239894	0.428800
	(0.39096)	(0.13510)
D(INF)	-0.824282	0.359332
	(1.14551)	(0.39585)
D(GDP)	-0.371719	0.088831
	(0.25867)	(0.08939)

Source: E-view 10.0 Statistical Output, 2023

The cointegration result suggests that there is evidence of cointegration among the variables interest rate, inflation rate and GDP. The test results indicate the number of cointegrating equations at the 0.05 significance level. The Trace test indicates that there is one cointegrating equation, while the Max-Eigenvalue test also suggests one cointegrating equation. This implies that there is a single long-term relationship among the variables.

The normalized cointegrating coefficients depicts that the coefficient for Interest rate is 1.000000, Inflation rate is -0.286230, and for GDP it is 0.857085 (standard errors are also provided in parentheses). These coefficients represent the long-term relationship between the variables. The adjustment coefficients indicate the speed at which the variables adjust to deviations from the long-term relationship in the short run. For instance, the adjustment coefficient for D (Interest Rate) is -0.435099 (standard error provided in parentheses). This means that if there is a deviation from the long-term relationship, D (Interest Rate) will adjust by approximately -0.435099 units in the next period.

Therefore, the cointegration analysis suggests the presence of a long-term relationship among the variables interest rate, inflation rate and GDP in Nigeria.

Summary of Findings

The regression analysis results indicate that the Interest Rate variable does not have a statistically significant effect on both GDP and the Inflation Rate.

For GDP, the p-value for the coefficient of the Interest Rate variable is 0.2543, which is greater than the significance level of 0.05. This suggests that there is insufficient evidence to reject the null hypothesis that the coefficient is zero. Therefore, the Interest Rate variable is not statistically significant at the 0.05 level of significance, indicating a positive but nonsignificant effect on GDP.

Similarly, for the Inflation Rate, the coefficient of the Interest Rate variable is 0.398569, with a standard error of 0.382626. The t-statistic is 1.041667, and the corresponding p-value is 0.3199. Since the p-value is greater than 0.05, there is not enough evidence to reject the null hypothesis. Hence, the Interest Rate variable is not statistically significant at the 0.05 level of significance, implying a positive but nonsignificant effect on the Inflation Rate.

In summary, based on the regression analysis, the Interest Rate variable does not have a statistically significant impact on both GDP and the Inflation Rate.

Conclusion

In conclusion, the analysis conducted on the effect of interest rate policy on selected macroeconomic variables in Nigeria suggests that the Interest Rate variable does not have a statistically significant impact on both GDP and the Inflation Rate.

For GDP, the results indicate that the Interest Rate variable has a positive but nonsignificant effect. This implies that changes in the interest rate policy do not have a significant influence on the country's economic output, as measured by GDP.

Similarly, for the Inflation Rate, the analysis reveals that the Interest Rate variable has a positive but nonsignificant effect. This suggests that variations in the interest rate policy do not have a significant impact on the rate of inflation in Nigeria.

These findings imply that other factors or variables may have a more significant influence on the macroeconomic variables studied. It is important to consider additional factors such as government policies, fiscal measures, exchange rates, and external shocks when examining the dynamics of GDP and inflation in Nigeria.

Recommendations

Based on the analysis conducted on the effect of interest rate policy on selected macroeconomic variables in Nigeria, the following recommendations can be made:

i. Given that the interest rate policy alone does not appear to have a significant impact on GDP and inflation in Nigeria, it is recommended to explore and utilize a broader range of policy tools. This may include fiscal policy measures, exchange rate management, and targeted sector-specific policies to stimulate economic growth and manage inflation effectively.

ii. To achieve better macroeconomic outcomes, it is crucial to strengthen coordination and communication between monetary and fiscal authorities. Coordinated efforts can help align policies and address macroeconomic challenges more effectively, taking into account the interdependencies and interactions among various policy instruments.

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Appendix 1
Data Presentation

YEAR	*INR (Percentage)*	*INF (Percentage)*	*GDP (Billion Dollars)*
2010	6.25	11.80	366.99
2011	12	10.30	414.47
2012	12	12	463.97
2013	12	8	520.12
2014	13	8	574.18
2015	11	9.55	493.03
2016	14	18.55	404.65
2017	14	15.37	375.75
2018	14	11.44	421.74
2019	13.50	11.98	474.52
2020	11.50	15.75	432.20
2021	11.50	15.63	440.83
2022	16.50	21.34	477.39

Sources: CBN Statistical Bulletin, 2022