

---

## Impact of Interest Rate on Economic Growth in Nigeria (1981-2019)

---

Okonkwo Gladys .O. Ph.D  
[gladysokonkwo47@gmail.com](mailto:gladysokonkwo47@gmail.com)  
Department of Banking and Finance  
Federal Polytechnic, Oko, Anambra State

**Abstract:** *This study examined the effect of interest rate on economic growth over the period from 1981-2019. Data for the study was obtained from secondary sources. The researcher made use of time series data which were collected from the Central bank of Nigeria statistical Bulletin. The data collected was analyzed using the Auto-regressive distribution lag (ARDL) and Granger Causality test. The results of our finding shows that interest rate has a negative and insignificant effect on economic growth in Nigeria. Therefore, the study recommended that interest rate should be liberalized in Nigeria and also aim at reducing the rate of inflation in Nigeria so that the output level can increase which entails economic growth in the face of the global financial crunch. Again, a strong monetary policy should not be based on interest rate regulation, except our financial sector is improved and the awareness of the activities of the financial institutions taken to ordinary Nigerians.*

**Keywords:** Interest Rate, Economic growth, Exchange Rate, Inflation Rate, Trade openness.

### 1.1 Introduction

It has been observed over the years that the ability of an economy to produce depends largely on the availability of resources in the economy. For emerging economies like Nigeria, production could be seen as a vital process that protects the economy against economic embarrassments like recession. Nigeria has over the years concentrated her production in the oil and gas sector neglecting other key sectors like agriculture, tourism and mining. This act has boxed Nigeria to the corner where we are today (economic recession). The ability and capacity to increase the level of production of quality service and tangible goods is pertinent to the growth of any economy (Adofu, Abula & Audu, 2010). Economic growth can therefore be viewed as an increase in the Gross Domestic Product (GDP) of a particular country. Interest rate is an essential macroeconomic variable capable of changing, transforming and redirecting the growth pattern of a country's economy (Utile, Okwori, & Ikpambese, 2018). Abebiyi (2002) opined that the desire of any economy is to have a sustained economic growth but this macroeconomic objective cannot be achieved in the face of hash and fluctuating interest rates. To Utile, Okwori, & Ikpambese (2018), inflation rates and high interest rates are major drawbacks of economic growth in emerging economies like that of Nigeria. The National Bureau of Statistics in Nigeria realised a statement in the 2nd quarter of 2017 that Nigeria has witnessed an increase in economic growth of about 0.055% but how much of this growth is felt by an average Nigerian in the face of high inflation and interest rates is already a puzzle.

Interest is the reward that accrues to people who provide the fund with which capital goods are bought (Soyibo and Adekanye, 1992). Interest can also be defined as the payment made to a lender by a borrower for the use of a sum of money for certain period of time. The charging of interest on loan was initially abolished during medieval days, both was later legalized by King Jenry VIII in 1545 when he abolished the usury laws in which it

was condemned. These usury laws were established during the medieval time when the payment of interest rate was strongly condemned and termed usury. During that time, it was believed that loan was an aid to an individual or a neighbour who is distressed, for such reason, they felt charging of interest on loan was not proper (Bhatia and Khatkhate, 1973).

The Nigerian government has since 1987 been pursuing a market-determined interest rate which does not permit a direct state intervention in the general direction of the economy (Guseh & Oritsejafor, 2007). In January, 1994 there was another policy reversal, this time the government had rightly introduced some measures of regulating interest rate management. It was claimed that there were wide variation and unnecessarily high rate under the complete deregulation of interest rate. Immediately, deposit rates were once again set up at 12 percent per annum from the previous 8 percent while a ceiling of 21 percent per annum was fixed for lending. The cap on interest rates introduced in 1994 was retained in 1995 with little modification for flexibility. The cap on interest rate adopted in 1994 was lifted in October 1996 and a flexible interest rate regime largely determined by the forces of supply and demand for funds was put in place and this has remained so, since late 1990s to date (Jelilov, Waziri & Isik, 2016). However, the problem has been that the market-based approach to interest rate management in Nigeria has always been associated with substantial interest rate volatility (Jelilov, Waziri & Isik, 2016).

For several decades now, interest rates had always been a problem in the Nigerian economy ever since the late 1980s when interest rates were deregulated, there has always been complains about high interest rate in the country. So far, the government has not been able to address the issue. (Ajayi, Oladipo, Ajayi, & Nwanji, 2017). It is evident that high interest rate is detrimental to the development of the real sector since it creates serious barrier to indigenous investors in their inability to access funds. The deregulation of interest rate that was introduced in the 1980s was expected to tackle the issues of discouragement of savings in financial assets, which in turn limited the supply of loanable funds while lending rates reduces excessive demand for credit resulting in the rationing of funds that had an adverse effect of depriving the economy from long term growth. Therefore, to effectively tackle the problem stated above, it becomes imperative to study the effect of interest rate on economic growth in Nigeria.

### **1.2 Statement of Problem**

Many developing countries, under a crushing burden of debt and other external disequilibria, adopted programmes to restructure their economies. A major cornerstone of such adjustment programmes is the liberalization of financial markets through a stable interest rate and greater role assigned to market forces in the allocation of financial resources, and generally involves interest rate deregulation and relaxation or cancellation of the policy of directed credits.

The policy of interest rate in Nigeria seems to have been backed by the McKinnon-Shaw financial intermediation hypothesis which postulates that interest rates have a positive response to economic growth. Also, studies of the effect of adjustment programmes on economic growth tend to assume the existence of the interest rate and economic performance i.e., macroeconomic balance (Ndulu, 1991).

Yet, it is known that resource gaps constrain economic growth in developing countries. The successful application of financial liberalization policies in developing countries, therefore, goes beyond demonstrating the applicability or otherwise of the McKinnon-Shaw hypothesis. While most of the blame lies at the doorstep of

commercial banks, the Nigerian government also has a joint responsibility since it has failed to create enabling environment for productive commercial activities that have the capability to reduce the transaction cost associated with production making the business environment to be risky. A host of macroeconomic variables are identified in the study to be responsible for driving growth in the Nigeria economy and this include, the cost of access to capital, institutional quality, the country's monetary policy, aggregate savings and finally aggregate loss of capital due to default or mismanagement in the Nigerian Banking system.

The researcher's motivation to study this area hinge on the fact that one, Interest rate is one of the most essential aspects of the Nigerian economic system that influence the cost of borrowing and borrowing is an imperative source of financing businesses and production which may lead to economic growth. Two, interest rates affect the return on savings, if the interest on savings is encouraging; individuals would be encouraged to save more idle cash which may pave way for availability of lendable funds in the bank consequently economic growth would be improved. Three, interest rates are an important component of the total return of many investments. Four, certain interest rates provide insight into future economic and financial market activity based on these vantage roles interest rates play in the Nigerian economy it is imperative to continuously study this area to find out how well or otherwise interest rates affect the Nigerian economy. The major problem this study seeks to solve is to ascertain the effect of interest rate on economic growth in Nigeria within the study period.

### **1.3 Objectives of the Study**

The broad objective of this study is to critically examine the impact of interest rate on economic growth in Nigeria. In an attempt to address this broad objective, the study specifically intends to:

- i. Examine the impact of interest rate on economic growth in Nigeria.
- ii. Evaluate the long run relationship between interest rate and economic growth in Nigeria.
- iii. Determine the nature of the causal relationship between interest rate and economic growth in Nigeria.

### **1.4 Research Questions**

Based on the objectives stated above, the following research questions are raised:

- i. How does interest rate have an impact on economic growth in Nigeria?
- ii. What is the trend of relationship between interest rate and economic growth in Nigeria in the long-run?
- iii. What is the direction of the causal relationship between interest rate and economic growth in Nigeria?

### **1.5 Research Hypotheses**

Based on the research questions stated above, the following hypotheses are tested:

H<sub>01</sub> - Interest rate does not have a significant impact on economic growth in Nigeria.

H<sub>02</sub> -There is no long-run relationship between interest rate and economic growth in Nigeria

H<sub>03</sub>-There exist no causal relationship between interest rate and economic growth in Nigeria.

## **2.1 Conceptual review**

### **2.1.1 Concept of Economic Growth**

Economic growth is defined in terms of achievement of yearly increases in both the total and per capita output of goods and services. In other words, it refers to the sustained increase in the actual output of goods and services (Akpakpan,1999). Moreover, Ohale (2002) defined economic growth in two senses. In one sense, as the increase in the productive capacity of the economy leading to an increase availability of goods and services in

the economy over some given period of time. In another sense, as sustained increase in per capital output of goods and services over a period of time. In a similar vein, Tom-Ekine (2011) wrote that economic growth is defined as the process whereby the real per capita income of a country increases over a long period of time.

According to Ekpo & Udoh (2013), “economic growth refers to a rise in national income and product; in other words, it is the percentage change in two consecutive years output or GDP. It connotes a sustained increase in GDP over-time.” Economic growth is measured by the increase in the amount of goods and services produced in a country. Thus, growth is also expressed in terms of increases in the gross output of the economy per period of time. All countries desire to achieve faster rates of economic growth because economic growth is seen to be the most effective way to bring about higher living standards in the economy, economic growth also offers the prospect for the reduction of poverty and it is an important instrument for acquiring power and prestige – political and military strengths are dependent upon economic power, also the more a country can produce and satisfy the needs of her citizens, the more the country will be respected by other countries (Ohale, 2002). An economy that is growing will produce more goods and services in each consecutive time period.

Growth is always thought of as a desirable objective for any economy but there is no agreement over the annual growth rate which an economy should attain. Generally, economists believe in the possibility of continual growth. For instance, once at full employment, the economy must continue to grow in order to remain at full employment. Growth occurs when an economy’s productive capacity increases which in turn, is used to produce more goods and services. Factors which lead to growth include improvements in the skill and training of labour force, increase in productivity, i.e., output per hour of work, better management and technology, enlarged excellence and higher excellence of the stock of capital.

Furthermore, two related factors explain the poor performance of Nigerian economy. They are inadequate productive capacity and inadequate administrative (executive) capacity. Regarding inadequate productive capacity, the country has a very limited capacity (that is, the knowledge and skills needed) to produce goods and services. The country lacks the knowledge and skills needed to produce most of the goods her citizens want. As a result, Nigerians have had to depend on other countries for the production of most of the services and goods they need or want to consume, including basic needs of the people.

### **2.1.2 The Concept of Interest Rate**

According to Keynes, the interest rate is the reward for not hoarding, but for parting with liquidity for a specific period of time. Keynes’ definition of interest rate focuses more on the lending rate. Adebisi (2002) will define interest rate as the return or yield on equity or the opportunity cost of deferring current consumption in the future. Some examples of interest rate include the saving rate, lending rate, and the discount rate.

According to Sanusi (2002), interest rates are the costs a borrower has to pay when obtaining a loan in any economy. This definition implies that, interest rates are the determinants of the cost of credits in an economy. The impact of high cost of interest rates in the society is not unconnected to the fact that borrowers may hesitate to borrow when they should. This may be because the cost of credit and the credit itself may aggregate to an amount that may be unaffordable to the borrower to pay back within the stipulated due date of the loan. The implication of this on the economy is that GDP of the economy would be low since equity financing alone cannot adequately sponsor the production activities in an economy. ToUtile, Okwori & Ikpambese (2018), money is borrowed at a cost and the cost associated with the borrowing of funds is referred to as interest rate. It

is not just production of goods that are negatively affected by increased interest rates but also affected are those involved in real estate business. The increase in interest rates affects demand for mortgages posing a challenge on the prices of residential real estates. On the contrary, proponents of high interest rates are of the opinion that high interest rates encourage the supply of idle funds in the market making an improvement in the cyclical flow of funds and making accessibility of funds quite easy for businesses to flourish.

## **2.2 Theoretical Review**

### **2.2.1 The Classical Theory of Interest**

This theory according to Vanish (2000) cannot be ascribed to any one single writer belonging to the classical school. Following Adam Smith, the classical writers being interested in those fundamental forces which determined the long-term interest rate, disregarded those factors of temporary and secondary nature which characterized the short-run disequilibrium situations. However, it is widely accepted that the theory was propounded by Marshall (1920) and Pigou (1932) and this theory is known as the demand and supply theory of saving. The theory states that the rate of interest is determined by the supply and demand of capital. The supply of capital is governed by time preference and the demand for capital is determined by the expected productivity of capital. The time and preference are dependent on savings (Maiga, 2017). According to Vanish (2000) the demand for capital consists of the demand for productive and consumptive purpose. Capital is demanded by the investors because it is productive. But the productivity of capital is subject to the law of variable proportions (additional units of capital are not productive as their earlier units).

However, the supply of capital according to Jhingan (2001) depends upon savings rather upon the will to save and the power to save of the community. Some people save irrespective of the rate. They would continue to save even if the rate of interest were zero. There are others who save because the current rate of interest induces them to save and reduce when the rates are low. The higher the rate of interest, the larger the community savings and more will be the supply of funds. The supply curve of capital or the savings curve moves upward to the right.

### **2.3 Empirical Review**

The issue of interest rate and economic growth has been well documented in the body of empirical literature. This section presents the review of previous empirical literature to provide a background for examining the relationship between interest rate and economic growth in Nigeria using time series data from 1981 to 2019.

Adeniran et al. (2014) examined the impact of exchange rate on economic growth in Nigeria, using secondary time series data for the period 1986 to 2013. They used correlation and regression analysis techniques to regress exchange rate, interest rate and inflation rate (the independent variables) against GDP (proxy for economic growth). The study found, among others, that interest rate had an insignificant negative impact on economic growth.

Ifeanyi and Chukwu (2014) examined the impact of interest rate deregulation on economic growth in Nigeria, using secondary data collected from Central Bank of Nigeria Statistical Bulletin for the period 1986 to 2010. The study employed OLS technique based on the E-View statistical package to analyse data, and found that low interest rate stimulates and increase growth in real domestic product.

Similarly, Mutinda (2014) conducted a study on the effect of lending interest rate on economic growth in Kenya. Though interest rate was used as the main explanatory variable, the study also introduced budget deficit, inflation rate, exchange rate and gross investment as control variables. The involved secondary time series data

for the period 2003 – 2012, collected from the Kenyan National Bureau of Statistics and the Central Bank of Kenya. They employed regression estimation techniques to analyse data, and the results showed that interest rate was negatively related to economic growth in Kenya during the period covered by the study.

Idris (2019), examined the impact of interest rate on economic growth in Nigeria using annual time series data spanning 1980 to 2017. The Vector Autoregression (VAR) model and the Granger causality test were employed to estimate the model coefficients and measure the causal relationship among the concerned variables. From the VAR-based impulse response function and its corresponding variance decomposition estimates, result shows the existence of negative relationship between interest rate and economic growth in Nigeria. In addition, the Granger causality test indicates the presence of bi-directional causal relationship between interest rate and economic growth.

Etale & Ayunku (2016), examined the relationship between interest rate and economic growth in Nigeria, using secondary time series panel data for the period 1985 – 2014. Data was collected from various issues of the Central Bank of Nigeria Statistical Bulletin and the National Bureau of Statistics. The study employed Augmented Dicker-Fuller (ADF) unit root tests as well as Johansen co-integration test followed by Error Correlation Model (ECM) approach. The ADF unit root test results indicated that the variables are all stationary at first difference. The variables were integrated of order one (1) which implies that the null hypothesis of non-stationary for all the variables of interest is rejected. The Johansen co-integration test result revealed the existence of two co-integrating relationship between the variables at 5% level of significance. The study proceeded to perform the ECM approach and found that interest rate is inversely related to economic growth, but the relationship is statistically insignificant.

Utile, Okwori & Ikpambese (2018), investigated the effect of interest rate on the economic growth of the Nigerian economy. The data for the study was obtained from the statistical bulletin of the Central Bank of Nigeria from 1980-2016. The research design adopted for the study was the ex-post facto research design. Multiple regression technique was used for the analysis of data. The student t-test was used to test the hypotheses formulated. It was found that inflation and exchange rate have negative and insignificant effect on GDP. Also, it was found that deposit interest rate has positive and significant relationship with GDP. The study generally concludes that interest rate has a negative and insignificant relationship with GDP.

Effiong(2020), examined the effect of interest rate on real sector output growth in Nigeria through the period 1985 to 2019. Data were obtained from the World Bank Database on World Development Indicators and the Central Bank of Nigeria Statistical Bulletin. The data were analysed using Error Correction Mechanism. The result from the analyses showed that interest rate was observed to exert a negative and significant effect on real sector growth. Thus, a unit percentage increase in interest rate is likely to lead to a 0.274% decrease in real sector output growth. The error correction term showed that 59.9% of the short run disequilibrium in real sector output growth is corrected annually. The paper recommended a cheap monetary policy that will keep interest rate at a favourable level so as to encourage investors to borrow.



### 3.1 Methodology

#### Research Design

This study employed ex-post facto research design. Ex-post facto design is appropriate in any after-the-fact research in which case an investigation or evaluation is carried out using already existing data (information) from the past event. This study utilized data from the publications of Central Bank of Nigeria (CBN) for periods covering 1981 – 2019. Data collected were subjected to stationarity test using Augmented Dickey Fuller (ADF) unit root test to ascertain the reliability of the result of the analysis. Autoregressive Distributed Lag (ARDL) model was employed in analyzing the models formulated to capture the effect of the interest rate on economic growth. The individual significance of the independent variables on the dependent variable was determined with reference to the values of t-statistics (probability) and all decisions were based on 5% level of significance.

#### 3.2 Model Specification

In examining the effect of interest rate on economic growth, the functional and econometrics form of the model is specified as follows

$$GDP = f(INT, TOP, INF, EXR) \dots\dots\dots 3.1$$

$$GDP = B_0 + B_1INT + B_2TOP + B_3INF + B_4EXR + e \dots\dots\dots 3.2$$

Where,

GDP = Economic growth

INT = Interest rate

TOP= Trade Openness

INF = Inflation rate

EXR = Exchange rate

$e$  = Stochastic error term  $\beta_0$  = Constant term  $\beta_1 - \beta_4$  = Estimated parameters Apriori Expectation Based on economic theory; the following a-priori relationships are postulated for the estimated results.  $\beta_1 < 0$   $\beta_2 > 0$   $\beta_3 < 0$   $\beta_4 > 0$ .

#### 3.3 Estimation Techniques

The various techniques of data analysis adopted for the study were based on the specific objectives of the study.

##### 3.3.1 Objective 1

To examine the impact of interest rate on economic growth in Nigeria, using the Autoregressive Distributed Lag (ARDL) model.

##### 3.3.2 Objective 2

To evaluate the long run relationship between interest rate and economic growth in Nigeria, using the Autoregressive distributed lag bound test of co-integration techniques.

##### 3.3.2.1 Autoregressive Distributed Lag (ARDL)

This study will make use of the Autoregressive distributed lag bound test of co-integration to determine the long run relationship between the variables. This test for co-integration was developed by Pesaran et al (2001). ARDL co-integration technique does not require pretests for unit roots unlike other techniques. Consequently, ARDL co-integration technique is preferable when dealing with variables that are integrated of different order, I(0), I(1) or mixture of both and, robust when there is a single long run relationship between the underlying variables in a small sample. The Autoregressive distributed lag (ARDL) method does not require the unit root

test of stationarity, but to avoid ARDL model crash in the presence of variables that are stationary at second difference, the unit root test will be carried out to determine the number of unit root in series of co-integration. The long run relationship of the underlying variables is detected through the F-statistic (Wald test). In this approach, long run relationship of the series is said to be established when the F-statistic exceeds the critical value bond (Nkoro and Uko,2016). Autoregressive distributive lag has the following advantage over other methods of Co-integration:

1. It identifies co-integrating vectors where there are multiple co-integrating vectors. That is, it identifies the co-integration between the variables.
2. The Error correction model (ECM) can be derived from ARDL model through a simple linear transformation, which integrates the short run adjustment with the long run equilibrium without losing the long run information.
3. When there is a single long run relationship, the ARDL procedure can distinguish between dependent and explanatory variable. That is, the ARDL approach assumes a single reduced form equation relationship exist between the dependent variables and the exogenous variables. (Nkoro and Uko, 2016).

To ascertain the co-integration between the variables, equation (3.2) can therefore be expressed as an ARDL model developed by Pesaran et al, (2001)

$$\ln GDP_t = \alpha_0 + \sum_{i=1}^n \beta_i \ln GDP_{t-i} + \sum_{i=0}^n \delta_i \ln INT_{t-i} + \sum_{i=0}^n \varphi_i \ln TOP_{t-i} + \sum_{i=0}^n \delta_i \ln INF_{t-i} + \sum_{i=0}^n \theta_i \ln EXR_{t-i} + \mu_t, \dots \dots (3.3)$$

Following the bound testing approach proposed by Pesaran et al, (2001), the bound test for equation (3.3) can be examined to be the following model

$$\Delta \ln GDP_t = \alpha_0 + \sum_{i=1}^n \beta_i \Delta \ln GDP_{t-i} + \sum_{i=0}^n \delta_i \Delta \ln INT_{t-i} + \sum_{i=0}^n \varphi_i \Delta \ln TOP_{t-i} + \sum_{i=0}^n \delta_i \Delta \ln INF_{t-i} + \sum_{i=0}^n \theta_i \Delta \ln EXR_{t-i} + \lambda_0 \ln GDP_{t-1} + \lambda_1 \ln INT_{t-1} + \lambda_2 \ln TOP_{t-1} + \lambda_3 \ln INF_{t-1} + \lambda_4 \ln EXR_{t-1} + \omega_t \dots \dots \dots (3.5)$$

The null hypothesis of no long run relationship is tested using the F-test on ( $H_0: \alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = 0$ ) against ( $H_a: \alpha_1 \neq 0, \alpha_2 \neq 0, \alpha_3 \neq 0, \alpha_4 \neq 0$ ). If the computed F-test exceeds the upper critical bounds value, then  $H_0$  is rejected signaling co-integration amongst the different variables. If the computed F-value is below the critical bound, we fail to reject  $H_0$ . But if the computed F-value falls within the critical value bound, the result is inconclusive (Moslares and Ekanyake, 2015). If these series are found to be co-integrated, an unrestricted error correction version of the corresponding ARDL model can be estimated to trace the short-term dynamics of the model (Wool and Baharumshah, 2010). The reparameterized result gives the short-run dynamics and long run relationship of the underlying variables.

### 3.3.3 Objective 3

To determine the nature of the causal relationship between interest rate and economic growth in Nigeria using granger causality test.

#### 3.3.3.1 Granger Causality Test

The causality test is used to determine the cause-and-effect relationship between variables. There are several tests for causality, this includes the granger test of causality and vector autoregressive (VAR) test. This study will make use the granger causality test to determine the causal relationship between economic growth proxy by GDP and interest rate. The granger causality test is a bilateral test and is based on the assumptions that the



information needed to predict the respective variable is contained solely in the time series data on these variables and that the disturbance terms are uncorrelated (Gugarati, 2013). The test involves estimating the following regression:

$$GDP_t = \sum_{i=1}^n \alpha_i INT_{t-i} + \sum_{j=1}^n \beta_j GDP_{t-j} + U_{1t} \dots\dots\dots (3.6)$$

$$INT_t = \sum_{i=1}^n \lambda_i INT_{t-i} + \sum_{j=1}^n \delta_j GDP_{t-j} + U_{2t} \dots\dots\dots (3.7)$$

Where:  $U_{1t}$  and  $U_{2t}$  are the error term and are assumed to be uncorrelated

**3.4 Justification of method**

This methodology was chosen in other to overcome the limitations of the Johansen and Juselius test for co-integration that makes use of only variables that are stationary at first difference (I{1}) because the variables are sometimes stationary at different levels. This methodology was used by Festus and Saibu (2019) in estimating the long run relationship between interest rate and economic growth and will also be used in this study to determine the relationship between interest rate and economic growth in Nigeria.

**3.4.1 Nature and Sources of Data**

The data used in this study are annual time series, secondary data on, economic growth, interest rate and inflation rate, degree of openness and Exchange Rate within the period under review that is from 1981-2019. The data utilized in the study is sourced through. Publication of the central bank of Nigeria (CBN) i.e., Statistical Bulletin.

The below table summarises the variables and the measurement:

Variable (s)	Measurement
<b>Economic growth</b>	Gross domestic product
<b>Exchange Rate</b>	Real Exchange rate vis-a vis Naira to Dollar
<b>Interest Rate</b>	Real interest rate
<b>Inflation Rate</b>	Year on year Headline Inflation
<b>Trade openness</b>	X+M

**4.1 Presentation and Analysis of Data**

**unitroot**

**Table 4.1: Augmented Dickey-Fuller results (1981-2019)**

Variables	ADF statistics	5% critical value	<b>Order of Integration</b>
<b>GDP</b>	-4.721	-3.450	I(0)
<b>INT</b>	-4.017	-3.553	I(1)
<b>EXR</b>	-3.651	-3.537	I(1)
<b>TOP</b>	-3.619	-3.533	I(0)
<b>INF</b>	-6.527	-3.533	I(0)

*Source: Author's computed results (Eviews9)*

Evidence from table 4.1 shows that the variables economic growth (GDP), trade openness (TOP) and inflation rate (INF) were stationary at level, that is, they were integrated of order zero. While the variables interest rate (INT) and exchange rate (EXR) were stationary after first difference, that is, they were integrated of order one.

**Table 4.2 Co-Integration Test**

ARDL Bounds Test		
Date: 06/16/21 Time: 08:42		
Sample: 1985 2019		
Included observations: 35		
Null Hypothesis: No long-run relationships exist		
Test Statistic	Value	k
F-statistic	10.49536	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Author's computed results (Eviews9)

From the above result, the F-statistics of 10.49 falls above the upper bound at 5% critical value. Therefore, we reject the null hypothesis of no co-integration and conclude that there is co-integration amongst the variables. This is to say that though there is no short run equilibrium relationship between economic growth (GDP), trade openness (TOP) and inflation rate (INF), in the long run there is existence of equilibrium relationship. Hence the observed long run relationship is given by ARDL regression result presented in table 4.3 below.

**Table 4.3 ARDL Regression result**

ARDL Cointegrating And Long Run Form				
Dependent Variable: GDP				
Selected Model: ARDL (1, 1, 0, 2, 2)				
Date: 06/16/21 Time: 08:48				
Sample: 1980 2018				
Included observations: 35				
Cointegrating Form				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INT)	-0.017471	0.081952	-0.213183	0.8330
D(EXR)	0.011661	0.005554	2.099472	0.0465
D(INF)	-0.082374	0.134809	-0.611047	0.5469
D(INF(-1))	0.234024	0.120517	1.941836	0.0640
D(TOP)	0.250546	0.070275	3.565197	0.0016
D(TOP(-1))	-0.239706	0.068689	-3.489735	0.0019

CointEq(-1)	-0.691227	0.127400	-5.425621	0.0000
Cointeq = GDP - (0.3946*INT + 0.0169*EXR -0.3054*INF + 0.6049*TOP -1.0656)				
Long Run Coefficients				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
INT	-0.394558	0.166240	-2.373430	0.0260
EXR	0.016870	0.008739	1.930371	0.0655
INF	-0.305378	0.261711	-1.166855	0.2547
TOP	0.604949	0.226492	2.670945	0.0134
C	-1.065602	2.081149	-0.512026	0.6133
R-squared	0.663463	Mean dependent var		4.702571
Adjusted R-squared	0.523239	S.D. dependent var		3.453121
S.E. of regression	2.384307	Akaike info criterion		4.826971
Sum squared resid	136.4381	Schwarz criterion		5.315795
Log likelihood	-73.47200	Hannan-Quinn criter.		4.995713
F-statistic	4.731453	Durbin-Watson stat		2.059409
Prob(F-statistic)	0.000874			

Source: Author's computed results (Eviews9)

#### 4.2 Interpretation

From our result in table 4.3, interest rate (INT) has a negative and significant effect on economic growth in the long run in Nigeria. That is, a one percent increase in interest rate will decrease economic growth by 0.39% on the average, all other things being equal. In the short run, interest rate was also found to have a negative and but insignificant effect on economic growth in Nigeria. Exchange rate (EXR) was found to have a positive relationship with economic growth in the long run in Nigeria but this positive relationship was found to be statistically insignificant at 5% level of significance. But in the short run exchange rate was found to have a significant positive effect on economic growth in Nigeria. That is, a one percent increase in exchange rate in the short run will lead to a 0.01% increase in economic growth. Further, inflation rate in Nigeria have a negative relationship with economic growth and this negative relationship was statically insignificant at 5% level of significance both in the long run and short run. The variable trade openness has a significant positive effect on economic growth in Nigeria both in the short run and long run. That is, a one percent increase in trade openness in Nigeria will increase economic growth by 0.25% and 0.60% in the short run and long run respectively.

Result from our error correction model shows that the error correction term i.e., CointEq(-1) is negative and statistically significant at the 5% level. Its coefficient of 0.691 implied that the speed at which the short-run equation converges to equilibrium in the long- run is high.

The value of the R-Squared for the model was 0.663 or 66%, which implies that interest rate, exchange rate, inflation rate and trade openness explains about 66% of the systematic variations in economic growth in Nigeria over the observed years while the remaining 34% variation are explained by other variables not captured in the regression model. This implies that the regression model is nicely fit.

The overall significance of our model is tested using F-statistic which measured the joint effect of the explanatory variables on the explained variables. The F-statistic for the regression model is given as 4.731453 with the corresponding probability value of 0.000874 which is significant at 5%. This implies that the explanatory variables proxied as interest rate, exchange rate, inflation rate and trade openness have significant effect on economic growth in Nigeria. The Durbin –Watson (DW) statistic has a value of 2.059409 indicating the presence of no autocorrelation in our model.

**Post Estimation Test**

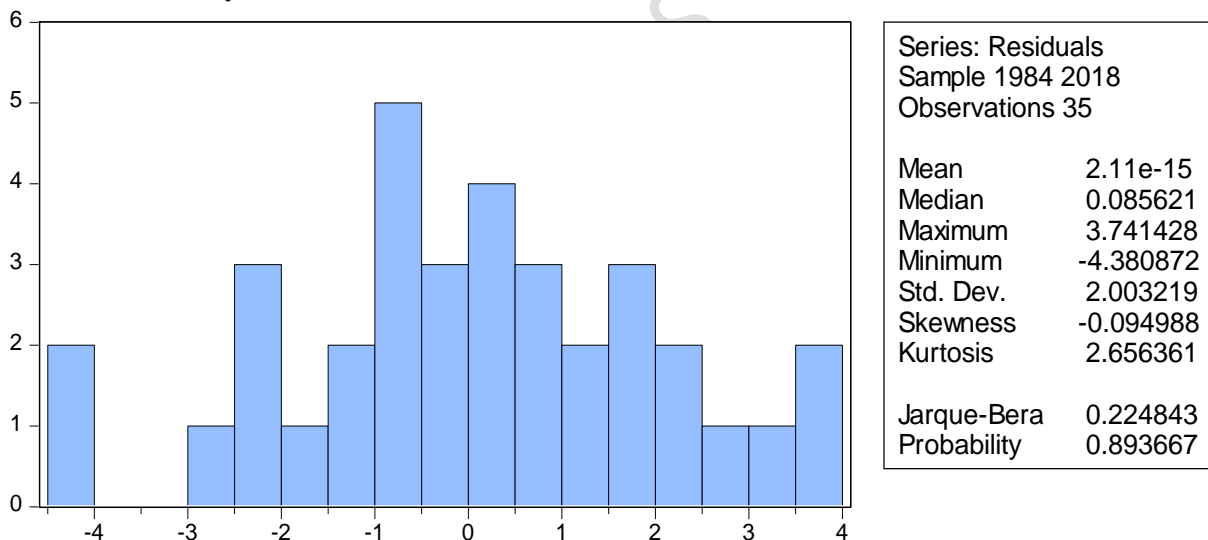
**Table 4.4 Serial correlation test**

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.068970	Prob. F(2,22)	0.9336
Obs*R-squared	0.218082	Prob. Chi-Square(2)	0.8967

**Source:** Author’s computed results (Eviews9)

The null hypothesis states that there is no serial correlation against the alternative hypothesis which states that there is serial correlation. From the table above  $0.8967 > 0.05$ , therefore we fail to reject the null hypothesis of no serial correlation and conclude that there is no serial correlation amongst the variables.

**Table 4.5 Normality Test**



**Source:** Author’s computed results (Eviews9)

H<sub>0</sub>: It does not follow a normal distribution

H<sub>1</sub>: It follows a normal distribution

**Decision rule:**

Reject H<sub>0</sub> if the histogram is bell shaped and the Jarque-bera statistics is not significant at 5% level of significance, otherwise we fail to reject H<sub>0</sub>.

From table 4.5, the Jarque-Bera value is 0.2248 with a p-value of 0.894. Therefore, we reject the null hypothesis and conclude that the model follows a normal distribution.

**Test for heteroscedasticity**

**Decision Rule:**

Reject  $H_0$  if F-statistic and obs\*R-square are significant, otherwise we fail to reject  $H_0$  and conclude that there is no heteroskedasticity in the model.

Heteroskedasticity Test: Breusch-Pagan-Godfrey			
F-statistic	1.588174	Prob. F(10,24)	0.1702
Obs*R-squared	13.93773	Prob. Chi-Square(10)	0.1759
Scaled explained SS	5.427546	Prob. Chi-Square(10)	0.8609

Source: Author's computed results (Eviews9)

From table above,  $0.1702 > 0.05$  &  $0.1759 > 0.05$ , therefore we fail to reject the null hypothesis of no heteroskedasticity and conclude that there is no heteroskedasticity in the model.

### 4.3 Hypotheses Testing

#### Hypothesis 1:

$H_0$  - Interest rate does not have a significant impact on economic growth in Nigeria.

$H_1$  - Interest rate has a significant impact on economic growth in Nigeria.

From the results in table 4.3 the probability value of 0.0260 is less than 0.05, therefore we reject the null hypothesis and conclude that interest rate has a significant impact on economic growth in Nigeria. This agrees with the apriori expectation.

#### Hypothesis 2:

$H_0$  -There is no long-run relationship between interest rate and economic growth in Nigeria

$H_1$  -There is a long-run relationship between interest rate and economic Nigeria

From our result in table 4.2, the F-statistics of 10.49 falls above the upper bound at 5% critical value. Therefore, we reject the null hypothesis of no co-integration and conclude that there is a long-run relationship between interest rate and economic Nigeria.

#### Hypothesis 3:

$H_0$  -There exist no causal relationship between interest rate and economic growth in Nigeria.

$H_1$  -There exist a causal relationship between interest rate and economic growth in Nigeria

Table 4.6 Pairwise Granger causality test.

Null hypothesis	F-statistics	P-value	decision
Interest rate does not Granger cause GDP	3.03564	0.0493	Reject null hypothesis
GDP does not Granger cause interest rate	4.93953	0.0100	Reject null hypothesis

Source: Authors computation Eviews9

Findings indicate that the null hypothesis which states that interest rate does not Granger cause GDP is rejected at 5 percent level of significance. In addition, the GDP also Granger cause interest rate at 5 percent significance level. This implies that, interest rate Granger cause GDP and the GDP also Granger cause interest rate thereby indicating a bi-directional causality between the variables.

### 5.1 Conclusion

The result indicates that the variables were stationary at level and at first differences. The autoregressive distributed lag bound co-integration test revealed the existence of long-run relationship between the variables. While the empirical result of the Long run ARDL test showed that interest rate and inflation rate exert negative effect on economic growth in Nigeria while exchange rate and trade openness exert positive influence on gross domestic product in Nigeria. Thus, interest rate was found to have a statistically significant inverse effect on economic growth in Nigeria.

## **5.2 Recommendations**

Based on the findings, the study made the following recommendations:

- i.** Since inflation rate varies inversely with GDP (aggregate output), the government should aim at reducing the rate of inflation in Nigeria so that the output level can increase which entails economic growth in the face of the global financial crunch.
- ii.** A strong monetary policy for Nigeria should not be based on interest rate regulation, except our financial sector is improved and the awareness of the activities of the financial institutions taken to ordinary Nigerians.
- iii.** Also, the enclave nature of the mainstay of the Nigerian economy should be changed by channeling the proceeds from oil to other sectors of the economy like education, industries, agriculture, etc and capital development which is a prerequisite for growth and development.
- iv.** Interest rate should be liberalized in Nigeria .

## **References**

- Abebiyi, M.A. (2002), The role of real interest rates and savings in Nigeria. *First Bank of Nigeria Plc, quarterly review, March, 2002.*
- Acha, I. A. and Acha, C. K. (2011). Interest rate in Nigeria: An analytical perspective. *Research Journal of Finance and Accounting, 2(3): 71-81.*
- Adeniran, J. O., Yusuf, S. A., & Adeyemi, O. A. (2014). The impact of exchange rate fluctuation on the Nigerian economic growth: An empirical investigation. *International journal of Academic Research in Business and Social sciences, 4(8), 224-233.*
- Adofu, I., Abula, M., & Audu, S. I. (2010). An assessment of the effects of interest rate deregulation in enhancing agricultural productivity in Nigeria. *Current Research Journal of Economic Theory, 2(2), 82-86.*
- Ajayi, S. A., Oladipo, O. A., Ajayi, L. B., & Nwanji, T. I. (2017). Interest rate and economic growth: The case of Nigeria. *International Review of Business Research Papers, 13(1), 141-150.*
- Akpakpan, E. B. (1999). The economy: Towards a new type of economics. *Port Harcourt: Belpot Publishers, 20.*
- Anaripour, J. T. (2011). Study on relationship between interest rate and economic growth by Eviews (2004-2010, Iran). *Journal of Basic and Applied Scientific Research, 1(11), 2346- 2352.*
- Bhatia, R. J., & Khatkhate, D. R. (1973). Financial intermediation, savings mobilization, and entrepreneurial development: the African experience. *Staff Papers, 22(1), 132-158.*



- Di Giovanni, J., & Shambaugh, J. C. (2008). The impact of foreign interest rates on the economy: The role of the exchange rate regime. *Journal of International economics*, 74(2), 341-361.
- Effiong, U. E. (2020). Interest rate and real sector output growth in Nigeria: Empirical
- Ekpo, A. H., & Udoh, E. (2013). Public debt, growth and poverty reduction in a failed state: Nigeria. *In American Economic Association Conference* (4-6).
- Etale, L. M., & Ayunku, P. E. (2016). The relationship between interest rate and economic growth in Nigeria: An error correction model (ECM) approach. *International Journal of Economics and Financial Research*, 2(6), 127-131. Evidence. *East African Scholars Journal of Economics, Business and Management*, 3(10), 20-27.
- Guseh, J. S., & Oritsejafor, E. (2007). Government size, political freedom and economic growth in Nigeria, 1960-2000. *Journal of Third World Studies*, 24(1), 139-165.
- Hansen, B., & Seshadri, A. (2013). Uncovering the relationship between real interest rates and economic growth. *Michigan Retirement Research Center Research Paper*, (201-303).
- Idris, M. (2019). Macroeconomic analysis of interest rate and economic growth in Nigeria: A Time Series Approach. *International Journal of Finance and Banking Research*, 5(4), 91.
- Ifeanyi, O. J., & Chukwu, N. G. (2014). The nexus of interest rate deregulation and economic growth in Nigeria. *International Journal of Empirical Finance*, 3(3), 142-151.
- Imoisi, A. I., Chika, U. P., & Moses, O. L. (2012). An analysis of interest and exchange rates effect on the Nigerian economy: 1975–2008. *Asian Economic and Financial Review*, 2(6), 648-657.
- Jelilov, G., Waziri, F., & Isik, A. (2016). Interest rate behaviour and its relationship with economic growth in Nigeria: an error correction model approach. *The Empirical Economics Letters*, 245-255.
- Jhingan M.L. (2001). *Monetary economics* 5th edition, Vrinda Publications (P) Ltd. Delhi.
- Maiga, F. K. (2017). Impact of interest rate on economic growth in Nigeria. *Pyrex Journal of Business and Finance Management Research*, 3(3), 98-111.
- McKinnon, R. I. (1973). *Money and capital in economic development* (Washington, DC: Brookings Institution, 1973). *McKinnon money and Capital in Economic Development* 1973.
- Mutinda, D. M. (2014). *The effect of lending interest rate on economic growth in Kenya* (Doctoral dissertation, University of Nairobi).
- Ndulu, B. J. (1991). Growth and adjustment in sub-Saharan Africa. *Economic Reform in Sub-Saharan Africa, Washington, DC: World Bank*, 364.
- Obamuyi, T. M. (2009). An investigation of the relationship between interest rates and economic growth in Nigeria, 1970-2006. *Journal of economics and International Finance*, 1(4), 093-098.
- Obamuyi, T. M., & Olorunfemi, S. (2011). Financial reforms, interest rate behaviour and economic growth in Nigeria. *Journal of Applied Finance and Banking*, 1(4), 39.
- Ohale, L., & Onyema, J. I. (2002). *Foundations of macroeconomics*. Port Harcourt: Springfield Publishers.
- Osofisan, A. O. (1993). *An Asset Portfolio Management Model for Nigerian Commercial Bank: A Case Study*. Unpublished MBA Project Report, Department of Economics, University of Ibadan. Ibadan.

- Sanusi, J. O. (2002). The evolution of monetary management in Nigeria and its impact on economic development. *CBN bullion*, 26(2).
- Saymeh, A. A. F., & Orabi, M. M. A. (2013). The effect of interest rate, inflation rate, GDP, on real economic growth rate in Jordan. *Asian Economic and Financial Review*, 3(3), 341-51.
- Shaw E (1973). Financial deepening in economic development. New York: Oxford University Press.
- Soyibo, A., & Adekanye, F. (1992). Financial system regulation, deregulation and savings mobilization in Nigeria. *African Economic Research Consortium, Nairo*.
- Tom-Ekine, N. (2014). Macroeconomics: Dimensions of competitive indicators and policy performance. *Port Harcourt: Dominus Printing Company*.
- Udoka, C. O. & Roland, A. A. (2012). The effect of interest rate fluctuation on the economic growth of Nigeria, 1970-2010. *International Journal of Business and Social Science*, 3(20), 295–302.
- Udoka, C. O., & Anyingang, R. A. (2012). The effect of interest rate fluctuation on the economic growth of Nigeria, 1970-2010. *International Journal of Business and Social Science*, 3(20).
- Utile, B. J., Okwori, A. O., & Ikpambese, M. D. (2018). Effect of interest rate on economic growth in Nigeria. *International Journal of Advanced Academic Research*, 4(1), 66-76.

IJFABS