



A Publication of Departments of Accounting & Finance and Business Administration, Fountain University, Osogbo.
Journal homepage: www.osogbojournalofmanagement.com
ISSN: 2315 – 6325 (Print) ISSN: 2408-6959 (Online)

GROWTH EFFECTS OF INTEREST RATES, INFLATION AND EXCHANGE RATES IN NIGERIA

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Abstract

The paper examines the relationship between inflation, interest and exchange rates on economic growth in Nigeria between 1990 and 2017. Unit root, Johansen co-integration as well as granger causality tests were explored to evaluate the empirical model. The results of findings suggest that all the variables of interest were $I(1)$ series which implies that they are integrated of order one. Further, the Johansen co-integration test reveals a long run co-movement among the variables indicating that interest rates, inflation rates and exchange rates will influence economic growth in the long run. The result of the granger causality test suggests that there is a uni-directional causal relationship between inflation rates, exchange rates and economic growth in Nigeria. The study equally observed that interest rate in Nigeria is growth-repressive. Therefore, there is absolute need for the interest rates to be market-driven in order to attract foreign investment and flows capable of stimulating economic growth in the long run. In addition, the seemingly high interest rate should be reviewed downward so that domestic and foreign investment can be stimulated. Inflation-targeting policies should be pursued with a view to maintaining a single digit inflation rate.

Keywords: *Inflation rate, Exchange rate, Interest rate, Economic growth*

JEL Classification Codes: *E31, F31, E40, O40*

1. INTRODUCTION

Since the attainment of political independence in 1960, Nigerian economy has undergone fundamental structural changes resulting into policy shifts which have

however not resulted in desirable exchange rate stability and controlled inflation. This is partly because Nigerian economy is external sector driven and therefore susceptible to supply shocks causing high volatility in inflation, an unstable exchange rate and disturbing the consumption, investment and production behavior (Lama and Medina, 2012). Exchange rate stability is crucial for inflation management since inflation affect the economic growth of a nation, as a stable exchange rate is expected to reduce domestic inflation pressures through government fiscal policies (Mohanty and Bhanumurthy, 2014).

For an open economy like Nigeria, inflation generates both domestic and external pressures. The external pressures result from increase in the world prices of commodities occasioned by fluctuation in the real exchange rate. However, the influence of exchange rate on inflation is a function of the exchange rate regime in the country. In a system of flexible exchange rate as practiced in Nigeria, fluctuations in the real exchange rate have a major impact on output and prices through the aggregate demand and supply channels. The depreciation or devaluation of domestic currencies affects the price level and output directly through the importation of goods in which case the country is an international price taker. Indirect effect of depreciation or devaluation is transmitted through the price of capital goods imported by the manufacturers as inputs in the production process. Since the 1970s policy makers have been saddled with the responsibility of reducing and stabilizing the inflation rate (Akpokodje, 2009).

Exchange rate policies in Nigeria have undergone significant changes over the past four decades thereby attracting prominent attention in the literature. According to Inyiama and Ekwe, (2014), exchange rate policy emerged as one of the controversial policy instruments in developing countries in the 1980s with vehement opposition to devaluation for fear of its inflationary impact among other effects. To put in perspective, Nigeria's monetary authorities have adopted various exchange rate arrangements over the years. It shifted from a fixed regime in the 1960s to a pegged arrangement between the 1970s and the mid-1980s, and finally, to the various types of the floating regime since 1986 following the adoption of the Structural Adjustment Programme (SAP) (Dada and Oyeranti, 2012; Victor and Eze, 2013). The fixed exchange rate regime induced an overvaluation of the naira and was supported by exchange control regulations that engendered significant distortions in the economy that gave vent to massive importation of finished goods with the adverse consequences for domestic production, balance of payments position and the nation's external reserves level (Obadan, 2006).

However, inflation is persistent under various exchange rate arrangements in Nigeria (Central Bank of Nigeria, 2013), exchange rate has been volatile in the post SAP period due to its excessive exposure to external shocks. The effect of recent global

economic meltdown, Nigeria exchange rate was phenomena as naira exchange rate vis-à-vis the US dollar astronomically rose from about N156/1\$ to more than N305/1\$ about 96% increase between 2013 and 2016 (CBN, 2017). This has resulted to a sharp drop in foreign earnings for Nigeria ostensibly due to persistent fall in the international price of crude oil, which plunged from all time high of US\$87 per barrel in 2013 to as low as US\$40 per barrel in December 2016. In view of this, it is essential to quantify the effects of exchange rate and inflation on economic growth in Nigeria. The rest of the paper is organized as follows: section 2 reviews the relevant past works while section 3 houses the methodology adopted for the study. Section 4 presents the results of the analysis while section 5 concludes the study.

2. LITERATURE REVIEW

2.1 Conceptual Framework

2.1.1 Exchange Rate

Exchange rate is the rate at which one country's currency is exchanged for the currency of another country that is the price of one country's currency relative to other countries' currency (David, Umeh and Ameh, 2010). While Mankiw (1997) defines it as the price at which exchange of currency between two countries take place. However, determination of a realistic exchange rate is issue that has taken the centre stage of monetary and international economics. Odusola (2006) submits that a realistic exchange rate is one that reflects the strength of foreign exchange inflow and outflow, the stock of reserves as well as ensuring equilibrium in the balance of payments that is consistent with the cost and price levels of trading partners. Similarly, Ogunleye (2009) noted that the real exchange rate in Nigeria has been principally influenced by external shocks resulting from the vagaries of world price of agricultural commodities and oil prices.

2.1.2 Overview of Exchange Rate Policies

(i) Fixed or Pegged Exchange Rates

Prior to 1986, when the Structural Adjustment Programme (SAP) was adopted in Nigeria, exchange rates were administratively determined. The fixed exchange rate is a phenomenon which occurs when the rate of a currency against other currencies is fixed. Under the pegged exchanged rates, all exchange transactions take place at an exchange rate that is determined by the monetary authorities (Adetifa, 2005). This connotes that the exchange rate of a currency to other currencies is stable. This allows for an increase in reserve of the country if there is a favourable balance of trade. International trade is

encouraged because prices of goods are more predictable and long term capital flows in an orderly manner can be encouraged. The major flaw of fixed exchange rates is the overvaluation of the currency value.

(ii) Flexible or Fluctuating Exchange Rates

The introduction of SAP paved way for flexible exchange rates in Nigeria. This occurs when the currency of a country against other currencies of the world is not stable. The rates are market - driven and because the market is highly unpredictable, this may lead to economic instability, high risk, possibility of incurring loss on investment in foreign exchange. Under a regime of freely fluctuating exchange rates, if there is an excess supply of a currency, the value of that currency in foreign exchange market will fall and will lead to the depreciation of the affected currency. On the other hand, shortage of a currency will lead to the appreciation of exchange rate thereby leading to restoration of equilibrium in the exchange market. These market forces operate automatically without any actions on the part of monetary authorities (Adetifa, 2005).

2.1.3 Exchange Rate and Inflation Profile in Nigeria

Inflation in Nigeria entered double digits bracket in the early 2000 when it recorded 13% and 14% in 2005 and 2006 respectively after which it reverted to a single digit of 6% in 2007 (see Table 1). As a response to contractionary fiscal and monetary policies, it fell from 13.7 percent in 2009 to 8.0 percent in 2014 and later shrank to 10.6 percent in 2017 from 11.4 percent in 2016. In similar vein, exchange rates have been fluctuating in Nigeria over the years. In the years 2005, 2006, 2007, the exchange rate of naira to one US dollar were N132.14, N128.65, N125.83 respectively and begin to decline in the year 2008 to N118.56 to \$1. As a result of the collapse of the price of crude oil in the global market, there was a surge in the exchange rate in the years 2010, 2011, 2012, 2013 and 2014, during which the Naira was exchange at the rate of N150.29, N153.86, N157.49, N157.31, N158.55 to one US dollar respectively. It should be noted that exchange rates of Nigeria increased from N201.50/US\$1 to N305.50/ US\$1 as a result of the economic recession experienced by the country. However, this trend analysis indicates that there exist a linear relationship between inflation and exchange rates in Nigeria.

Table 1: Exchange Rate, Inflation and Economic Growth

| YEAR | RGDP | EXR N/US \$1 | INF % |
|------|------------|--------------|-------|
| 2005 | 561,931.39 | 132.14 | 13.1 |
| 2006 | 595,821.61 | 128.65 | 14.5 |
| 2007 | 634,251.14 | 125.83 | 6.00 |
| 2008 | 672,202.55 | 118.56 | 7.40 |
| 2009 | 718,977.33 | 148.88 | 13.7 |
| 2010 | 776,332.21 | 150.29 | 13.1 |
| 2011 | 834,000.83 | 153.86 | 12.3 |
| 2012 | 888,893.00 | 157.49 | 11.3 |
| 2013 | 883,075.34 | 157.31 | 12.4 |
| 2014 | 868,656.00 | 158.55 | 8.00 |
| 2015 | 880,208.25 | 201.50 | 10.2 |
| 2016 | 877,313.40 | 305.45 | 11.4 |
| 2017 | 875,392.33 | 305.50 | 10.6 |

Source: Authors' Compilation, (2019)

In addition, the gross domestic product in real terms increased from N561,931.39 billion in 2005 to N776,332.21 billion in 2010 representing a growth rate of 28 percent. In similar vein, the real gross domestic product (RGDP) oscillated between N834,000.83 billion in 2011 to N875,392.33 billion in 2017 connoting a growth rate of 47.3 percent. This is a clear reflection that at moderately high exchange and inflation rates, economic growth (proxied by RGDP) improves and performs better as domestic production and consumption are stimulated.

2.2 Empirical Review

On the growth effects of exchange rates and inflation, Carrera and Vuletin (2003) empirically estimate and test the relationship between exchange rate accommodation and the degree of inflation persistence using a non-linear autoregressive inflation equation for ten European countries for the period 1974:1-1998:2. In the estimation procedure they allow for the presence of an unknown number of shifts in the mean of inflation. Their results provide supportive evidence for the existence of a positive link between exchange rate accommodation and inflation persistence for most of the smaller and more dependent exchange rate mechanism (ERM) countries, even when mean level shifts in inflation are appropriately accounted for. For the larger countries and the countries that remained outside the ERM for most of the period they find hardly any evidence of such positive link. Overall, their results provide modest support for the existence of the theoretically hypothesized positive link between exchange rate accommodation and inflation persistence.

Benita and Lauterbach (2007) examined the daily volatility of exchange rate between the United States of America dollar and 43 other currencies in 1990-2001. This study used several macroeconomic variables to proxy for the domestic economy uncertainty, wealth and openness to international markets as controls in the analysis. The main findings of the study were that exchange rate volatility was positively correlated with real domestic interest rate and with the degree of the central bank intervention. In the panel, the study finds positive correlation between exchange rate volatility, real interest rates and the intensity of the central bank intervention.

Mame (2007) investigated the determinants of consumer price inflation in Mali between 1979 and 2006. The analysis made use of co-integration techniques within the framework of general-to-specific model. Average national rainfall, and to a lesser extent deviation from monetary and external sector equilibrium were found to be the main long-run determinants of inflation. Philip (2010) employed the Johansen co-integration technique to study the relationship between inflation and growth in Nigeria using annual data spanning from 1970 to 2005. The results of the study indicated that for the period of study, there was a negative co integration relationship between inflation and growth in Nigeria. The Engle and Granger Causality test was used to further check the causality relationship between the two variables. The study also established a uni- directional causality running from inflation to growth.

Odusanya and Atanda (2010) examined the dynamic and simultaneous inter-relationship between inflation and its determinants in Nigeria within the period 1970-2007. The Augmented Engle-Granger (AEG), co-integration test and error correction model were employed. The estimated result indicates substantial benefits accrued when moving from high or moderate rate to low level of inflation. Bakare (2011) examined the determinants of money supply growth and its implications on inflation in Nigeria. The study employed quasi-experimental research design approach for the data analysis. The design combined theoretical consideration (a priori criteria) with empirical observations and extracted maximum information from the available data. The estimated regression result revealed a positive relationship between money supply growth and inflation in Nigeria.

Agalega, and Antwi (2013) examined the impact of macroeconomic variables on GDP in Ghana covering from 1980-2010. Annual time series data were obtained from Bank of Ghana publications and Bulletins, Ghana Statistical Service, the Institute of Statistical, Social and Economic Research (ISSER). The study applied multiple linear regressions to prove that there existed a fairly significant positive correlation between GDP, interest rate and inflation. Inflation and interest rate could only achieve causation in GDP by mere 44 percent. The paper also proved that there existed positive relationship

between inflation and GDP, while interest rate was negative. It was suggested among others that government should develop and pursue prudent monetary policies that could target lowering and stabilizing macroeconomic indices in order to positively drive the economy.

Kasidi and Nwakanemela (2013) studied the impact of inflation on economic growth in Tanzania. Annual time-series data for the period 1990 - 2011 were employed. Correlation coefficient and co-integration technique established the relationship between inflation and GDP while the coefficient of elasticity was used to measure the degree of responsiveness of change in GDP to changes in general price levels. Findings indicated that inflation had a negative effect on economic growth. The study further established that there was no co-integration (absence of long-run relationship) between inflation and economic growth in Tanzania within the period studied.

Osuala, Osuala and Onyeike (2013) examined the impact of inflation on economic growth in Nigeria utilizing annualized time series data sourced from the Central Bank of Nigeria Statistical Bulletin covering the period 1970-2011. Preliminary tests for stationarity of the variables were ascertained using Augmented Dickey Fuller (ADF) and Philip-Perron (PP) techniques. Also, the Granger causality test was conducted to determine direction of causality between inflation and economic. The findings indicated a statistically significant positive link between inflation and economic growth. On the contrary, the scholars discovered that there was no prominent variable in the relation between inflation and economic growth. In that regard, the authors concluded that the impact was contemporaneous.

Umaru and Zubairu (2012) applying ADF and Granger causality techniques studied the effect of inflation on economic growth and development in Nigeria for the period 1970-2010. The ADF test determined the stationarity of the variables while Granger causality tested causal relationship between inflation and GDP (proxy for economic growth and development). Result of the study affirmed a uni-directional causal link between GDP and inflation rather than between inflation and GDP. This means that GDP influences inflation and not the other way round. The policy implication is that inflationary pressure can be put in check in an economy by boosting productivity so as to curb prices of goods and services. In other words lower inflation rate can solely be achieved by increasing productivity.

Bakare, Kareem and Oyelekan (2015) assessed the effects of inflation rate on economic growth in Nigeria using annualized time series data for the period 1986 – 2014. The secondary data were sourced from CBN Statistical Bulletin. The ADF econometric technique was used to determine the stationarity of the series, while Granger causality

test was employed to ascertain the causal direction of dependent and independent variables. The study found out that inflation rate related negatively and significantly with economic growth. Also, the finding test indicated that GDP granger caused inflation, and inflation did not granger cause GDP. Regarding policy implication of the result, it was recommended that productive activity should be intensified in the economy so as to reduce and stabilize prices of goods and services for the purpose of promoting economic growth.

Chughtai, Malik and Aftab (2015) investigated the impact of major economic variables like inflation rate, interest rate and exchange rate on economic growth of Pakistan. Secondary data spanning the period 1981-2013 were utilized for this study. Findings from multiple linear regression revealed that both inflation and interest rates related negatively with economic growth, whereas exchange rate had significant positive effect on the economy. Semuel and Nurina (2015) analyzed the effect of inflation, interest rates and exchange rates on GDP of Indonesia. There was a significant negative relationship of inflation and interest rates on GDP and a significant positive relationship of the exchange rates on the GDP, while inflation had a non-significant influence on GDP.

Agwu (2015) explored the factors that contribute to economic growth in Nigeria. For the purpose of realizing the research objectives, Vector Error Correction Mechanism (VECM) was applied in order to ascertain the short-run and long-run dynamics of economic growth. The long-run estimate indicated that government expenditure and oil revenue boosted economic growth, while interest rate and inflation rate had significant negative effects on economic growth. The study suggests stiffer measures to lessen incidences of corrupt practices in the economy. Hussain, Shabir and Kashif (2016) explored the impact of macroeconomic indicators such as inflation rate, exchange rate and interest rate on GDP of Pakistan covering a sample period of 32 years from 1980 to 2011. The study revealed that inflation rate and interest rate had a significant negative impact on GDP, while exchange rate related significantly and positively with GDP. Based on the results and analysis, it was recommended that the government should adopt tight monetary policy measures to control inflation.

To this end, it is quite obvious from the literature that the combined effect of inflation, interest and exchanges rates on economic growth particularly in developing economies has not been extensively dealt with in the literature. Hence, this paper intends to fill this gap.

3. METHODOLOGY

This section envelopes the theoretical underpinning as well as the model specification of the study.

3.1 Theoretical Framework

The theoretical framework of this study is hinged on the Quantity theory of money propounded by Fisher (1980) as sighted in Jhingan (2011). However, this framework is adapted from the study conducted by Okuneye (2018). The theory emphasized the transactions demand for money in terms of the velocity of money which, in turn, is determined by the level of full employment income. Thus, inflation will be directly proportional with the quantity of money stock. In the Fisher’s ‘Equation of Exchange’,

$$MV = PT \dots\dots\dots (1)$$

Where M is the money supply, V is the velocity of circulation; T is the total number of goods and services exchanged for money and P is the price level.
From equation 1,

$$P=MV/T \text{ or } V=PT/M \dots\dots\dots (2)$$

The proportional relationship between the money stock and general price level (inflation) can be shown in terms of the elasticity of the price level with respect to the money supply as;

$$\epsilon_{pm} = \partial P / \partial M \cdot M / P \dots\dots\dots (3)$$

Differentiating equation 1 totally;

$$M\partial V + V\partial M = P\partial T + Y\partial P = 0 \dots\dots\dots (4)$$

But T and V are constant at full employment, that is, change in T and V is zero at full employment. Thus, equation 4 can be written as:

$$V\partial M = Y\partial P \dots\dots\dots (5)$$

$$\partial P / \partial M = V / T \dots\dots\dots (6)$$

Substituting equation 6 into 3 gives:

$$\epsilon_{pm} = V/T.M/P \dots\dots\dots (7)$$

From equation 2, $V=PT/M$. Substituting this into equation 7 yields:

$$\epsilon_{pm} = 1/T.PT/M. M/P=1 \dots\dots\dots (8)$$

Equation (8) illustrates a direct proportional relationship between the general price level and the growth rate of money supply, when velocity and output are held constant. In this case, the coefficient of money is assumed to be unity. The implication of this is that a permanent increase in money growth leads to a proportional increase in the general price level which will in turn generate disequilibrium in the exchange rate of the domestic currency and by extension facilitate output growth in the economy.

3.2 Model Specification

In examining the relationship between exchange rate, inflation rate and economic growth, the study follows the works of Adeniran, Yusuf and Adeyemi (2014). The model specifies that economic growth (GDP) is significantly influenced by the Exchange Rate, Inflation rate and interest rate and is formulated as follows;

$$RGDP_i = f (EXR_i, INFr_i, INTr_i) \dots\dots\dots (9)$$

The explicit form of equation (9) could be modeled as:

$$RGDP_i = \beta_0 - \beta_1 EXR_i - \beta_2 INFr_i - \beta_3 INTr_i + U_i \dots\dots\dots (10)$$

Where:

$RGDP_i$ = Real gross domestic product

EXR_i = exchange rate of naira

$INTr_i$ = Interest rate

$INFr_i$ = Inflation rate

β_0 = constant

$\beta_1 \dots\dots\dots \beta_3$ = Coefficient of the explanatory variables

U_i = error term.

4. FINDINGS AND DISCUSSIONS

The result of the empirical analysis are presented and discussed in this section. In specific terms, the descriptive analysis, unit root test, co-integration test as well as causality tests are enveloped in this section.

4.1 Descriptive Analysis

Table 2: Descriptive Statistics

| | EXR | INFR | INTR | LOG_RGDP |
|--------------|----------|----------|----------|----------|
| Mean | 110.7575 | 18.50714 | 18.67857 | 13.18201 |
| Median | 123.4000 | 12.55000 | 12.10000 | 13.14419 |
| Maximum | 305.5000 | 72.90000 | 72.80000 | 13.69773 |
| Minimum | 8.030000 | 6.000000 | 5.400000 | 12.70261 |
| Std. Dev. | 80.47050 | 17.43876 | 17.36688 | 0.378760 |
| Skewness | 0.645541 | 2.001056 | 1.994213 | 0.167022 |
| Kurtosis | 3.326431 | 5.741030 | 5.725798 | 1.433488 |
| Jarque-Bera | 2.069023 | 27.45183 | 27.22710 | 2.993137 |
| Probability | 0.355400 | 0.000001 | 0.000001 | 0.223897 |
| Sum | 3101.210 | 518.2000 | 523.0000 | 369.0962 |
| Sum Sq. Dev. | 174838.5 | 8210.979 | 8143.427 | 3.873400 |
| Observations | 28 | 28 | 28 | 28 |

Source: Authors' Computation (2019)

The descriptive analysis in Table 2 above showed that the means and the median values of interest rate, inflation rate, exchange rate and the growth rate of real gdp fall within their minimum and maximum values. With the exception of exchange rate, the values of the standard deviation show that inflation rates, rgdp and interest rates cluster around their mean values. The values of Jarque-Bera statistics for inflation rates and interest rates are statistically significant at 1% respectively which implies that the variables are normally distributed around the mean values. However, the moment coefficients of kurtosis indicate that while exchange rates, interest rates and inflation rates are leptokurtic, log_rgdp is platykurtic. The value of skewness which measures the degree of asymmetry indicates that the series are positively skewed.

4.2 Unit root Test

Table 3: Augmented Dickey Fuller (ADF) test results

| Variables | Level | Critical Value @ 5% | First Difference | Critical Value @ 5% | Order of Integration |
|-----------------|-----------|---------------------|------------------|---------------------|----------------------|
| LOG_RGDP | -0.073109 | -2.976263 | -3.192575 | -2.981038 | I(1) |
| INT | -1.931712 | -2.976263 | -4.185108 | -2.981038 | I(1) |
| INF | -1.940346 | -2.976263 | -4.220334 | -2.981038 | I(1) |
| EXR | 0.682587 | -2.976263 | -4.301195 | -2.981038 | I(1) |

Source: Authors' Computation (2019)

The unit root properties of the variables presented in Table 3 were conducted using Augmented Dickey Fuller (ADF) test and the results from this test showed that

none of the variables was stationary at level. However, all the variables were stationary at first difference meaning that all the variables are integrated at order one. The implication of this is that all the variables are I(1) series. This, therefore, calls for investigation into long-run co-movement among the variables using co-integration estimation technique. In this case, Johansen Co-integration technique is equally employed so as to determine the number of co-integrating equations.

4.3 Co-integration Test

Table 4: Johansen Co-integration Result

| Hypothesized | Trace | 0.05 | | Max-Eigen | 0.05 | |
|--------------|-------------------------------------------------------------------------|----------------|--------|-----------|----------------|--------|
| No. of CE(s) | Statistic | Critical Value | Prob. | Statistic | Critical Value | Prob. |
| $r \leq 0^*$ | 78.42569 | 55.24578 | 0.0001 | 36.91823 | 30.81507 | 0.0080 |
| $r \leq 1^*$ | 41.50746 | 35.01090 | 0.0089 | 28.78818 | 24.25202 | 0.0117 |
| $r \leq 2$ | 12.71928 | 18.39771 | 0.2589 | 8.632421 | 17.14769 | 0.5343 |
| $r \leq 3^*$ | 4.086855 | 3.841466 | 0.0432 | 4.086855 | 3.841466 | 0.0432 |
| | Trace test indicates 2 co-integrating eqn(s) at the 0.05 level | | | | | |
| | Max-eigenvalue test indicates 2 co-integrating eqn(s) at the 0.05 level | | | | | |
| | * denotes rejection of the hypothesis at the 0.05 level | | | | | |
| | **MacKinnon-Haug-Michelis (1999) p-values | | | | | |

Source: Authors’ Computation (2019)

The results of the Johansen co-integration test depicted in Table 4 show that there is long-run co-movement among the variables. This was evidenced from the Trace statistic and Max-Eigen statistic which showed that the Johansen co-integration had two co-integrating equations emanated from each statistic. Thus, this result showed there was a convergence relationship among the variables in the long-run. The result is however at variance with the works of Kasidi and Nwakanemela (2013).

4.4 Causality Test

Table 4: Pairwise Granger Causality Tests (Lags: 4)

| Null Hypothesis: | Obs | F-Statistic | Prob. |
|----------------------------------|-----|-------------|--------|
| INTR does not Granger Cause EXR | 24 | 1.03826 | 0.4200 |
| EXR does not Granger Cause INTR | | 1.55580 | 0.2369 |
| INFR does not Granger Cause EXR | 24 | 0.84560 | 0.5179 |
| EXR does not Granger Cause INFR | | 2.12722 | 0.1277 |
| RGDP does not Granger Cause EXR | 24 | 3.23061 | 0.0423 |
| EXR does not Granger Cause RGDP | | 1.15947 | 0.3674 |
| INFR does not Granger Cause INTR | 24 | 0.15404 | 0.9582 |
| INTR does not Granger Cause INFR | | 0.12604 | 0.9707 |
| RGDP does not Granger Cause INTR | 24 | 0.61649 | 0.6575 |
| INTR does not Granger Cause RGDP | | 0.60212 | 0.6670 |
| RGDP does not Granger Cause INFR | 24 | 0.67203 | 0.0215 |
| INFR does not Granger Cause RGDP | | 0.56603 | 0.6911 |

Table 4 shows the results of granger causality test between interest rates, inflation rates, exchange rates and real gdp in Nigeria lagging the variables by 4. The result revealed that there exists a uni-directional causality between rgdp and exchange rates in Nigeria which runs from exchange rate to real gdp at 5% level of significance.. Similarly, there is a uni-directional causality between inflation rates and rgdp in Nigeria running from inflation to real gdp. However, interest rate does not granger cause economic growth in Nigeria. The implication of this is that interest rate in Nigeria is growth-repressive. Apart from the fact that it is relatively high, interest rates in Nigeria is not market-driven since it is institutionally fixed by the monetary authority. This result is in consonance with the work of Philip (2010) and Osuala, Osuala and Onyeike (2013) which affirmed a uni-directional relationship between inflation rates, exchange rates and economic growth in Nigeria.

5. CONCLUSION AND RECOMMENDATIONS

The study investigated the relationship between exchange rate, inflation and economic growth in Nigeria between 1990 and 2017. The empirical econometric model employed for analyzing the relationship between exchange rates, inflation rates and economic growth was adapted from Adeniran, *et al.* (2014). As noted earlier, the results of the analysis revealed that there is a long run relationship between interest rates, exchange rates, inflation rates and economic growth in Nigeria. By implication, the results of findings have demonstrated the effectiveness of monetary policy at stimulating

desirable economic growth in Nigeria. In terms of causal link among the variables, the result of granger causality indicates there is a uni-directional causal relationship between inflation rates, exchange rates and economic growth in Nigeria.

Based on the empirical findings of the study, the following recommendations are suggested for effective policy intervention:

- There is absolute need for the interest rate to be market-driven as this will attract foreign investment and flows capable of stimulating economic growth in the long run.
- Inflation-targeting policies should be re-invigorated with a view to maintaining single-digit inflation rates.
- There is urgent need for the policy makers to review downward the high interest rate so that domestic and foreign investment can be stimulated.
- A mix of monetary policy intervention is needed to mitigate incessant fluctuations in the exchange rates, interest rates and inflation rates in order to drive realistic and sustainable economic growth in Nigeria.

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