Inflation and Economic Growth in Nigeria

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Abstract :-**The study examined " inflation and economic growth in Nigeria". Time series data from 1981-2017 was used. The study used real gross domestic product as dependent variable while interest rate (INT), inflation rate (INF), consumer price index(CPI), foreign exchange rate(EXCH) were used as independent variables. Unit root test was carried out using augmented dickey fuller and the result indicated that all the vairables were stationary at first difference. Thus, the vector Error correction method (VECM) was employed for this research to find the relationship between inflation and economic growth in Nigeria. The study observed that there was a negative relationship between interest rate and real gross domestic product, exchange rate has a negative relationship with real gross domestic product and finally, consumer price index has a positive relationship with real gross domestic product. The study therefore suggested that government should encourage the export promotion strategies in order to maintain a surplus balance of trade and also conducive enviornment, adequate security, effective fiscal and monetary, as well as infrastructural faclities should be provieded so that foreign investors will be attracted to invest in Nigeria.**

Keywords:**Consumer price index,exchange rate, economic growth, Inflation rate, Real domestic product.**

I. INTRODUCTION

It is generally believed that price stability promote long-term economic growth, whereas high inflation is inimical to growth**.** Over the past few decades, the rate of inflation has been over two digits, and this rate is believed to be on a high side. When there is persistent rise in general price level, the currency losses purchasing power. When this happens, it hampers perception of foreign investors as they would shy away from investment opportunities in a country as this.

This term, Inflation as it is widely known is a general increase in prices and fall in the purchasing value of money. There are two parts to this definition. One affects the other simultaneously, and together they become a cause effect relationship. As fuel pump rises in a country or state, this affects a wide range of products and services in the economy. This in turn causes the average worker or employee to spend the same amount of money on little product or service compared to yesterday. So, to ensure the economy comes back to its optimal point of operation, the government tends to reduce inflation through a major monetary policy called the contractionary monetary policy. The principal benefit of low inflation is improved certainty and hence, the ability to plan. Meanwhile, the fact that increasing price level leads to; a fall in the standard of living, unpredictability of government policy actions and of macroeconomic relationships is no more an issue of dispute (Maku & Adelowokan, 2013)

In ensuring inflation is reduced drastically through these policies, one macroeconomic term is affected, the national output or as economists would call it, the Gross Domestic Product (GDP) which is the standard indicator for measuring the economic performance of a nation.

According to Hossain,Gosh and Islam (2012) high inflation is bad for an economy because of its adverse effect on economic performance, zero inflation is equally harmful because it will lead to eventual stagnation of the economy since its presence at a mild level is needed for economic growth. The problem of inflation is not confined to national boundaries neither is it restricted to emerging market economies of the world; it is also an over-arching challenge in the developed market economies, and since it is by no means a new challenge or phenomenon, over the years, its control has become the unquestioned slogan of economic policymakers worldwide. Nigeria as a nation is by no means immune to the danger of inflation. Hence, after an appreciable economic performance in the early 1970s, the Nigerianeconomy witnessed some anxious moments in the late 1970s to mid-1980s. Severe pressures built up in the economy mainly because of the expansionary fiscal policy of the federal government during these years. This was accompanied by high monetary expansion as the huge government deficit was financed largely by the Central Bank of Nigeria. This was made worse by the transfer of government sector deposits to the banks and the resultant increase in their free reserves with adverse consequences on the general price level. The inflationary pressure was further aggravated by high demand for imports of both intermediate inputs and consumer goods due to over valuation of the naira which made imports relatively cheaper than locally manufactured goods.

There exist several views and several schools of thoughts with backing empirical evidence emanating from cross country and country specific studies on the relationship between inflation and economic growth. Nevertheless, most of them seem to agree that inflation on its own is not healthy for every economy and must therefore be diligently fought against**.**The link between inflation and economic growth usually measured by output growth over time cannot equally be disputed; inflation leads to a depreciation in the value of the currency such that the same bundle of goods and services consumed today cannot therefore be consumed tomorrow, hence a decrease in consumption capacity and consequently output. Yet, empirical evidence vary on whether it affects economic growth positively/negatively and significantly or

not, as it differs with countries studied, periods considered and methodologies used.

Theories and previous studies about the relationship between inflation and economic growth have shown that there might be no relationship Sidrauski(1967), negative relationship (Barro, 2013)or positive relationship Mallik & Chowdhury (2001)between these two variables. Structuralists believe that inflation is essential for economic growth, whereas the monetarists see inflation as detrimental to economic progress.

Recently, intensive research has focused on the non-linear relationship between these two variables. That is, at lower rates of inflation, the relationship is positive or not significant, but at higher rate, inflation has a significantly negative effect on growth. In terms of non-linearity, inflation growth in Nigeria have changeddramatically over the past ten years. From 1960-1969, 1970-1979, 1980-1989, 1990-1998 and 1999-2009, the inflation rate was only 2.6% per year in the 1960s and rose rapidly to 9.2% per year in the 1970s and then 10.3% per year in the 1980s. In addition, from 1990-1998 the average inflation rate was the 33.31% and from 1999-2009 the average inflation rate was 13.8. Between 2010 and 2018, it had an average rate of 11.63%. (Femi & Emmanuel, 2015)

From the above picture, it is evident that the rate of inflation has been on a rising trend, and this has had an ill effect on other macro-economic variables like GDP, Employment Rate, Exchange Rate, Interest Rates. It is against this background that this study is initiated. In other words, this study is an investigation on the impact Inflation has on economic growth in Nigeria.

As observed by Iyoha (2012), the use of Monetary policies to ensure inflation rate is low had always resulted in what he described as"overshooting" and the phenomenon of policy-induced cyclical fluctuations in the gross national product(GNP). Besides, it had been found that the goal soffull employment and stable prices are largely incompatible.

II. LITERATURE REVIEW AND EMPIRICAL STUDIES

A research study carried out by Gillman and Harris (2010) examined the effect of Inflation on Growth - Evidence from a Panel of Transition Countries. They focused on 13 transition countries over the 1990-2003 period; they used a fixed effects panel approach to account for possible bias from correlations among the unobserved effects and the observed country heterogeneity. The econometric results found a strong, robust, negative effect on growth of inflation or its standard deviation, and one that appears to decline in magnitude as the inflation rate increases, as seen for OECD countries.

Another study conducted by Behera and Mishra (2016) used the Augmented Dickey Fuller (ADF) test and the Phillips Perron (PP) Unit Root Tests to check the stationarity of each of the series on the panel data. Johansson's integration test, the ARDL bound test, and Granger causality test were also employed to test the extent to which Inflation affects economic growth. Their results indicate that a long run positive relationship between inflation and economic growth only for China and South Africa at the 5 percent level of significance. The study also found that there is a unidirectional causality between economic growth and inflation in the context of India whereas; bidirectional causality takes place in the case of China

Barro (2013) in his study adopted different panel data methodologies; Fixed Effects (FE), Difference Generalized Method of Moments (DIF-GMM), System Generalized Method of Moments (SYSGMM), and Seemingly Unrelated Regression (SUR) estimators were used in order to examine the relationship between inflation and economic growth in the region.

Panel Smooth Transition Regression (PSTR) methodology were also utilized to examine the nonlinearities in the inflation-growth nexus. Results from his study indicated that inflation and economic growth in the region are negatively related, as is also the case in other regions of the world as depicted by the empirical literature (Fisher, 1993 and De Gregorio, 1993). The empirical results also revealed that shocks to South African inflation have significant economic impact on inflation, openness, investment and economic growth in the rest of the SADC region.

A research study conducted by Umaru and Zubairu(2012) adopted econometric models such as Augmented Dickey-Fuller, and Granger Causality to examine the relationship between Inflation and economic growth. Their study found out that that inflation possessed a positive impact on economic growth through encouraging productivity and output level and on evolution of total factor productivity. A good performance of an economy in terms of per capita growth may therefore be attributed to the rate of inflation in the country.

In line with the study conducted by Umaru and Abdulrahman (2012), another study carried out by Osuala, Osuala and Onyeike (2013) utilised Ordinary Least Square (OLS) estimation technique in obtaining the numerical estimates of the coefficients in the model. The study employed two econometric models to achieve the empirical results. The first econometric model examines the short-run and long-run relationship between real GDP and Inflation rate by applying the Johansen (1998) co-integration test and the associated Error Correction Model (ECM) and the second was the application of the Granger causality test to determine the direction of causality between the two variables. The empirical result showed that there exists a statistically significant positive relationship between inflation and economic growth in Nigeria. However, there is no leading variable in the relation between inflation and economic growth in Nigeria. And hence we conclude that the effect is contemporaneous. And since there exist a positive relationship between inflation and economic growth in Nigeria, the "bad

era of double digit inflation rate" could be effectively utilized by the Nigeria government to erode the country's debt burden.

In concrete agreement to the studies above, Olu and Idih (2015) in a study reveal that inflation rate in line with apriority expectations had a positive relationship but non-significant with the economic growth rate. This suggested that as the GDP raises inflation also rises, suggesting that there has been no effectiveness in the monetary policies aimed at tackling or controlling inflation rate in Nigeria.

Doguwa (2012), though having a little different finding, adopted the Generalized Autoregressive Conditional Heteroscedasticity (GARCH) methodology, the ARCH Residual LM test and the Jacques–Bera normality test. Results of the estimated model analysed shows that the threshold level of inflation above which inflation is inimical to growth is estimated at 10.5 to 12 per cent for Nigeria. Using the estimated two threshold point model, this paper did not find enough reasons to accept the null hypothesis of the super-neutrality of money, and therefore, suggest that there is a threshold level of inflation above which money is not super-neutral.

Idris, Bakar and Ahmad (2017), in their study utilized a descriptive method and further utilized charts to show the inflationary trend and GDP growth. Their study revealed that the current inflationary trend in Nigeria is negatively affecting the realisation of sustainable growth and development.

Shuaib, Augustine and Frank (2015) also in their study utilised secondary data for the period of 1960 to 2012 and used E-view 7.2 statistical window in processing and analyzing the time series data. The empirical result of the study showed that for the periods, 1960-2012, there was no co-integrating relationship between Inflation and economic growth for Nigeria data.

Kenneth, Yuni and Okezie (2016) in a contradicting approach, in their study adopted a two stage least square estimation to examine a simultaneous equation model. The study used the three appropriate means of estimating over-identified simultaneous equations (2SLS, GMM and LIML) to estimate the effect of inflation on GDP. Having estimated the equations, their study found out that inflation is beneficial to growth though not significantly while growth is significantly beneficial to inflation; given the positive relationship between inflation and growth and the negative relationship between growth and inflation.

In concordance to the above study, Okafor, Onwumere and Chijindu (2017), utilised the autoregressive distributed lagged (ARDL) model in estimating the implication of price disturbances on national output. The long-run association between the two variables was estimated using the Bound Testing for cointegration, while the vector autoregressive (VAR) causality was adopted in determining the forecasting powers of inflation on national output and vice-versa. Findings from their study revealed that inflation and official exchange rate have non-significant positive impact on Nigeria's output level between 1960 and 2014

Kasidi and Mwakanemela (2013) in their study utilized Correlation coefficient and co-integration technique to establish the relationship between inflation and GDP. Coefficient of elasticity was applied to measure the degree of responsiveness of change in GDP to changes in general price levels. From their study, Results suggested that inflation had a negative impact on economic growth. The study also revealed that there was no co-integration between inflation and economic growth during the period of study. No long-run relationship between inflation and economic growth in Tanzania.

In line with the above review, another study carried out byMadurapperuma (2016) on "Impact of Inflation on Economic Growth in Sri Lanka", adopted the framework of Johansen cointegration test and Error Correction model, and found out that there is a long run negative and significant relationship between economic growth and inflation in Sri Lanka.

In parity of the prior investigation aboveMunyeka (2014), adopted the quantitative study design to be able to determine the relationship between economic growth and inflation, and found out that the existence of a negative relationship between these two macroeconomic variables in the South Africa economy was evident.

In contrast to the above, Majumder, (2016) in his study, employed the Granger causality and then error correction model to investigate the relationship between economic growth and inflation in Bangladesh during the period of 1975 –2013. His study found out that Bangladesh has indicated a statistically significant long run positive relationship between the rate of inflation and economic growth.

III. METHODOLOGY

This research model was underpinned by the Mudell" s Model of Inflation and Growth developed by Stockman (1981), which expresses the significance, that an increase in the inflation rate results in a lower steady state level of output and people's welfare declines accounting for a negative relationship between the steady-state level of output and the inflation rate, and therefore promotes a negative relationship to economic growth.

However, it adapted the econometric model of Kenneth, Yuni, and Okezie, (2016) on "Inflation and Growth Nexus in Nigeria: An Investigation into the Simultaneous Relationship". The research work eliminated the government expenditure (gex), gross fixed capital formation (inv), money supply (MS) and trade openness (TO) proxy. It however, included the Interest rate, Exchange rate and Consumer Price Index proxy, which was not previously, used in several Inflation research works.

The model for this research work will be specified below as:

RGDP = f (INF, INTR, EXCH.R, CPI) (1)

The model can be written explicitly as:

$RGDP = \alpha_0 + \beta_1 INF.R + \beta_2 INTR + \beta_3 EXCH.R + \beta_4 CPI + \mu_t$ (2)

Where,

RGDP= Real Gross Domestic Product

INF.R= Inflation Rate

INTR= Interest Rate

EXCH.R= Exchange rate

CPI= Consumer Price Index

$\alpha_0$is the intercept and *t* are the time series. $\beta_1$to β_4 are the parameters to be estimated

ϵ_t = Error term which denotes other variables that are not specified in the model

β_1, β_2, β_3, β_4 = Slope of the equation

The Real GDP is preferred as a measure of economic growth in this paper because, it reduces distortions due to economic factors such as inflation and currency rate fluctuations as the current case may be now, and it has a greater accuracy in expressing national economic performance than GDP or Nominal GDP.

A Priori Expectation:

The *apriori* clarification is drawn from the economic theory. Each of the model parameter estimates is expected to have its own sign as it shows the effect of the independent variables on the dependent variables.

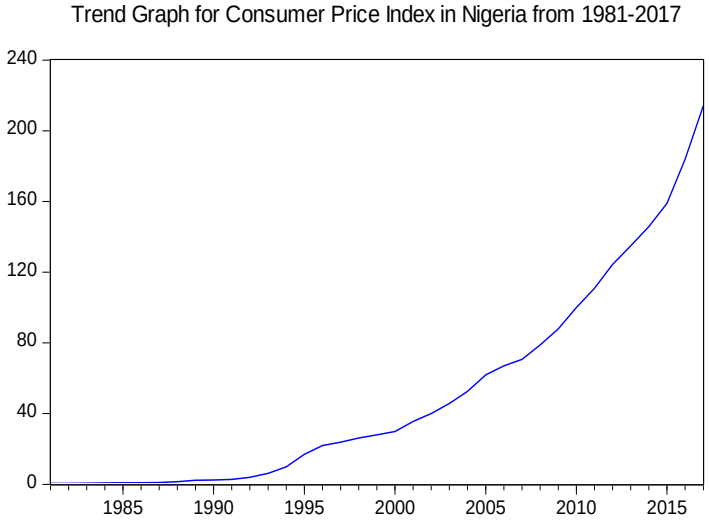
Table 3.1 *Apriori* Expectations

VARIABLES	EXPECTED SIGNS
Real GDP	This is the dependent variable and it shows a random behavior because of its stochastic nature.
Inflation Rate	This is an independent variable that is meant to have a negative relationship with the dependent variables. That is, $\beta_1 < 0$
Interest Rate	This is an independent variable that is meant to have a negative relationship with the dependent variables. That is, $\beta_2 < 0$
Exchange Rate	This is also an independent variable that is meant to have a positive relationship with the dependent variables. That is, $\beta_3 > 0$
Consumer Price Index	This is also an independent variable that is meant to have a negative relationship with the dependent variables. That is, $\beta_4 < 0$

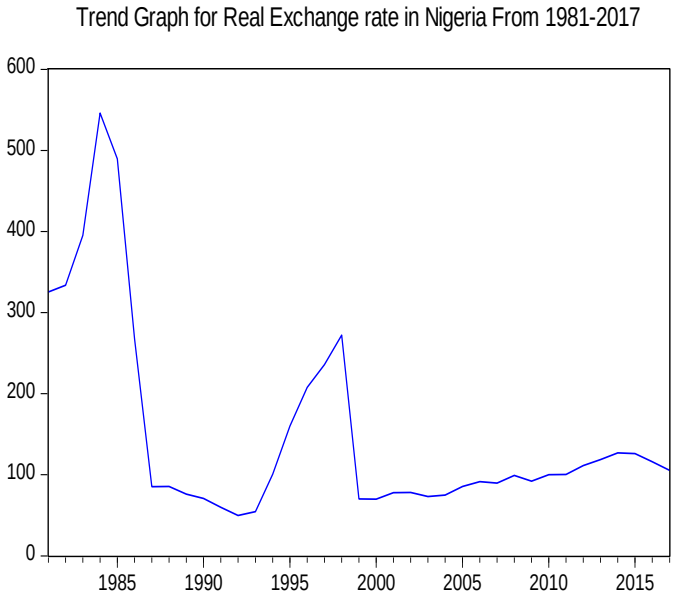
Source: Author's computation (2018)

IV. TREND ANALYSIS, RESULT PRESENTATION AND INTERPRETATION

Trend Analysis

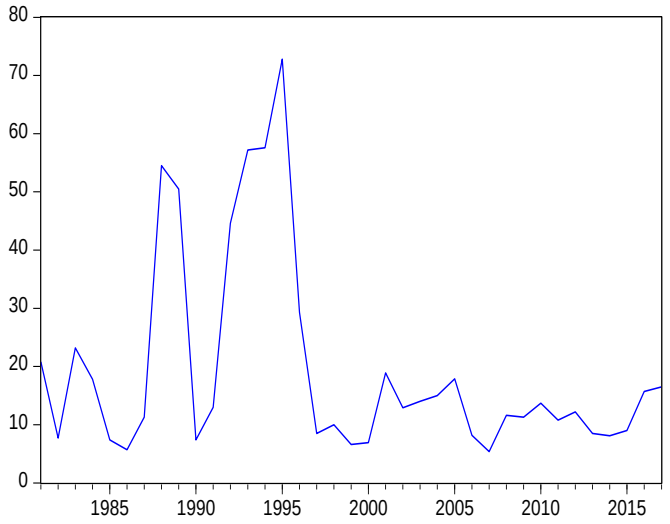


The graph above depicts the trend or the movement of consumer price index in Nigeria from 1981-2017. It is showed in the graph that CPI value from 1981-1989 was too low that almost not seen in the graph. However, from 1990-2017, consumer price index experience drastic increase



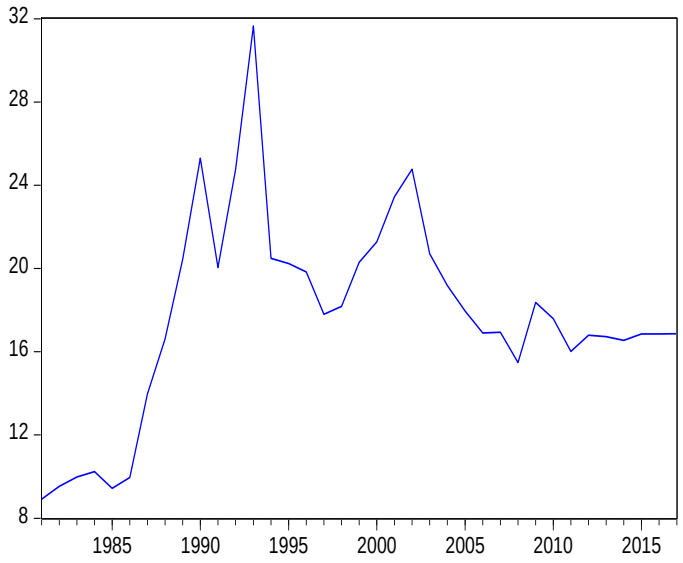
The graph above depicts the trend for real exchange rate. From the graph, it is observed that real exchange rate has been on the increasing side from 1981 – 1986. However, there was a drastic fall in real exchange rate in 1987 – 1992. The graph experienced another increase in 1993 and fell again in 1999. Finally real exchange rate was stable from 2000 – 2017 as depicted in the graph.

Trend Graph for Inflation Rate in Nigeria from 1981-2017



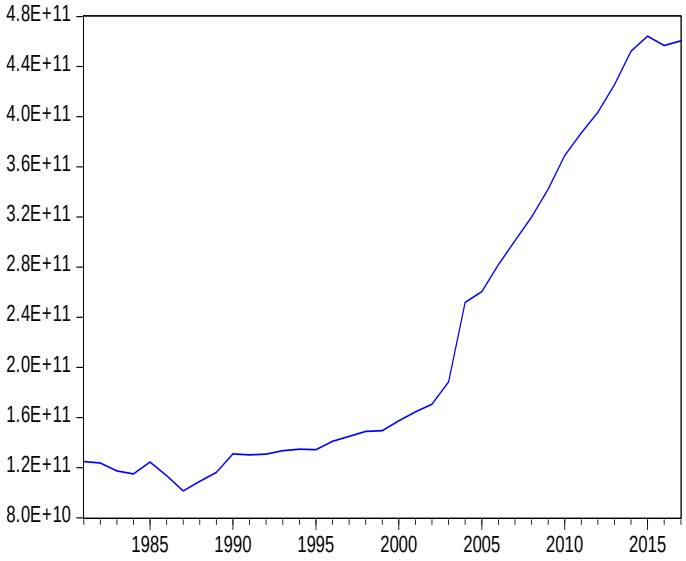
There is no consistent trend in inflation rate from the graph above as the graph is typically characterized by years of increment followed by years of decline in financial deepening such that it almost constitutes a cycle in the trend. For example, the years 1987-1995 were years of highest inflation rate which were immediately followed by declining years from 1997-2015. However, from the year 2015, inflation rate showed increase

Trend Graph for Interest Rate in Nigeria from 1981-2017



Nigeria interest rate was as low as 8.9% in 1981. After 1981, interest rate gradually started increasing to 31.65 % in 1993. Thus from the graph it can be seen and believe that interest rate which is one of the key macroeconomic variables the greatly influence investment performance in the country has not been stable

Trend Graph for Real Gross Domestic Product in Nigeria from 1981-2017



The graph shows continuous increase only in the trend of real GDP from the year 1981 to 2015 with the slightest decrease only occurring in the years 2016 and 2017

Descriptive Statistics

Tabular representation of descriptive statistics

	CPI	EXCH	IN_F	INTR	LNRGDP
Mean	51.19308	151.9866	19.52730	17.75403	10.24503
Median	27.93258	100.0000	12.90000	17.58500	10.01902
Maximum	214.2321	546.0390	72.80000	31.65000	11.14221
Minimum	0.493799	49.74400	5.400000	8.917000	9.530920
Std. Dev.	58.70718	123.5457	17.49022	4.901584	0.548966
Skewness	1.168086	1.796420	1.698837	0.210837	0.393016
Kurtosis	3.398384	5.361333	4.666127	3.615940	1.696231
Jarque-Bera	8.658635	28.49678	22.07693	0.859002	3.573062
Probability	0.013177	0.000001	0.000016	0.650834	0.167540
Sum	1894.144	5623.506	722.5100	656.8990	379.0661
Sum Sq. Dev.	124075.2	549487.1	11012.68	864.9188	10.84908

Source: Researcher's computation via e-view 9.0 (2019)

Descriptive statistics result shows that, the mean value for consumer price index, exchange rate, inflation rate, interest rate and real gross domestic product are 51.19%, 151.98 naira/dollar, 19.52%, ₦17.75% and ₦10.24 billion. The

maximum value for consumer price index is 214.23 and a minimum of 0.493, the maximum value for exchange rate is 546.03 while the minimum value was 49.744; inflation rate has the maximum and minimum values as 72.8% and 5.4%; the maximum value for interest rate is 31.65% and a minimum of 8.91%. Finally, the maximum value for real gross domestic product is ₦11.14 billion and the minimum was ₦9.53. There is a large difference between the values of the series and this signifies that there is a significant variation in the trends of the variable over the period under consideration. Skewness result shows that all the variables are positively skewed. The Jacque-Bera statistics is a goodness of fit to check whether the sample data have the skewness and kurtosis matching a normal distribution. The result shows that there is normality in all the variables except interest rate because all the variables are greater than the standard threshold of 2

Tabular Representation of Vector Correction Model for Long Run Parameters

Variables	Coefficients	Standard Error	T-Statistics
LNRGDP	1.000		
INTR	-0.104	0.022	4.743
INF	-0.021	0.005	4.254
EXCH	-0.007	0.001	7.066
CPI	-0.002	0.003	0.625
C	13.84		

Source: Authors Computation Using E-Views 9(2019)

$R^2 = 0.525806$

Adjusted $R^2 = 0.488709$

F-statistics = 2.21

Regression Equation: LNGGDP = 13.84 – 0.104INTR – 0.021INF – 0.007EXCH - 0.002CPI

The regression equation shows that there is a negative relationship between interest rate and real gross domestic product. It further denotes that a unit increase in interest rate will lead to 10.4% decrease in real gross domestic product. Furthermore, there is negative relationship between inflation rate and real gross domestic product and thus a unit increase in inflation rate will lead to a 2% decrease in real gross domestic product. Exchange rate has negative relationship with real gross domestic product and thus a unit increase in exchange rate will decrease real gross domestic product by 0.7% and finally, consumer price index has a negative relationship with real gross domestic product and thus a unit increase in consumer price index will decrease real gross domestic product by 0.02%

Model Evaluation

T-Statistics: Thiswill be used to find out the statistical significant of each of the explanatory variables on the dependent variable. It should be noted that in this study, the explanatory variables are INTR, INF, EXCH, and CPI while the dependent variable is LNRGDP.

Variables	T-statistics		T-tabulated	Decision Rule	
	Short run	Long run		Short run	Long run
INTR	-2.364	-4.743	2.04	Significant	Significant
INF	-0.507	-4.254	2.04	Insignificant	Significant
EXCH	-2.082	-7.066	2.04	Significant	Significant
CPI	0.726	0.625	2.04	Insignificant	Insignificant

Source: Authors Computation Using E-Views 9 (2019)

The result above denotes interest rate and exchange rate have a significant relationship with real gross domestic product both in the long and short run. Inflation rate, only has a significant relationship with real gross domestic product in the long run while consumer price index do not have any significant relationship both in the short and long run.

Coefficient of Determination (AdjustedR^2)**:** The value for AdjustedR^2 from the regression result is 0.4887. This value implies that 48.87% variations in economic growth is a function of inflation rate.

VI. SUMMARY, CONCLUSION AND POLICY RECOMMENDATION(S)

5.1 Summary of Findings

The overall objective of this study is to find out the impact of inflation rate on economic growth in Nigeria. The variables used are inflation rate (EXCH), inflation rate(INF), consumer price index (CPI), interest rate (INTR) and real gross domestic product(LNRGDP). It is observed that the mean value for consumer price index, exchange rate, inflation rate, interest rate and real gross domestic product are 51.19%, 151.98 naira/dollar, 19.52%, ₦17.75% and ₦10.24 billion. The maximum value for consumer price index is 214.23 and a minimum of 0.493, the maximum value for exchange rate is 546.03 while the minimum value was 49.744; inflation rate has the maximum and minimum values as 72.8% and 5.4%; the maximum value for interest rate is 31.65% and a minimum of₦8.91% finally, the maximum value for real gross domestic product is ₦11.14 billion and the minimum was ₦9. 53.. Optimal Lag length for the analysis was lag 2 and also Johansen co-integration test showed co-integration equation among the variables.

Result from Vector Error Correction model shows that there is a negative relationship between interest rate and real gross domestic product. It further denotes that a unit increase in interest rate will lead to 10.4% decrease in real gross domestic product. Furthermore, there is negative relationship between inflation rate and real gross domestic product and thus a unit increase in inflation rate will lead to a 2% decrease in real gross domestic product. Exchange rate has negative relationship with real gross domestic product and thus a unit

increase in exchange rate will decrease real gross domestic product by 0.7% and finally, consumer price index has a negative relationship with real gross domestic product and thus a unit increase in consumer price index will decrease real gross domestic product by 0.02%. Test of significant indicated that interest rate and exchange rate have a significant relationship with real gross domestic product both in the long and short run. Inflation rate, only has a significant relationship with real gross domestic product in the long run while consumer price index do not have any significant relationship both in the short and long run.

5.2 Conclusion

The study was able to establish a relationship between inflation rate and economic growth in Nigeria both in the long run and short run. It was observed that there is a significant negative relationship between inflation rate and economic growth in Nigeria.

5.3 Policy Recommendations

Based on the findings we made the following recommendations:

There should be fiscal discipline in such a manner that expenditures of the government should yield desired results and not just about making too much money flow without it being channeled to productive purposes. In doing this, efforts should be made by the relevant agencies of the government to fight leakages, embezzlement and diversion of funds as all these lead to inflation.

Government should encourage the export promotion strategies in order to maintain a surplus balance of trade and also conducive environment, adequate security, effective fiscal and monetary, as well as infrastructural facilities should be provided so that foreign investors will be attracted to invest in Nigeria as the study indicated negative relationship between exchange rate and real gross domestic product

Exchange rate management is necessary but not adequate to revive the Nigerian economy. A broad program of economic reform is required to complement the exchange rate policy adopted as both inflation and exchange rate work simultaneously.

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