

INFLATION, UNEMPLOYMENT AND ECONOMIC GROWTH IN NIGERIA (1980-2019)

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Abstract

A country's macroeconomic performance can be judged by three broad variables: inflation rate, unemployment rate and economic growth rate. This study examined impact of inflation and unemployment on economic growth in Nigeria for the period of 1980 to 2019. Secondary data obtained from Central Bank of Nigeria and World Bank was used. Augmented Dickey- Fuller and Phillips Perron were used to test stationarity of the data, while Autoregressive Distributive Lag Bound was used to investigate long run relationship among inflation, unemployment and economic growth. Long run and short run impact of inflation and unemployment on economic growth were examined using Autoregressive Distributive Lag Long Run Coefficient and Error Correction Model respectively. In addition, Granger Causality was used to determine the direction of causality of the variables. Results of the study showed that all the variables were stationary at first difference, while co integration test results revealed that variables had long run relationship. The results showed that inflation has positive and insignificant impact on Nigeria economic growth ($\beta=0.1864$, $P>0.05$), while unemployment has negative and insignificant impact on Nigeria economic growth ($\beta=-0.0769$, $P>0.05$). The Granger causality results reported that inflation cause economic growth, while unemployment does not cause economic growth in Nigeria for the period covered by the study. This study therefore recommends that government needs to establish more industries, that would generate more employment, increase productivity, spur economic growth and reduce inflation rate.

Keywords: Economic Growth, Inflation, Long and Short Run Relationship, Unemployment

JEL Classification: E24; E31

Introduction

Inflation and unemployment are persistent problems of almost all the countries in the world. The two phenomena have been referred to as twin problems that cause indigent in many countries. The existing literature explained that these two phenomena constituted vicious circle that lead to abject poverty in many countries (Bhagwati, 2004; James and Baker, 2010; Datara, 2013). Many past research works concluded that inflation and unemployment have significant impact on economic growth in many countries (Thayaparan, 2014; Shahid, 2014; Mohseni & Jouzaryan, 2015). In Nigeria, inflation problem can be traced back to the period of civil war (1966-1970). As a result of the civil war, government expenditure increase especially expenditure on ammunitions, this leads to budget deficit and inflation. Also Udoji salary award to civil servants in 1974 trigger inflation in the mid 1970s. Nigeria averaged inflation rate for the period of 1980-1989 was 5.86%. For the period of 2000 to year 2009 the averaged rate stood at 12.49% and averaged inflation rate for the period of 2010 to 2019 was 13.59%. Unemployment became a serious problem in

Nigeria in the mid of 1980s as a result of collapse of oil price which is the major source of fund for the nation. Past records showed that before this period Nigerian economy provided jobs for almost all the jobseekers and also absorbed foreign workers (Aminu, Manu & Salihu 2014; Ojonye, 2015). As a result of the mass migration of youths and adults to the urban cities in the late 1970s, economic recession in the early 1980s and introduction of Structural Adjustment Programme (SAP) in 1986, unemployment rate moved from 6.28% in 1980 to 7.63% in 1990, reached 21.46% in 2010 and declined slightly to 7.82% in 2014, moved to 22.23% in 2019.

Nigeria economy is one of the fastest growth economies in Africa. The country experienced economic expansion from 1960 to 1980, throughout this period the country Gross Domestic Product (GDP) growth rate continue to increase steadily, apart from time of civil war (1967-1970). Due to oil glut in early 1980s the country experienced negative GDP growth rate from 1981 till 1987, apart from 1985 that recorded positive GDP growth rate. From 1988 to 1990 the GDP growth rates

were positive, with averaged GDP growth rate of -0.97% for the period 1980 to 1984 and 0.57% for the period 1985-1989. From 1996 the GDP growth rates continue to fluctuate till 2019 but remained positive. It can be seen that fluctuation in economic growth affects price instability (inflation) and also caused high rate of unemployment in Nigeria during the period 1980-2019.

This study differs from other previous studies by examined the impact of inflation and unemployment on economic growth. Hence, the objectives of this study are: to investigate the impact of inflation and unemployment on economic growth; and to determine the direction of causality among inflation, unemployment and economic growth.

Literature Review

Conceptual Clarifications

Inflation can be defined as a situation where money chasing few goods. It can be also defined as persistent increase in the general price level of goods and service in a country over a period of time. According to Umaru and Zubairu (2012) inflation has been intrinsically linked to money. It reflects a reduction in the purchasing power of money and a loss of real value of medium of exchange and unit of account within the economy. Inflation is measured as the percentage rate of change in general price index and commonly measured using the Consumer Price Index (CPI). The CPI is calculated by dividing the current year price by the base year price index, multiply by hundred. In the economic literatures two types or causes of inflation were more pronounced: demand-pull inflation and cost-pull inflation. Demand pull inflation occurs when the aggregate demand of goods and services is higher than the supply of goods and services in the economy. Cost-pull inflation means increase in costs of any four factors of production that is labour, land, capital and entrepreneur.

Unemployment can be defined as a situation where people who are willing and capable of working are unable to find suitable paid job, International Labour Organization (2011) defined unemployment as a state of joblessness which occurs when people who are willing to work are without jobs and they have actively sought for job within the past few weeks. The organization explained further that unemployed active population includes people who have lost their job and those who have voluntarily left their jobs. Olusokan (2013) defined unemployment as numbers of people who are willing and able to do work, as well as make themselves available for the work at the prevailing wages but no work for them. The National Bureau of Statistics (2010) definition of unemployment however covers age bracket between ages

15 to 65, persons who are within the reference period and available for work, seeking for work but were unable to find work can referred to as unemployed.

Types and causes of unemployment identified in the literature includes: cyclical, seasonal, frictional, structural, technological, residual unemployment (Bhagwait, 2004; Ansari, 2011; Darata, 2013). Apart from the above mentioned causes of unemployment, other causes of unemployment in Nigeria include: economic recession witnessed by the country in the late 1980s and early 1990s. Neglect of the agricultural sector which provides more than 70% of employment in 1960s and 1970s also caused unemployment in Nigeria. Rapid population growth witnessed by the country also leads to increase in labour force which does not match with supply of jobs. Poor social infrastructure: such as good roads, stable electricity and so on also caused unemployment. Others identified causes are: decrease in government expenditure to the real sector of the economy, high interest rate that leads to reduction in investment, insecurity which reduced inflow of foreign direct investments, poor enabling environment for the local entrepreneurs, poor employable skills for Nigeria graduates and looking for white collar jobs by many graduates instead of settle for self employment (Umar, 2012 ; Abubakar, 2013 ; Aminu, Manu & Salihu, 2014).

Economic growth can be defined as an increase in a specific measure, such as real national income, gross domestic product or expansion of production possibilities measured as increase in real gross domestic product over a given period of time. According to Bhagwati (2004) several factors drive economic growth; among them are investment, trade openness, research and development. Economic growth can be calculated as the value of the output produced either in a country or equivalently as the total income, in form of wages, rents, interests and profits, earned in a country (James and Baker 2010). The economic growth rate can be calculated by deducting real gross domestic product of previous year from real gross domestic product of current year and divide it by real domestic product in previous year, multiply by hundred.

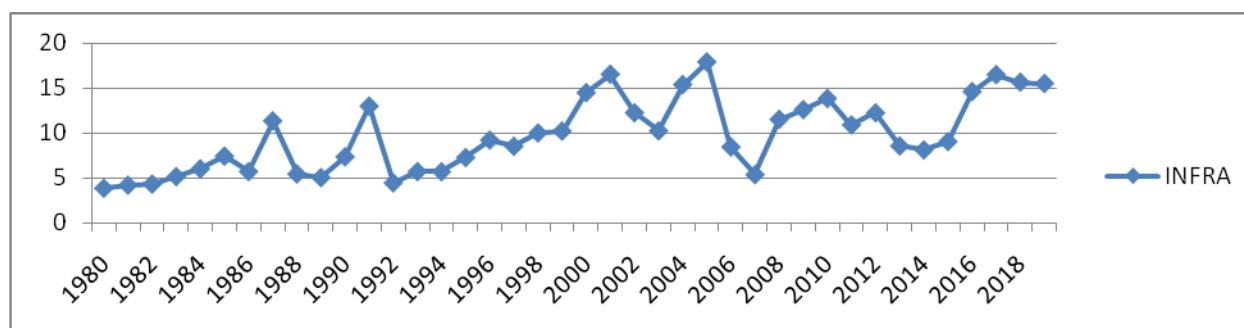
Inflation, Unemployment and Economic Growth in Nigeria

Inflation and unemployment are macro-economic variables that have important impact on Nigerian economy. The two variables have been major problem for the country over the past years. Inflation has continued to increase in recent years; this has been traced to increase in demand for goods and services without corresponding increase in supply and increase in cost of production. Nigeria inflation rate moved from 3.86% in 1980 to 6.02% in 1984 with averaged rate of 4.71% for

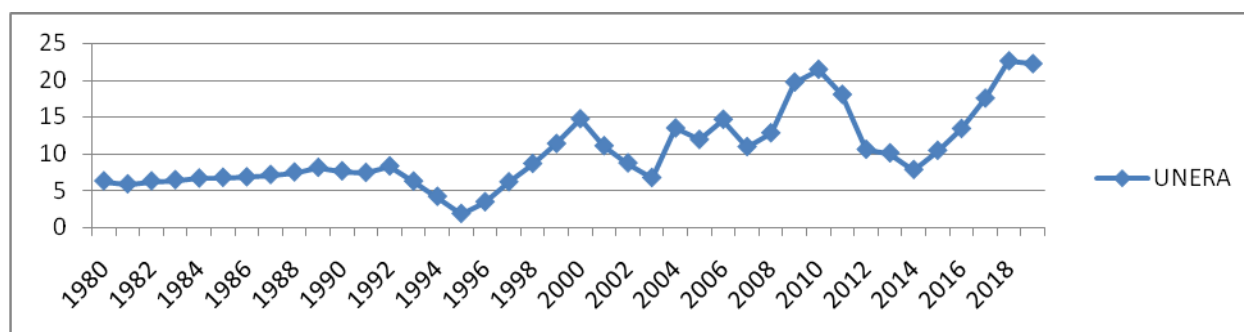
the period of 1980 to 1984. The averaged inflation rate increased from 4.71% for the period of 1980-1984 to 7.01% in 1985-1989. The rate continues to increase steadily, moved upward from 7.36% in 1990 to 14.51% in year 2000. The rates were fluctuating during the period

of 2001 to 2019. Inflation rate increased from 14.51% in 2000 to 17.93% in 2005, decreased to 13.86% in 2010, moved downward to 9.06% in 2015 and increased 15.53% in 2019

Inflation Rate in Nigeria 1980-2019 in Percentage (%)



Unemployment Rate in Nigeria 1980-2019 in Percentage (%)



Gross Domestic Product GDP Growth Rate in Nigeria 1980-2019 in Percentage (%)

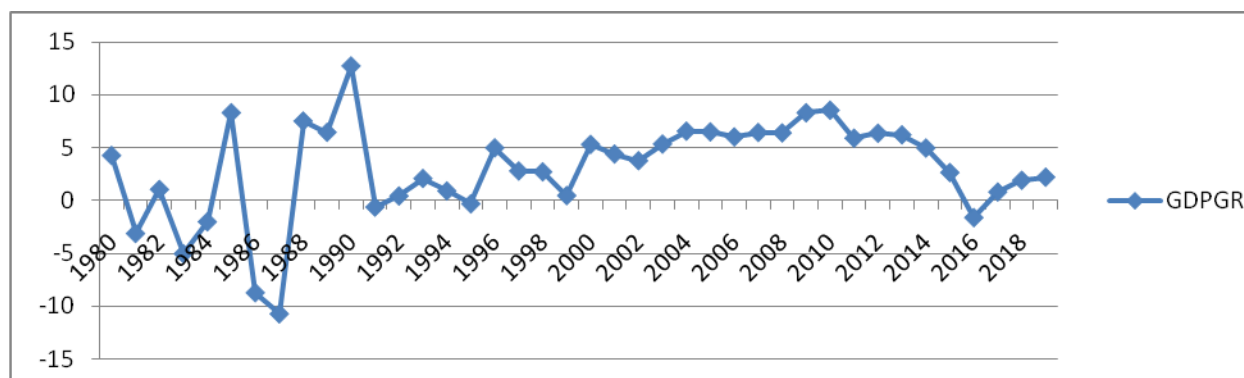


Figure 1: Inflation, Unemployment and GDP Trend

Source: Central Bank of Nigeria Annual Report and Financial Statements (Various Issued)

Table 1: Average Inflation Rate, Unemployment Rate and Gross Domestic (GDP) Growth Rate in Nigeria (1980 to 2019) in Percentage (%)

Year	1980 - 1984	1985- 1989	1990- 1994	1995- 1999	2000- 2004	2005- 2009	2010- 2014	2015-2019
Inflation Rate (%)	4.71	7.01	7.25	9.06	13.80	11.18	10.75	14.28
Unemployment Rate (%)	6.30	7.26	6.75	6.29	10.94	14.05	13.59	17.24
GDP Growth Rate (%)	- 0.97	0.57	3.11	2.13	5.09	6.74	6.41	1.19

Source: Central Bank of Nigeria Annual Report and Financial Statements (Various Issued)

Unemployment has been a major problem for most of the countries in the world, Nigeria inclusive. Nigeria unemployment rate was 6.28% in 1980, this rose to 7.63% in 1990. The averaged unemployment rate during the period of 1980 to 1984 was 6.30% and for the period of 1985 to 1989 was 7.26%. Unemployment rates fluctuating from 1990 to 2004, decreased from 7.63% in 1990 to 4.16% in 1994, increased to 14.72% in year 2000 and declined to 13.47% in 2004. The averaged rate for the period of 2005 to 2009 was 14.05%, while the averaged rate for the period of 2010 to 2014 was 13.59%. The rate continues to fluctuate during the period of 2015 to 2019, increased from 10.43% in 2015 to 22.23% in 2019.

The GDP growth rate of Nigeria was -3.12% in 1981, negative GDP growth rate continued till 1984, this occurred as a result of economic recession in the early 1980s, the rate turned to positive in 1985 with rate figure of 8.32%. During the period of 1980 to 1984 the averaged GDP growth rate was -0.97%. The GDP growth rate decreased to -8.75% in 1986 from 8.32% in 1985, declined to -10.75% in 1987 and increased to positive figure of 12.76% by 1990. The averaged GDP growth rate for the period of 1985 to 1989 was 0.57%. The rate decreased from 12.76% in 1990 to -0.31% in 1995 and increased to 5.32% in year 2000. With averaged rate for the period 1990 to 1994 stood at 3.11% and for the period of 1995 to 1999 was 2.13%. Since year 2000 the rates continued to fluctuate but remained positive, decreased from 5.32% in year 2000 to 3.78% in 2002, increased to 6.51% in 2005, decreased to 6.41% in 2008. By year 2010 the GDP growth rate moved to 8.56% from 6.41% in 2008, decreased to 2.65% in 2015 and decreased to 2.21% in 2019. The averaged GDP growth rate for the period 2000 to 2004 was 5.09%, for the period 2005 to 2009 was 6.74%, for the period of 2010 to

2014 was 6.41% and for the period 2015 to 2019 was 1.19%.

Review of Related Literature

Mosikari (2013) conducted research study on effects of inflation and unemployment on economic growth of South Africa. The study used annual time series data from 1980 to 2011. The study used Augmented Dickey-Fuller (ADF) test to examine the unit root of the variables. Johansen co-integration test was carried out to test the presence of co-integration among the variables and Granger causality test was done. The results of the study showed that the variables area co-integrated, while Granger causality indicated that there is no causality between inflation and economic growth. The major limitation of the study was failure to carry out necessary diagnostic and stability tests in order to determine the robustness of the model of the study.

Shahid (2014) investigated the impact of inflation and unemployment on economic growth in Pakistan. The study used time series data for the period of 1980 to 2010. Unit root (Augmented Dickey-Fuller and Phillips-Perron) tests results showed that the variables were not stationary at the same level. The auto-regression distributive lag results showed that there is long run relationship among inflation, unemployment and economic growth. The results of White Heteroskedasticity and Breusch-Godfrey serial correlation tests showed that there is no problem of heteroskedasticity and serial correlation. The major limitation of the study was the inability to show direction of causality of the variables.

Thayaparan (2014) examined effect of inflation and economic growth on unemployment in Sri-Lanka for the period of 1990 to 2012. The study used Augmented Dickey Fuller to test stationarity of the variables and

Ordinary Least Square Technique to examine effect of independent variables on dependent variable. The author used Johansen method to test the co-integration of the variables and Vector Error Granger Causality to test the direction of causality of the variables. Results of the study revealed that all variables are not stationary at the same level and variables have long run relationship. Both inflation and economic growth have negative and significant impact on unemployment in Sri-Lanka. Major Limitation of the study is used of Johansen method instead of Auto-regressive Distributive Lag to test co-integration of the variables.

Mohammad, Okoroafor and Awe (2015) analyzed the relationship between unemployment, inflation and economic growth in Nigeria for the period of 1987 to 2012. The study utilized Ordinary Least Square Method to examine the impact of unemployment and inflation on economic growth. The study results showed that inflation and unemployment have inverse effects on Nigeria economy, while interest rate and total public expenditure have significant impact on Nigeria economy. Like some of the previous studies (Shahid, 2014 & Datara, 2014) the study failed to consider the causality of the variables.

Mohseni and Jouzaryan (2015) examined the role of inflation and unemployment in economic growth of Iran from 1996 to 2012. The authors employed Auto-regressive Distributive Lag modeled to examine long term co-integration of the variables. The model estimation results showed that in the long run inflation and unemployment have negative effects on economic growth of Iran. Limitation of the study include: neglect of short run relationship of the variables and inability to show direction of the variables used.

Onwachukwu (2015) investigated the impact of inflation and unemployment on economic growth in Nigeria. The author used time series data for the period of 1985 to 2010. The study used Augmented Dickey-Fuller and Johansen techniques to test stationarity and co-integration of the study variables. Results of the study showed that variables were not stationary at the same level. The results also showed that inflation has negative and insignificant impact on economic growth, while unemployment has negative and significant impact on economic growth in Nigeria. Limitation of the study include: time frame of the study which is not sufficient to give better analysis and used of Johansen technique instead of Auto-regressive Distributive Lag (ARDL) which is the most appropriate technique for the variables that are not stationary at the same level.

Finda and Aminu (2016) utilized panel data analysis to examine the impact of inflation and unemployment on

economic growth of Tunisia for the period of 1990 to 2010. The authors employed ADF technique to test unit root of the variables and Johansen co-integration method to test co-integration of variables. The results of the study revealed that inflation has positive and insignificant impact on economic growth, while unemployment has negative and significant impact on economic growth of Tunisia. Limitation of this study include: insufficient time frame of the study and use of inappropriate technique to test co-integration of the variables.

Abdulsalam and Abdullahi (2016) investigated the effects of unemployment and inflation on economic performance in Nigeria from 1981 to 2014. The study used Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) to test unit root of the variables while Johansen co-integration technique was employed to test long run relationship of the variables used in the model. Ordinary Least Square (OLS) technique was used to examine the impact of independent variables on dependent variable. Result of the study indicated that unemployment and inflation are positively related to economic growth of Nigeria. Unemployment positively related is significant, while inflation positively related is insignificant to Nigeria economic growth. The major limitation of the study is use of Johansen co-integration technique instead of Auto-regressive Distributive Lag to test co-integration of the variables.

Anning, Tuama and Darko (2017) investigated impact of inflation and unemployed on the economic growth of Iraq. The authors used annual time series data for the period of 1990 to 2014. The study use Polynomial technique to check the unit root of the variables, while Vector Auto-regression (VAR) technique was used to examine the impact of independent variables on dependent variable. The study results indicated that inflation and unemployment have negative impact on economic growth of Iraq. Major limitations of the study are: failure to carry out co-integration of the variables and inability to show the direction of causality of the variables.

Enejoh and Tsauni (2018) analyzed the impact of inflation and unemployment on economic growth in Nigeria from 1970 to 2016. The study used Augmented Dickey-Fuller to test stationarity of the variables and used bound test to determine long run relationship of the variables. ARDL model was used to examine long and short impact of independent variables on dependent variable, while bound test was used to test causality of the variables used. Results of the study showed that variables used were not stationary at the same level and bound test showed that there is long run relationship among the variables. The results also showed that

inflation has positive and insignificant impact on economic growth, while unemployment has negative and insignificant impact on economic growth. Granger causality test results showed that inflation did not cause economic growth but unemployment cause economic growth in Nigeria. The major limitation of this study is time frame of the study.

Tenzin (2019) investigated associated among economic growth, inflation and unemployment in Bhutan. The author used annual data for the period of 1998 to 2016. Augmented Dickey-Fuller was used to test the unit root of the variables while ARDL Bound Test used to test co-integration of the variables and ARDL Regression Model used to test long and short run impact of independent variables on dependent variable. Results of the study indicated that all variables are not stationary at the same level and there is existence of a long run co-integration among the variables used. The empirical results of the study also showed that economic growth had no impact on reduction of unemployment both in short and long run. While inflation had negative impact on economic growth in short run and positive impact in long run. The limitations of the study include: time frame of the study

and inability of the study to show causality between economic growth variable and independent variables.

Methodology

Sources of Data

Data for this study are secondary data extracted from Central Bank of Nigeria Statistical Bulletin and World Bank Database published by World Bank. In line with previous empirical studies (Thayaparan, 2014; Abdulsalam, Ademola and Abdullahi, 2016; Anning, Tuama and Darko, 2017; and Sunusi and Ahmad, 2018), the study used Gross Domestic Product Growth Rate (GDPGR) to measure Economic Growth which is dependent variable. Inflation Rate and Unemployment are used to measure Inflation and Unemployment respectively, the independent variables.

Model Specification

With regard to Philips curve, Cobb-Douglas production model and previous empirical studies (Ayesh, 2013; Thayaparan, 2014; Anochiwa and Maduka 2015; and Sunusi, and Ahmad (2018), Economic growth can be expressed as a function of inflation and unemployment. This can be expressed in equation form as:

$$\text{GDPGR} = f(\text{INFRA}, \text{UNERA}) \dots \dots \dots (1)$$

The relationship between the economic growth variable, inflation variable and unemployment variable can be expressed as:

$$\text{GDPGR} = \alpha_0 + \alpha_1(\text{INFRA}) + \alpha_2(\text{UNERA}) \dots \dots \dots (2)$$

Then, take the logarithm of the variables, equation 2 will be expressed as:

$$\ln \text{GDPGR} = \alpha_0 + \alpha_1 \ln(\text{INFRA}) + \alpha_2 \ln(\text{UNERA}) \dots \dots \dots (3)$$

Transform equation (3) to econometric model, it becomes:

$$\ln \text{GDPGR} = \alpha_0 + \alpha_1 \ln(\text{INFRA}) + \alpha_2 \ln(\text{UNERA}) + \varepsilon_t \dots \dots \dots (4)$$

Express equation 4 in Error Correction Model, it becomes:

$$\Delta \ln \text{GDPGR} = \alpha_0 + \alpha_1 \Delta \ln(\text{INFRA}) + \alpha_2 \Delta \ln(\text{UNERA}) + \text{ECM}(-1) + \varepsilon_t \dots \dots \dots (5)$$

Granger causality equation can be written as follows:

$$\Delta \ln (\text{GDPGR}) = \alpha_0 + \alpha_1 \sum_{i=1}^n \Delta \ln (\text{INFRA}) + \varepsilon_t \dots \dots \dots (6) \quad i=1$$

$$\Delta \ln (\text{GDPGR}) = \alpha_0 + \alpha_1 \sum_{i=1}^n \Delta \ln (\text{UNERA}) + \varepsilon_t \dots \dots \dots (7)$$

$i=1$

Where:

GDPGR= Gross Domestic Product Growth Rate.

INFRA= Inflation Rate.

UNERA= Unemployment Rate.

α_0 =Regression Constant.

α_1 and α_2 = Regression Parameters.

ϵ_t = Error Term.

Methods of Data Analysis

The unit root test was performed using Augmented Dickey-Fuller (ADF) and Philip-Perron (PP) statistics. The test examined whether variables used in this study are stationary and the level of stationarity of the variables. Long run relationship of the variables was tested using ARDL Bounds test technique. Since all variables are not stationary at the same level, ARDL Bound test technique is the most appropriate technique to test the long run relationship of the variables. The number of lags to be used in the Error Correction Model (short run relationship) was determined through lag length selection criterions, including Likelihood-Ratio (LR), Final Prediction Error (FPE), Akaike's Information Criterion (AIC) and Schwarz Bayesian Information Criterion (BIC).

Short run relationship of variables was examined using Error Correction Model (ECM). The result from ECM confirmed the existence of long run co-integration of the variables. Diagnostic test was done using JB statistic, B.G. serial correction and white heterosk, Finally, Granger causality test was applied to determine the causality among the variables and to see the direction causality whether unidirectional or bi-directional.

Results and Discussions

Unit Root Test

The results of unit root test are presented in table 1. Both Augmented Dickey-Fuller (ADF) and Phillips-Perron (PP) tests were used to test stationarity of the variables.

Table 1: Results of Unit Root Test

Variable	Model Specification	Augmented Dickey-Fuller (ADF) Test		Order of Integration	Phillips-Perron (PP) Test		Order of Integration
GDPGR	Intercept	-4.238***	-4.460***	I(0)	-4.393***	-7.371***	I(0)
	Trend and Intercept	-4.479***	-4.616***	I(0)	-5.866***	-9.784***	I(0)
INFRA	Intercept	-3.082**	-6.013***	I(0)	-3.421**	-7.274***	I(0)
	Trend and Intercept	-3.794**	-6.381***	I(0)	3.912**	8.913***	I(0)
UNERA	Intercept	-1.653	3.492**	I(1)	-2.449	-3.461**	I(1)
	Trend and Intercept	-2.115	4.087**	I(1)	-2.341	-4.962**	I(1)

Note: *** and ** indicate rejection of the null hypothesis of non stationary at 1% and 5% significant level respectively based on the Makinnon critical value.

Source: Authors' Computation Using E-View, 2020.

Table 1 results shows that Gross Domestic Product (GDPGR) and Inflation Rate (INFRA) are stationary at levels in both ADF and PP statistics tests, where as Unemployment Rate (UNERA) is not stationary at level but stationary at the first difference in both ADF and PP

statistics tests. Since all the variables are not stationary at the same level the best model to test long run co-integration of variables is Auto-regressive Distributive Lag (ARDL) bound test technique.

Co-Integration Test

Table 2: Result of Co-integration Test Using ARDLBounds Test Technique

Test Statistic	Value	Significance	Lower Bounds I(0)	Upper Bounds I(1)
F-Statistic	8.637			
K	2			
		1%	5.15	6.36
		5%	3.79	4.85
		10%	3.17	4.14

Source: Authors' Computation Using E-View, 2020.

Table 2 showed results of co-integration test using ARDL bounds test, it indicates that there is co-integration among the variables under consideration. This implies that there is long run relationship among inflation,

unemployment and economic growth in Nigeria. Since bounds test F-Statistic of 8.637 is higher than lower and upper bound values at 1%, 5% and 10% (5.15, 6.36; 3.79, 4.85; and 3.17, 4.14) respectively.

Long Run Relationship of Variables

Table 3: ARDL Long Run Coefficient Based on AIC

Dependent Variable: LGDPGR			
Variable	Coefficient	Std. Error	Prob. -Value
LINFRA	0.1864	0.2317	0.1486
LUNERA	-0.0769	0.0854	0.5931
C	4.1686	0.4173	0.0236
R-Squared-----0.6429		F-Statistic-----21.6289	
Adjusted R-Squared-----0.6170		Prob. (F-Statistic-----0.0002	
Durbin-Watson Stat-----1.7849			

Source: Authors' Computation Using E-view, 2020.

Table 3 results shows that in the long run Inflation Rate with coefficient of 0.1864 had positive impact on Gross Domestic Product Growth Rate, but the positive impact is insignificant, since probability value is 0.1486. The result also indicates that 1% increase in Inflation Rate leads to 0.18% increase in Gross Domestic Product Growth Rate. The Unemployment Rate coefficient value of -0.0769 with probability value of 0.5931 indicates that in the long run Unemployment Rate had negative impact on Gross Domestic Product Growth Rate but the impact is insignificant. Also implies that 1% increase in Unemployment Rate reduce Gross Domestic Product Growth Rate by more than 0.07% in the long run.

Furthermore, table 3 shows result of R-Squared value of 0.6429, which implies that 64.29% variation in Gross Domestic Product Growth Rate explained by the independent variables (Inflation Rate and Unemployment Rate). The F-Statistic value of 21.6289 with probability value of 0.0002, which measures the joint significance of the independent variables, is relatively high and statistically significant at 1% level. The Durbin-Watson Statistic value of 1.7849 showed that there is absence of first order serial correlation problem in the model and proved that auto-correlation problem did not exit.

Short Run Relationship of Variables

To test short run relationship of variables, appropriate lag length for variables must be determined. This can be

done by use lag length selection criteria, such as Sequential Modified Likelihood-Ratio (SMLR), Final Prediction Error (FPE), Akaike's Information Criterion

(AIC), Hannan-Quinn Information Criterion (HQIC) and Schwarz Bayesian Information Criterion (SBIC).

Table 4: Lag Selection-Order Criteria

Sample: 1980-2019 Number of Observation = 40								
Lag	Lag Length	SMLR	df	P-Value	FPE	AIC	HQIC	SBIC
0	-246.180	-	-	-	0.011	2.168	2.171	2.354
1	-210.614	119.624	9	0.004	0.016	1.816	2.985	3.275
2	-138.620	83.166	9	0.000	0.002**	0.072**	0.069**	1.248**

Note:** indicates lag order selection by the criterion.

Source: Authors' Computation Using E-view, 2020.

Table 4 indicates lag length selection process, based on selection criterion, maximum lag length of 2 selected, since SMLR, FPE, AIC, HQIC and SBIC tests indicated

lag 2 to be the most appropriate lag length as showed by the asterisk (**) in the table results.

Table 5: ARDL Short Run (Error Correction Model)

Coefficient Based on AIC			
Dependent Variable: D (LGDPGR)			
Variable	Coefficient	Std Error	Prob.-Value
D (LGDGR) (-1)	0.3841	0.1635	0.0246
D (LGDPGR) (-2)	0.7263	0.2793	0.0035
D (LINFRA) (-1)	0.1062	0.0897	0.0454
D (LUNERA) (-2)	-0.0385	0.0372	0.0486
ECT (-1)	-0.1673	0.0293	0.0038

Source: Authors' Computation Using E-view, 2020

Table 5 shows that in the short run Inflation Rate had positive and significant impact on Gross Domestic Product Growth Rate at lag 1. The Unemployment Rate had negative and significant impact on Gross Domestic Product Growth Rate at lag 2. The computed coefficient of Error Correction Term (ECT) showed the expected conventional negative figure of -0.1673, which is statistically significant at 1%. This result also confirmed the long run relationship between the two explanatory variables (Inflation Rate and Unemployment Rate) and explained variable (Gross Domestic Product Growth

Rate) in ARDL bounds test in table 3. The ECT coefficient of -0.1673 indicates that 16.73% of the disequilibrium due to the shock in the previous years is adjusted back to the long run equilibrium in the current year.

As a result of various problems associated with long run estimation, two post diagnostic tests were conducted: Normality Test and Serial Correlation and Heteroskedasticity Tests. Table 6 showed the results of diagnostic tests.

Diagnostic Tests

Table 6: Diagnostic Test Results

Test	Statistic Value	Prob. Value
Normality (JB Statistic)	1.9616	0.4863
Serial Correction and Heteroskedasticity:		
i. BG Serial Correction	0.1683	0.7190
ii. White Heterosk	2.0924	0.3955

Source: Author's Computation Using E-view, 2020

The result of JB Statistic of 1.9616 with probability value of 0.4863 implies that the alternative hypothesis of normally distributed error term should be accepted. Also, the results of BG Serial Correlation and White Heterosk show no serial correlation and heteroskedasticity.

Causality Test

Table 7: Granger Causality Test

Variable	t-Statistic	Prob. Value	Direction of Causality
INFRA does not Granger cause GDPGR	4.5694**	0.0281	INFRA ==► GDPGR
GDPGR does not Granger cause INFRA	2.6395	0.4862	-----
UNERA does not Granger cause GDPGR	2.0641	0.2416	-----
GDPGR does not Granger cause UNERA	2.3947	0.2685	-----
INFRA does not Granger cause UNERA	4.1102**	0.0409	INFRA ==► UNERA
UNERA does not Granger cause INFRA	2.9264	0.3160	-----

Note: ** indicate significance at 5% level

Source: Authors' Computation Using E-view, 2020

According to table 7, Inflation Rate Granger cause Gross Domestic Product Growth Rate but Gross Domestic Product Growth Rate does not Granger cause Inflation Rate. This shows that there is unidirectional causality ran from Inflation to Economic Growth in Nigeria for the period covered by the study. There are no evidence of causality between Unemployment Rate and Gross Domestic Product Growth Rate. This implies that Unemployment does not cause Economic Growth. Inflation Rate Granger cause Unemployment Rate, but Unemployment Rate does not Granger cause Inflation Rate, a unidirectional causality, ran from Inflation to Unemployment. This implies that Inflation cause Unemployment in Nigeria.

Conclusion and Recommendations

This study examined the impact of inflation and unemployment on economic growth in Nigeria. The

study used data for the period of forty years, 1980 to 2019. Econometric techniques such as Auto-regressive Distributive Lag, Error Correction Model, Granger Causality and Diagnostic techniques were used to analyze data collected from Central Bank of Nigeria Statistical Bulletin and World Bank Database. The results of unit root test showed that all the variables used in this study stationary at most at first difference. Co-integration test results indicated that there is long run relationship among Inflation, Unemployment and Economic Growth. Auto-regressive Distributive Lag showed that Inflation had positive and insignificant, while Unemployment had negative and insignificant impact on Nigeria Economic Growth in the long run. Error Correction Model results indicated that Inflation had positive and significant, while Unemployment had negative and significant impact on Nigeria Economic Growth. The results showed that Inflation does not hinder Economic Growth, both

Unemployment hinder Economic Growth in Nigeria for the period covered by the study. Granger causality results revealed that Inflation cause Economic Growth, while Unemployment does not cause Economic Growth and Inflation cause Unemployment.

Based on findings of this study, the following recommendations are made:

In order to reduce unemployment in Nigeria, government should create more jobs by produce more products locally, using labour intensive against capital intensive. Entrepreneurship and self employment should be

encouraged in order to check unemployment problem in Nigeria.

Government should use both monetary and fiscal policies to control inflation; inflation rate should be maintained at single digit. Government needs to establish more industries and also provide more infrastructures that would encourage industrialization which would generate more jobs, increase output, spur economic growth and reduce inflation.

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