Abuja Journal of Economics & Allied Fields, Vol. 10(4), March, 2022
Print ISSN: 2672-4375; Online ISSN: 2672-4324

Impact of Selected Macroeconomic Variableson Economic Growth in Nigeria: 1990 -2020

Adamu Ndanusa[1]Osekweyi Joel Odonye[2] Baba Madu[3]

[1]Department of Economics, Federal University, Lafia- Nigeria
[2]Department of Economics, Nasarawa State University, Keffi Nigeria
[3]Department of Economics, Veritas University, Bwari Abuja, Nigeria

Abstract

Due to the immense contribution of some selected macroeconomic variables to the economic growth and development in Nigeria, this research investigates the impact of selected macroeconomic variables on economic growth in Nigeria from 1990-2020. Auto-regressive distribution lags model (ARDL) based on the Unit root test was used to determine the effect of three major factors; interest rate (INTR), exchange rate (EXR) and inflation (INFR) on real gross domestic product (RGDP) which proxies' economic growth The findings from the empirical point of view show a positive relationship of gross domestic product (GDP) with Interest rate while exchange rate inflation rate have a negative relationship with real Gross domestic Product (RGDP) also, interest rate, exchange rate and inflation are all significant at all levels of significance.

Keywords*:* Interest rate, Exchange rate, Inflationrate, Economic growth
JEL: 010,011

*1.0*Introduction

Manufacturing Sector Report, (2015). Statedthat Nigeriathe largest economy in Africa with an emerging market, mixed economy, middle-income earning, with increasingindustrialized, fiscal, service, communications, technology and entertainment sectors is ranked as the 27th- in terms of nominal GDP, and the 22nd-largest in terms of purchasing power parity. Nigeria as thelargest economy in Africa, it produces a large proportion of goods and services in the West African sub region. As at the end of the first quarter of 2019, Nigeria's population is put at 188.7million with a gross domestic product of $1.1 trillion at 0.8% growth, unemployment rate of 7.0% and Inflation rateof Consumer Price Index (CPI) was estimated as 16.5%.

The impact of selected macroeconomic variables (MEVs) over the years has remained grossly insufficient to meet theexpanding social political and public spending needed in the fostering of economic growth. Forinstance inflation rate, interest rateand exchange rate

This study examined theextent economic growth has been impacted by selected

macroeconomic variables.Indeveloping and developed nations, economic growth isthe continuous responsibility of government on her economy. The need to carry out this study isanchored in the fact that MEVs like interest rate, inflation rate and exchange rate areconsidered the major engine or drivers of economic growth in Nigeria. The fluctuating rate of exchange against major international trading currencies has causedinflation to gallop in Nigeria while exchange rate, interest rate and inflation worth an empirical examination.

It is in the light of the above that thisquestionis raised: Does government policies that impactMacroeconomicVariables hinder economic growth inNigeria? If participants in the global market experience somelevels of macroeconomic stability, then it is true that other nations or nationals face similarconditions but at various levels. Since oil and gas dominate the country's economy as it accounts forover 83% of the country's revenue base thereby making government to lose its sense of reasoningin exploring other revenue sources, this present government have come up with diversificationplan which need serious political will.

In addition, former military leaderGen. Ibrahim Babangida, came up with the Structural Adjustment Programme (SAP) with the broad intent of diversifying the economy, did not achieve itsobjective. The over dependent on oil and gas has led to low GDP and economic retardation whichhas affected the Macroeconomic variables under consideration in this study. Impact of selected Macroeconomic variables needsspecial understanding for economic growth by both the private and publicsectors. The implication of export and import on Nigerian economy its felt as a continuousdepreciation of the naira exchange rate for other hard currencies like the European Euro or USDollar and weakening CBN's relentless effort at attaining and sustaining a single digit headline rateof inflation to double digit through her monetary policy rate.

2.0 Literature Review

Conceptual Framework

Danso,Ganesh&moses (2012), opined that real exchange rate determine how much residents of a country receive for goods and services imported and how much they receive as payment for exported goods and services.

Emenike (2014). States that interest rate changes are transmission mechanism via monetary policy effects on prices of assets

Ismaila &Affoi (2015), defined economic growth as the quantity of goods and services produced in a nation real gross domestic product mostly measure.

Empirical Review

Philip (2010) studied and identified a unidirectional causality and no co-integratingrelationship between Inflation and economic growth through Co-integration and Granger causality test in Nigeriabetween 1970 and 2005.

Ayyoub et al (2011) studied the relationship between inflation and economic growth ofPakistan between 1972 and 2010 using the Ordinary Least Squares (OLS) regression and concluded that asignificantly inverse relationship exists between inflation and economic growth.

Mamo (2012) identified a negative significant relationshipbetween inflation and economic growth while studying 13 Sub Saharan Africa (SSA) countries for 1969 to 2009, Ina study of twenty-two countries between 2004 and 2010,

Karim etal, (2012) used the structural vector error correction model (SVECM) approach to study the relationship betweeneconomic growth, fixed investment, and household consumption in Malaysia and found out that

householdconsumption and foreign direct investment impact significantly on GDP in short run only and in the long run,economic growth had a permanent impact on household consumption and investment.

Agalega and Antwi (2013) studiedthe economy of Ghana from 1980-2010 to examine the impact of inflation andinterest on GDP. By running multiple linear regressions, a strong positive correlation between GDP, interest rate andinflation was identified by them and the variance of interest rate and inflation explained about 44% of the variabilityof GDP. They further added that GDP and inflation have a positive coefficient where interest rate and GDP have anegative coefficient.

Rahman (2014) examined the inflation and economic growth relationship in Bangladesh during 1976 to 2011usingvector auto-regression (VAR) and discovered a statistically significant negative relationship between inflation andeconomic growth while a study covering the period of 2000-2012 concluded that inflation rate and GDP growthwere positively correlated in Bangladesh

Ismaila and Imoughele (2015) examined macroeconomic determinants of economic growth inNigeria measured by real gross domestic product (RGDP) from 1986 to 2012. The ADF unit root test and Johansen's co-integration wereused to test for both short and long run relationship between economic growth and macroeconomicdeterminants. The study recommended that there is need for government to consciously developthe business environment by provision of the necessary business infrastructure which will lowerthe cost of doing business in Nigeria. There is also the need for government to retain tight broadmoney supply and fiscal policies in order to fight inflation

Oshodi (2018) examined empirical analysis of macroeconomic indicators on economic growth inNigeria and China. Both countries rediscovered themselves in the late 70s and put in placesustainable economic trajectory to take a leadership position but still Nigeria revolves around sameposition after 50 years of independence. This analysis examined the major development indicatorsand compares the two countries to appreciate empirical trends and put in place strategic effortswhere necessary with 22 year time series data from 1994 to 2015 was considered. The AugmentedDickey Fuller (ADF) test to determine the mean and variance of the data are consistence over time.While the ordinary least square was used to ascertain the extent of relationship existing betweenthe macroeconomic indicators. The study concluded with empirical evidences that trends inmacroeconomic variables can be used to predict the economic growth of these countries.

Research GAP: No single study has examined the combined impact of all the three selected macroeconomic variables considered in this paper (Interest Rate, Inflation Rate, and Exchange Rate, on the economy of Nigeria

Theoretical Framework

This work adopted Neo classical of theory of interest as its theoretical base and guide, because the theory gives the ground upon which the relationship between interests rate on loanable fund, money supply, inflation and economic growth can be tested and analyze.

3.0 Methodology

Model specification

Model specification explains the functional relationship between macroeconomic variables. The study adopted the model of

Zekeri& James (2020), which was modified to achieve the objectives of the study

The functional form of the model is expressed as:

$RGDP_t$= F($INTR_t$, EXR_t, $INFR_t$)…… (1)

The linear form of the model can be expressed as follows;

$RGDP_t$:$\alpha_o + \beta_1 INTR_t + \beta_2 EXR_t - \beta_3 INFR_t$……(2)

In order to allow for the inexact relationship among the variables as in the case of most economic variables, stochastic error term 'μ_t' is added to the equation. Thus, we can express the economic form of the model as:

$RGDP_t=\alpha_o + \beta_1 INTR_t + \beta_2 EXR_t + \beta_3 INFR_t + \mu_t$ ……. (3)

Where;

$RGDP_t$= real gross domestic product

INTR =Interest Rate

EXR_t = Exchange Rate

$INFR_t$ =Inflation Rate

μ = the stochastic error term

In order to properly estimate the parameters of the postulated model, we rescale the dependent variable by logging it, thus, transforming it into a log-linear model as follows:

$LOG(RGDP_t)$: $\alpha_o + \beta_1 LOG(INTR_t) + \beta_2 LOG(EXR_t) + \beta_3 LOG(INFR)_t + U_t$……...(4)

Apriori Expectations

By theoretical postulation, the coefficients of Interest Rate (INTR)is expected to be positive while the coefficient of exchange rate (EXR) and Inflation Rate (INFR) are expected to be negative.

$$\alpha_o, \beta_1, > 0, \beta_2, \beta_3 < 0$$

Nature and Sources of Data

The research relied mainly on secondary data published by the Central Bank of Nigeria (CBN). These annual time series data for analysis related to key macroeconomic variables and economic growth in Nigeria. The annual time series data with respect to Domestic product (RGDP), Intrestrate(INTR), Exchange rates (EXR), as well as Inflation rate (INFR) were obtained from the statistical bulletin of the Central Bank of Nigeria (CBN) and National Bureau of Statistic (NBS). The period covered for this study is from 1990 to 2020

Methods of data analysis

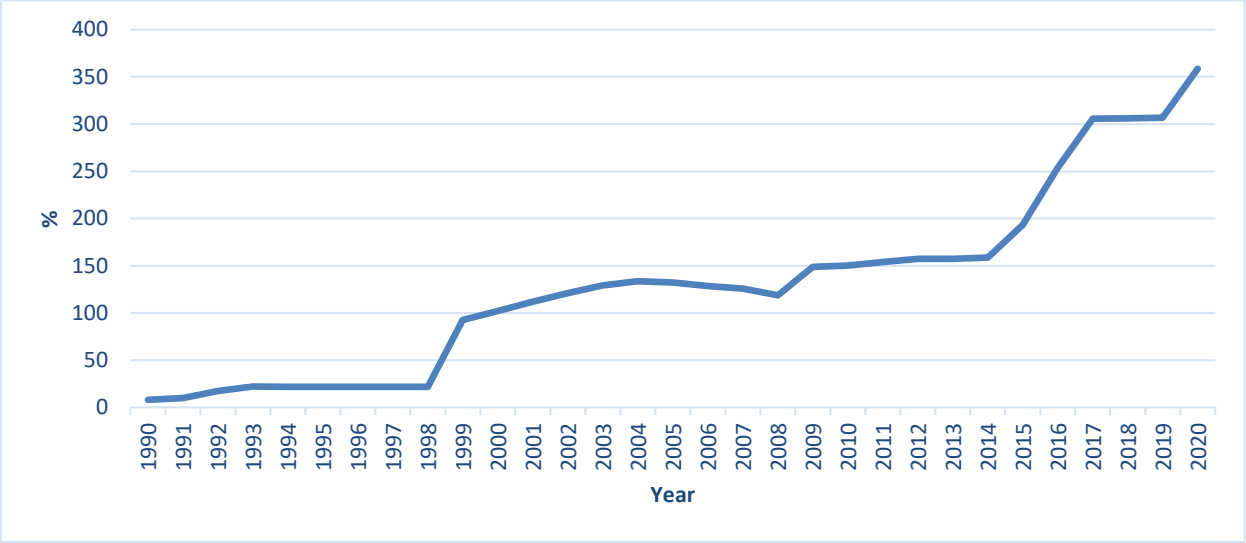
The analysis of the data collected for the purpose of this research shall be carried out using quantitative, analytical techniques which involves running a regression of the specified economic model using appropriate estimation techniques. In a bid to avoid the phenomenon of spurious regression, the data were subjected to diagnostic investigation to determine their stationary status as well as the trend trajectory or the data.

4.0 Data Presentation

4.1: Trend Analysis

The trends in the variables are captured in separate figures below. This is to give an insight regarding the existence of any unique characterization of the variables over the stud

Figure 4.1 (a): A line chart showing distribution of trends of Nigeria's real Gross Domestic Product (=N= Million) from 1990 -2020



Source: Author's computation, 2021 using E-views 9.0

An examination of fig. 4.1 (a) above showed that real gross domestic product (RGDP) is in upward trend. The figure also reveals that GDP is generally stable during the period 1990-2020. The time series data on appendix 1 underscore the upward trend in RGDP. The data showed that real gross domestic product (RGDP) which stood at =N=21,462,733.73.28 million in 1990 rose consistently to =N=70, 014, 371.85 million in 2020. This indicates that GDP has an upward trend (see appendix 1 attached).

Figure 4.1 (b): Trend in Interest rate (%) from

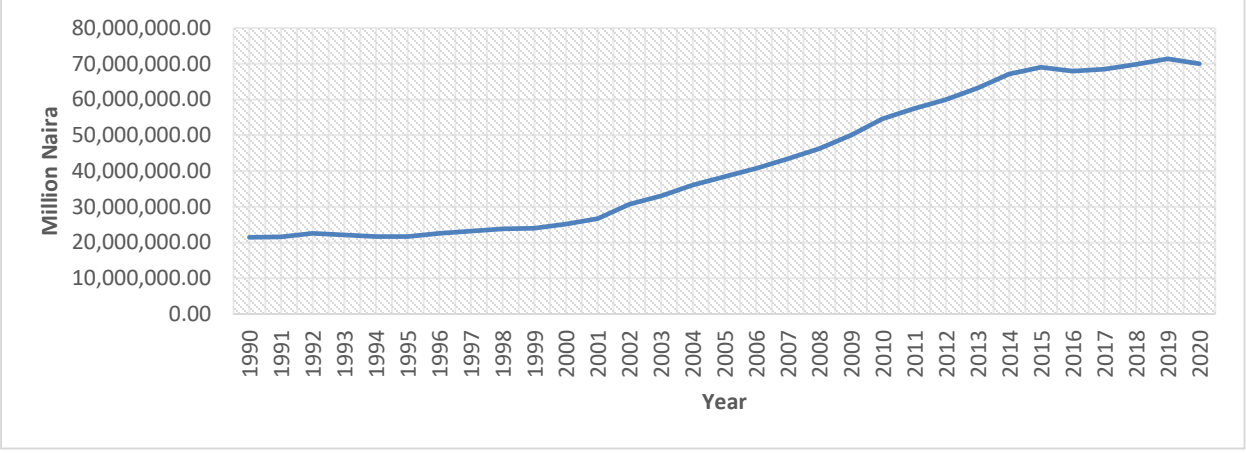
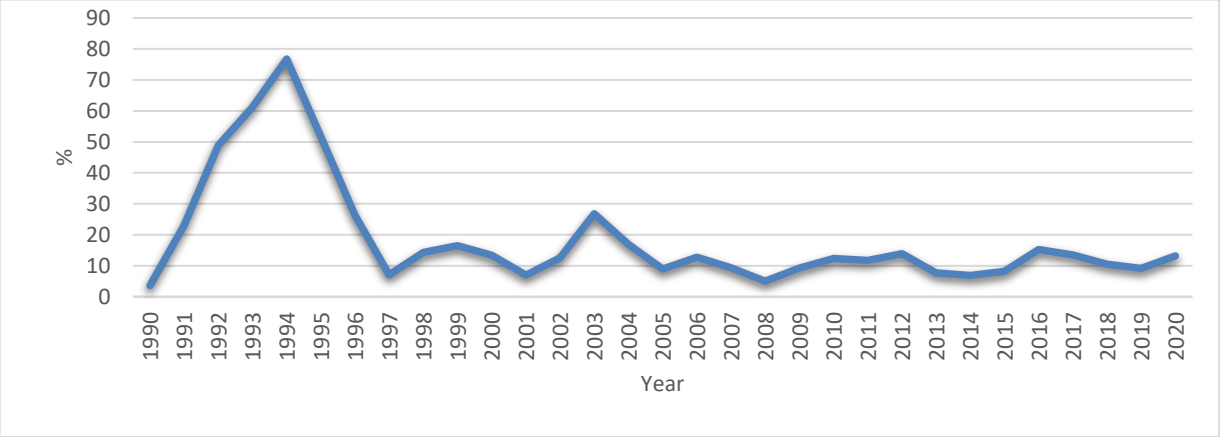


Fig. 4.1(b) above showed that interest rate (INTR) is generally in zigzag trend, reaching its maximum in 2003. The figure shows that INTR in Nigeria was not stable between 1990 and 2020 while becamestable from 2004 - 2020.The initial instability in INTRexperienced in Nigeria could be due to macroeconomic environment in the country arising from monetary policies instruments by the central bank of Nigeria (CBN).

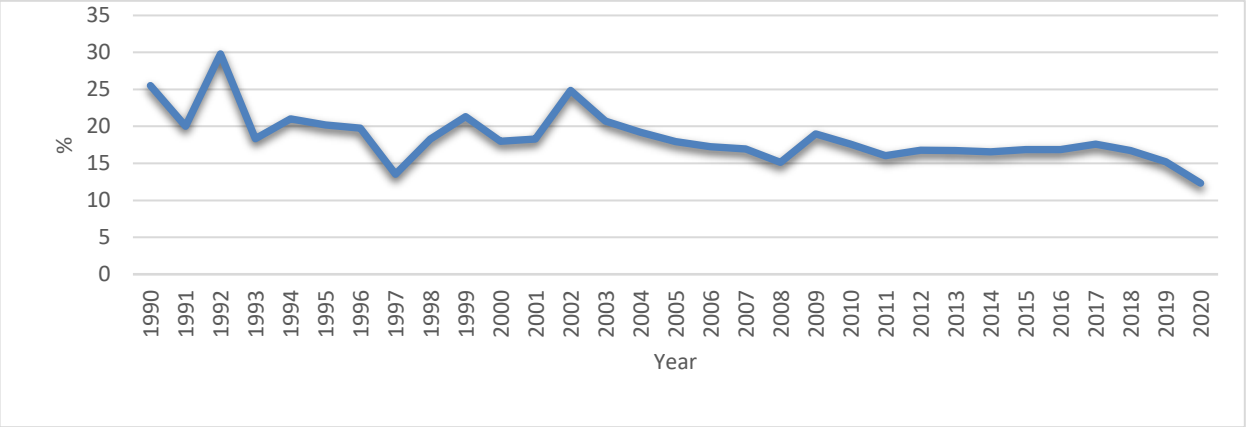
Fig. 4.1 (c) Trend in Exchange Rate (EXHR)



Source: Author's computation, 2021 using E-views 9.0

An examination of fig. 4.(c) above showed that exchange rate (EXHR) is generally in zigzag upward trend. The figure also showed that foreign exchange rate in Nigeria was not stable between 1990 and 2020. Exchange rate (EXHR) increases consistently from =N= 8.04 per U S dollar in 1990 to =N= 358.56 per one dollar in 2020 (i.e, the exchange value of naira in terms of U. S dollar falls consistently in the 1990-2020). It has an upward trend (see appendix 1 attached).

Fig. 4.1 (d) Trend Inflation Rate (INFR)



Source: Author's computation, 2021 using E-views 9.0

Fig. 4.1 (d) above showed that inflation (INF) is generally in zigzag trend, reaching its maximum in 1994. The figure also shows that inflation in Nigeria was not stable between 1990 and 2020.Inflation rate (INF) rose from 76.76 percent in 1994. It falls to 5.06 percent in 2008, and rose sharply to 15.24 percent 2016. It falls again to 9.16 percent in 2019, and rose to 13.21 percent in 2020. It has zigzag trend (see appendix 1 attached).

Table 4.2: Summary of Descriptive Statistics

Descriptive Statistics	RGDP	INTR	EXHR	INFR	GDP_{t-1}
Mean	7.582193	18.52290	129.4529	18.51484	7.329122
Median	7.584091	17.95000	128.6500	12.79000	7.556998
Maximum	7.853624	29.80000	358.5600	76.76000	7.853624
Minimum	7.331685	12.32000	8.040000	3.610000	0.000000
Std. Dev.	0.203179	3.460566	97.15631	17.42377	1.374452
Skewness	0.051351	1.299783	0.680894	2.067617	-5.120470
Kurtosis	1.368520	5.461759	2.832745	6.390045	27.85486
Jarque-Bera	3.451688	16.55659	2.431487	36.93207	933.4111
Probability	0.178023	0.000254	0.296490	0.000000	0.000000
Sum	235.0480	574.2100	4013.040	573.9600	227.2028
Sum Sq. Dev.	1.238452	359.2654	283180.5	9107.634	56.67355
Observations	31	31	31	31	31

Source: Author's computation, 2021 using E-views 9.0

The table 4.2 reveals that Gross domestic product (GDP) has a mean of 7.582193and varies from a minimum of 7.331685to a maximum of 7.853624and a standard deviation of 0.203179with a probability value of 0.0178023. interest rate (INTR) has a mean of 18.52290and varies from a minimum of 12.32000to a maximum of 29.80000and a standard deviation of 3.460566with a probability value of 0.000254. Exchange rate (EXR) has a mean of 129.9484and varies from the minimum of 8.040000to a maximum of 358.5600with a standard deviation of 97.15631and probability of 0.296490. Furthermore, inflation rate (INFR) has a mean of 18.51484and varies from the minimum of 3.610000to a maximum of 76.76000 with a standard deviation of 17.42377 and probability value of 0.0000. Lastly, lagged value of gross domestic product (GDP_{t-1}) has a mean of 7.329122and varied from a minimum of 0.000000to a maximum of 7.853624and a standard deviation of 0.43277 with a probability value of 0.000000. Consequently, real gross domestic product, foreign direct investment, exchange, degree of openness, trade balance and lagged value of real gross domestic product, were positively skewed while lagged value of real gross domestic product has negative skewness.

4.3 Results of Tests Conducted

The results of tests conducted are summarized, presented in tabular form and analyzed below: The tests conducted are: unit root, and autoregressive distributive lag (ARDL) Model.

4.3.1 Unit Root Test

Dickey-Fuller (1979) stated that there is likelihood of obtaining spurious results if the series that generated the results are non-stationary. This is why this study investigated the time series properties of the data by conducting unit root test for stationarity using Augmented Dickey-Fuller (ADF) method. The results are presented on table 4.3 below.

Table 4.3: Summary of the description of variables and their corresponding unit and sources

Variable	Description	Unit	Source
RGDP	Real Gross Domestic Product	Million Naira	NBS
INTR	Interest rate	Percentage	CBN
EXHR	Exchange rate	US$	CBN
INFR	Inflation rate	Percentage	NBS

Source: Researcher's own computation

Table 4.2: Augmented Dickey-Fuller (ADF) Unit Root Test

Series	ADF Test Statistics	5% Critical Value	Probability Value	Order of Cointegration
GDP***	-7.147897	-2.971853	0.0000	1(2)
INTR	-3.984840	-2.963972	0.0046	1(0)
EXHR	-3.794726	-2.967767	0.0076	1(1)
INFR	-4.371840	-2.971853	0.0019	1(1)

Source: Author's computation, 2019 using E-views 9.0

The results of unit root test shown on table 4.2 above revealed that all the absolute values of ADF test statistics for RGDP, INTR, EXHR and INFR are greater that their critical values at 5% implying that RGDP, INTR, EXHR and INFR are stationary at 5%, It is integrated of order 1, 2 and 0 that is, I(1), 1(2) and 1(0). The results also showed that all the variables are stationary at both 5% since their absolute value of ADF statistics are respectively greater than their critical values at 5%.

Table 4.3: Regression of RGDP =F($INTR_t$, EXR_t, $INFR_t$)**from 1990-2020**

Dependent Variable: RGDP
Method: ARDL
Date: 10/07/21 Time: 03:35
Sample (adjusted): 1992 2020
Included observations: 29 after adjustments
Maximum dependent lags: 2 (Automatic selection)
Model selection method: Akaike info criterion (AIC)
Dynamic regressors (2 lags, automatic): INTR EXHR INFR
Fixed regressors: C
Number of models evalulated: 54
Selected Model: ARDL(2, 0, 1, 0)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
RGDP(-1)	0.335229	0.101970	13.09429	0.0000
RGDP(-2)	-0.341725	0.103935	-3.287863	0.0034
INTR	0.003151	0.000550	5.725094	0.0000
EXHR	-0.000312	0.310005	-4.267867	0.0003
EXHR(-1)	0.000328	0.930005	4.130925	0.0004
INFR	-0.000631	0.000109	-5.806258	0.0000
C	0.016968	0.124994	0.135748	0.8933

R-squared	0.998888	Mean dependent var	7.599416
Adjusted R-squared	0.998584	S.D. dependent var	0.198667
S.E. of regression	0.007475	Akaike info criterion	-6.747887
Sum squared resid	0.001229	Schwarz criterion	-6.417850
Log likelihood	104.8444	Hannan-Quinn criter.	-6.644523
F-statistic	3292.321	Durbin-Watson stat	2.074591
Prob(F-statistic)	0.000000		

*Note: p-values and any subsequent tests do not account for model selection.

Source: Output of E-Views 9.0, 2021.

Model:

LRGDP= 0.01697+0.00315INTR-0.00031EXHR-0.00063INFR+U_t

(0.13575) (0.5.7251) (-4.26767) (-5.80626)

Where;

RGDP = Real Gross Domestic Product

INTR = Interest rate

EXHR = Exchange rate

INFR = Inflation rate

4.3 Discussion of Results

The result on table 4.3 above revealed the following:

The equation shows that $\alpha = 0.016797$ which is the intercept. This is the base level of prediction for the dependent variable when all the independent variables are equal to zero. The coefficients of the independent variables measure how a percentage change in independent variables affect the dependent variable.

(i.) 1 percent decrease in interest rate leads to about 0.0.00315% increase in real gross domestic product (RGDP). It was found that coefficient of INTR is positive, indicating positive relationship between INTR and RGDP in the periods 1990-2020, and this is in line with a priori. This result is statistically significant at 5 percent as the p-value of 0.0000. The standard error measures the statistical reliability of the coefficient estimates- the larger the error, the more statistical noise in the estimates. The standard error is 0.000550percent which is small or significant and thus shows that FDI is statistically reliable to predict RGDP in Nigeria.

(ii.) 1 percent increase in exchange rate (EXHR) leads to about 0.00031% increase in real gross domestic product (RGDP). It was found that coefficient of EXHR is negative, indicating negative relationship between EXHR and RGDP in the periods 1990-2020, and this is in line with a priori. This result is statistically significant at 5 percent as the p-value of 0.0003. The standard error measures the statistical reliability of the coefficient estimates- the larger the error, the more statistical noise in the estimates. The standard error is 0.310005percent which is small or significant and thus shows that EXHR is statistically reliable to predict RGDP in Nigeria.

(iii.) 1 percent increase in inflation rate (INFR) leads to about 0.000164 percent increase in real gross domestic product (RGDP). It was found that coefficient of INFRisnegative, indicating positive relationship between INFR and RGDP in the periods 1990-2020, and this is in with a priori expectation. This result is statistically significant at 5 percent level as the p-value of 0.0000. The standard error measures the statistical reliability of the coefficient estimates- the larger the error, the more statistical noise in the estimates. The standard error is 0.000109 percent which is small or significant and thus shows that INFRis statistically reliable to predict RGDP proxies for sustainable development in Nigeria.

5.0 Conclusion and Recommendations

This research study has so far examined the effects ofsome selected macroeconomic variables on economic growth in Nigeria employing Unit root test and ARDL approach. Specific references were made to the relevant macroeconomic variables complementary to foreign exchange rates such as interest rates and inflation rates. Empirical results reveal that exchange rates and other related variables considered for the analysis jointly had significant effect on

economic growth in Nigeria during the period under review, implying that interest rate, exchange rate and inflation rate are an important determinant of productivity in Nigeria.The real Gross Domestic Product is the dependent variable proxied by economic growth. The result shows that there is positive and significant impact of INTR whileEXRand INFR have negative impact on economic growth in Nigeria.The study therefore recommended that, government should provide enabling macroeconomic environment particularlyright monetary policies in place in terms of providing policies that will boast the local production in order to increase output to cushion effects of high cost of the goods and servicesas well as increase forex supply in to maintain stability of the exchange rate.

References:-

S, Zekeri& S, O. James (2020).Empirical Study Of The Relationship Between KeyMacroeconomic Variables And Nigeria Economic Growth:International Journal of Innovative Research and Advanced Studies (IJIRAS) Volume 7 Issue 9.

Danso, M. Genesh P, P. &Moses , P. (2012) The impact of real exchange volatility on economic growth; Kenya evidence BEH Business and economic horizons vol 7 (1) page 59-75

Emenike, K. O &Odili O. (2014); Stock market return volatility and macroeconomic variables in Nigeria;International journal of empirical finance vol,. 2 No.2 P,P 75-82

Ismaila, M. &&Imoughele, L. E, (2015); a Cointegration approach. International journal ofAcademic Research in economic and management sciences 4 (1), 34-46

Agalega, E., Antwi, S. 2013. The Impact of Macroeconomic Variables on Gross DomesticProduct: EmpiricalEvidence from Ghana. International Business Research, 6(5), Pp. 108-116.

Ayyoub, M., Chaudhry, I.S., Farooq, F. 2011. Does Inflation Affect Economic Growth? The case of Pakistan.Pakistan Journal of Social Sciences (PJSS), 31 (1), Pp. 51–64.

Karim, Z.A., Karim, B.A., Ahmad, R. (2012). Fixed investment, household consumption, andeconomic growth: A structural vector error correction model (SVECM) study ofMalaysia. International Journalof Business and Society, 13(10), Pp. 63–76.

Mamo, F.T. (2012). Economic Growth and Inflation A panel data analysis. Unpublished MasterThesis,Södertörns University, Sweden, Pp. 1-44.

Rahman, Z. (2014). Inflation and economic growth in Bangladesh: An empirical analysis by usingVAR model.Asian Journal of Empirical Research, 4 (8), Pp. 404-420.

Oshodi, B. A. (2018) Analysis of macroeconomic indicators on economic growth: EmpiricalStudies of Nigeria and China https://ssrn.com/abstract=3358697 accessed 20th October, 2021

Philip, O. 2010. Inflation and Economic Growth in Nigeria. Journal of Sustainable Development, 3 (2), Pp. 159–166.

Appendix 1: Original Data Sourced on selected variables

Year	RGDP (=N= Million)	INTR (%)	INFR (%)	EXHR (%)

1990	21,462,733.72	25.5	3.61	8.04
1991	21,539,613.83	20.01	22.96	9.91
1992	22,537,095.78	29.8	48.8	17.3
1993	22,078,072.14	18.32	61.26	22.05
1994	21,676,851.42	21.23	76.76	21.89
1995	21,660,487.07	20.18	51.59	21.89
1996	22,568,866.73	19.74	26.45	21.89
1997	23,231,123.13	13.54	7.07	21.89
1998	23,829,758.43	18.29	14.32	21.89
1999	23,967,591.42	21.32	16.51	92.69
2000	25,169,538.79	17.98	13.45	102.11
2001	26,658,621.29	18.29	6.95	111.94
2002	30,745,192.06	24.85	12.53	120.97
2003	33,004,796.34	20.71	26.83	129.36
2004	36,057,737.78	19.18	16.94	133.5
2005	38,378,796.06	17.95	8.99	132.15
2006	40,703,681.38	17.26	12.79	128.65
2007	43,385,877.08	16.94	9.35	125.83
2008	46,320,014.94	15.14	5.06	118.57
2009	50,042,360.65	18.99	9.24	148.88
2010	54,612,264.18	17.59	12.4	150.3
2011	57,511,041.77	16.02	11.73	153.86
2012	59,929,893.04	16.79	13.87	157.5
2013	63,218,721.73	16.72	7.73	157.31

2014	67,152,785.84	16.55	6.86	158.55
2015	69,023,929.94	16.85	8.21	193.28
2016	67,931,235.93	16.87	15.24	253.49
2017	68,490,980.34	17.58	13.55	305.79
2018	69,799,941.95	16.72	10.54	306.08
2019	71,387,826.67	15.21	9.16	306.92
2020	70,014,371.85	12.32	13.21	358.56

Source: National Bureau of Statistics and Central Bank of Nigeria's Bulletin, 2020

Appendix 2: Transformed Data

Year	RGDP	INTR	INFR	EXHR
1990	7.33	25.5	3.61	8.04
1991	7.33	20.01	22.96	9.91
1992	7.35	29.8	48.8	17.3
1993	7.34	18.32	61.26	22.05
1994	7.34	21.23	76.76	21.89
1995	7.34	20.18	51.59	21.89
1996	7.35	19.74	26.45	21.89
1997	7.37	13.54	7.07	21.89
1998	7.38	18.29	14.32	21.89
1999	7.38	21.32	16.51	92.69
2000	7.40	17.98	13.45	102.11
2001	7.43	18.29	6.95	111.94
2002	7.49	24.85	12.53	120.97
2003	7.52	20.71	26.83	129.36
2004	7.56	19.18	16.94	133.5
2005	7.58	17.95	8.99	132.15
2006	7.61	17.26	12.79	128.65
2007	7.64	16.94	9.35	125.83
2008	7.67	15.14	5.06	118.57
2009	7.70	18.99	9.24	148.88
2010	7.74	17.59	12.4	150.3
2011	7.76	16.02	11.73	153.86

2012	7.78	16.79	13.87	157.5
2013	7.80	16.72	7.73	157.31
2014	7.83	16.55	6.86	158.55
2015	7.84	16.85	8.21	193.28
2016	7.83	16.87	15.24	253.49
2017	7.84	17.58	13.55	305.79
2018	7.84	16.72	10.54	306.08
2019	7.85	15.21	9.16	306.92
2020	7.85	12.32	13.21	358.56

Source: Researcher's own computation