



MACROECONOMICS AGGREGATES AND ECONOMIC GROWTH IN NIGERIA

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Abstract: The effectiveness of macroeconomic factors are essential for the growth and development of every emerging and developed nations. To this end, every economy must design frame work to ensure the working of the macroeconomic variables for optimum economic growth and development. Given this premise, the paper examined the effect of selected macroeconomic aggregates on economic growth in Nigeria from 1985-2018. The objectives of the paper were to; examine the effect of inflation rate, exchange rate and balance of payments (BOP) on economic growth in Nigeria. Time series on real gross domestic product (GDP), inflation rate, exchange rate and balance of payments (BOP) were sourced from central bank of Nigeria (CBN) statistical bulletin. The data was analyzed through Error Correction Mechanism (ECM) and granger causality technique. The stationarity test via the Augmented Dickey Fuller (ADF) unit root test preceded the ECM and Granger causality test. The unit root test showed that all the variables were stationary at order one. The Johansen co-integration result showed that there is a long run relationship amongst the variables. The parsimonious ECM result showed that, the adjusted R² is about 56percent. The coefficient of inflation rate appeared with negative sign. But the coefficient of exchange rate and BOPs appeared with positive sign. The Durbin Watson statistic value of 1.9 is very close to 2.0 benchmark, implies that there exists a lesser degree of serial autocorrelation in the model. In the meantime, the granger causality result showed that both exchange rate and BOP granger causes economic growth, while inflation rate does not impact on economic growth. Based on the findings, the following recommendation amongst others was made: Government together with the Central Bank of Nigeria should develop and pursue prudent monetary policies that would aim at reducing and stabilizing both the macro and macroeconomic indicators such as inflation targeting, interest rate, so as to boost the growth of the economy.

Key Words: Aggregates, BOP, GDP, Economic growth, Exchange rate, Inflation rate

1. INTRODUCTION

Macroeconomic factors are essential drivers of economic growth and development in every economy. This is so because a developing economy needs a competitive business environment to flourish. Meaning that, an economy should be characterized with an environment where there is low price level, increase employment level,

stable exchange rate as well as stable political situation amongst others. The behaviours of these factors, specifically the macroeconomic variables have recently gained centre stage in explaining variations in competitiveness, growth and prosperity across countries (Ezenekwe & Obayori, 2017). There is no doubt that economic growth in Nigeria has been disappointed when

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compare to other developing countries like Ghana and South Africa. This is because, the basic economic indicators such as stable price level, exchange rate, interest rate and favourable BOP which serves as the drivers of the economy have not perform creditably well in order to spur growth.

Macroeconomic aggregates/variables such as inflation, interest rate, exchange rate amongst others have been established by considerable research to be of great determinants of GDP elsewhere in developed countries (Obayori & George-Aokwuru, 2019). But in the Nigerian economy, the reverse is the case. For instance, CBN (2016) statistic revealed that the exchange rate moved from its level of 54K: US \$ 1.00 in 1980 to ₦22.05: US \$1.00 in 1994 moved to ₦305: US \$1.00 in 2016. Conversely, Balance of Payments (BOP) fluctuated with negative sign from the year 1980 to 2014 except for the years 1980, 1997, 2000, 2001, 2004, 2013 and 2014 that recorded positive figures. Similarly, inflation rate has not been encouraging. For instance, in 1985 inflation rate was 5.5 percent. It increased to 7.5 percent in 1990. Inflation rate decreased to 6.9 percent in the year 2000. But from the year 2017 and 2019, it hover between 17.9 percent in and 18.9 percents.

In lieu of the scenario above, successive governments in Nigeria had initiated several fiscal and monetary policies aimed at bringing inflation and interest rate down and as well encourage stable rate of exchange with the view to boosting economic growth as measured by GDP. Whiles these policies might be good, the effects of these macroeconomic aggregates on the Nigerian economy has not been encouraging. Thus, the objectives of the paper were; to exermine the effect of inflation rate on economic growth; determine the effect of exchange rate on Nigeria's economic growth; and exermine the effect of balance of payments on economic growth.in Nigeria

2. THEORETICAL AND EMPIRICAL REVIEW

There are various theories that brelates macroeconomic aggregates to the growth of an economy. But the paper is based on the endogenous growth theory. The endogenous growth theory was developed by In David Romer in the mid-1980s. According to Romer (1994), endogenous growth theory indigenizes the rate of technological progress. It traces the rate of growth of output per capita to two main sources – savings and efficiency. It also argues that policy measures can have an impact on the long-run growth rate of an economy, even if they do not change disaggregate saving rate. Thus countries with high level of efficiency, appropriate economic system, sound, economic policy, tend to grow more rapidly (Romer, 1994). Rapid growth rates are associated with country with efficient economic system and prestige (Lewis, 1978). This new thinking is very important for countries in an integrated arrangement or considering forming an economic union, and therefore aptly explains why countries economic growths are different (Essien & Bawa, 2007).

The efficiency argument is not entirely a new one. Economists have long held this view as they recognized technical change as important catalysts for economic growth. However, this endogenous growth theory is now being broadened to also include efforts to utilize the accumulated knowledge and other supportive conditions to optimal benefit. Thus technical change is viewed as an aspect of general economic efficiency. It is said to be good for growth as to squeeze out more output from a given input and that is what efficiency is about.

In conclusion, endogenous growth model is relevant to this study because it indigenizes the rate of technological progress vis-à-vis openness of trade and exchange rate, export amongst others. This will in turn lead to growth.

Empirical reviews of previous studies on macroeconomic aggregates and economic growth in both developed and developing countries include; Tom-West and Kalu (2022) who examined selected external sector variables and economic development in Nigeria from 1980 to 2021 with



the use of auto regressive distributed lag model (ARDL). The ARDL bound test results showed that, there is a long-run relationship amongst the variables. In the short-run, there is a positive relationship between foreign exchange reserves and economic development in Nigeria. Also, in the short-run, there is a positive and significant relationship between exchange rate and economic development in Nigeria. Similarly, trade openness has positive impact on economic development in Nigeria. Also, Ismaila and Imuoghele (2015) used OLS to examine macroeconomics determinants of economic growth in Nigeria. They used time series data obtained from CBN from 1986 to 2012. Augmented Dickey-Fuller (ADF) test was used for the unit root test and Johansen's co-integration test was also conducted to establish short and long run relationships between economic growth and its macroeconomics determinants. The result shows six co-integrating equations which establish the existence of long run relationship among the variables. The results show that gross fixed capital formation, foreign direct investment and total government expenditure are the main determinants of Nigeria economic output under a stable inflationary rate. Also, Muhammad, Muhammad and Rashid (2015) examined the impact of major economic variables on economic growth of Pakistan. The secondary on GDP, inflation rate, interest rate and exchange rate data from 1981 to 2013 was used. The results of the OLS multiple linear regression describe that both inflation rate and interest rate spread negative impact on Pakistan's economic growth while exchange rate is found positively significant on the economy.

Muhammad, Muhammad, Umar and Saima (2014) investigated the impact of macroeconomic variables on GDP growth of Pakistan by using annual data over the period of 1980 to 2013. To achieve objective, correlation coefficient, regression analysis and Granger causality test are used. From the result of correlation coefficient, the inflation and interest rate have negative and significant

association with GDP growth. The result of Granger causality test indicated that the interest rate and inflation have a unidirectional causality and exchange rate and FDI have also unidirectional causality. From the regression analysis result it indicates that inflation, interest rate, exchange rate and FDI demonstrate significant impact on GDP growth.

Antwi, Mills and Zhao (2013) examined the long-run macroeconomic factors of economic growth in Ghana using Johansen approach to cointegration vectors. The study period spanned from 1980 to 2010. The time series properties of the data were, first, analyzed using the Augmented Dickey Fuller (ADF) test. The empirical results derived indicate that all the variables of interest were stationary after their first differencing. The study found cointegration relationship between real GDP per capita (economic growth) and its macroeconomic factors. Evans and Antwi (2013) investigate the effect that changes in the inflation and interest rates have on the Gross Domestic Product (GDP) in Ghana from 1980-2010. Data were collected from Bank of Ghana publications and bulletins, Ghana Statistical Service, the Institute of Statistical, Social and Economic Research (ISSER). The paper employed multiple linear regressions to establish that there exists a fairly strong positive correlation between GDP, Interest rate and Inflation, but Inflation and Interest rate could only explain movement in GDP by only 44 percent. The study further established that, there existed positive relationship between inflation and GDP and interest rate is negative. Zafar and Zahid (2013) examined the effects of some of the key macroeconomic variables on economic growth. Employing multiple regression framework and time series data over the period 1959-60 to 1996-97. The empirical results suggested that budget deficit and external debt is negatively related to economic growth, suggesting that relying on domestic resources is the best alternative to finance growth and reinforce the importance of sensible long-run growth-oriented policies



to obtain sustainable growth. Kolawole (2013) empirically examined the growth-effects of macroeconomic stability factors in Nigeria. Using time series data for the period 1980 to 2011 and adopting various econometric techniques such as Granger causality test, and Error Correction Mechanism (ECM), the results reveal that real interest rate has direct and significant effects on Nigeria economic growth while external debt and real exchange rate impact negatively on growth in the country.

Asogwa (2008) adopted the Exponential Generalized Autoregressive Conditional Heteroscedasticity (EGARCH) and Vector Error Correction (VEC) model to examine the impact of macroeconomic variables volatility on economic growth in Nigeria from 1970-2005. The results show that fluctuations in economic growth is positively determined by the level of inflation rate, real interest rate, unemployment rate, but negatively influenced by investment ratio, per capita income, real exchange rate and the degree of trade openness. It further shows that there is transmission of structural shocks between economic growth and its determinants. However, the transmission mechanism of these shocks is complex and difficult to determine. The result of the conditional variance shows that there is high degree of volatility clustering between economic growth and its determinants.

3. METHODOLOGY

Table 1 Augmented Dickey Fuller Unit Root Test at Level and First Difference

Variable	ADF Test @ Level	Critical Value			Order of Integration
		1%	5%	10%	
GDP	-1.3258	-3.6793	-2.9604	-2.6229	Not Stationary
INF	-2.5853	-3.6617	-2.9604	-2.6192	Not Stationary
EXR	1.2292	-3.6617	-2.9604	-2.6192	Not Stationary
BOP	-3.6250	-3.6999	-2.9604	-2.6274	Not Stationary

Source: Authors' Computed Result Using (E-Views 10.0)

Table 2 Augmented Dickey Fuller Unit Root Test at First Difference

Variables	ADF Test	Critical Value	Order of integration
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The study used time series obtained from the CBN statistical bulletin and National Bureau of Statistics (NBS) on Real Gross Domestic Product, inflation rate, exchange rate and balance of payments from 1985-2018. It employed the ADF unit root test and Co-integration/Error Correction Mechanism (ECM) methods as the analytical tools. The unit root test was conducted to capture the stability of the variables in the model and avoid spurious regression result (Dickey & Fuller, 1979; Granger & Newbold, 1974). Also, the co-integration test was conducted to examine the long-run relationship amongst the variables in the model (Johansen, 1988); and the Error Correction Mechanism helps to establish the speed of adjustment from the short-run equilibrium to the long-run equilibrium state.

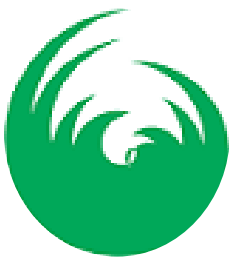
Model Specification

The ECM linear form of the model was specified as follow;

$$GDP_t = \beta_0 + \sum \beta_1 GDP_{t-1} + \sum \beta_2 INF_{t-1} + \sum \beta_3 EXR_{t-1} + \sum \beta_4 BOP_{t-1} + \rho ECM_{t-1} + e_t \quad (1)$$

Where; β_0 is the intercept parameter, $\beta_1 - \beta_4$ are the slope parameters, GDP is the dependent Variable, INF, EXR and BOP are the explanatory variables, ρ is the coefficient of ECM which measure the speed of adjustment of the model and e is the error term.

4. RESULTS AND DISCUSSION



		1% critical value	5%critical value	10%critical value	
GDP	-7.972332	-3.679322	-2.967767	-2.622989	Order One
INF	-5.162300	-3.724070	-2.967767	-2.632604	Order One
EXR	-5.184339	-3.679322	-2.967767	-2.622989	Order One
BOP	-3.075834	-2.674290	-2.967767	-1.608175	Order One

Source: Authors' Computation Using (E-Views 10.0)

The ADF unit test was used to investigate stationarity of the variables. The analysis of the unit root test results in Tables 1 and 2 showed that in Table 1 none of the variables was stationary at level. But in Table 2, all the variables

were differenced once and all were stationary at first difference. Meaning that in absolute term, their respective ADF values were greater than their critical value at 1%, 5% and 10% respectively.

Table 3 Johansen Co-integration Test Result

Eigen value	Trace Statistics	5% critical value	Prob. **	Hypothesis of CE(s)
0.857678	94.67465	47.85613	0.0000	None *
0.548314	38.13435	29.79707	0.0044	At most 1 *
0.305839	15.08605	15.49471	0.0575	At most 2
0.143720	4.499576	3.841466	0.0339	At most 3

Source: Computed Result Using (E-Views 9.0)

In order to determine the long-run equilibrium relationship amongst the variables, a co-integration test was conducted. The Johansen co-integration test in Table 3 showed that there is a long run equilibrium relationship among the

variables in the model. Thus, all the explanatory variables will move together in the long-run to bring about increase in economic growth in Nigeria.

Table 4. Parsimonious Error Correction Result

Variables	Coefficient	T-Statistics	T-Table	Probability
C	0.041133	2.506274	2.034	0.0210
D(GDP(-1))	0.249844	1.258497	2.034	0.2227
D(GDP(-2))	0.274085	1.383280	2.034	0.1818
D(GDP(-3))	-0.229615	-1.076012	2.034	0.2947
D(INF)	-0.000364	-0.627057	2.034	0.5377
D(EXR)	0.022477	5.506880	2.034	0.0064
D(BOP)	2.06E-10	3.317600	2.034	0.0039
ECM(-1)	-0.001450	-2.309826	2.034	0.0317
Adjusted R ² =0.55954	DW-Stat= 1.9067	F-Stat=6.7498	F-tab=3.340	F-prob=0.00575

Source: Computed Result Using (E-Views 10.0)

The parsimonious ECM result in Table 4 showed that the adjusted R² is about 56 percent. Also, the entire model is statistically significant at 5 percent level given the

calculated F-stat of 6.75 and the f-stat (prob) of 0.00575. The coefficient of inflation rate (-0.000364) appeared with hypothesized negative sign. Thus, a persistence rise in the



general price level will bring about a reduction in the growth rate. Also, the coefficient of both exchange rate (0.022477) and BOPs (0.000000000206) appeared with hypothesized positive sign. Thus, a strong value of the Naira in relation to the international currencies, US dollar in particular will bring about increase in the growth rate of the economy. This finding corroborates the empirical work of Obayori and George-Anokwuru (2019) who averred that

there is a direct link between exchange rate, BOP and economic growth.

The Durbin Watson (DW) statistic value of 1.9 is very close to 2.0, based on rule- of-thumb; it implies that there exists a lesser degree of serial autocorrelation in the model. The coefficient of ECM has the hypothesized negative sign and statistically significant at 5% with the speed of adjustment of 0.145%. Thus, the short run error has been adjusted to long run equilibrium relationship.

Table 5 Pairwise Granger Causality Tests Result

Variables	Observation	F-Statistic	Prob.	Decision
(INF) → (GDP)	31	1.02143	0.3746	Accept Ho
(GDP) → (INF)		1.18302	0.3229	Accept Ho
(EXR) → (GDP)	31	4.66248	0.0190	Reject Ho
(GDP) → (EXR)		2.04700	0.1502	Accept Ho
(BOP) → (GDP)	31	3.14438	0.0605	Reject Ho
(GDP) → (BOP)		0.38430	0.6849	Accept Ho

Source: Computed Result Using (E-Views 10.0)

In the meantime, in Table 5, the granger causality result showed that both exchange rate and BOP granger causes and impact on economic growth, while inflation rate does not impact on economic growth. The findings from the study showed that macroeconomic indicators such as exchange rate and balance of payments are key determinants of economic growth in Nigeria.

5. CONCLUDING REMARKS

The paper examined the effect of macroeconomic aggregates on economic growth in Nigeria. Based on the reviewed literature, it was discovered that, Nigeria in her effort to achieve economic growth and development formulates policies that tends to bring about stability of the macroeconomic aggregates of the economy in order to bring about increase in economic growth. Thus, objectives of the study were to; determine the effect of inflation rate on economic growth; examine the effect exchange rate

on Nigeria's economic growth and determine the effect of balance of payments and Nigeria's economic growth. The empirical results based on the parsimonious Error Correction Model showed that, inflation rate has negative relationship with GDP, while both exchange rate and BOP have positive relationship with GDP. The granger causality result showed that both exchange rate and BOP impact on economic growth, while inflation rate does not impact on economic growth. Thus, the conclusion from the finding shows that both exchange rate and BOP have greater influence in increasing economic growth in Nigeria during the period of study.

Based on the findings of the study, the following recommendations were made: Government should formulate and implement contractionary monetary policy that aim at reducing the rate of inflation in order to attain sustain economic growth. Also, macroeconomic policy



measures that address the problem of exchange rate variation should be consistent in the Nigeria economy in order to boost economic growth. There should be consistency of macroeconomic policy measures in Nigeria economy to redress balance of payments disequilibrium in order to boost more economic growth. This can be done by diversifying the economy to strengthen the balance of payment position of the country.

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