Comparative Analysis of the Impact of Fixed and Floating Exchange Rates on Economic Growth in Nigeria

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Abstract

This paper analyses the impact of fixed and floating exchange rates on economic growth in Nigeria using annual data spanning (1960-2020). It sought to: examine the relationship between exchange rate and economic growth; and also to determine the nature and the direction of causality between exchange rate and economic growth in Nigeria. Employing the Ordinary Least Square (OLS) technique and the Granger Causality Test, the study revealed the existence of a positive but significant relationship between exchange rate and economic growth in Nigeria. The Chow-test result also shows that there was a structural break between exchange rate and economic growth in Nigeria within the period under review. This change in relationship can be attributed to the Structural Adjustment Programme (SAP) embarked upon by the Nigerian government in 1986. Furthermore, the results also indicate that there is no causality between exchange rate and economic growth in Nigeria. In view of the fact that exchange rate stability is absolutely imperative for macroeconomic stability, the paper recommended that government and monetary authorities should adopt monetary (money supply and interest rates) as well as fiscal policies (taxation and spending) that will not only ensure a convincing and stable exchange rate but will also serve to raise economic growth in Nigeria.
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1.   Introduction

In Nigeria, the exchange rate policy has undergone substantial transformation from the immediate post-independence period when the country maintained a fixed parity with the British pound, through the oil boom of the 1970s, to the floating of the currency in 1986, following the near collapse of the economy between 1982 and 1985 period. In each of these periods, the economic and political considerations underpinning the exchange rate policy had important repercussions for the structural evolution of the economy, inflation, the balance of payments and real income.

Exchange rate is an important macroeconomic policy instrument. Changes in exchange rates have powerful effects on tradable and non-tradable of countries concerned through effects on relative prices on goods and services (Ufoeze, Okuma, Nwakoby & Alajekwu, 2018). Since Nigeria's independence in October 1960, monetary authorities has pursued vigorously the objectives of internal and external balance in a desperate bid to raise the standard of living, alleviate poverty and acquire economic and political power, stability and prestige. They did this by administratively adjusting the foreign exchange rate of the domestic currency *Vis-a Vis* the peculiar and prevailing economic situations (Osuka & Osuji, 2008).

Mehdi Arezoo and Alireza (2014) states that the effect of exchange rate fluctuations on economic growth varies from country to country, asserting that one of the factors determining the way exchange rate fluctuations affect economic growth is the development level of each country's financial markets. In the bid to achieve macroeconomic stability, Nigeria's monetary authorities have adopted various exchange rate arrangements over the years. It shifted from a fixed regime in the 1960s to a pegged arrangement between 1970s and the mid – 1980s and finally to the various types of the floating regime since 1986 following the adoption of the Structural Adjustment Programme (SAP) (Eze & Okpala, 2014).

The fixed exchange rate regime induced an over valuation of the naira and was supported by exchange rate control (regulations that engendered significant distortions in the economy), that gave rise to massive importation of finished goods with adverse effects for domestic production, nation's external debt, balance of payment position and external reserves level (Akonji, 2013). Also, the period was affected by sharp practices perpetrated by dealers and end users of foreign exchange (Adelowoka, 2012). These and many other problems led to the adoption of a more floating exchange rate regime during the SAP era of 1986.

Although various factors have been adduced to the poor economic performance of Nigeria, it is necessary to examine the growth process of Nigeria under the various exchange regimes that had been adopted in the country, and that is the main thrust of this paper. The concept is of relevance for economic growth because no country is independent and no country is immune to global crisis. The huge reliance on oil export revenue by Nigeria and import of essential goods and services exposes the country's economic growth and her exchange rate excessively to external shocks (Kalu, Ugwu, Ndubuaku & Ifeoma, 2019)

Rodrick (2007) concurs that economists have long known that poorly managed exchange rates can be disastrous for economic growth. The real exchange rate thus, serves as an international price for determining the

competitiveness of a country. Takaendesa (2006) explains that the real exchange rate plays a crucial role in guiding the broad allocation of production and spending in the domestic economy between foreign and domestic goods. Nwosu (2016) opined that exchange rates that emerged after the collapse of Bretton Wood System has been unstable and has made scholars and professionals to be skeptical about its effectiveness in enhancing economic growth. For instance, the naira to US Dollar exchange rate was N4 in 1987 while the real GDP was about N204.8Billion. In 1995, it depreciated to N21 to one US Dollar while the real GDP was N281.4Billion. As at 2014, the exchange rate was N168 to one USD and the exchange rate depreciated to N365 in 2017.

According to Central Bank of Nigeria [CBN], (2010) real exchange rate was relatively stable during the fixed regime but it fluctuated throughout the floating regime. On the other hand, growth rate of real gross domestic product (GDP) has been quite epileptic throughout the period 1970-201. Between 1970 and 1985 economic growth and exchange rate of growth of GDP increases and decreases with the exchange rate. This was in the period of fixed exchange rate in Nigeria. However, with the introduction of Structural Adjustment Programme (SAP) by the Federal Government, the country moved from a pegged regime to a flexible exchange rate regime where exchange rate was allowed to be determined by market forces of demand and supply and from this period the exchange rate started rising above the growth rate of GDP.

Despite all the policies adopted by government to achieve stability in exchange rate, the naira continued to depreciate against the American dollar. The economic growth of Nigeria started on a good note in the 1970's as the period coincided with the end of civil war which necessitated the need for massive reconstruction activities. Growth rate of GDP was negative in 1986, 1987, 1991, and 1995 while exchange rate kept on rising. Apart from these four years. Nigeria has never experienced negative growth since flexible exchange rate was adopted. There was a drastic increase in exchange rate from 1999 to 2000 as naira was depreciated from ₦21.89 in 1999 to ₦85. 98 in 2000 while the growth rate moved from 0.5% to 5.3% (Uduakobong & Enobong, 2015). During the period of fixed exchange rate between 1970 and 1985, GDP was increasing and decreasing with the exchange rate. However, following the adoption of Structural Adjustment Programme (SAP) in 1986 the country moved from a pegged regime to a flexible exchange rate where exchange rate is allowed to be determined by the forces of demand and supply. From this period the exchange rate of naira began to rise although the rate of growth seems to maintain a positive state, but the rate at which exchange rate rises is far above the rate of growth (CBN, 2011).

In the light of the above, it is important to advance a research whose aim is to assess the central relationship existing between the fixed and floating exchange rate regimes and economic growth in Nigeria. This study bridges the knowledge gap by answering the relevant research question of "how has the foreign exchange rate under the fixed and floating regimes influenced economic growth of Nigeria? Is there the presence or absence of structural break? What is the direction of causality between fixed exchange rate, floating exchange rate and economic growth in Nigeria? Answering these questions is important to virtually all the various economic agents; for instance, policy makers will find the answer useful in knowing what policy to pursue when determining appropriate exchange rate policy. Investors (both institutional and private) will also find the result interesting as it will help in determining their expectations as to changes in exchange rate influences on economic growth and of course market performance.

2.   Literature Review
2.1   Conceptual Literature
2.1.1   Concept of Exchange Rate
Exchange rate implies the price of one currency in terms of another (for example how much Nigerian Naira exchanges for a US Dollar). Exchange rate is the ratio between a unit of one currency and the amount of another currency for which that unit can be exchanged at a particular time (Ngerebo-a & Ibe, 2013). Various forms of exchange rate regimes are open to individual countries. They range from floating exchange rate regime at one extreme to firmly fixed arrangements at the other extreme, with the remaining regimes falling in a continuum in between.

A fixed exchange rate is a system in which a country's exchange rate remains constant or stays within some small margin of fluctuation around a constant par value. On the other hand, the floating exchange rate (which is our concern in this study) is an exchange rate system with no government or central bank action to keep it stable. With floating rates external shocks especially foreign trade shocks are less disruptive and monetary policy is more effective in influencing aggregate demand (Pugel, 2007), hence economic growth is achieved.

2.1.2   Concept of Economic Growth
Economic growth is defined and measured as either: an increase in real gross domestic product (GDP) accruing over some time period, or an increase in real GDP per capita occurring over some time period (McConnell, Brue, & Flynn, 2009). It is the rise in the total output of a country over a specified period of time. The growth of an economy over time

is widely measured with Gross Domestic Product (GDP). Nigeria economic performance since independence in 1960 has been decidedly mediocre, despite the availability and expenditure colossal amount of foreign exchange derive mainly from its oil and gas resources, economic growth has been weak and the incidences of poverty has increased (Ismaila, 2016).

Economic growth are determined by various macroeconomic indices which include but no limited to exchange rate, inflation, government expenditure, capital mobilization visa viz: well-functioning of the financial sector, human capital development and index of industrial production among others. Traditionally, inflation and economic growth negatively correlated, because the higher the prices of commodities less the purchasing power of money and more people will be reluctant to spend. A reduction in spending would result in low production of goods and services, which ultimately decrease the GDP. Similarly, if government expenditure is high there is no corresponding monetary policy measure to cope inflation, there will much money in circulation resulting in inflation. The purchasing power of money for productive activities would be eroded, hurting the total output within that period of budget implementation. However, the liquidity mop up measure, higher government would lead capital accumulation which will enhance production, thereby increasing the GDP (Anyanwu, Ananwude & Okoye, 2017).

2.2   Theoretical Review
2.2.1   Solow Growth Model

The model for this project work will adopt the modified neo-classical Solow model of growth (Solow, 1994). The Solow neoclassical growth model in particular represented the seminal contribution to the neoclassical theory of growth and later earned Robert Solow the Nobel Prize in economics. It expanded on the Harrod-Dormar formulation by adding a second factor, labour, and introducing a third independent variable, technology, to the growth equation. More formally, the standard exposition of the Solow neoclassical growth model uses an aggregate production function in which:

$$Y = K^\alpha (AL)^{1-\alpha} \dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots\dots.(1)$$

Where:

Y= Gross Domestic Product

K= Stock of capital (which may include human capital as well as physical capital)

L= Labour

A= Labour productivity, which grows at an exogenous rate $^{1-\alpha}$= the elasticity of output with respect to capital

According to traditional neoclassical growth theory, output growth results from one or more of three factors: increases in labour quantity and quality (through population growth and education), increases in capital (through savings and investment), and improvements in technology as well as exchange rate which can affect economic growth.

2.2.2   Purchasing Power Parity Theory of Exchange Rate

Cassel (1981) developed the purchasing power parity theory. In effort to retort to call for a substitute exchange rate determination system following the fall of the fixed exchange rate system, the purchasing power parity theory was advanced. The theory states that the exchange rate between two currencies is solely determined by movement of demand and supply forces. The basis of the theory is that, if any pair of currency is set at par, then, the exchange rate differential should reflect variations arising from the purchasing powers of the relative currency in relation to the Base Exchange rates (Ibenta, 2012).

Mimicking the example of Ibenta, the price of semolina in Nigerian and Ghanaian markets should trade at the same price (after adjusting for exchange rate). If the price is semolina is lower in Nigeria, then purchasers will buy wheat in Ghana so far as the price is cheaper (after taking into account transportation costs). This will result in fall in demand in Nigeria and rise in Ghana. From this explanation, a favourable/ appreciative exchange rate (local currency against foreign currency) will spur economic growth as demand for goods and services would increase production, which eventually lead to rise in gross domestic product. The purchasing power parity theory has undergone reforms over time and general accepted by international financial market operators in determining exchange rate between two currencies.

2.3   Empirical Review

Ufoeze, et al., (2018) investigated the effect of exchange rate fluctuations on Nigerian economy. The time period covered was 1970 to 2012. The study employed the ordinary least square (OLS) multiple regression technique for the analysis. The coefficient of determination (R^2), F-test, t-test, beta and Durbin-Watson were used in the interpretation of the results. The result revealed that about 85% of the changes in macroeconomic indicators are explained in the fixed exchange era. In the floating exchange era, 99% was explained while the whole periods have 73% explanatory power, hence the floating exchange era (1986 to date) is more effective in explaining economic trends in Nigeria. Also, exchange rate has significant

positive effect on GDP during the fixed exchange rate era and negative effect during the eras floating and all-time.

Eze and Okpala (2014) investigated the quantitative impact of foreign exchange polices in Nigeria using the Chow test procedure to determine the structural stability of the relationship between exchange rate and output of goods and services during the fixed exchange rate regime and floating regime. The conducted Chow test showed that the relationship between exchange rate and economic growth performance in Nigeria have not undergone any significant structural changes. They therefore infer that no matter the exchange rate regime adopted by a country, whether fixed or floating, what matters is the effectiveness of the management its exchange rate policy.

Dada and Oyeranti (2012) investigated the impact of exchange rate on macroeconomic aggregates (Such as Real GDP, inflation, government revenue, government expenditure, and import) in Nigeria using the Two-stage Least Squares (2SLS) regression analysis based on the annual time series data for the period 1970 to 2009. The findings of the study show that there is no evidence of a strong directional relationship between changes in the exchange rate and GDP growth. Rather, it was found that Nigeria's economic growth has been directly affected by fiscal and monetary policies and other economic variables particularly the growth of exports (oil).

Ali, Ajibola, Omotosho, Adetoba and Adeleke (2015) investigated the impact of Naira real exchange rate misalignment on Nigeria's economic growth using quarterly data spanning the period 2000-2014. It was found that real exchange rate misalignment impacts negatively on economic growth. The study recommended the continued use of market-based exchange rate arrangements as a way of ensuring that the naira real exchange rate follows its path of sustainable equilibrium.

Jibrin, Jelilov and Gayypov (2017) examined the impact of change scale on the Gross Domestic Product (GDP) and other macroeconomic totals for an example of ten (10) ECOWAS part states. The nations were Benin Republic, Burkina Faso, Cape-Verde, Gambia, Ghana, Guinea, Guinea Bissau, Liberia, Nigeria, and Sierra Leone. Utilizing the Ordinary Least Square technique for investigation, the examination uncovered that swapping scale significantly affected the GDP in Benin Republic, Guinea Bissau, Liberia, and Nigeria.

Yaqub (2010) investigated the effect of exchange rate on output of different sectors of Nigeria on the backdrop of the epileptic economic performance of the country despite the adoption of both the fixed and market based exchange rate regimes to attain a realistic exchange rate that would ensure efficient allocation of foreign exchange and pave way for a non-

inflationary growth. Using a modified IS-LM framework and Seemingly Unrelated Regression Estimation (SURE) technique to analyse time-series data spanning from 1970 to 2007, it was found that exchange rate had significant contractionary effects on agricultural and manufacturing sectors while it had expansionary effect on services sector. Therefore, Yaqub (2010) concludes that the existing structures in Nigeria could not support an expansionary depreciation argument in the basic sectors.

Uduakobong and Enobong (2015) analyzed the relationship between Exchange Rate Movements and Economic Growth in Nigeria. Employing the Ordinary Least Square (OLS) technique and the Granger Causality Test, the study revealed the existence of a positive and insignificant relationship between exchange rate and economic growth in Nigeria. The results also indicate that there is no causality between exchange rate and economic growth in Nigeria. In view of the fact that exchange rate stability is absolutely imperative for macroeconomic stability, the study recommends amongst others that government should adopt appropriate monetary and fiscal policies that will not only ensure a realistic and stable exchange rate but will also serve to foster economic growth in Nigeria.

Akonji (2013) analyses the impact of exchange rate volatility on Macroeconomic variables in Nigeria using Correlation Matrix, Ordinary Least Square (OLS) and Granger Causality test with data from 1980 to 2010. It was found that exchange rate volatility has a positive influence on Gross Domestic Product, Foreign Direct Investment and Trade Openness, but negative influence on the inflation rate in the country. Based on these findings, the country should improve her revenue base by increasing volume of export and reducing reliance on petroleum sector, and also reduce the importation of nonessential items in addition to increased domestic production.

Alalade, Adekunle and Joseph (2014) investigated the effect exchange rate regimes has had on non-oil export revenue in Nigeria between 1986 and 2010, using a non-oil model Augmented Dickey Fuller unit root test, Eagle-Granger approach to test co-integration in the long run, and error correction model to correct short run deviations focusing on some macroeconomic variables such as inflation, price index, gross domestic product (GDP), exchange rate and degree of openness. Overall, the findings of the study show that exchange rate reforms are not sufficient to diversify the economy and change the structure of exports.

Adelowokan (2012) examines the precise channel of exchange rate pass-through in Nigeria between 1970 and 2010 employing the interest rate and inflation rate channels of exchange rate pass-through using the classical Ordinary Least Square estimation method. The empirical results revealed that

it is only previous exchange rate of naira vis-à-vis U.S dollar that pass-through interest rate in Nigeria between 1970 and 2010, while neither current exchange rate of naira vis-a vis U.S dollar (ER) nor previous exchange rate of naira vis-à-vis U.S dollar (ERt-1) pass-through inflation rate in Nigeria between 1970 and 2010.

Opaluwa, Umeh and Ameh (2010) examined the impact of exchange rate fluctuations on the Nigerian manufacturing sector during a twenty (20) year period (1986–2005) using regression analysis. It was found that fluctuations in exchange rate adversely affect output of the manufacturing sector. It was discovered that the performance of the manufacturing sector was affected by factors such as high cost of foreign exchange for procuring raw materials and machineries required for production, availability of financial capital, technological underdevelopment, inadequate socio-economic infrastructure, shortage of technical manpower and foreign domination; following the implementation of exchange rate devaluation; the manufacturing sector has not performed any better because of the influence of the earlier mentioned factors which affect the manufacturing sector performance.

From the literature, the theoretical and empirical arguments on the comparison between fixed and floating exchange rate regimes are still inconclusive. There are gaps in the study that this paper provides solutions within its context. Both works fail to compare the performance of the Nigerian economy under the two regimes: fixed and floating and to show the degree of differences so that proper solution can be proffered to exchange rate fluctuation in Nigeria. Hence, this study is an attempt to contribute to the literature by critically examining the impact of fixed and floating exchange rates on economic growth in Nigeria and this paper will build on these empirical works to eliminate these gaps in the context of Nigerian economy. Despite these gaps in study of the reviewed works, they have credit for being works that approach exchange rate and economic growth in Nigeria.

3.   Materials and Method

The study adopted secondary data and were generated from the CBN Statistical Bulletin Nigerian Bureau of Statistics and World Development Indicators. In order to estimate the impact of fixed and floating exchange rates on the Nigerian economy, the linear regression model based on the Ordinary Least Square (OLS) technique would be employed. Ordinary least square (OLS) is extensively used in regression analysis primarily because it is intuitively appealing and mathematically much simpler than any other econometric technique (Gujarati, 2004). The model of this paper is adopted from the purchasing power parity theory developed by Cassel in 1981 though

with slight modification. The theory expressed economic growth as a function of real exchange rate. In his theory, a favourable exchange rate (local currency against foreign currency) will spur economic growth as demand for goods and services would increase production, which eventually lead to rise in gross domestic product. Real Gross Domestic Product (RGDP) would be used as a proxy for economic growth as this has been used severally in the literature which is dependent on the exchange rate (RER) while inflation rate and balance of payment as related control variables.

The general functional form of the linear regression model could be stated as follows:

$$RGDP = f(RER, BOP, INF) ....(2)$$

The linear form of equation (2) is specified as follows:

$$RGDPt = \beta_0 + \beta_1 RERt + \beta_2 BOPt + \beta_3 INFRt + Ut .... (3)$$

Where:

GDP = Gross Domestic Product proxy of Economic Growth)

RER = Real Exchange rate for Naira

BOP = Balance of Payments

β_0 = autonomous or the intercept

β_1, β_2 and β_3 are coefficients of each exogenous or explanatory variable, respectively

U_t = error term or stochastic term

In a more explicit form, it can be written in a log-linear form to transform the variables into the same unit and base. Thus:

$$lnGDP = \beta_0 + \beta_1 lnRER + \beta_2 lnBOP + \beta_3 lnINFR + Ut .... (4)$$

In order to determine the presence or absence of structural break or change in the relationship between fixed and floating exchange rate regimes in Nigeria in a period of 61 years (1960-2020), the Chow-Test invented by Gregory Chow in 1960 would be employed. The period of 1960 to 1985 witnessed the fixed exchange rate while the Structural Adjustment Programme (SAP) of 1986 implemented by the Nigeria government from brought about the floating exchange rate regime. Such changes in regime are expected to affect economic growth. To see if this happened, we shall categorize our data set into three periods: 1960-1985 (which is the pre-SAP era); 1986-2020 (which is the post-SAP era); and 1960 – 2020 (which is the pooled period). This will give three possible regression stated as:

Time period 1960-1985:

$$RGDP = \lambda_0 + \lambda_1 RER + U_{1t} \; n_1 = 26 ....,............. (5)$$

Time period 1986 - 2020:

$$RGDP = \psi_0 + \psi_1 RER + U_{2t} \; n_2 = 35 .... (6)$$

Time period 1960-1960 - 2020:

$$RGDP = \alpha_0 + \alpha_1 RER + U_{3t} \; n_3 = 61......................... (7)$$

Equation (6) assumes that there is no difference between the two time periods and therefore estimates the relationship between financial liberalization and private savings for the entire time period consisting of 61 observations. In other words, this regression assumes that the intercept as well as the slope coefficient remains the same over the entire period; that is, there is no structural change. If this is in fact the situation, then $\alpha_0 = \lambda_0 = \psi_0$ and $\alpha_1 = \lambda_1 = \psi_1$. Equation (5) and (6) assume that the regressions in the two time periods are different; that is, the intercept and the slope coefficients are different.

To check for the presence or absence as well as the direction of causality between financial liberalization and private investment, the Granger causality test will be used. It can be stated thus:

$$RER_t = \sum_{i=1}^{m} \alpha_i \, RGDP_{t-1} + \sum_{j=1}^{n} \beta_j \, RER_{t-j} + u_{1t} \ldots \ldots \ldots \ldots \ldots \ldots \ldots (8)$$

$$RGDP_t = \sum_{i=1}^{m} \lambda_i \, RGDP_{t-i} + \sum_{j=1}^{n} \sigma_j \, RER_{t-j} + u_{2t} \ldots \ldots \ldots \ldots \ldots \ldots (9)$$

Where U_{1t} and U_{2t} are assumed to be uncorrelated

4. Results and Discussion

Some basic statistical analyses are presented in the tables below:

4.1. Correlation matrix Model 2 and 3

Table 1: Correlation Matrix model 1

	RGDP	RER	INFR	BOP
RGDP	1			
RER	0.8738	1		
INFR	0.2417	0.0677	1	
BOP	0.6252	0.5093	0.0332	1

Source: Authors Computation, 2022

Table 1 shows that there is a strong positive correlation between RER and RGDP (r = 0.8738), BOP and RGDP also shows a strong positive correlation (r = 0.6252) while INFR and RGDP shows a weak positive correlation (r = 0.2417). .

4.2. Unit Root Test
Table 2: Augmented Dickey Fuller (ADF) unit root test result

Variable	ADF Statistics	5%Critical Value	Prob. Value	Order of Stationarity
GDP	-6.384857	-2.911730	0.0000	1(1)
RER	-8.944331	-2.913549	0.0000	1(2)
INFR	-2.912509	-2.910860	0.0498	1(0)
BOP	-3.067235	-2.921175	0.0356	1(1)

Source: Authors Computation, 2022

The result of the unit root test in Table 2 shows that RGDP and BOP were stationary at first differencing, RER became stationary at second differencing while INFR was stationary at level all with intercept at 5 percent level of significance. After conducting the stationarity test, is therefore necessary to carry out co-integration test to ascertain whether the variables have long-run equilibrium relationship in the model by using the Johansen Co-integration test.

4.3 Co-integration Test
Table 3: Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.537663	79.20733	47.85613	0.0000
At most 1 *	0.362756	34.46263	29.79707	0.0135
At most 2	0.117586	8.327707	15.49471	0.4310
At most 3	0.018318	1.072267	3.841466	0.3004
Trace test indicates 2 cointegrating eqn(s) at the 0.05 level				
* denotes rejection of the hypothesis at the 0.05 level				
**MacKinnon-Haug-Michelis (1999) p-values				

Source: Authors Computation, 2022

The co-integration test was conducted to determine the long-run relationship between the dependent variable and independent variables. From this model RGDP = f(RER, INFLR, BOP), the Johansen co-integration trace test reported in Table 3 shows that there is a long run relationship between the variables (RGDP, RER, INFLR, BOP). The trace test shows evidence of two co-integrating equations. The test was carried out at 5% level of significance, thus the null hypothesis of no co-integration were rejected for which implies there exists long run relationship between economic growth and the independent variables, RER, INFR and BOP.

4.4 Ordinary Least Square (OLS)
Table 4: Regression estimates

Variable	Coefficient	Std. Error	t–Statistic	Prob.
C	2380710.	1501492.	1.585563	0.1185
RER	229072.1	16702.27	13.71503	0.0000
INFR	245486.7	63426.22	3.870429	0.0003
BOP	286765.5	88312.60	3.247164	0.0020
DUMMY	-38932730	7396574.	-5.263616	0.0000
R-squared	0.893525			
Adjusted R-squared	0.885919			
F-statistic	117.4858			
Prob(F-statistic)	0.000000			
Durbin-Watson stat	1.480669			

Source: Authors computation, 2022

The result of the regression in Table 4 shows that real exchange rate (RER) has a statistically significant positive impact or effect on economic growth in Nigeria. That is, the more devaluation of the Nigerian naira, the higher the level of economic growth. Specifically, for every unit increase in the exchange rate in Nigeria, economic growth grows by 229072.1 units on the average, holding all other variables constant. As expected, the result further reveals that inflation rate also has a statistically significant positive impact on economic growth in Nigeria. That is, every other thing held constant, as inflation increases, the level of economic growth in Nigeria would increase. This means that a unit increase in inflation rate will lead to 245486.7 units increase in economic growth in Nigeria. On the other hand, balance of payments shows a positive significant relationship with economic growth. That is, high level of balance of payment encourages meaningful economic growth in Nigeria. A unit increase in balance of payment will lead to a corresponding 286765.5 unit increase in economic growth in Nigeria.

In addition, the Adjusted R-squared reveals that 0.89% changes in RGDP was attributed to the joint variations in real exchange rate, inflation rate and balance of payment. The Durbin Watson statistic of 1.48 is not quite bad, however, the serial correlation LM test in Table 6 reveals no autocorrelation in the model

4.5 Chow Test
Decision rule: Reject the null hypothesis (no structural break) if F calculated is greater than F tabulated at the chosen level of significance (5%), otherwise, do not reject.

From the F table we find that for 2 and 61 df, the 5% critical F value is approximately 3.34. Since the F calculated value of 117.4858 is greater

than the *F* tabulated, we reject the null hypothesis and conclude that there was indeed a structural break or change in the relationship between fixed and floating exchange rate regimes in Nigeria in the periods of 1960-2020 as suspected. This change in relationship is obviously, to a large extent, due to the Structural Adjustment Programme (SAP) embarked upon by the Nigeria government in 1986 which led to the adoption of the floating exchange rate regime.

4.6. Granger Causality Test Result
Table 5: Granger Causality Rest Result (Model 1)

Null Hypothesis:	Obs	F-Statistic	Prob.	Decision
RER does not Granger Cause RGDP	59	0.02998	0.9705	RER ⇔RGDP
RGDP does not Granger Cause RER		0.93481	0.3989	No causality
INFR does not Granger Cause RGDP	59	0.09981	0.9052	INFR⇔RGDP
RGDP does not Granger Cause INFR		0.19456	0.8238	No causality
BOP does not Granger Cause RGDP	59	2.41819	0.0987	BOP⇔RGDP
RGDP does not Granger Cause BOP		3.01997	0.0571	No causality

Source: Authors Computation, 2022

The causal relationship between RGDP, RER, INFR and BOP is one of the main focuses of this empirical investigation. The result from Table 5 showed that the p-values of RER and RGDP are 0.97 and 0.39 respectively which are greater than 0.05 level of significance, we therefore accept the null hypothesis and reject the alternative hypothesis meaning there is no causality between RER and RGDP. The probabilities of RGDP and INFR are 0.90 and 0.82 which are greater than the 5% level of significance and showed no evidence of causality. The table further revealed that BOP does not granger cause RGDP indicating 0.09 and 0.05 respectively. Therefore, we accept the null hypothesis indicating no causal relationship between RGDP and BOP.

4.7 Post Diagnostic Tests
Table 6: Summary of Results of the Post Diagnostic Tests

Test		*f-statistic*	Probability
LM Test	No serial correlation	1.637824	0.2039
White (CH-sq)	No conditional heteroscedasticity	8.678757	0.3281
Jarque-Bera	Not normally distributed	41.45073	0.0000

Source: Authors Computation, 2022

Results from Table 6 show that the test for serial correlation produced an LM statistic of 1.637824 with a probability of 0.2039. For the Histogram and Normality Test, Jarque-Bera is 41.45 and the probability is 0.0000. Thus, the Jarque-Bera statistic is significant as it is below the 5 percent significance level. Therefore, the null hypothesis of a normal distribution was rejected. Heteroscedasticity tests showed the F-statistic of 8.678757 and the probability of 0.3281 which means that the null hypothesis of no heteroscedasticity was accepted. The alternative hypothesis was that there is heteroscedasticity. This means that the residuals are homoscedastic.

5.   Conclusion and Recommendations

This paper, using the OLS regression analysis, Chow test and the Granger causality test, empirically examines the nature of the relationship between real exchange (fixed and floating) rates and economic growth in Nigeria from 1960-2020. The findings reveal that real exchange rate (RER) has a statistically significant positive impact or effect on economic growth in Nigeria. That is, the more the naira is being devalued against other currencies, the higher economic growth would be. The findings of this study has empirical shown that real exchange rate in Nigeria starting from the introduction of Structural Adjustment Programme (SAP) has significantly affected the economy. Although there is no recommended rate of exchange that guarantees economic growth, monetary authorities should always strive through policies to maintain a stable exchange rate system devoid of frequent volatility.

The policy implication to the Nigerian economy is that the depreciation of the nation's currency has the ability to cause an upsurge in the price of imported raw materials as well as the cost of imported finished goods. In this regards, manufacturers would choose locally sourced inputs. Similarly, locally made products would become more desirable to consumers as they will be economical than their imported substitutes. This means, exchange rate depreciation has a way of boosting home-grown production and increasing national output. Based on this, occasional devaluation of the naira by the government and the monetary authorities should be allowed as it is capable of enhancing output performance and boosting the Nigerian economy. On the other hand, exchange rate appreciation has the tendency of making imported raw materials and imported finished goods cheaper thus impeding local production and decreasing national output. This result is in line with findings by Uduakobong and Enobong (2015) who found the existence of a positive relationship between exchange rate and economic growth in Nigeria.

Furthermore, the Chow test result shows that there was indeed a structural break or change in the relationship between real exchange rate and economic growth in Nigeria in the periods of 1960-2020 as used in this study. This study is at par with the one conducted by Eze and Okpala (2014) who found that the relationship between exchange rate and economic growth performance in Nigeria have not undergone any significant structural changes. This change in relationship can be attributed to the Structural Adjustment Programme (SAP) embarked upon by the Nigeria government in 1986 which liberated the exchange rate from being fixed. Therefore it can be inferred that the exchange rate regime adopted by a country, whether fixed or floating matters and the effective of the management of its exchange rate policy should be given topmost priority.

In addition, the Granger causality test shows that although there is dependence between real exchange rate (floating exchange rates) and economic growth, none causes the other. This study clearly shows that real exchange rate is very important determinant and in fact indispensible in achieving economic growth in Nigeria.

Based on the above findings, we therefore recommend the following:
i. Since exchange rate has a direct positive impact on economic growth and how absolutely imperative is exchange rate stability for economic growth, the study recommended that government and other stakeholders and other monetary authorities should adopt monetary policies (money supply and interest rates) as well as fiscal policies (taxation and spending) that will not only ensure a convincing and stable exchange rate but will also serve to raise economic growth in Nigeria.
ii. The country should improve her revenue base by increasing volume of export and reducing reliance on petroleum sector, and also reduce the importation of nonessential items in addition to increased domestic production.
iii. Government should formulate and implement an appriopriate mix of fiscal and monetary policies that will not only ensure a realistic and stable exchange rate but will also guarantee a rate that encourages local production and boosts national output.

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