

Impact of Exchange Rate Fluctuations on Economic Growth in Nigeria (1987-2020)

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Abstract

This study is to examine the impact of exchange rate fluctuations on economic growth in Nigeria. The independent variables used for this study are money supply, interest rate, inflation rate and real exchange rate. The data used for this study is obtained from CBN statistical bulletin, 2019. The study used cointegration and Error correction mechanism to estimate the long run and short run relationship between the dependent variable and independent variables. The cointegration result shows that there is a long run relationship between the dependent and the independent variables. The ECM results of the estimate shows that real exchange rate have positive and significant impact on Real GDP at 5% level of significance. The study therefore recommend that the CBN should track and effectively monitor all operators in the foreign exchange market, especially parallel market operators and other speculators so as to stabilize the Naira exchange rate and achieve steady economic growth.

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1.0 INTRODUCTION

Evidence from the economic community of West African states shows that exchange rate policy matter for economic growth of any nation (Yakeen & Magaji, 2016; Eke, Magaji, Obalemo, and Ezeigwe 2020; and Magaji & Eke 2013). Exchange rate, interest rate and prices of goods and services determine economic growth. The structure of these three prices mutually interacts and influences each other's levels and overall macroeconomic stability. This interaction and mutual inter-dependence become more critical in the age of globalization in general and in an import-dependent developing economy with high import demand elasticities in particular. It is apparent that the interaction between these prices therefore provides the major insight into the link between the exchange rate and economic growth in an emerging market economy (Nwafor, 2018).

Proponents of fixed exchange rate argue that unlike floating exchange rate, it removes risks and uncertainties associated with excessive rate volatilities, hence promotes trade openness and boosts international trade volumes and capital flows, as well as fiscal discipline in view of the nominal anchor it provides (Hanke & Schuler, 1994; Frankel, & Ross, 2002; Magaji & Eke 2015). However, advocates of flexible exchange rate argue that it is more beneficial as it facilitates automatic external sector adjustment in the event of any external sector disequilibrium; enhances fiscal discipline via immediate exposure of unsound monetary and fiscal policies which reflect in adverse price movements; while the risk and uncertainties to international trade under a flexible exchange rate regime are easily rendered benign through systemic hedging (Velasco, 2000).

The long-standing theoretical and policy debate on the impact of frequent fluctuations in the exchange rate on the economy in general is not only due to its impact on exports, employment growth, trade, inflation, investment, and general economic activity, but on overall economic growth in both developed and emerging economies. Therefore, given the critical role of the exchange rate in determining the success of all other macroeconomic policies particularly in developing economies (especially during business cycle shocks) and the absence of an existing consensus on it till date (Alagidede and Ibrahim, 2016), an examination of the influence of exchange rate policy on economic growth and the overall performance of the macro economy has remained a subject of continuing theoretical and empirical investigation and debate across all shades of modern economic

thought.

The effect of constant exchange rate fluctuations on economic growth is still a subject of debate both in Nigeria and globally. This is so particularly with respect to its impacts on government expenditure, aggregate supply, trade, investment, interest rate, inflation as well as aggregate demand. Anecdotally, a depreciation of the Naira exchange rate that accompanies a negative oil price shocks such as that of 2015/2016 and 2020, is expected to engender a short-run contraction in the economy's growth. Past observed evidence has met or refuted this expectation through a positive GDP growth and exchange rate appreciation. Therefore, the exact nature of the relationship between these three macroeconomic variables is a subject for continuing empirical investigation.

Nwafor (2018) in his study of the effect of floating exchange rate on the Nigerian economy for the period 2006 – 2016, found that the exchange rate of the Naira indeed has no significant impact on economic growth in Nigeria. This finding contradicts those of earlier Nigeria studies such as; Osigwe (2015); Obi, Oniore, and Nnadi (2016), all of which support the argument that floating exchange rate has significant positive long-run impact on economic growth, as similarly concluded by Alagidede & Ibrahim (2016) in their study on the Ghanaian economy. Therefore, further examination of the role of shocks such as supply, demand, commodity price, monetary and financial, as well health shocks in the success of economic growth and development policy is particularly relevant in commodity-exports dependent economies potentially exposure to the "Dutch Disease".

Based on the above submission, it is evidence that the impact exchange rate fluctuations on economic growth in Nigeria remain inconclusive; this might be as a result of the methodology, scope and variables measurement used by these studies. Therefore, the inability of extant empirical studies to provide a clear understanding of the impact of real exchange rate fluctuations on Nigeria's economic growth has left a gap to be filled by current empirical research. Therefore, the primary research problem of this study is to empirically examine the impact of real exchange rate fluctuations on economic growth in Nigeria.

The main objective of this study is to examine the impact of real exchange rate fluctuations on economic growth in Nigerian within the period 1987 to 2020. These specific objectives are as follows: To empirically examine whether there is any significant relationship between real exchange rate fluctuations and economic growth in Nigeria; to determine the key drivers of real exchange rate fluctuations in Nigeria.

Based on the above objectives, the hypotheses to be tested by this study are stated below in their null form:

- i. H_{O1} : Real exchange rate fluctuations have no significant relationship with economic
- ii. H_{O2} : There are no key drivers of real exchange rate fluctuations in Nigeria.

2.0 LITERATURE REVIEW

2.1 Exchange Rate

According to Henry, Murtadho & Bhaumik (2020), Exchange rate is the rate at which a country's currency is exchanged for another country's currency. It is the price of one country's currency expressed in terms of some other country's currencies. It determines the relative prices of domestic and foreign goods, as well as the strength of external sector involvement in international trade.

The real exchange rate on the other hand describes how many of a good or service in one country can be traded for one of that good or service (their equivalents) in another country (Yakeen & Magaji, 2016). It can also be defined as the relative price of a basket of traded and non-traded goods between the domestic and the external economy (Magaji, Micheal & Anthony, 2018). Here, emphasis is no longer on money but on real goods and services (for example, bottles of coke or wine). It represents units of foreign goods over units of similar equivalent domestic goods, or how many units of foreign goods you can get per equivalent units of similar domestic goods that are sold and their domestic currency value exchanged into foreign currency.

By implication, the real exchange rate (RER) is the nominal rate adjusted for inflation measures in both the domestic and foreign country. Which, is a more reliable indicator of competitiveness between two countries, as it also considers price and wage developments. The real exchange rate can therefore be viewed as the relative price of foreign goods in term of domestic goods or basket of similar goods– this is the Purchasing Power Parity (PPP) based definition of real exchange rate (Cassel, 2016). Thus, real exchange rate measures the relative prices of two goods - tradable goods and services in relation to non-tradable goods and services.

2.2 Economic Growth

Todaro (2007) defines economic growth as an increase in a nation's capacity to produce goods and services. This implies a simple increase in the economic value of goods and services produced in a particular economy. Kwong (2015) defines economic growth as a rise in Gross Domestic Product GDP or GDP per capita. Economic growth can also be viewed as an increase in the production of economic goods and services, compared from one period of time to another. It can be measured in nominal or real (adjusted for inflation) terms (Potters & Investopedia Staff, 2021). Aggregate economic growth is therefore traditionally measured in terms of gross national product (GNP) or gross domestic product (GDP) or gross domestic product per capita, although alternative metrics are

sometimes used.

2.3 Exchange Rate Fluctuations and Economic Growth

Cassel (2016) used time series data to study the relationship between real exchange rate fluctuations and economic growth in Liberia for the period 1980 to 2012 deploying autoregressive distributed lag (ARDL) with estimates of the short run and long run dynamics via conditional Vector Error Correction Method (VECM). The result of the study showed that while exchange rate fluctuations did not account for the decline in economic growth, fluctuations in the economic growth rate were found to be a major cause of fluctuations in the exchange rate. On the strength of this finding, he recommended that the authorities should adopt monetary and fiscal as well as other policies to stabilize the growth rate of GDP so as stabilize volatile changes in the exchange rate.

Alagidede & Ibrahim (2016) analysed the causes and effects of persistent exchange rate fluctuations on economic growth in Ghana based on annual time series data between 1980 to 2013 deploying GARCH model to examine volatility, VAR and VECM models with impulse response functions and variance decomposition to examine the drivers of real exchange rate volatility, and Generalised Methods of Moments (GMM) to examine the effects of a volatile exchange rate on growth. Their findings showed that for the Ghanaian economy, output and exchange rate volatility itself are the most important drivers of exchange rate fluctuations in the short-run, while in the long run, exchange rate fluctuations are significantly influenced by government expenditure and money supply growth and terms of trade shocks. Shocks to the real exchange rate are found to be mean reverting. The results also showed that much of volatility in the exchange rate is self-driven and excessive volatility is detrimental to economic growth in the short-run, while growth-enhancing effect emanate from innovation and more efficient resource allocation accompanying in the long-run. Based on these findings, they recommended that limited intervention in the foreign exchange market as unbridled intervention could not only exacerbate volatility but could also be costly in terms of the potential output growth and welfare gains from flexible exchange rate.

Adelowokan, Adesoye, and Balogun, (2015) in their empirical analysis on the impact of exchange rate fluctuations on investment and growth in Nigeria, utilizing Vector Auto Regression (VAR) within a VECM framework, they found that exchange rate fluctuation has a significantly negative relationship with investment and growth, and a positive relationship with inflation and interest rate in Nigeria. On this basis, they advised policy makers to develop sound exchange rate management policies as a primary basis for growing the Nigerian economy.

Anyanwu, Ananwude & Okoye (2017) studied the impact of exchange rate policy on Nigeria's economic growth for the period 1986 to 2015 showed a positive but insignificant relationship between real exchange rate and economic growth. However, real exchange rate significantly impacts manufacturing capacity utilization within the period. They recommended the use of strict exchange rate policy controls to stabilize the value of the Naira exchange rate.

Nwafor (2018) in his study of the effect of floating exchange rate on the Nigerian economy for the period 2006 – 2016, found that the exchange rate of the Naira indeed has no significant impact on economic growth in Nigeria.. The study by Ufoeze, Okuma, Nwakoby & Alajekwu (2018) covering the period 1970 to 2012 however show a negative relationship between exchange rate fluctuations and GDP growth. Studies by Iwegbu & Nwaogwugwu (2019) using SVAR for the period Q₁ 2016 to Q₄ 2017 show that fully deregulated exchange rate has a significant negative impact on agricultural and industrial output in the long run. Okoro & Charles (2019) examined the role of exchange rate variation on Nigeria' economic growth between 2000 and 2017 using Error Correction Methodology (ECM) found that variations in the Naira exchange rate accounts for 65% variation in Nigeria's real GDP. They recommended timely implementation of effective monetary and fiscal policies to counter this effect. A similar study of exchange rate and economic growth in Nigeria by Kenny (2019) for the period 1981 to 2015 using Fully Modified Ordinary Least Squares (FMOLS) technique found that exchange rate changes along with external reserves, money supply and capital inputs have significant impact on Nigeria's economic growth. The use of sustained managed float was recommended to boost domestic output and the stock of external reserves.

Koirala (2018) examines the Impact of Real Effective Exchange Rate on Economic Growth of Nepal. The study uses annual time series data for the period of 1975 to 2015. Engle Granger residual based test and error correction model was used to detect the impact of REER on real GDP of Nepal. The explanatory variables used in the study are real effective exchange rate, broad money supply, trade openness and gross fixed capital formation. The results of the study reveal that real effective exchange rate has positive impact on the real GDP of Nepal.

Musa, Muhammad, Mohammed & Adamu (2019) examine foreign exchange rate and economic growth. The study used Autoregressive Distributed Lag model (ARDL) on time series Data, for the period 1981-2017. The correlation test result shows that the highest correlation is between money supply and oil revenue while the lowest correlation is between inflation rate and foreign direct investment. The ARDL Co-integration test

revealed the existence of long-run relationship among the variables. ARDL test results reveal that real effective exchange rate is negatively and significant in explaining economic growth in Nigeria in the long-run. In the short-run, the lag value of real effective exchange rate is insignificant in explaining the changes in the current rate of economic growth.

Henry, Murtadho & Bhaumik (2020) examine the relationship between the exchange rate fluctuations and economic growth in Nigeria between 1997 and 2017. The study adopted the descriptive research design. The study used Secondary data on gross domestic product (GDP), exchange rate and inflation rate it obtained from the Central Bank of Nigeria (CBN) bulletins. Ordinary least square method and Pearson's product moment correlation were used to analyse the data collected. The study revealed decline in Nigeria economic growth since 2002 as shown by continuous drop in GDP. The findings of the study indicated a multiple regression coefficient ($R = 0.042$), which means that inflation rate was found to be positive and high but without significant relationship to economic growth.

Anifowose (2021) examines effect of exchange rate on economic growth in Nigeria with emphasis on asymmetric relationship among the variables (Gross Domestic Product, Exchange Rate and Inflation Rate) using data from 1981 to 2020. The study applied the Non Linear Autoregressive Distributed Lag Model (NARDL) approach to examine asymmetric relationships among variables. The study found that, in the long-run, economic growth is positively affected by positive shocks to exchange rate. However, the result shows that both negative and positive shock to inflation rate was found to have adverse non contemporaneous effect on growth in the long-run.

2.4 Theoretical Framework

Many theories of exchange rates determination have been propounded in the literature which has accounted for the diverse interpretations of the impact of exchange rate on economic growth by both policy makers and researchers. This study premise its framework on the Mundell–Fleming Model

The Mundell–Fleming model shows the short-run relationship between an economy's nominal exchange rate, interest rate, and output in a small economy open to international trade in goods and financial assets. The model was set forth by Mundell (1963) as an extension of the IS-LM Model, and is commonly known as the IS-LM-BoP model. While the traditional IS-LM Model deals with economy under autarky, the Mundell–Fleming model describes a small open economy. Specifically, the model shows the short-run relationship between an economy's nominal exchange rate, interest rate, and output in contrast to the closed-economy IS-LM model, which focuses only on the relationship between the interest rate and output. Under this model, the effect of exchange rate changes is transmitted via its impacts on international trade and interest rate (which affects capital flows) under a specific exchange rate regime.

The Mundell-Fleming model thus argues that an economy cannot simultaneously choose to implement policies of monetary autonomy, free flow of capital, and fixed exchange rate at the same time. This is also known as the impossible or inconsistent trinity, implying that a country can only choose two of the options as it is impossible to achieve all three at the same time. Any deviation from these choices may trigger a harmful currency depreciation or appreciation (as the case may be) with negative consequences to domestic economic growth.

Therefore, a country that wants to maintain fixed exchange rate regime and have an autonomous interest rate policy cannot allow free capital flows across its borders. Similarly, if a country chooses free flow of capital and monetary policy autonomy, it cannot have a fixed exchange rate regime, but must allow its currency to float. And if it adopts a fixed exchange with free capital moment, it cannot have an independent monetary policy that is free from external influence. This trilemma was probably what compelled Nigeria's choice of monetary autonomy, free capital flows and a floating exchange rate regime as a component of its financial reforms under Structural Adjustment Programme (SAP).

3.0 METHODOLOGY

The study employs descriptive statistics and econometric technique to empirically analyze the impact of real exchange rate fluctuations on economic growth as well as the key drivers and transmission mechanism in Nigeria using secondary annual time series data for the period 1987 to 2020 within a composite modelling framework. Annual time series data is preferred given the fairly long-run nature of real exchange rate changes where primary data generation is not feasible within the study period, couple with data computational conventions of variables such as *TOT*. The estimation process begins with a test of the stationary of the data variables and their cointegration properties to avoid spurious regression, followed by a test of causality between the variables once found to have a unit root and is cointegrated.

3.1 Model Specification

In order to examine the impact of real exchange rate fluctuations on economic growth in Nigerian within the

period 1986 to 2020, a linear multiple regression model is built. Thus, the functional model is given as;

$$RGDP_t = f(REXR_t, INFL_t, MS_t, INR_t) \dots\dots\dots 3.1$$

The econometrics form of the model is written as

$$RGDP_t = \beta_0 + \beta_1 REXR_t + \beta_2 MS_t + \beta_3 INR_t + \beta_4 INFL_t + U_t \dots\dots\dots 3.2$$

Where:

RGDP= Real Gross Domestic Product, REXR= Real exchange rate, MS= Money Supply, INR= Interest Rate, INFL= Inflation rate

β_0 = Constant term, $\beta_1 - \beta_3$ = Set of parameters to be estimated and U_t = Stochastic Error term

4.0 DATA ANALYSIS AND DISCUSSION OF RESULT

Table 4.1: Descriptive Statistic of Variables

<i>Statistic</i>	<i>RGDP</i>	<i>REXR</i>	<i>INFL</i>	<i>MS</i>	<i>INR</i>
Mean	4.767048	109.7621	19.16485	6,326.766	18.64292
Median	5.307924	92.14000	12.90000	1505.964	17.95000
Maximum	14.60438	272.5200	72.80000	25079.72	29.80000
Minimum	-1.583065	49.78000	5.400000	23.80640	10.50000
Std. Dev.	3.907805	56.80709	17.07353	8,374.384	3.811635
Skewness	0.408579	1.797959	1.765814	1.095853	0.945949
Kurtosis	2.631937	5.323506	5.095073	2.715893	4.514941
Jarque-Bera	1.104424	25.20280	23.18488	6.715902	8.077192
Probability	0.575675	0.000003	0.000009	0.034807	0.017622
Sum	157.3126	3622.150	632.4400	208783.3	615.2163
Sum Sq. Dev.	488.6702	103265.4	9328.177	2.24E+09	464.9140
Observations	35	35	35	35	35

Source: Authors' computation

Table 4.1 shows that all the variables are positively skewed.. Skewness of 1.79 indicates that the *REXR* is highly skewed to the right. Also, kurtosis of 5.32 show non-normal distribution of the real exchange rate. The skewness of 0.4085 and kurtosis of 2.6319 shows the *RGDP* is slightly positively skewed and fairly normally distributed. With reference to the probability estimates of the Jacque-Bera statistic, it can be observed that *RGDP* appear to be normally distributed, as the *p*-value estimates of 0.575675 is higher than the critical significance values of 0.01, 0.05 and 0.10 (i.e. are not significant 1%, 5%, 10%), leading to the acceptance of the null hypothesis of normality of its distribution. On the other hand, *INR*, *MS*, *INFL*, *REXR* appear not to be normally distributed as their respective probability (*p*-values) estimates of 0.0176, 0.0348, 0.0000, and 0.000 respectively are lower than the critical significance values of 0.05 and 0.10 (are significant at 5% and 10%), thus rejecting the null hypothesis of normality of their distribution.

The above is further evidenced by the significant deviation of the kurtosis of *INR*, *INFL*, *REXR* from 3 which is one of the raw properties of normally distributed variables. In general, the Jacque-Bera values of the variables are above 1, showing that none of the variables is exactly normally distributed, neither do their skewness show perfect symmetry (0.0000), with *REXR* and *INFL* having the highest Jacque-Bera values (25.20280) showing the most abnormal distribution pattern within the period. It is instructive to note that average *RGDP* per capita of US\$4.7670 shows the rather low income level and high poverty rate in Nigeria within the sample period.

4.2 Unit Root Tests

The results of the Unit Root tests using Augmented Dickey-Fuller (ADF) and Phillip-Perron (PP) tests are presented below.

Table 4.2: Unit Root Test Results

Variables	ADF Statistic	PP Statistic	Critical Values*	Stationarity Status
<i>RGDP</i>	-7.809316	-7.809316	-4.284580(1%) -3.562882(5%) -3.215267(10%)	<i>I</i> (1)
<i>REXR</i>	-6.497562	-6.497562	-4.284580(1%) -3.562882(5%) -3.215267(10%)	<i>I</i> (1)
<i>INFL</i>	-7.048361	-4.834975	-4.416345 (1%) -3.622033 (5%) -3.248592 (10%)	<i>I</i> (1)
<i>MS</i>	-5.891249	-5.891249	-4.284580(1%) -3.562882(5%) -3.215267(10%)	<i>I</i> (1)
<i>INR</i>	-4.105309	-9.267661	-3.752946 (1%) -2.998064 (5%) -2.638752 (10%)	<i>I</i> (1)

Source: Author's computations

The results from the Table 4.2 shows that the model variables which are found to be non-stationary at levels become stationary at first difference *I*(1) at the conventional one, five, and ten percent significance levels as shown above. Therefore, we reject the null hypothesis (H0) of a unit root in the data series used for the study. It follows that cointegration test should be carried out to confirm whether or not there is any long-run relationships between the variables.

4.3 Cointegration Result

Table 4.3 Cointegration Test

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.766723	105.7694	69.81889	0.0000
At most 1 *	0.592761	60.64796	47.85613	0.0020
At most 2 *	0.464555	32.79898	29.79707	0.0219
At most 3	0.326619	13.43460	15.49471	0.0998
At most 4	0.037220	1.175855	3.841466	0.2782

Trace test indicates 3 cointegrating eqn(s) at the 0.05 level

* denotes rejection of the hypothesis at the 0.05 level

Going by the Trace Statistic there is a long-run equilibrium relationship between the dependent variable and the independent variables. In other words, the variables possess the characteristics that would cause them to converge in the long-run.

Given the fact that the variables are co-integrated, the next step is to estimate the short-run dynamics in error correction model in order to capture the speed of adjustment to equilibrium in case of any shock that might arise in the independent variables.

Error Correction Mechanism

Dependent Variable: D(RGDP)

Method: Least Squares

Date: 11/15/21 Time: 01:30

Sample (adjusted): 1987 2019

Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.569491	1.257108	-0.453017	0.6543
D(REXR)	3.294972	1.658954	1.986174	0.0477
D(INFL)	-2.053571	0.998149	-2.057379	0.0498
D(INR)	8.454794	2.818986	2.999233	0.0059
D(MS)	2.965666	5.214135	0.568774	0.5744
ECM(-1)	-0.555450	0.167504	-3.316045	0.0027
R-squared	0.415651	Mean dependent var		-0.081250
Adjusted R-squared	0.303276	S.D. dependent var		3.708604
S.E. of regression	3.095572	Akaike info criterion		5.265183
Sum squared resid	249.1467	Schwarz criterion		5.540009
Log likelihood	-78.24293	Hannan-Quinn criter.		5.356280
F-statistic	3.698785	Durbin-Watson stat		1.811146
Prob(F-statistic)	0.011621			

Source: Authors' computation, E-view 9.0 result

Error correction mechanism was carried out to examine parameters estimates. In testing this hypothesis, (REXR) Real exchange rate, (MS) Money Supply, (INR) Interest Rate and (INFL) Inflation rate were regressed against Real Gross Domestic Product (RGDP). The result of the estimate shows that REXR have positive and significant impact on RGDP. Similarly, the result shows that INR rate have positive and significant impact on RGDP. Also, MS have positive but insignificant impact on RGDP. However, the result shows that INFL negative but significant impact on RGDP.

Based on the F-statistics value of (3.698785) which was found to be greater than P-value, it shows that overall regression of the variables is statistically significance.

5.0 Conclusion and Recommendations

Based on the findings of the study, it's therefore concludes that there is an impact of real exchange rate fluctuations on economic growth in Nigerian within the period covered by the study. Also, the study concludes that there is both long run and short run significant relationship between real exchange rate fluctuations and economic growth in Nigeria. Furthermore, the empirical review shows that overdependence on importation of goods and service is the key drivers of real exchange rate fluctuations in Nigeria.

The fiscal and monetary authorities should replace the existing import substitution industrialization strategy with export-led industrialization strategy through massive incentives and exports promotion needed to attract both foreign and domestic investment and massively grow Nigeria's exports sector in order to diversify Nigeria's foreign exchange earnings and stabilize the Naira exchange rate.

The government through the Central Bank of Nigeria (CBN) should introduce a good exchange rate stabilization policy as this will in turn promote local production and increase economic growth.

The CBN should track and effectively monitor all operators in the foreign exchange market, especially parallel market operators and other speculators so as to stabilize the Naira exchange rate.

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