

Macroeconomic Effect of Exchange Rate on Nigerian Economy

Dare Raphael Olorunmola¹ & Nasiru Sani Bako²

¹Department of Economics, Nasarawa State University, Keffi

²Department of Agricultural Economics Extension, Bayero University, Kano

Corresponding Email: drolorunmola@gmail.com

Abstract

This paper examines the macroeconomic effect of exchange rate on Nigeria economy for the period 1986 to 2020. Real effective exchange rates and economic growth are the variable of choice in the study. In addition we computed the influence of money supply, government expenditure and inflation rates on real gross domestic product to see the level of effect and employs the Autoregressive Distributed Lag approach for co-integration and error correction modeling in its analysis. The long-run model showed that real effective exchange rates, government expenditure and inflation rate have negative effect and statistically significant. Increase in these variables in the long run will impact negatively on the real gross domestic product. The long-run model further showed that money supply was statistically significant and have positive effect on the economy but significant and have negative effect at the short run. However in the short run real effective exchange rate and inflation rate have positive effect on exchange rate and invariably impact the economy positively while money supply was statistically significant and have negative effect at the short run. The error correction coefficient indicated that about 41 per cent of disequilibrium which occurred due to external shock in the previous year will be restored within the current year. This study therefore, recommends that, government should design and implement foreign exchange policies from the long run perspective and focus policies that would help diversify the economy.

Keywords: Macroeconomic, Exchange Rate, Gross Domestic Product

JEL Classification: E63, F31, O47

1. Introduction

Over the past few decades, the nexus between exchange rate and economic growth have drawn extensive attention of macroeconomists, policy makers and the central bankers of both developed and developing countries (Uddin, Rahman & uaosar, 2014). To a large extent, the viability of all sectors of the economy depend on the exchange rate of the local currency against other foreign currencies because there is a strong alignment between

exchange rate and growth of per capita output in developing nations (Babatolu, 2015).

Exchange rate also connects domestic and world markets for goods and assets as well as reflects the competitiveness power of a country's exchange with the rest of the world in a pure market (Ismaila, 2016). In this regard a stable exchange rate is profitable to the economy than a volatile one because persistent fluctuations of exchange rate can lead to depreciation of the home currency as currency volatility is a natural outcome of a floating exchange regime (Danladi & Uba, 2016).

In the Nigeria context, Anyanwu, Ananwude and Okoye (2017) posited that foreign exchange has become the life-wire of Nigeria, whose fortune is vehemently dependent on the fluctuation of the US dollar owing to our reliance on crude oil for foreign exchange amidst dwindling price of crude oil in the international oil market. Any change in the value of the US dollar threatens the Nigeria's economy as we hanged on to one product: crude oil for over 95% of our revenue and leaned on imports for virtually all our consumptions. The deterioration in the exchange rate has increased our debt burden, depleted foreign reserves, repressed local production, and asphyxiated various government attempts for industrial sector growth and exorbitant cost of living as currently the case. Consequently, the exchange rate remains more or less transparent and sometimes subjected to arbitrary changes (Anyanwu, et.al. 2017).

Therefore exchange rate volatility and sustainable development have become a crucial policy issue since the global economic managers started to adopt the floating exchange rate system in the 1970s. As such, attention of research in finance and economic literature on exchange rate volatility has grown tremendously. Previous empirical researches were conducted on the determinants of exchange rate and its impact on GDP, these include Jones (2012); Linjoun (2007); Akpan and Atan (2012); Babatolu (2015). However, these earlier works were conducted before the emergence of the flexible exchange rate regime and with more emphasis on the determinants of foreign exchange. Therefore, this study bridged the gap to bring an update to the existing researches with special interest on the macroeconomic effect of exchange rate on economic growth in Nigeria. It will also contributes to the existing literature by investigating and modeling an approach to exchange rate management and its structural variant to see if current exchange rate policies would impact on the GDP.

Several factors can technically affect exchange rates. What are these factors? Are they demand driven or supply sided. Are the prevailing economic environment and performance of the country affect exchange rate positively or negatively? What role does interest rate and inflation rate play

in this regard? Does the strength or weakness of the economy contribute to the fluctuation of currency's exchange rate? Similarly, could the exchange rate policies choices arising from structural transformation such as reducing imports and expanding non-oil exports and its consequences of depreciation of the nominal exchange rate and short-run impact on prices as well as demand, are really damaging to the economy (Akpan & Atan, 2012).

Therefore, the main objective of the study was to investigate the role of exchange rate fluctuations on Nigerian economy and specifically examine the effect of exchange rate on the GDP; Determine the effect of government total expenditure on the GDP and find out the inter-relationship among the variables money supply, government expenditure and inflation rate on economic growth. Following the introductory section is a brief literature review, theoretical framework and empirical review. These are followed by methodology in section three and discussion of results in section four while section five shows the conclusion and recommendations of study.

2. Literature Review

2.1 Historical Background of Exchange Rate in Nigeria

Historically, a number of flexible exchange rate systems have been introduced and the dynamic effect on economic growth and development has not been identical across the world economy. In the same vein, explanations as to which macroeconomic variable(s) is significantly affected by the exchange rate volatility in a particular economy have also received considerable attention in order to provide policy guide to economic managers of different countries (Bala & Asemota, 2013). Changes in the economy and structural shifts in production are the key factors that brought about the evolution of foreign exchange market in the Nigerian economy. Private sectors and commercial banks earned and held foreign exchange by acting as local agents during which agricultural export was the main source of foreign exchange receipt (Babatolu, 2015).

A comprehensive exchange rate came in bear in Nigeria around 1982, despite that the foreign exchange was deficient in yielding an adequate means of foreign exchange alleviation in line with requirement of internal balance. These resultant shortfalls brought about the introduction of what is called as Second Tier Foreign Exchange Market (SFEM) in 1986; through which market forces dictates exchange rate and budget allocation. In 1989, the scope of the exchange rate bureau was broadened. Yet another reform was introduced in 1994 due to volatility in the exchange market, which include official pegging of the Naira exchange rate, centralization in the Central Bank of Nigeria (CBN), restriction on Bureau De Change, the

reaffirmation of the illegality of parallel market, discontinuation and bills of payment (Oyejide & Ogun, 1995).

The introduction of an Autonomous Foreign Exchange Market (AFEM) brought about the liberalization of the foreign exchange market in 1995 by the CBN. In October 1999, the foreign exchange witnessed yet liberalization with the introduction of Inter-Bank Foreign Exchange Market (IFEM) (CBN, 2015; Akpan & Atan, 2012).

Following the failures of the variants of the flexible exchange rate mechanism (the AFEM introduced in 1995 and the IFEM in 1999) to ensure exchange rate stability, the Dutch Auction System (DAS) was re-introduced on July 22, 2002. The DAS was to serve the triple purposes of reducing the parallel market premium, conserve the dwindling external reserves and achieve a realistic exchange rate for the naira. The DAS helped to stabilize the naira exchange rate, reduce the widening premium, conserve external reserves, and minimize speculative tendencies of authorized dealers. The foreign exchange market has been relatively stabilized since 2003 by Nigeria Deposit Insurance Corporation (NDIC).

In order to further liberalize the market, narrow the arbitrage premium between the official interbank and bureau de change segments of the markets and achieve convergence, the CBN introduces the Wholesale Dutch Auction System (WDAS) on February 20, 2006 replacing the Retail Dutch Auction System RDAS. This was meant to consolidate the gains of the retail Dutch Auction System as well as deepen the foreign exchange market in order to evolve a realistic exchange rate of the naira. Under this arrangement, the authorized dealers were permitted to deal in foreign exchange on their own accounts for onward sale to their customers. These exchange rate regimes have handsome implication for economic performance (NDIC, 2016).

After the crash in crude oil market which led to economic downturn in Nigeria which affected the exchange rate stability, it was observed that the RDAS and WDAS were no longer sustainable because the foreign reserve was depleted. A new flexible foreign exchange policy was introduced in June 2016 (CBN, 2016). In line with the Central Bank of Nigeria's (CBN's) mandate to foster depth, stability and liquidity in the Nigerian Foreign Exchange (FX) market, CBN has adopted the flexible exchange rate system and established the Foreign Exchange Primary Dealers (FXPDs) system whereby interested Authorized Dealers are accorded access to transact FX products directly with the CBN. This is to allow the forces of demand and supply to determine the value of the naira.

The CBN hereby emphasizes that the nature of its relationship with the FXPDs is primarily a counterparty relationship and delisted some items

from accessing foreign exchange window, therefore, importers of such items shall source for their foreign currency without any recourse to the Nigerian foreign exchange market. Delisted items include Rice, Cement, meat, vegetables, galvanized steel sheet etc. This policy pushed the demand for forex to move upward at geometric rate and the CBN has to intervene again in the market by providing liquidity to some customers for reasons such as, Personal Travel Allowance PTA, Business Travel Allowance BTA, Medical bills, School fees etc. this helped in gaining stability in the market with (N360-N364/ 1\$) (CBN, 2016).

2.2 Empirical Review

In this section, an empirical study is reviewed to understand the link among gross domestic product (GDP) and economic exchange rates that indicate economic growth. Using multiple regression analysis and data obtained from CBN, Ayodele (2014) in *Empirical Evaluation of the Impact of Exchange Rate on the Economy of Nigeria* find out that Nigeria's Stock Exchange (NSE), the Nigerian Securities and Exchange Commission as well as inflation possess a significant influence on the economy of Nigeria.

Ignatius, Agus and Long (2018) in a lesson on the dynamics of inflation, money growth, exchange rate and interest rate in Ghana used the Distributed lag (ARDL) model for experimental analysis, and find out that the exchange rate and inflation rate markedly affects money growth in both the short and long term for economic growth.

Similarly, Barguelli, Ben-Salha and Zmami (2018) examined the impact of exchange rate fluctuations on economic growth using observations from 45 emerging and embryonic countries in 1985-2015 and find out that the measurement of the nominal exchange rate and the volatility of the real exchange rate are based on heterogeneous summaries default conditions which have a negative correlation with economic growth and the impact of exchange rate variations rest on the exchange rate regime and financial openness. They concluded that, when countries combine flexible exchange rate regimes and financial openness, volatility is likely to be less destructive. Hussaini, Aguda and Davies (2018) examined the effects of Exchange Rate Volatility on Economic Growth of West African English-Speaking Countries. Using data sourced from the World Bank database, estimated the regression model and the configuration test showed that heterogeneity problem does not exist in the data extracted. However while Hausman test was in support of the fixed effect technique against the random effect model, the results of estimation, and the fixed random analysis revealed that real exchange rate has a negative coefficient and causality effect on economic growth in West African English-Speaking Countries.

In the same vein, Kenneth, Jonathan and Kenneth (2016) investigated exchange rate regime for Nigerian economic growth and its impacts using the generalized moment method (GMM) to guesstimate economic growth from 1970 to 2014. The study found out that, the relaxation of the exchange rate system would stimulate Nigeria economic progress throughout 1970-2014 and during the unseemly distant future. The estimation output suggested further that, the fixed exchange rate will at some point in time limits the general welfare of the Nigerian economic enhancement because the real exchange rate reflects the opposite correlation of economic progress throughout the age of the fixed exchange rate system especially in mono-economy. Agus et.al (2018) in their work titled *An Evidence Analysis of the Exchange Rate Disconnect Puzzle in Indonesia* established a connection between exchange rate and macroeconomic fundamentals in 1990 to 2017. Using ARDL model, the research find out that, in the short- term, Dornbusch- Frankel sticky price model explained better the refusing of the puzzle evidence which provided macroeconomic fundamental that affect exchange rate.

Peter and Isaac (2017) used the yearly statistics from 1984 to 2014 to study the causal connection amid Ghana's real exchange rate and economic growth using government spending, real effective exchange rates, fixed capital formation, real GDP growth, labor force, openness to trade, and foreign direct investment as parameter of choice. The descriptive estimations indicated that all the regressors except foreign direct investment have positive effect on growth. The ARDL co-integration estimation technique established that, the real exchange rate possesses a firm co-integration relationship with economic growth. The long-term estimates of ARDL further indicate that total fixed capital formation, and labor have a positive and significant impact on economic growth, while real effective exchange rates, government expenses, real gross domestic product (GDP), openness to trade and foreign direct investment versus economic growth have a substantial adverse impact on growth. Short-term output again shows that foreign direct investment, openness to trade; real effective exchange rate and total fixed capital formation have a robust and significant impact on growth.

Ehinomen and Oladipo (2012) noted in their paper entitled the impact of exchange rate management on Nigerian manufacturing growth that exchange rate depreciation was an integral part of the 1986 Nigerian Structural Adjustment Policy (SAP). The paper also indicated that exchange rate in the Nigerian economy was closely related to domestic output in the Nigerian economy and yielded an unseemly result. On the basis of this proof, the authors suggested that a pragmatic measure should be put into place to promote exchange rate appreciation which may enrich and reduce cost of

local manufacturing industries that frequently import overseas inputs and urged the government to completely barred or reduced merchandize products and intermediate imported products.

Akpan and Atan (2012) studied the impact of exchange rate changes on Nigeria's economic progress. Using a quarterly data from 1986 to 2010, Akpan and Atan (2012) examined the potential unswerving and unintended relationships among exchange rates and GDP increase through the generalized method of moments (GMM). The outputs of the research work showed no exiting proof of close unswerving association among exchange rate variations and output growth and concluded that In contrast, Nigeria's economic progress is unswervingly influence by currency indicators. Alos, Korkmaz (2013) studied the impact of exchange rates on economic development by employing yearly facts from nine randomly selected European countries from 2002-2011. The study found out that nine European countries have a causative association from exchange rate to economic growth.

Mori, Asid, Lily, Mulok and Loganathan (2012) examined the impact of exchange rates on economic growth: an empirical test of nominal and actual. The paper employed time series data from 1971 to 2009 to study the impact of exchange rates on Malaysia's economic growth. The study used variables such as real GDP (RGDP) as a proxy and a meter of economic growth, the real exchange rate (RER) and nominal exchange rate (NER) as independent variables. ARDL threshold test results showed that there was a long-term co-integration association among the nominal exchange rate and the real exchange rate and economic growth, in which the real exchange rate showed a substantial positive coefficient.

Ahmad, Ahmad and Ali (2013) scrutinized the association between exchange rate and economic growth in Pakistan by using yearly time series data from 1975 to 2015. The study used multiple regression method based on the Ordinary Least Square (OLS) and find out that exchange rate not effectively managed had an adverse impact on the economic progress in Pakistan. Based on the Adam Smith view of Balance of Payment, the Balance of Payment theory posits that the exchange rate is determined by the market forces of demand and supply in the foreign exchange market. Accordingly Arize, Osang and Slottje (2000), is of the view that the demand for foreign exchange arises from the debt item in the Balance of Payments, whereas the supply of foreign exchange arises from credit items. On the other hand (Obaseki, 1997) asserts that the Purchasing Power Parity (PPP) theory which originated with the school of Salamanca was developed by Gustav Cassel in 1916 is simply an application of the law of one price to national price levels rather than to individual prices. This implies that under the PPP

theory, exchange rates between any two countries are adjusted to reflect changes in the price levels of the two countries.

The Mint Parity theory propounded by Professor Cassel of Sweden defines national currencies in mints of fine gold. Under this system, the currency in use was made of or convertible into gold at a fixed rate (Ekanem, 1997). However, according to Babalola, Danladi, Akomolafe and Ajiboye (2015) in practice, exchange rates are determined in two main ways, namely; by government and by the market forces. When they are determined by government, they are said to be 'fixed', 'administered' or 'pegged'. But when they are determined by market forces they are considered to be 'flexible' or 'floating'. The floating/flexible exchange rate is of two forms, the free floating exchange rate (clean float) and the managed floating exchange rate (dirty float) policies (Soludo, 1998). The latter is a system whereby exchange rates are allowed to float in response to demand and supply forces in the foreign exchange market and are not usually subject to occasional government intervention. According to (Obaseki, 2001) the managed float approximates what obtains in reality and has become quite common in recent years while the clean float is academic as it does not exist anywhere in the real world.

According to Akpan and Atan (2012) the greatest advantage of the fixed exchange rate policy is that it guarantees stability of the exchange rate and this stability is transmitted to domestic prices so that the general price level remains stable. Opaluwa (2008) is of the view that SAP-valuation of the naira encouraged imports, discouraged non-oil export and helped sustain productivity because of over-reliance on trade, use of exchange control to mitigate balance of payment deficit and the overvalued money which encouraged importation of finished commodities and further discouraged production for export.

3. Methodology

The dataset for this study consisted of annual time series data for Nigeria for the period spanning, 1986 to 2020. This period marked the flexible exchange rates regime in Nigeria. The time series include values of real gross domestic product (RGDP) measured at constant basic prices in naira; real effective exchange rate measured as trade-weighted real effective exchange rate for the Nigerian in naira: USD bilateral exchange rate (REER); government total expenditure (GEXP) in naira and Money Supply (MS) in naira. Data on real gross domestic product, money supply, total government total expenditure and real output were obtained from the Central Bank of Nigeria statistical bulletin (2020), while data on real effective exchange rate

and inflation rates were extracted from World Development Index database (2020).

3.1 Model Specification

A country's exchange rate dynamics is essentially a monetary phenomenon. The approach focuses on the impact of real effective exchange rate on gross domestic product. This study adopted the Autoregressive Distributed Lag (ARDL) approach (i.e. the bounds testing approach to co-integration) by Pesaran, Shin, and Smith (2001) to examine the impact of real effective exchange rates on real gross domestic product during the study period. The approach was adopted as it does not require pre-testing of the variables of the variables to determine their order of integration since the model can be estimated regardless of whether the series are purely I(1), purely I(0), or mutually integrated. The ARDL (p,q,r,s,t) model used for the bounds test takes the following simple form:

$$\begin{aligned} rgdpt = & \alpha_0 + rgdp_{t-i} + reer_{t-j} + gexp_{t-k} + ms_{t-l} + infr_{t-1} \\ & + rgdp_{t-1} + reer_{t-1} + gexp_{t-1} + ms_{t-1} + infr_{t-1} \\ & + \varepsilon_t \dots \dots \dots (1) \end{aligned}$$

Where Δ is a difference operator, l is logarithm, t is time, α_0 is an intercept term, and δ_1 to δ_5 are the coefficients of their respective variables and p , q , r , s and t are the respective lag lengths for the independent variables. β_i , ϕ , η , σ , and θ .

To examine the existence of long-run relationship, the study first test, based on Wald test (F-statistics), for the joint significance of the coefficients of the lagged levels of the variables, i.e. $H_0: \delta_1 = \delta_2 = \delta_3 = \delta_4 = \delta_5 = 0$

$$H_1: \delta_1 \neq \delta_2 \neq \delta_3 \neq \delta_4 \neq \delta_5 \neq 0$$

The asymptotic critical values for the bounds test provides a test for co-integration with lower values assuming the included variables are I(0), and an upper value assuming I(1) variables. If the calculated F-statistics exceeds the upper critical value, the null hypothesis is rejected, implying that there is co-integration. However, if it is below the lower critical value, the null hypothesis cannot be rejected, indicating lack of co-integration. If the calculated F-statistics falls between the lower and upper critical values, the result is inconclusive. Once co-integration is established, the conditional ARDL long-run model can be specified as:

$$lrgdpt = \alpha_0 + \beta_lrgdp + \phi_lreer_t + \eta_lgexp_t + \sigma_lms_t + \theta_linf_t + \xi_t \dots \dots \dots (2)$$

In the next step, we obtain the short-run dynamic parameters by estimating an error correction model associated with the long-run estimates. This is specified as follows:

$$\Delta lrgdp_t = \alpha_0 + \sum_{i=1}^p \beta_i \Delta lrgdp_{t-i} + \sum_{j=1}^q \varphi_j \Delta lreer_{t-j} + \sum_{k=1}^r \eta_k \Delta lgexp_{t-k} + \sum_{l=1}^s \sigma_l \Delta lms_{t-l} + \sum_{m=1}^t \theta_m \Delta linfr_{t-m} + \vartheta ecm_{t-1} + \xi_t \quad (3)$$

Where *ecm* is the error correction term derived from equation (3) and ϑ is the speed of adjustment.

4. Results and Discussion

In order to carry out a diagnostic analysis of the variable under the study to determine the stationarity status of the variables in the model the descriptive statistics of the variable were done as detailed in this section.

Table 1: Descriptive Statistics of Variables

	RGDP	REER	GEXP	MS	INF
Mean	39619.78	110.8866	2570.838	8364.322	19.51387
Median	33004.80	100.0000	1225.988	1952.921	12.55496
Maximum	71387.83	275.2900	10164.56	36014.88	72.83550
Minimum	17007.77	50.17000	16.22370	23.80640	5.388008
Std. Dev.	19628.61	55.10234	2877.102	11210.51	17.82600
Skewness	0.456873	1.836067	1.127076	1.194413	1.703013
Kurtosis	1.596886	5.615805	3.381644	3.088077	4.547342
Jarque-Bera	4.088672	29.64355	7.622496	8.333281	20.40978
Probability	0.129466	0.000000	0.022121	0.015504	0.000037
Observ.	35	35	35	35	35

Source: Authors Compilation, 2021

From the descriptive statistics, the result reveals that the variables averagely change by ₦39619.78 billion and ₦110.8866 for real gross domestic product (RGDP) and real effective exchange rate (REER) over the years and fall within their minimum and maximum values respectively. The implication of this is that RGDP and REER changes over the years have been within expected values. The standard deviation figures ₦19628.61 billion and

₦55.10234 for RGDP and REER imply that RGDP is less volatile to shocks compared to REER. This is because the real effective exchange rate for Nigeria is determined by many factors among which the most important are oil price and agricultural produce that mark the major determinants of Nigeria current account balances that determine the value of its currency.

Apart from the associated measures of central tendency described above, the Jarque-Berra statistics indicates that the overall real effective exchange rate, government total expenditure, money supply and inflation rates were not normally distributed (probabilities greater than 0.05), but real gross domestic product was normally distributed.

4.1 Results of Unit Root Test

To confirm that all the study variables satisfy the ARDL underlying assumption of being $I(0)$ or $I(1)$, or both, but not $I(2)$, the stationarity test was carried out. The test results in levels and first differences based on Augmented Dickey-Fuller (ADF) procedure is presented in Table 2. The second column shows their order of stationarity at level while the third column shows their order of stationarity at first difference.

Table 2: Results of Augmented Dickey-Fuller Test for Stationary of Study Variables

Variable	Level	First Difference	I(d)
RGDP	-4.006636***	-0.016461	I(0)
REER	-4.004166	-6.741020***	I(1)
GEXP	5.12975	-6.449855***	I(1)
MS	0.948568	-6.171708***	I(1)
INF	-3.027058	-6.446442***	I(1)

*Significant at 10% level, **Significant at 5% level, ***Significant at 1% level.

Source: Authors Compilation, 2021

The results indicate that real gross domestic product (RGDP) was stationary in levels, the remaining variables were stationary in first difference, thereby giving a mix of $I(0)$ and $I(1)$ variables in the sample. This affirmed the use of ARDL in the analysis. In applying the ARDL bounds model, we first obtained the optimal lag orders on the first differenced variable. As shown in Table 3, the maximum order of two (2) lags was selected for the ARDL estimation based on Akaike information criterion (AIC).

Table 3: Optimal Lag Length Selection Result

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-1359.457	NA	3.51E+28	82.75499	83.02709	82.84655
1	-1174.298	291.7670*	4.33e+24*	73.71501	75.61965*	74.35586*
2	-1135.373	47.18102	4.57E+24	73.53777*	77.07497	74.72793

Note: * denotes lag-order selected by the criterion

LR denotes sequential modified LR test statistic; FPE denotes Final prediction error; AIC= Akaike information criterion; SC= Schwarz information criterion; and HQ: Hannan-Quinn information criterion.

Source: Authors Compilation, 2021

The model selection criteria table for the first top 5 models based on Akaike information criterion is shown in Table 3. Among the selection criteria, the Akaike information criterion showed up with the minimum model specification of ARDL (2,2,2,2,2).

4.2 Long Run Co-Integration (Bound Test)

Table 4 shows the ARDL Bound test for the presence of long run co-integration among the study variables. The F-statistic value of 5.403124 which was higher in value compared with the upper bound value of 5.06 at 1 percent level implied the presence of long run co-integration among the variables.

Table 4: Result of ARDL Bounds Test

Test Statistics	Value	K
F-statistics	5.403124	4
Critical Value Bounds		
Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.50%	3.25	4.49
1%	3.74	5.06

Source: Authors Compilation, 2021

Hence, the null hypothesis of no long-run relationship was strongly rejected, meaning that there was long-run relationship among the variables used in the model. This implies that real gross domestic product, real

effective exchange rate, government total expenditure, money supply, real interest rate and inflation rate all had equilibrium conditions that kept them together in the long-run. The confirmation of a co-integration relationship among the variables led to the estimation of the long-run and short-run coefficients based on the optimal ARDL model.

4.4. Short- Run and Long Run Estimates of ARDL

Table 5 shows the results of the estimated short run model of the impact of exchange rate and other macroeconomic variables on the growth of the economy. Exchange rate serves as a major link between a country's economy (especially through trade) with the outside world or other countries. The result showed that lagged series of exchange rate ($\alpha = 0.1$), one year lag of money supply ($\alpha = 0.05$) and lagged series of inflation rate significantly affected economic growth in the short run in Nigeria.

The present study results revealed that the current year exchange rate did not significantly affect economic growth. However, lagged series of exchange rate ($\alpha = 0.1$) had positive and significant effect on economic growth. Furthermore, a percent increase in exchange rate in the previous year resulted in 0.03 percent increase in economic growth in the present year. This finding is in favour of devaluation as means of stimulating economic growth. This may be achieved through aggressive encouragement of export which may eventually enhance economic growth. The results showed that money supply had a negative relationship with economic growth and was statistically significant at 1%. Lagged values of money supply affected economic growth negatively in the current period. This implies a percentage increase in money supply decreases the growth of GDP by 19%.

However, the result further shows that inflation significantly and negatively affected economic growth. This negativity is contrary to theory and this might be due to the very high inflation rate experienced in the country which might have been beyond the acceptable threshold to enhance noticeable economic growth. The negative influence of inflation on real growth in the economy reported in this study corroborated the assertion of Hussaini et al., (2018) that high inflation is not good for the economy.

The ECM estimate is correctly signed negatively meaning that gross domestic product and the real effective exchange rates move together in the long run and it's statistically significant at 1% level of probability. The ECM estimate simply means that short run disequilibrium between exchange rate, other macroeconomic variables included in the model and the gross domestic product of Nigeria is adjusted at a speed of 0.41 and statistically significant at 1% probability level i.e 41 percent of the disequilibrium in the system due to external shock in the previous year is restored back in the current year. In

effect, it takes less than three (3) years for the system to restore back unto its long run equilibrium path in the event of any disequilibrium due to an external shock on the system.

Table 5: Short-Run and Long Run Coefficient Estimates

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(RGDP(-1), 2)	-0.3677	0.14796	-2.4852	0.0237
DLOG(REER, 2)	0.0185	0.0227	0.81516	0.4263
DLOG(REER(-1), 2)	0.03935	0.01958	2.01003	0.0606
DLOG(GEXP, 2)	-0.0594	0.03481	-1.7075	0.1059
DLOG(GEXP(-1), 2)	0.04998	0.03301	1.51426	0.1483
DLOG(MS, 2)	-0.0052	0.05129	-0.1016	0.9203
DLOG(MS(-1), 2)	-0.1908	0.0578	-3.301	0.0042
D(INF, 2)	-0.0561	0.01338	-4.1918	0.0006
D(INF, 2)	0.03368	0.01428	2.35959	0.0305
CointEq(-1)	-0.4168	0.15784	-2.6405	0.0172

$$\text{Cointeq} = \text{DLOG(RGDP)} - (-0.1425*\text{DLOG(REER)} + .4522*\text{DLOG(GEXP)} + 0.5649*\text{DLOG(MS)} - 0.2294*\text{DLOG(INF)} - 0.0096)$$

Source: Authors Compilation, 2021

Table 6: Long Run Coefficients

Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(REER)	-0.142522*	0.07379	-1.9315	0.0703
DLOG(GEXP)	-0.45224**	0.17887	-2.5284	0.0217
DLOG(MS)	0.564925**	0.23234	2.4315	0.0264
DLOG(INF)	-0.22939**	0.10408	-2.2041	0.0416
C	-0.0096	0.03743	-0.257	0.8002

$R^2 = 0.78$ Adjusted $R^2 = 0.61$ Durbin Watson = 1.60 AIC= 4.31 HQC = 4.09
*, **, and *** denote 10%, 5% and 1% significant level, respectively.

Source: Authors Compilation, 2021

The long-run result from table 5 shows that apart from money supply which was positively signed and statistically significant, real effective exchange rate (REER), government total expenditure (GEXP) and inflation rate (INF) had negative effects on economic growth. Even though, the coefficient was statistically significant, the negative impact of real effective exchange rate however contradicted a priori expectation, and indicates that one percent decrease in real effective exchange rate would reduce economic growth by 0.14%. This implies that exchange rate depreciation cannot be used to improve economic growth rate in Nigeria. The theory that exchange rate affects output and trade is not demonstrated by this result. The reason being that Nigeria is near to mono economy, such that the greater percentage of her export is from one product (the oil), therefore the advantage of exchange rate depreciation is not reaped because the country has not diversified her export opportunities. The outcome, however, corroborates other studies Kenneth, Jonathan and Kenneth (2016) where real exchange rate was found to be negative in the long-run.

Government expenditure was found to be significant at 5% and had negative effect on economic growth which contradicted a priori expectation. A percentage increase in Government expenditure will lead to a decrease in economic growth by 0.45%. This finding is in line with the thoughts of the neo classical school that increasing government expenditure could decrease the aggregate production of an economy. In their argument, in order for the government to increase their expenditure, they definitely need financial resources which are generated through increment of tax or borrowing from abroad. Increment of tax may lead to a decrease in income and aggregate demand because higher taxes discourage additional work. Furthermore, tax increase leads to increase in costs of production and decrease in investment. If the government decides to increase their borrowing in order to increase their expenditure on the other hand, this reduces private investment due to competition and overcrowding.

Money supply growth has been an important contributor to the rise in inflation in Nigeria. It was associated with an increase in consumer prices, with the estimated coefficients remaining statistically significant both in the long and short run. However, money supply was found to be positive and significant at 5% in the long run and this implies economic growth is determined by money supply in the Nigeria context. It therefore means that Nigeria's economic growth has been affected more by money supply and past levels of GDP rather than exchange rate. This indicated that inflation in Nigeria is a monetary phenomenon consistent with the traditional quantity

theory of money, and can be moderated through the adoption of sufficiently tight monetary policy actions overtime.

Nevertheless, inflation rate was negative and statistically significant at 5% level of probability. The relationship between inflation rate and economic growth in the long run shows, for every percent increase in inflation rate, economic growth will be fall by 22%. Therefore, we conclude that inflation rate has a negative effect on economic growth in the period investigated in Nigeria. This indicates that the control measures for inflation control are not sustainable and it is unstable. This result is consistent with the findings of Babalotu (2015).

5. Conclusion and Recommendations

One of the difficult tasks confronting many developing economies is the achievement of a stable exchange rate. Although there is no prescribe rate of exchange that guarantees economic growth, development of basic infrastructure that results in growth and development of an economy requires accumulation of foreign exchange that has a favourable or a stable exchange rate. The findings of this study empirically examined the impact of real exchange rate on Nigeria's economic growth for the period spanning 1986 - 2020. Government expenditure, money supply and inflation rates were included in the model to make the study empirically robust. The autoregressive distributed lag (ARDL) methodology was employed to analyse the data based on the outcome of the stationarity test.

The empirical evidences in this study led to the conclusion that real effective exchange rate variations or depreciations can only be used to improve economic growth in the short-run and never in the long run in Nigeria. Real effective exchange rate affected economic growth negatively in the long-run and positively in the short-run with a lag; the long-run impact was statistically significant and the magnitude of the long-run coefficient exceeded its positively significant lagged short-run value. The negative effect of real exchange rate on economic growth in the long-run implies that foreign exchange rate management policies in Nigeria were not effective to achieve external balance in the long run but effective in the short-run. Government expenditure is found to have significant and negative impact on economic growth of Nigeria. This finding may be due to loan servicing where the government uses significant portions of its expenditure as interest on loans of previous borrowings.

Finally, it is apparent that any external stabilization programme which relies profoundly on real exchange rate adjustment alone may have little success in improving the economic growth of Nigeria if it is not accompanied by consistent and prudent monetary and fiscal policies that

would affect government expenditure, money supply and consumer prices. It is therefore, recommended that;

- i. There is a need for the CBN to design and implement foreign exchange policies from the long-run perspective.
- ii. Government should implement structural policies that would help diversify the economy in order to withstand the recurring oil price and other commodity price shocks.
- iii. Monetary authorities should continuously moderate the growth in money supply given its potential of exerting excessive pressure on consumer prices in Nigeria
- iv. Government should improve their spending patterns by focusing more on human development through appropriate expenditure switching policy.

References

- Ahmad, A., Ahmad, N., & Ali, S. (2013). Exchange rate and economic growth in Pakistan. *Journal of Basic and Applied Scientific Research*, 3(8), 740-746.
- Akpan, E. O., & Atan, A. J. (2012). Effects of exchange rate movements on economic growth in Nigeria. *CBN Journal of Applied Statistics*, 2(2), 1-14.
- Anyanwu, F.A., Ananwude, A. C., & Okoye, N. T. (2017). Exchange rate policy and Nigeria's economic growth: a granger causality impact assessment. *International Journal of Applied Economics, Finance and Accounting*, 1(1), 1-13
- Arize A.C., Osang T., Slottje D.J (2000). Exchange rate volatility and foreign trade: Evidence from thirteen LDCs. *Journal of Business Economic Statistics*, 18(2), 10-17.
- Ayodele. T. D. (2014). An empirical evaluation of the impact of exchange rate on the Nigeria economy. *Journal of Economic and Sustainable Development*, 5(8), 24-28.
- Azra, B. S., Memood, T., & Jadoon, A. K. (2015). What determines balance of payments: A case of Pakistan. *Journal of Management and Business*, 2(1), 47-70.
- Babalola, O.O., Danladi, J. D., Akomolafe, K. J. & Ajiboye, O. P. (2015). Inflation, interest rates and economic growth in Nigeria. *European Journal of Business and Management*, (30), 1-20.
- Babtolu, S. (2015). Effect of exchange rate volatility on GDP in Nigeria. *Journal of Social Sciences UNJU*, 1(3), 1-15.

- Bala, D. A., & Asemota J. O. (2013). Exchange rates volatility in Nigeria: Application of GARCH models with Exogenous Break. *CBN Journal of Applied Statistics*, 4(1), 89-116.
- Barguelli, A., Ben-Salha, O., & Zmami, M. (2018). Exchange rate volatility and economic growth. *Journal of Economic Integration*, 33(2), 1302-1336.
- Central Bank of Nigeria (2007). Statistical Bulletin. Vol.18. Central Bank of Nigeria, Abuja.
- Central Bank of Nigeria (2020). Statistical bulletin, CBN, Abuja
- Central Bank of Nigeria Statistical Bulletin (2015).
- Central Bank of Nigeria Statistical Bulletin (2016).
- Danladi, J. D., & Uba, U. P. (2016). Does the volatility of exchange rate affect the economic performance of countries in the West African Monetary Zone? A case of Nigeria and Ghana. *British Journal of Economics, Management & Trade*, 11(3), 1-10.
- Ehinomen, C., & Oladipo, T. I. (2012). Exchange rate management and the manufacturing sector performance in the Nigerian economy. *IOSR Journal of Humanities and Social Science*, 5(5), 1-12. Available at: <https://doi.org/10.9790/0837-0550112>.
- Eita, H. J., & Gaomab, H. M. (2012). Macroeconomic determinants of balance of payments. *International Journal of Business and Management*, 7(3), 173-184.
- Ekanem (1997). Corporate strategy in the manufacturing sector. A Survey of Selected Companies in Nigeria. Unpublished Ph. D Thesis, River State University of Science and Technology, Port Harcourt.
- Hossain, E., Ghosh, B. C., & Islam, K. (2012). Inflation and economic growth in Bangladesh. *International Refereed Research Journal*, 4(2), 85-96
- Hussaini, U., Aguda N. A., & Davies, N. O. (2018). The effects of exchange rate volatility on economic growth of West African English-speaking countries. *International Journal of Academic Research in Accounting, Finance and Management Sciences*, 8(4), 131-143.
- Ignatius, A., Agus, S., & Long, V. (2018). The dynamics of inflation, money growth, exchange rates and interest rates in Ghana. *Journal of Business Management and Economic Research*, 2(6), 21-32. Available at: <https://doi.org/10.29226/tr1001.2018.39>.
- Ismaila, M. (2016). Exchange rate depreciation and Nigeria economic performance after Structural Adjustment Programmes (SAP). *NG-Journal of Social Development*, 5(2), 122-132.

- Jones E. W. S. (2012). Exchange rate depreciation and the South African economy; growth, inflation and interest rate. *European Journal of Economics*, 2(3), 1–11.
- Kenneth, O. O., Jonathan, O. O., & Kenneth, U. N. (2016). The impact of exchange rate regimes on economic growth in Nigeria. *Journal of Economic and Sustainable Development*, 7(12), 100 -115.
- Korkmaz, S. (2013). The effect of exchange rate on economic growth: Balikesir University: researchgate.
- Linjouom, M. (2007). The impact of the real exchange rate on manufacturing exports in Benin Africa Region Working Paper Series No. 107
- Mori, K., Asid, R., Lily, J., Mulok, D., & Loganathan, N. (2012). The effect of exchange rates on economic growth: empirical testing on nominal versus real. *The IUP Journal of Financial Economics*, 10(1), 7-17.
- NDIC (2016). Nigeria Deposit Insurance Corporation (NDIC) Quarterly, December, 2016
- Obaseki, P. J. (2001). Issues in exchange rate design and management *Central Bank Economic and Financial Review*, 39(2). 61 -75.
- Obaseki, P. J. (1997). The need for exchange rates convergence in Nigeria. *Central Bank Economic Review*, 35(3). 1 – 25.
- Odumosor, C. J. (2019). Impact of money supply growth of the Nigerian economy, 1976-2015. *Journal of Economics and Finance (IOSR-JEF)*, 10(1) 1-25.
- Opaluwa, D. (2008). The effect of exchange rate fluctuations on the Nigerian manufacturing sector 1986 - 2005 :An Unpublished M.Sc Thesis Presented to the Department of Economics, Benue State University, Makurdi.
- Opaluwa, D., Umeh, C., & Ameh, A. (2010). The effect of exchange rate fluctuation on the manufacturing sector. *African Journal of Business Management*, 4(14). 280 – 290.
- Osisanwo, B. G., Tella, S. A., & Adesoye, B. A. (2019). The empirical analysis of monetary policy on balance of payments adjustments in Nigeria: A bound testing approach. *Iranian Economic Review*, 23(1), 129-147.
- Oyejide T. A., & Ogun, O. (1995). Structural adjustment programme and exchange rate policy in macroeconomic policy issues in an open developing economy: A case study of Nigeria. NCEMA Publications, Ibadan.
- Pesaran M. H., Shin Y., & Smith, R. J. (2001). Bounds testing approaches to the analysis of level relationships. *Journal of Applied Econometrics*, 16(3), 289–326.

- Peter, Y. M., & Isaac, K. O. (2017). Real exchange rate and economic growth in Ghana. MPRA Paper No. 82405.
- Soludo, C. (1998). Macroeconomic policy modeling of African economies. Enugu.
- Uddin, K. M. K., Rahman, M. M. & Quaasar, G. M. A. A. (2014). Causality between exchange rate and economic growth in Bangladesh. *European Scientific Journal*, 10(31), 11-26.
- Umer, M., Muhammad, D. S., Abro, A. A., Sheikh, A. Q., & Ghazali, A. (2010). The balance of payments as a monetary phenomenon: econometric evidence from Pakistan. *International Research Journal of Finance and Economics*, 38, 210-218.
- World Development Index database (2020).
- Yaqub, J. O. (2010). Exchange rate changes and output performance in Nigeria; A sectorial analysis. *Pakistan Journal of Social Sciences*, 7(5), 380-387.