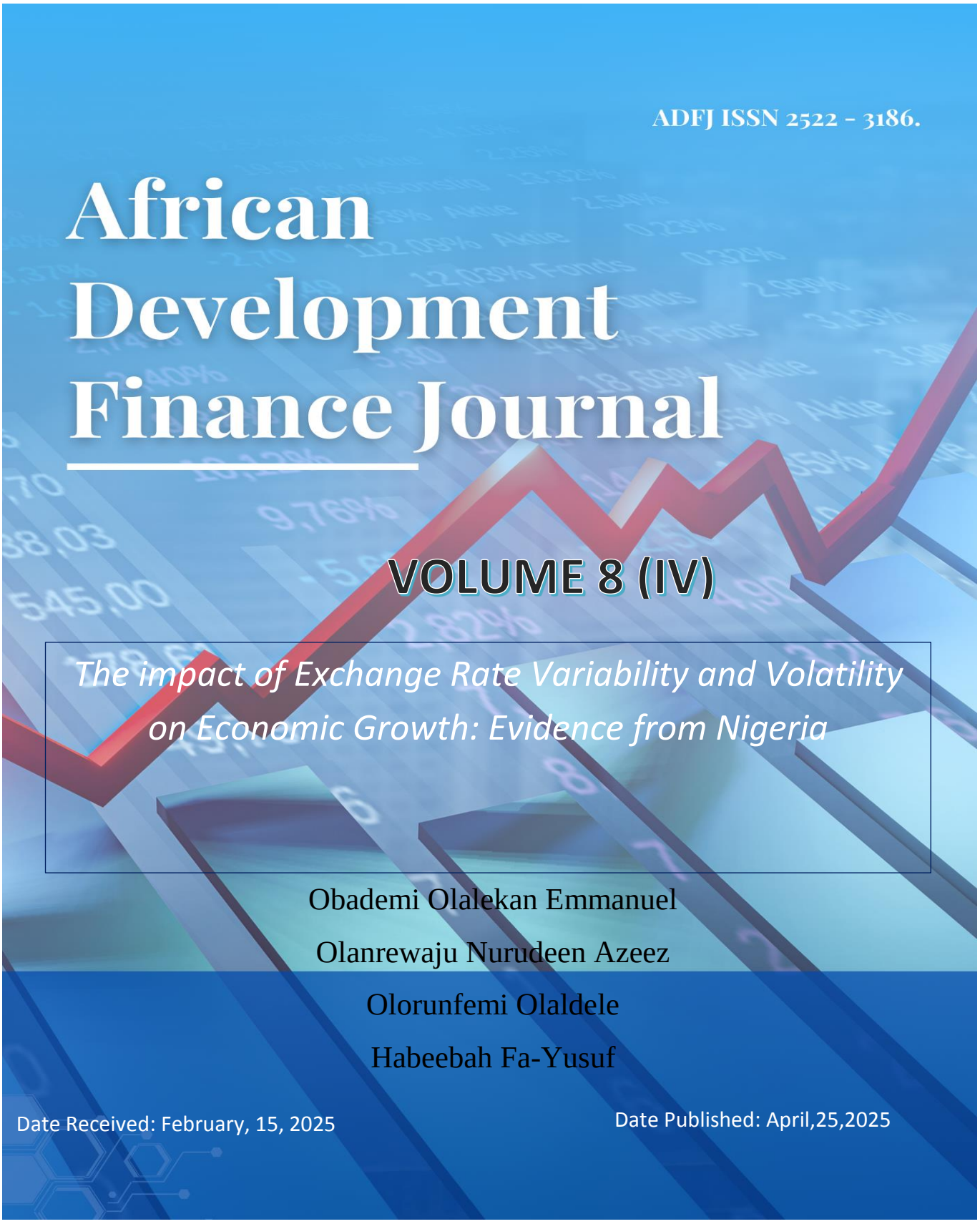
http://journals.uonbi.ac.ke/index.php/adfj
ISSN 2522-3186



African Development Finance Journal http://journals.uonbi.ac.ke/index.php/adfj
April Vol 8 No.4, 2025 PP 99-111 ISSN 2522-3186

The impact of Exchange Rate Variability and Volatility on Economic Growth: Evidence from Nigeria

By: Obademi Olalekan Emmanuel [1], Olanrewaju Nurudeen Azeez[2], Olorunfemi Olaldele[3] and Habeebah Fa-Yusuf [4]

Abstract
This paper focuses on investigating the impact of exchange rate variability and volatility on Nigeria's economic growth for a period of thirty-three years while also looking at the causal impact of interest rate and inflation on real gross domestic product using values from year 1990 up to 2023. The importance of this study is premised on the fact that Nigeria being an import dependent nation of a sort, an understanding of the relationship and impact of the aforementioned variables is needed for proper macroeconomic management. Drawing from a background of the understanding of the investment-savings and liquidity-money model, the weighted least square analytic method was used. Results from the study showed that exchange rate exhibits a direct and positive relationship with the growth rate of real gross domestic product but the impact is low. Inflation rate also showed a negative relationship with the growth rate of real gross domestic product, interest rate is inversely related to the growth of real gross domestic product. This makes it imperative as recommended that import substitution should be embarked upon by deliberately incentivising local producers and investors through concessionary interest rates.

Keywords: *Exchange Rate Variability, Exchange Rate Volatility, Economic Growth*

1. Introduction

In contemporary times, discussions concerning exchange rate variability and its impact on specific sectors of the economy has been scaled to cover its impact on the entire economy especially in Nigeria where there has been a consistent rise in exchange rate in the last ten years until recently when a semblance of stability is being seen when a float exchange regime has become operational.

In specific sectoral applicability, foreign exchange (forex) for example as it impacts on the manufacturing sector is known to be through the transmission mechanism of increased cost of inputs imported by players in the real sector. Most manufacturers in Nigeria rely on imported raw materials, machineries and intermediate goods resulting in increase in the cost of production of finished goods.

[1]*Department of Finance, University of Lagos, Nigeria, Email: eobademi@unilag.edu.ng*
[2] *Department of Finance, University of Lagos, Nigeria*
[3] *Department of Finance, University of Lagos, Nigeria*
[4] *Department of Finance, University of Lagos, Nigeria*

Exchange rate variability and volatility also has implications on the magnitude of foreign direct investment that can be attracted into an economy. It is a rational expectation that investors have, in that they are concerned about how predictable the business climate is, because it enables long-term planning and profit forecast cum the value of future profit when they are eventually repatriated.

For the banking sector, the foreign exchange rate risk that a volatility in exchange rate presents is a thing of concern to managers and shareholders. With the further devaluation of the naira which is the Nigerian currency recently, the impact of foreign exchange on economic growth proxied by real gross domestic product is worth investigating and this underscores the essence of this paper.

It's been observed that many previous studies focused on short-term impacts of exchange rate policies and more so on specific sectors, for example the study by Ajudua (2020) investigated the impact of exchange rate volatility on export and posited that exchange rate volatility has a significant and negative relationship with export performance in Nigeria, while the study by Ihuoma, Eke, Obafemi (2015) in their study on Exchange Rate Behaviour and Trade Balances in Nigeria, confirmed that there is long run relationship between exchange rate, gross domestic product and trade balances in Nigeria.

Going by the notion that the behaviour of a country's exchange rate depends on the type of exchange rate regime, as in whether it is a fixed or float or flexible regime, as posited by Blanchard (2007) who introduced an arbitrage behaviour of financial investor with an eye on the highest rate of return on his investment, the overarching objective of this paper is to investigate how foreign exchange volatility impacts on economic growth while other specific objectives focus on the causality and impact of forex variability on interest rate and inflation while also interested in how they in turn impacts on economic growth as well as specific sectoral growth for the period up to year 2023.

2. Literature Review

Several scholars over the years have investigated the causality and impact of forex volatility, for example, Olawale (2024) in his study on the impact of exchange rate volatility on manufacturing sector growth performance in Nigeria found an insignificant influence of exchange rate volatility on manufacturing sector output. It is instructive to state that the rise or decrease in exchange rate is an indicator of the strength or weakness of a nation's currency to a foreign currency and it is relevant in ascertaining the competitiveness of local industrial products in the global market.

Aliyu (2008) in a previous study conducted to examine the impact of exchange rate volatility on non-oil exports in Nigeria using vector error correction showed that a percentage increase in exchange rate decreased non-oil export by 3.65% whereas the same estimate for the American dollar volatility increased export of non-oil in Nigeria by 5.2%. It was discovered that cointegration results showed that a steady long-run equilibrium relationship exists between non-oil exports and exchange rate volatility. Berg and Miao (2010) it their study found that during times of economic distress, nations with a stable foreign exchange rates were in a more advantageous position to maintain export growth as against the countries with fluctuating currencies.

According to Orji, Ogbuabor and Anthony (2018) when a currency depreciates against major currencies, there is a high possibility of domestically produced goods becoming more expensive when compared to imported alternatives. Simon-Oke and Aribisala (2010) in their study asserted that fluctuations in exchange rate impacts on export competitiveness. A study by Mussa (2000) showed that floating exchange rate regimes though provides a more flexible approach to respond to economic distortions, the downside is that it can impact negatively on trade.

Henry (2020) investigated the relationship between exchange rate fluctuation and economic growth in Nigeria for the period between 1997 – 2017, they found that growth is negatively impacted by exchange rate volatility and depreciation. Nwobia, Ogbonnaya and Okoye (2020) studied the effect of exchange rate fluctuation on Nigeria's international trade with the result showing that exchange rate volatility had depressing effect on external trade between the year 2000 – 2019.

Nguyen and Do (2020) studied the effects of inward foreign direct investment, imports and real exchange rate shocks on export performance in Vietnam an emerging economy like Nigeria for a period between 2009 – 2018, the result showed that high import values significantly increased export performance in the short term but had no significant impact in the long run.

In the same vein, Ewubare and Ushie (2022) in their study on exchange rate and output using ARDL approach for the period between 1981-2020 posited that exchange rate and inflation impacts negatively on output.

3. Methodology

Drawing from a background of the Investment-Savings and Liquidity-Money (IS-LM) model, the Weighted Least Square analytical method was used.

3.1 Model Specification

Exchange rate management is very important especially for import dependent nations. It is often proposed that import dependent nations should overvalue their currencies so as to make imported goods cheaper since they don't have capacity for a competitive export. This overvaluation should continue until such countries can master the art of mass production by adopting imports substitution strategies, and their products can compete favorably in the international market. Import substitution strategy helps in conserving foreign exchange while export promotion helps in generating more foreign exchange with attendant increase in gross domestic product.

3.1.1 Hypothesis

Ho: Exchange rate, inflation rate and interest rate have no significant impact on the growth rate of real GDP

H1: Exchange rate, inflation rate and interest rate have significant impact on the growth rate of real GDP

3.2 Model Specification

The model for this analysis shall be specified thus:

RGDP = f(EXCHR, INFR, INTR)……..1

The above implicit model can be restated explicitly thus:

$RGDP = \beta_0 + \beta_1 EXCHR + \beta_2 INFR + \beta_3 INTR + \mu$……...2

Where: RGDP = GDP in 2010 constant basic prices (Real GDP)

EXCHR = Exchange rate

INFR = Inflation rate

INTR = Interest rate

β_0 is intercept; β_1, β_2, and β_3 are parameters to be estimated; while μ is a stochastic error term. It is expected that the parameters will follow a priori expectation where $\beta_0>0$, $0<\beta_1<0$, $\beta_2<0$ and $\beta_3<0$. The data spans between 1990-2023, the sample is large enough to guide against spurious regression that usually associates with low sample size.

4. Presentation of Data

Table 4.1: Exchange Rate Fluctuation and GDP Growth in Nigeria (1990-2023)

	EXCHR (%)	INFR (%)	INTR (%)	RGDP NBillion
1990	8.039	7.5	27.7	21462.73
1991	9.91	12.7	20.8	21539.61
1992	17.3	44.8	31.2	22537.1
1993	22.05	57.2	36.09	22078.07
1994	21.89	57	21	21676.85
1995	21.89	72.8	20.79	21660.49
1996	21.89	29.3	20.86	22568.87
1997	21.89	10.7	23.32	23231.12
1998	21.89	7.9	21.34	23829.76
1999	92.69	6.6	27.19	23967.59
2000	102.11	6.9	21.55	25169.54
2001	111.94	18.9	21.34	26658.62
2002	120.97	12.9	30.19	30745.19
2003	129.36	14	22.88	33004.8
2004	133.5	15	20.82	36057.74
2005	132.15	17.8	19.49	38378.8
2006	128.65	8.199	18.7	40703.68
2007	125.83	5.40	18.36	43385.88
2008	118.57	11.6	18.7	46320.01
2009	148.88	12.4	22.62	50042.36
2010	150.3	13.7	22.51	54612.26
2011	153.86	10.8	22.42	57511.04
2012	157.5	12.2	23.79	59929.89

2013	157.31	8.5	24.69	63218.72
2014	158.55	8.05	25.74	67152.78
2015	193.28	9.01	26.71	69023.93
2016	253.49	15.7	27.29	67931.24
2017	305.79	16.5	30.6	68490.98
2018	306.08	12.1	28.16	69799.94
2019	306.92	11.4	30.57	71387.83
2020	358.81	13.25	28.64	70014.37
2021	400.24	16.95	28.06	72393.67
2022	425.98	18.85	28.11	74639.47
2023	645.19	24.66	27.98	76684.94

4.1 Analysis of Data

This section analyses the model specified earlier. We start with preliminary test by analysing the descriptive statistics and latter employing unit root to test for the stationarity of the data before proceeding to analyse the data using Weighted Least Square WLS.

Table 4.2: Descriptive Statistics

	EXCHR	INFR	INTR	RGDP
Mean	161.3147	18.27265	24.71206	45229.70
Median	130.7550	12.80000	23.55500	42044.78
Maximum	645.1900	72.80000	36.09000	76684.94
Minimum	8.040000	5.400000	18.36000	21462.73
Std. Dev.	143.1272	15.91509	4.354659	20491.60
Skewness	1.425237	2.176629	0.494035	0.162433
Kurtosis	5.187665	6.832988	2.542304	1.389244
Jarque-Bera	18.29069	47.66042	1.679837	3.825104
Probability	0.000107	0.000000	0.431746	0.147703
Sum	5484.700	621.2700	840.2100	1537810.
Sum Sq. Dev.	676017.9	8358.568	625.7808	1.39E+10
Observations	34	34	34	34

Source: Author's computation using data between 1990-2023. Eview 9 software.

Table 4.2 presents the precise descriptive statistics of the data sample. The computed statistical measures as can be seen above include the Mean, Median, Standard Deviation, Skewness, Kurtosis, Jarque-Bera, and Probability. Furthermore, the total number of observations amounts to

34. The data include EXCHR, INFR, INTR, and RGDP. The RGDP and INTR values demonstrate a normal distribution, as evidenced by a Jarque-Bera probability value over 0.05. However, the EXCHR and INFR do not follow a normal distribution since their Jarque-Bera probability values are less than 0.05. In addition, the INTR and RGDP display a platykurtic distribution characterised by a Kurtosis value below 3, whereas the EXCHR and INFR display a leptokurtic distribution. Lastly, standard deviation which measures the deviation of each variable from their mean is reported to be minimal.

In the literature, most time series variables are non-stationary and using non-stationary variables in the model might lead to spurious regressions (Granger, 1969). The first or second difference term of most variables will usually be stationary (Ramanathan, 1992). Following Engle and Granger (1987) procedure, we start with the testing for the order of property of the variables of interest, the Augmented Dickey-Fuller (ADF) and Phillips-Perron test are employed.

Table 4.2: Unit Root Test Using Augmented Dickey-Fuller (ADF) and Phillips-Perron 1990- 2023

Variable	Test Stat		Critical Value		Order of Integration
	ADF	Phillips-Perron	1%	5%	
RGDP	-3.30	-2.24	-4.30	-3.57	I (0)
EXCHR	2.09	2.55	-4.26	-3.55	I (0)
INFR	-1.17	-1.31	-2.64	-1.95	I (0)
INTR	-0.05	-0.25	-2.63	-1.95	I (0)

Adopting the simple economic relationship of random walk with drift, the results of the unit root tests are reported Using ADF and Phillips-Perron test. All variables are integrated of order zero that is they are stationary at level.

4.2 Model Analysis

The model specified in section three is employed in this section and the Weighted Least Square WLS parsimonious regression output is shown below.

Dependent Variable: LOG(RGDP)
Method: Least Squares
Date: 02/02/25 Time: 08:15
Sample: 1990 2023
Included observations: 34
Weighting series: INTR
Weight type: Standard deviation (average scaling)
HAC standard errors & covariance (Bartlett kernel, Newey-West fixed bandwidth = 4.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.34999*	0.203909	50.75796	0.0000
EXCHR	0.002767*	0.000720	3.842023	0.0006
INFR	-0.006565**	0.003273	-2.005864	0.0540
INTR	-0.002695	0.011124	-0.242257	0.8102

Weighted Statistics

R-squared	0.705063	Mean dependent var	10.44151
Adjusted R-squared	0.675569	S.D. dependent var	1.691827
S.E. of regression	0.260146	Akaike info criterion	0.254986
Sum squared resid	2.030284	Schwarz criterion	0.434558
Log likelihood	-0.334765	Hannan-Quinn criter.	0.316225
F-statistic	23.90556	Durbin-Watson stat	0.282939
Prob(F-statistic)	0.000000	Weighted mean dep.	10.56413
Wald F-statistic	22.45300	Prob(Wald F-statistic)	0.000000

Unweighted Statistics

R-squared	0.718086	Mean dependent var	10.60986
Adjusted R-squared	0.689895	S.D. dependent var	0.485851
S.E. of regression	0.270556	Sum squared resid	2.196023
Durbin-Watson stat	0.281700		

Note: *, ** denote significant at 1% and 5% level respectively.

4.3 Analysis of Regression Result

The value of intercept implies that if all included explanatory variables are zero, the value of real GDP will rise by 10.3%. This implies that there are other variables that are influencing real GDP besides the assumed exogenous variables included in the model. This is statistically significant at 1% level. At 1% level of significant, Exchange rate is positively related to Real GDP but the size or magnitude of its impact is very low. The regression result can be interpreted that a percent rise in exchange rate will lead to a 0.0027 percent rise in RGDP. With this positive and low impact of exchange rate on RGDP, it can be deduced that economy will suffer more should exchange rate depreciates further. Nigeria is a net importer of all sort of goods; both consumer and capital goods. A depreciating exchange rate makes the imported goods expensive, thereby causing imported inflation. The positive sign of the parameter can be deduced from the depreciation impact on capital flow. Naira depreciation over the years has led to foreign capital inflow to Nigeria

economy. But it should be stated unequivocally that the negative impact of exchange rate depreciation outweighed its positive impact on the macro-economic space.

Inflation rate is expected to be negatively related to the growth rate of Real GDP. This follows a priori expectation. At 5% level of significance, a percent rise in inflation rate leads to a fall in real GDP by 0.0065 percent in the period under review. The Tinubu economic policies in recent past has even worsen inflation as general prices are oscillating to unprecedented rate of 30%-50% on average. The rise in general prices in recent time is partly occasioned by the exchange rate depreciation that leads to increase in the price of imported goods and input cost; and partly caused by the dislocation in domestic economy occasioned by the removal of various forms of subsidies ranging from oil, electricity, and telecommunication. Besides, low productivity in the real sector can also be attributed to high rise in general prices as aggregate supply has always been falling short of aggregate demand. Capacity underutilization in the manufacturing sector as the share of manufacturing sector to GDP is abysmally poor.

Interest rate shows a negative sign as expected and its value is also low but not statistically significant. From the regression result, it can be interpreted that a percent rise in the rate of interest leads to a fall in the real GDP by 0.002. Bank credit to the private sector helps in stimulating investment in the real sector, reducing unemployment and enhancing productivity. But this comes with a cost, cost of capital is the interest rate received by the owners of capital. The higher this rate the worse off will be the economy and vice-versa.

4.4 Diagnostic Test

The diagnostic tests further support well specification of the model. The Adjusted R-Square shows that 67.5 percent of the variation in the dependent variable (RGDP) is explained by the included explanatory variables. It shows that the model is good and perfectly fit. The value of F-stat and its p-value further corroborate the point that the model is perfect. However, the model is not free from the presence of serial or autocorrelation as the value of Durbin-Watson stat fall within the region of acceptance of null hypothesis of the presence of autocorrelation.

5. Conclusion and Recommendations

The findings from the Weighted Least Square regression analysis in section four revealed that in the year under review (1990-2023) exchange rate exhibits a direct and positive relationship with the growth rate of Real GDP but the magnitude or impact is extremely low. It can be deduced that Nigeria attracts relatively more capital flow inform of foreign direct investment FDI and portfolio investment in the exchange rate depreciation regime. The negative impact of exchange rate depreciation on domestic economy cancelled out its positive impact via capital flow; leaving it to be directly proportional with low magnitude. Inflation rate in the year under review further reveals a negative relationship with the growth rate of real GDP and statistically significance at 1% level. Inflation in Nigeria is attributed to many factors: demand pull – associated with increase in demand for goods and services consequence of increase in population, change in taste and fashion; cost push- associated with a rise in the cost of production; and imported inflation- associated with high rise in imported goods occasioned by exchange rate and tariff. Low productivity in the real sector is another factor that characterized Nigeria inflationary pressure, to the extent that aggregate supply fall short of aggregate demand.

Interest rate is also inversely related with the growth rate of real GDP but with low magnitude. Its worrisome that Nigeria is one of the Countries with high interest rate in sub-Sahara Africa. Interest rate in Nigeria hovers between 22% - 30%, it is not attractive to genuine investors. In European countries, interest rate ranges between 2%- 5%. This encourages investment, financial inclusion and deepening which in turn impacts positively on the real sector.

From the foregoing, the following recommendations are considered necessary; there must be an effective formulation of monetary and fiscal policies for the proper management of exchange rate. This is possible through import substitution and export promotion strategies by deploying the strategy of concessionary interest rates for specific sectors. In addition, the encouragement of citizens to develop appetite for locally made products and reduce demand for foreign made goods is imperative. This will go a long way to conserve foreign exchange.

Also, increased productivity in the real sector is germane. Government at all levels must incentivize investors and all operators in the real sector to improve productivity. This will bridge

the gap between aggregate demand and supply and have a positive impact on exchange rate valuation as well as inflationary pressure in Nigeria. The only sector in Nigeria that doesn't declare loss in their financial statement is the banking sector, even if the economy is witnessing depression. This is because the banking sector charges commission on every transaction and they focus less on their primary mandate of credit facilitation to the private investors. The Central Bank of Nigeria in its supervisory role should mandate all commercial banks to focus more on financial intermediation which is their core mandate.

References

Ajudua, E. (2020) "Analysis of Exchange Rate and Export Performance in Nigeria" *Lapai Journal of Economics.* Vol 4 No 1 pp 81-94

Aliyu, S, U. (2008) "Exchange Rate Volatility and Export Trade in Nigeria: An Empirical Investigation*" Munich Personal REPEC Archive (MPRA) Paper No 13490*

Berg, A and Miao, Y. (2010) "The Real Exchange Rate and Growth Revisited: The Washington Consensus Strikes Back? IMF Working Paper WP/10/58 pp 1-24

Blanchard, O; Gali, J. (2007) "Real Rigidities and the New Keynesian Model" *Journal of Money, Credit and Banking.* Proceedings of the Conference on Quantitative Evidence on Price Determination. Pp 35-66

Ewubare, D.B and Ushie, U. A (2022) "Exchange rate fluctuations and economic growth in Nigeria" *International Journal of Development and Economic Sustainability.* 10(1) 41-55 www.eajournals.org

Henry, E; Murtadho, A.M and Bhaumik, A (2020) "The relationship between exchange rate fluctuations and economic growth in Nigeria" *International Journal of Management and Human Science* 4(4) 11-18 https://ejournal.lucp.net/index/ijmhs/article/view

Ihuoma, Eke; Eke, F; and Obafemi, F (2015) "Exchange Rate Behaviour and Trade Balances in Nigeria" *International Journal of Humanities and Social Science* Vol 5 No 8 pp 71-78

Nguyen, Van. Chien and Do, Tuyet. Thi (2020) "Impact of exchange rate shocks, inward FDI and import on export performance; A Cointegration Analysis" Journal of Asian Finance, Economics, and Business" vol 7 No 4 (2020) 163-171.

Nwobia, C.E; Ogbonnaya, Udo and Okoye, J.N (2020) "Effects of exchange rate fluctuations on Nigeria's external trade" *International Journal of Economics, Business and Management Research* 4(10) 47-60 www.ijebmr.com

Olawale, A. (2024) "Impact of exchange rate volatility on the manufacturing sector growth performance in Nigeria" htts://papers.ssrn.com

Orji, A; Ogbuabor, J and Nwosu, E. (2018) "Foreign capital inflows and unemployment in Nigeria: A New Evidence from ARDL Bounds Testing Approach" *International Journal of Business, Economics and Management* 5(6) 176 -188

Simon-Oke, O. O and Aribisala, S.E (2010) Exchange rate deregulation and industrial performance and assessment" *African Research Review* Vol 4(2) pp 236 -251