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Impact of Exchange Rate Fluctuations on Trade in Nigeria: An Empirical Analysis (1990-2023)

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Abstract
The study examined time series analysis from 1990 - 2023 to examine exchange rate fluctuations on trade in Nigeria. Autoregressive distribution lag model (ARDL) for testing the short-run and long-run relationship between trade and exchange rate fluctuation in Nigeria. Results of the empirical revealed, that exchange rate fluctuation affects GDP either in the short run or in the long run. Excessive exchange rate fluctuation affects economic growth in Nigeria. The study recommends that the government needs to reduce wasteful spending on unproductive expenditures with little or no return to the economy. Awareness should be in encouraging citizens to patronize local produce; the action leads the country's currency to appreciate against foreign currency.

Keywords: Exchange rate, Economic Growth, Import and Export, Autoregressive Distribution Lag (ARDL)

Introduction

One of the macroeconomic variables that are very important for the trade process is the exchange rate, its instability slows down trading activities as both the investors and traders want the exchange rate to be more favourable for more economic activities to take place. Both wait for the favourable exchange rate to take place More so, any instability in exchange rates not only affects the decision-making of traders and investors but also destabilizes the capital movement and volume of trade. (Atiff, 2014). Developing country's exchange rate policies are often sensitive and controversial, due to the kind of structural transformation required by reducing imports or expanding non-oil exports, which invariably imply a depreciation of the nominal exchange rate. Adjustment domestically in the short run has effects on the prices and demand and is perceived as damaging to the economy. The subject of debate in developing economies that depend so much on imports for consumption and production is the distortions in overvalued exchange rate regimes. The degree of exchange rate fluctuations in the face of internal and external shocks is a major concern of the debate in developing economies. Because of monetarism, devaluation or depreciation could boost domestic production by stimulating the net export component. An increase in international competitiveness of domestic industries leads to the diversion of spending from foreign goods whose prices become high, to domestic goods (Guitan, 1976 cited in Dornbusch, 1988).

The applications of monetary policy in terms of currency depreciation for the success of trade balance depend more on switching demand in the proper direction as well as domestic trade to meet additional demand and supply. More so, economic performance is determined by the rate of country exchange rate fluctuations. That is why exchange rate fluctuations influence economic performance (Mordi, 2016). The country's exchange rate policy has undergone substantial transformation from the immediate post-independence period when the country maintained a fixed parity with the British pound, through the oil boom of the 1970s, to the floating of the currency in 1986, following the near collapse of the economy between 1982 and 1985 period. In each of these periods, the economic and political considerations underpinning the exchange rate policy had important repercussions for the structural evolution of the economy, inflation, the balance of payments, and real income (Eme & Johnson, 2021).

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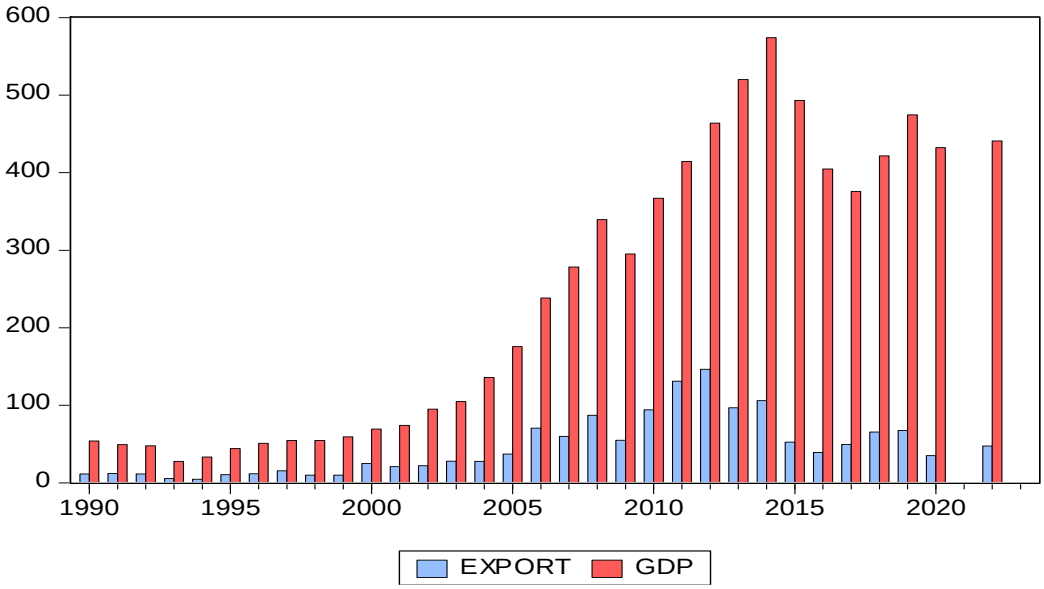
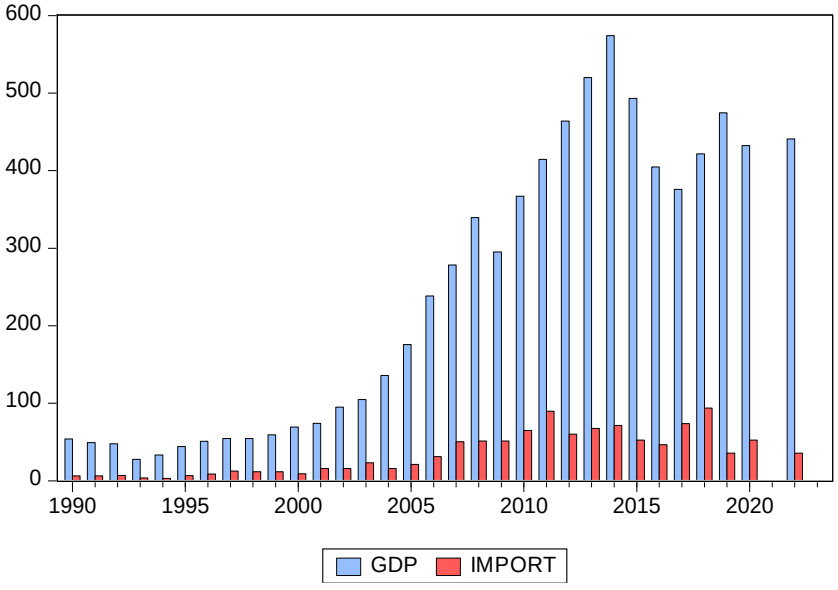


Source: Author's Computation 2024

Figure 1: Stylized Facts on the exchange rate, export and import

Figure 1 above shows the export data of Nigeria from 1990 to 2023. The data is for over three decades and shows different positions of export trades experienced over the years. Early export has a slow and steady low growth from the early 1990s till year 2000. From the year 2000 export trade continued to increase till around the year 2003 as a result of an increase in demand for oil export due to war in the Middle East till around 2005. The period was an economic boom. Country Oil boom periods lead to neglect of other sectors of the economy for export. Nigeria still experiences steady and low growth to date, as a result of low demand for crude oil from the U.S.A and China and neglect of other sectors of the economy for export reduced the strength of our currency as against another exchange rate.



Source: Author's Computation 2024
Figure 2: The import rate of Nigeria from 1990 till 2023

Figure 2 shows the import rate of Nigeria from 1990 till 2023. The early 1990s shows a low rate of importation into the country due to high dependence on local productions. This enables the local currency appreciated against foreign

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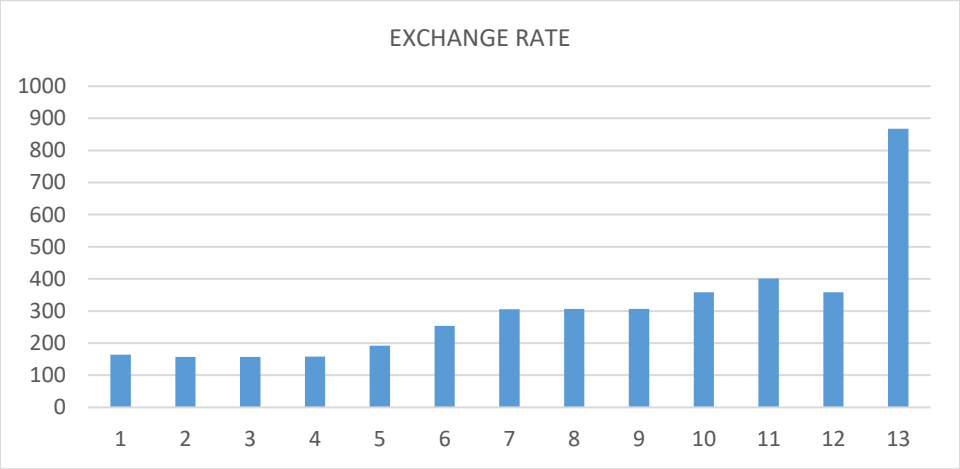
currency and this results in better realization of GDP into the economy. The early 2000s was the beginning of a high rate of importations into the country as a result of high revenue from crude oil due to war in the Middle East and the beginning of neglect of local produce. The continued dependence on foreign goods and services up till the present day leads to a continued fall in the country's currency as a result of the high importation of items that can be produced locally. This over-dependency on foreign goods leads to shut shutdown of many factories and greatly affects the country's exchange rate as against Dollars.



Source: Author's Computations 2024.

Figure 3: Nigeria exchange rate fluctuations as against USD from 2011 till 2023.

The above Figure shows the Nigeria exchange rate fluctuations as against USD from 2011 till 2023. The exchange rate has increasing trends as a result of over-dependency on foreign items and neglect of local productions. The research intends to examine the effect of exchange rate fluctuations on trade in Nigeria and how the exchange rate instability affects country trade. The empirical study will capture various exchange rate regimes from 1990 to 2023 in Nigeria.

Adelowokan et al. (2015): On the effect of exchange rate volatility on investment and growth in Nigeria. The study employed the error correction method (ECM) and found that exchange rate volatility affects investment and growth while exchange rate volatility has a positive impact on inflation and interest rates in Nigeria. Another view Mireille (2017) on the major problem in the recovery process between Nigeria and the Benin Republic on the exchange rate by those nations. He suggested that to have equilibrium and better economic performance there is a need for devaluation in line with well-targeted measures and upward adjustment in the domestic price of goods. Akpan (2008) On regimes of the exchange rate in Nigeria for the period 1986 to 2007. The time series and an Error Correction Model estimation were used in the estimation process Their outcome was that the exchange rate was low as well as the price chain during the time under review and contradicted the literature that the exchange rate is always higher in the developing countries that developed countries. Both concluded that in the long run exchange rate will increase and monetary policy should be in a position to accommodate the effect on the economy. Alagidede and Ibrahim (2017) on exchange rate volatility on Ghana's economic performance from 1980 to 2013. The study employed the use of a vector error correction model. It revealed that excessive volatility impacts economic growth in Ghana. Kamin and Klau (2018), used the error correction method as a technique in linking the output to the real exchange rate The result shows that devaluations were contractionary in the long run. More so, through the control of the sources of spurious correlation, reverse causality appeared to alternate the measured contractionary effect of devaluation in the short run.

Theory of Optimal Currency Area

The position of Mundell (1961) and McKinnon (1963) as theoretical foundations on exchange rate policy. The importance of the theory was on the exchange rate policies. The theory aimed to ensure stability in the business cycle. Fixed exchange rate regimes accelerate trade and output growth by reducing cost and increase investment by reducing currency premiums from interest rates.

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Methodology

It employed the use of times series data from 1990 to 2023, the research adopted econometric models to investigate the relationships among the variables in Nigeria.

Specification of the model.

In line with the position of the Theory of optimal currency area by Mundell (1961) and Mckinon (1963) on the theory of exchange rate. The research adopted a study by Adeniran et al (2014):

GDP = F (EXR, GFCF, INF, INT, TOP) (1)

Where:

GDP = Gross domestic products
EXR = Exchange rate
GFC F= Gross fixed capital formation
INF = Inflation rate.
INT = Interest rate
TOP = Trade openness.
Model specification is as follows:

$$GDP = \theta + \Sigma a_1 GDP_{t-1} + \Sigma b_1 EXR_{t-1} + \Sigma b_2 GFCF_{t-I} + \Sigma b_3 INF_{t-1} + \Sigma b_4 INT_{t-1} + \Sigma b_5 TOP\ \Sigma t \quad (2)$$

The GDP is the dependent variable which represents the economic performance of the country in the study. The exchange rate is the independent variable proxy by the official Nigerian currency against US Dollar. Among the other variables are GFCF as a percentage of GDP. Inflation rate, interest rate, and trade openness.

Specification of the model for ARDL Error Correction Model and the long-run relationship is represented below:

Error Correction Model (i.e., ECM) is used in the following form:

$$\Delta \text{ Log RGDP} = \varphi_1 + \Sigma \varphi_2 Lag_1 \Delta \text{ Log RGDP} + \Sigma \varphi_3 Lag_1 \Delta \text{ Log EXCH} - \varphi_4 \mu C_{,t-1} - e_2 \quad (3)$$

$$\Delta \text{ LogRGDP} = \varphi_{11} + \Sigma \varphi_{22} Lag_1 \Delta \text{ LogEXCH} + \Sigma \varphi_{33} Lag_1 \Delta \text{ LogRGDP}_1 - \varphi_5 Ec_{,t-1} + e_2 \quad (4)$$

From the equation above, the coefficient θ of the ECM term is expected to be negative to restore the equilibrium position. For that to happen our $\theta < 0$.

Table 1: Descriptive Statistics

Variables	GDP	EXCH	GFCF	INF	INT	TOP
Mean	22.3245	28.667	16.8976	19.8754	18.9764	37.9087
Median	25.3679	26.5678	26.000	12.65768	19.0786	37.8975
Max	45.10987	53.8767	72.89876	36.9086	67.0975	67.983
Std.Dev	16.9864	10.5674	11.7832	15.8965	5.24567	7.98053
Skewness	1.14378	-0.14678	3.8796	1.87835	1.18754	-0.0703
Kuitosis	3.45781	6.3726	8.4532	2.6754	3.8976	2.3468
Jerque-Ber	456.583	562.103	724.897	692.786	8.54360	0.5643
Sum	113.746	422.893	654.897	112.907	342.897	231.908
Sumf sq	897.097	411.897	876.907	675.097	784.783	445.012
Prob	0.0675	0.29975	0.05456	0.0345	0.0168	0.03457
Obs	35	35	35	35	35	

Source: Author's Computations 2024 from E-View.

Table 1 shows the descriptive statistics for Gross Domestic Product(GDP) Exchange rate (EXCH), Gross fixed capital formation (GFCF)Inflation rate (INF), and Trade openness(TOP). Summary statistics revealed that the average of GDP, EXCH, GFCF, INF, and TOP are: 22.345, 28.667, 16.897, 19.8754,18.9764 and 37.9087 respectively. While the maximum values of the variables are: 45.10978, 53.8767, 72.8987, 36.9086, 67.0975 and 67.983 respectively. The skewness revealed that the majority of the variables in the study were positively skewed except for exchange rate and trade openness which are negatively skewed with coefficients of -0.14678 and -0.0703. The Jarque-Bera statistics indicated the result of the probability values for the exchange rate (EXCH) is greater than 0.05 (5%).

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Table 2: Unit Root Test

Variables	Test of order	ADF Stat	Critical Value	Level of Sig	P-Value	Order of Integration
RGDP	Level	-4.7683	-2.85673	5%	0.06583	1(0)
EXCH	Level	-2.4563	-2.96754	5%	0.00457	1(0)
INF	Level	-1.84673	-2.94657	5%	0.07844	1(1)
GFCF	Level	-2.31278	-2.93542	5%	0.02546	1(0)
INT	Level	-3.2676	-2.96785	5%	0.03546	1(0)
TOP	Level	-7.5647	-2.91435	5%	0.02416	1(1)

Source: Author's computation from E-View 2024.

Table 2 above shows the results of the GDP, EXCH, INF, GFCF, INT, and TOP in which all the variables are stationary at level 5% level of significance. These indicate that those incorporated series in the regression model have no unit root and that the series in their first difference are mean reverting and converging towards the long-run equilibrium.

Table 3: Autoregressive Distribution Lag (ARDL) Bound test

Null Hypothesis: No long-run relationship exists		
Test Statistic	**Value**	**K**
F-Statistic	4.15580	6
Critical Value Bounds		
Significance	10 Bound	11 Bound
10%	2.13	3.24
5%	2.46	3.65
2.5%	2.76	3.98
1%	3.15	4.42

Source: Author's computation from E-View 2024.

Table 3 above shows the bound test for co-integration. The Wald Test calculated F Statistics is compared against the Pear and Shin (1995) Lower Bound 1(0) and Upper Bound 1 (1) critical values at a 5% level of significance. At all levels of significance, the F-Statistic of 4.1558 is greater than the corresponding upper bound values at a 5% significance level. This indicates that there exists enough evidence of the null hypothesis of no co-integration and as such can't be accepted at all levels. This affirms that there exists a long-run equilibrium relationship.

Table 4: ARDL Long-Run Test

Variables	Coefficients	Std Error	T-Stat	prob
Log (EXCH)	-1.63037	0.59286	-2.74995	0.0137
GFCF	-0.58902	0.261613	-2.25148	0.0379
INF	-0.307370	0.078348	-3.923105	0.0011
INT	0.875634	0.19635	4.45627	0.0003

Source: Author's computations 2024 from E-View.

Table 4 above presents the long-run relationship among the variables at a 5% level of significance and harms the GDP of values 0.00137,0.0379 and 0.0011. The rate of interest has an impact on economic growth with a p-value of 0.003. 1% decrease\(increase) in each EXCH,INF which leads to increase(decrease) in GDP by about 0.016 % and 0.307 % .Every increase (decrease) in USD other will lead to a 0.583% increase (decrease) in GDP. 1% increase in INT will lead to a 0.88% rise in GDP, EXCH, GFCF, and INF with a negative significant long-run relationship on economic growth.

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Table 5: ARDL Error Correction Model

Variable	Coefficient	Standard.Err	T-Sta	Prob
D(GDP) (-1)	0.352350	0.160117	2.157567	0.0482
D (GDP) (-2)	0.241321	0.108453	2.675434	0.0185
D(EXR)	-5.567233	1.318678	-4.286745	0.0004
D(GFCF)	-0.083112	0.281345	-0.245654	0.7864
D (INF)((-1)	0.365467	0.026523	6.215678	0.0001
D(INF)(-2)	0.385745	0.025677	1.636212	0.1352
D (INT)	0.356231	0.121564	2.141326	0.0068
D(INT)(-1)	-0.654376	0.123654	-3.248756	0.0007
D(TOP)	-5.369132	1.215871	-4.115678	0.0014
Coint .Eqn (1)*	-0.871326	0.132671	-4.361136	0.0002

Source: Author's computations 2024 from E-View.

The above table presents the result of the short-run relationship among the variables. From the result, the coefficient of -0.871326 of the ECM is negatively related and also significant since the p-value of 0.0001 is less than 0.05. It implies that there is the existence of a short-run relationship between EXCH and RGDP, and are negatively related in Nigeria.

Discussion

The estimated results of the relationship between Δ LogRGDP and Δ LogEXCH have been reported in Tables 3 and 4. Both reflected the existence of a long-run and strong inverse relationship between EXCH rate and real GDP in Nigeria which in turn implies a long-run negative relationship between exchange rate and economic growth. The coefficients are statistically not significant and negative. On average, a 1-percent increase in the exchange rate in Nigeria leads to a decline in real GDP by 0.015 percent. On the other hand, on average, a 1 percent increase in the real GDP leads to a decline in the exchange rate by 0.047 percent. There is a linear causation between the exchange rate and real GDP in Nigeria. The estimated coefficients are negative but statistically not significant implying that both exchange rate and real GDP affect each other negatively, and inflation is harmful for economic growth.

The long-run relationship among the variables at a 5% level of significance harms the GDP with p-values of 0.00137,0.0379 and 0.0011. Interest rate impacts GDP significantly with a p-value of 0.003.1% decrease\(increase) in each EXCH, INF which leads to an increase(decrease) in GDP by about 0.016 % and 0.307 %. Every increase (decrease) in USD other will lead to a 0.583% increase (decrease) in GDP. Every 1% increase in INT will lead to a 0.88% rise in GDP, EXCH, and INT have a negative significant long-run relationship on economic growth in Nigeria. Nigeria's currency fluctuations exert a negative influence on economic growth. A rise in the value of Nigerian currency to USD leads to an increase in the growth of trade in Nigeria. There is also the existence of a short-run relationship between EXCH and RGDP which are negatively related in Nigeria. The study is in line with the study of Greenaway-McGrevy et al. (2018), who argued that a stable exchange rate brings about growth and development capacities. It was revealed that fluctuations in excessive exchange rates impede economic growth and lead to reductions in productivity.

Conclusion

This paper examined if a relationship exists between the exchange rate and trade in Nigeria under the review periods. The result concludes that exchange rate and economic growth are negatively related. An increase in the exchange rate will have a great impact on domestic trade, which will later influence the growth of GDP negatively in the country.

Recommendations

1. Budget deficits need to be controlled to have an increased growth rate of GDP and a low rate of inflation.
2. The government should reduce spending on unproductive expenditures that cannot bring growth into the country. Expenditure should be on infrastructural facilities that will encourage local and foreign investors to invest and trade in the country. Such actions will later lead to an appreciation of the Naira as against USD.

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