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DETERMINANTS OF EXCHANGE RATE IN NIGERIA

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Abstract
The aim of this paper is to empirically analyze the determinants of exchange rate of Nigeria during the time period 1980-2020. The data is taken from various sources WDI (World Development Indicators) and IFS (International Financial Statistics). The real exchange rate (RER) is taken as dependent variable while Gross Domestic Growth Rate (GDPG), Inflation Rate (INFL), Interest Rate (INTR) and Trade Openness (TOP) are used as independent variables. The unit root analysis show that all variables are mixture I(O) and I(1). The result of co-integration analysis shows that all the variables have a long run relationship. After this, Autoregressive Distributed Lag Model (ARDL) regression was applied. In the short term, GDP growth rate has significant negative relation with real exchange rate. Inflation rate has a significant positive relationship with real exchange rate. Also in the short run, interest rate has a significant positive relation with the exchange rate. While trade openness has an insignificant but negative relationship with real exchange. Furthermore, the findings in the long run established that there is significant negative relationship between real exchange rate and GDP growth rate. This is consistent with short run finding. Also, a significant positive relationship was established between real exchange rate and inflation rate. As shown by the long-term findings, an insignificant positive relationship was established between interest rate and real exchange rate in Nigeria. Also, a negatively insignificant relationship was established between real exchange rate and trade openness. Appropriate policy recommendations were made.

Keywords: *Gross Domestic Growth rate, Inflation, Interest rate, Real exchange rate*

Introduction

The exchange rate is the rate at which one currency is exchanged for another. It is the price of one currency in terms of another currency (Jhingan, 2005). Exchange rate is the price of one unit of the foreign currency in terms of the domestic currency. The debate over what determines the choice of exchange rate regimes has continued unabated over some decades now. Friedman (1953) argued that in the presence of sticky prices, floating rates would provide better insulation from foreign shocks by allowing relative prices to adjust faster. His popular support for floating exchange rate stipulates that in the long run the exchange rate system does not have significant real consequences. His reasoning is that the exchange rate system is ultimately a choice of monetary regimes. At the end, monetary policy does not matter for real quantities, but in the short run it does. While Mundell (1963) posits that in a world of capital mobility, optimal choice of exchange rate regime should depend on the type of shocks hitting an economy: real shocks would call for a floating exchange rate, whereas monetary shocks would call for a fixed exchange rate. Traditionally, it has been argued that a country's optimal real exchange rate is determined by some key macroeconomic variables and that the long-run value of the optimal real exchange rate is determined by suitable (permanent) values of these macroeconomic variables (Williamson, 1994).

Incidentally, since the fall of Bretton-Woods system in 1970s and the subsequent introduction of floating exchange rates, the exchange rates have in some cases become extremely volatile without any corresponding link

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to changes in the macroeconomic fundamentals. This however has led to higher interest in exchange rate modeling as the question of exchange rate determination reveals to be one of the most important problems on theoretical field of monetary macroeconomics. There are different types of exchange rate regimes practiced all over the world; from the extreme case of fixed exchange rate system to a freely floating regime. Practically, countries tend to adopt a combination of different regimes such as adjustable peg, crawling peg, target zone/crawling bands, and managed float, whichever that suits their peculiar economic conditions. For instance, exchange rate managements in Nigeria has witness different significant changes over the past four decades. Nigeria maintained fixed exchange rates from 1960 till the breakdown of the Bretton Woods Monetary System in the early 1970s. Between 1970 and mid 1980 Nigeria exchange rate policy shifted from fixed exchange rate to a pegged arrangement and finally, to the various types of the floating regime since 1986 following the adoption of the Structural Adjustment Programme (SAP) (Sanusi, 2004).

A regime of managed float, without any strong commitment to defend any particular parity, has been the predominant characteristic of the floating regime in Nigeria since 1986. The changes from the different regimes are not peculiar to the Naira as the US dollar was fixed in gold terms until 1971 when it was de-linked and has since been floated. The fixed exchange rate regime induced an overvaluation of the naira and was supported by exchange control regulations that engendered significant distortions in the economy. That gave vent to massive importation of finished goods with adverse consequences for domestic production, balance of payments position and the nation's external reserves level. Moreover, the period was bedeviled by sharp practices perpetrated by dealers and end-users of foreign exchange. These and many other problems informed the adoption of a more flexible exchange rate regime in the context of the SAP, adopted in 1986 (Sanusi, 1988). In line with the above, this study intends to find out determinants of exchange rate in Nigeria.

Developments in the Foreign Exchange Market and Exchange Rate Movements in Nigeria

The management of the foreign exchange (forex) rate market in Nigeria has witnessed series of reforms which first led to a shift from a controlled exchange rate to the Second-tier Exchange Market introduced in September 1986. As part of the reform, the Bureau de Change Foreign Exchange Market was introduced in 1989 purposely to deal with privately sourced foreign exchange. The introduction of this segment of the exchange rate market led to large volatility in the rates, thus prompting further reforms ranging from the formal pegging of the naira exchange rate to reaffirmation of the illegality of the parallel exchange rate market. By 1995, the Central Bank of Nigeria enhanced the sale of foreign exchange to end-users through the Autonomous Foreign Exchange Market. Central to the reforms is the handling of the Bureau de Change Market as authorized dealers. To further enhance accessibility of forex market, the interbank foreign exchange market was introduced in 1999. In 2002 and 2013 the exchange rate policy was managed between a Retail Dutch Auction System and Wholesale Dutch Auction System. Subsequently, the interbank foreign exchange market (with CBN interventions) operated from November 2013 till June 2016 when it was further enhanced to improve the exchange rate flexibility. Nonetheless, the Central Bank of Nigeria continued to intervene in the market to stabilize the exchange rate (CBN, 2020). There was relative stability in the exchange rate market, as expected, under the control regime, with the official exchange rate at an average of N1.75 per US dollar (USD). The movement of the foreign exchange experienced mostly depreciation since the liberalization of the 1986 until 1993 when it was again, fixed at N22/USD. This fixed exchange rate could not be supported again leading to further depreciation to N92/USD by 1999. Meanwhile, at this same time, the AFEM intervention rate depreciated continuously from N81.98 in 1997 to N91.83 in 1999. Subsequent reforms led to unceasing depreciation between 1999 and 2004, when it reached N132/USD. A slight respite for the economy was achieved between 2004 and 2008 when it appreciated for the first time. The rate however, has been heading north since then, reaching N192/USD in 2015 and N253/USD on the average in 2016.

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It should be noted that the rate depreciated between June and September 2016, when it was officially maintained at N305/USD till date (July, 2018). The Central Bank devalued the currency twice in 2020, and it has traded within a band of 380.0 and 381.0 NGN per USD since last July. The naira has been under pressure from rising demand for U.S. dollars as foreign investors pulled out of the country in the wake of the global health crisis, which sent oil prices tumbling.

Looking ahead, prospects for the currency remain grim and panelists expect it to continue losing value against the greenback amid structurally high inflation, capital outflows and the Central Bank prioritizing credit growth to stimulate economic activity. Focus Economics Consensus Forecast panelists see the NAFEX exchange rate ending 2021 at 428 per USD, while the official interbank naira is seen ending 2021 at 413 per USD. As at March, 2022, a dollar is exchanged for 415.75 naira.

The movement in the bureau de change rate followed similar trend, but more volatile as expected. As at 1995, the rate was N83.69/USD and depreciated to N99.26/USD in 1999. The rate increased to N140/USD in 2004 and appreciated continuously till it reached N120/USD in 2008. By 2009, at the period of the fallout of the global financial crisis, it depreciated to average of N161/USD, a rate that was maintained until 2014 and 2015, when it depreciated again to N171/USD and N222/USD, respectively. The period marked the new era of continuous and unwavering depreciation in the market due to the inability of the Central Bank of Nigeria to fully support the forex as a result of the dwindling fortune of the country which suffered immensely from the global oil price crash. The management of exchange rate was hampered by speculative activities at this period. The exchange rate reached the peak of N493.29/USD by January 2017, until it stabilized to about N360/USD by end of 2017 and till mid of 2018 (CBN, 2019).

Literature Review

Surveying economic literature revealed that modelling exchange rate volatility has followed different dimensions over the years (Diebold & Nerlove, 1989; Sengupta & Sfeir, 1996; Usman & Adejare, 2010; Ojebiyi & Wilson, 2011; Adeoye & Atanda, 2012; Ajao & Igbekoyi, 2013; Bala & Asemota, 2013). Diebold and Nerlove (1989) appears to be the first study to model the exchange rate volatility using the Auto Regressive Conditional Hereteroskedasticity (ARCH) framework. The ARCH model only account for symmetric impacts in a shock. However, economic agents do not respond the same way to both positive and negative shocks. Thus, the study did not account for asymmetric shocks in the model. Also, Sengupta and Sfeir (1996) attempted the modelling of exchange rate volatility in five countries (Japan, France, United Kingdom and West Germany) using the Autoregressive Conditional Hereteroskedasticity (ARCH) and Generalized Autoregressive Conditional Hereteroskedasticity (GARCH). The study revealed that exchange rate follows a random walk while the volatility follows a persistent nonlinear behaviour. Again, the study failed to capture for asymmetric impact that is often common with volatile series.

In Nigeria, a number of studies have attempted to model exchange rate volatility. A notable work in this regard is Adeoye and Atanda (2012). The study revealed the presence of overshooting volatility shocks. However, the study did not account for asymmetric impacts in the model. Further, Bala and Asemota (2013) considered modelling exchange rate volatility in Nigeria and argued that asymmetric impacts and shocks are important when dealing with high frequency data. Therefore, evaluating the presence of asymmetric shocks on exchange rate is very pertinent to investors and policy makers. In addition, Olusola and Opeyemi (2013) examined exchange rate volatility in Nigeria using Parametric Measure. They found that exchange rate volatility represents uncertainty and risk, which impose costs on risk averse economic agents. The results from their Exponential Generalised

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Autoregressive Conditional Heteroscedasticity (E-GARCH) model indicated that exchange rate was volatile in Nigeria as a result of unusually high and low deviations.

Model Specification

Following the argument of Williamson (1994), a country's optimal real exchange rate is determined by its macroeconomic fundamentals (i.e. some key macroeconomic variables) and that the long-run value of the real exchange rate is determined by suitable (permanent) values of these fundamentals, we formulate the determinant of real exchange rate in Nigeria as follows;

RER = F (GDPR INTR INF TOP) 1

where RER = Real Exchange Rate
GDPG = Gross Domestic Product Growth Rate
INTR = Interest rate
INF = Inflation Rate
TOP =Trade Openness

For the purpose of empirical computation, equation (1) converges to:

$RER = \alpha_{0+} \propto_1 \text{RER} + \propto_2 GDPR + \propto_3 INTR + \alpha_4 \text{INFL} + \propto_4 TOP + \mu$ 2

α_0= the constant term
α_s = the parameters to be estimated
μ =error term

Sometime the dependent variable responds to the explanatory variables with a lapse of time (Gujarati, 2004). Hence, equation (2) transforms into a dynamic model as follow:

$$\Delta RER_t = \propto_0 + \sum_{i=1}^{p} \alpha_1 \Delta RER_{t-1} + \sum_{i=0}^{q_1} \propto_2 \Delta GDPR + \sum_{i=0}^{q_2} \propto_3 \Delta INTR_{t-1} + \sum_{i=0}^{q_3} \propto_4 \Delta INFL_{t-1} + \sum_{i=0}^{q_4} \alpha_5 \Delta TOP_{t-1} + \gamma_1 RER_{t-1} + \gamma_2 GDPR_{t-1} + \gamma_3 INTR_{t-1} + \gamma_4 INFL_{t-1} + \gamma_5 TOP_{t-1} + \mu_t \quad 3$$

Where Δ is the drift component and is the difference operator. The model's short run dynamics are represented by the summation α_1 to α_5, while the long run relationship is represented by the coefficients γ_1 to γ_5, and t is the serially uncorrelated disturbance with zero mean and constant variance. The following long run model for GINI was estimated after confirming the existence of cointegration between variables:

$$\text{RER}_t = \propto_0 + \gamma_1 RER_{t-1} + \gamma_2 GDPR_{t-1} + \gamma_3 INTR_{t-1} + \gamma_4 INFL_{t-1} + \gamma_5 TOP_{t-1} + \mu_t \quad 4$$

To find the ideal structure of the ARDL specification, the lag orders of the variables were chosen using the appropriate Akaike Information Criterion. To predict the short run dynamics, the following error correction model was created after estimating the ARDL specification and calculating the related long run multipliers:

$$\Delta RER_t = \propto_0 + \sum_{i=1}^{p} \alpha_1 + \sum_{i=0}^{q_1} \propto_2 \Delta GDPR + \sum_{i=0}^{q_2} \propto_3 \Delta INTR_{t-1} + \sum_{i=0}^{q_3} \propto_4 \Delta INFL_{t-1} + \sum_{i=0}^{q_4} \alpha_5 \Delta TOP_{t-1} + \acute{\Gamma} ECM_{t-1} + \mu_t \quad 5$$

Where the short run parameters range from α1 to α5, and the adjustment parameter is supposed to be smaller than zero. ECM is the lagged error correction term derived from the equation's estimated cointegration model. The CUSUM and CUSUMSQ tests to the residual equation were used to see if the long run and short run

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coefficients were stable, and if the two statistics stayed under the 5% significant level. We shall use Akaike Information Criteria (AIC) to determine the optimal lag length of the model.

Results

Descriptive Statistics

Descriptive statistics for the variables are provided in order to better understand the characteristics of the series under consideration in the model. According to the data in Table 1 below, all variables have mean and median values that are between their maximum and lowest values, which indicates that the data series is consistent. All data series have a high degree of consistency, as shown by the fact that their mean and median values fall within their maximum and lowest values across all descriptive statistics examined in this research. The standard deviation values revealed that none of the series included in the research are fundamentally or statistically different from their mean values. A combination of the skewness and kurtosis of the descriptive statistics, as well as the thickness of the tails in the distribution, suggest that symmetry holds for the probabilistic distribution of the observed data series. Having both the skewness and kurtosis statistics is crucial because they are used to construct the Jarque-Bera statistic, which is then used to assess the normality of the variables that were utilised in the research.

Table 1: Descriptive Analysis

	RER	GDPG	INFL	INTR	TOP
Mean	98.31592	3.28E+13	62.97971	0.337111	32.60707
Median	101.6973	6.57E+12	29.60073	4.310292	34.18000
Maximum	358.8108	1.54E+14	267.5115	18.18000	53.28000
Minimum	0.546781	4.60E+11	0.405056	-65.85715	9.140000
Std. Dev.	100.6851	4.56E+13	74.42524	14.27219	12.49593
Skewness	0.916136	1.330185	1.206579	-2.685826	-0.366300
Kurtosis	3.034686	3.498192	3.424353	12.77500	2.190695
Jarque-Bera	5.737307	12.51485	10.25582	212.5258	2.035783
Probability	0.056775	0.001916	0.005929	0.000000	0.361356
Sum	4030.953	1.35E+15	2582.168	13.82154	1336.890
Sum Sq. Dev.	405499.5	8.32E+28	221564.7	8147.812	6245.926
Observations	41	41	41	41	41

Source: *Author's computation*

Correlation Analysis

The correlation matrix of the variables is supplied so that the degree of relationship between the series in the models may be understood better. Table 2 shows the degree to which the characteristics evaluated in the research were associated with one another. A variable's connection with other variables is represented by the numbers outside of the major diagonal, whilst its relationship with itself is represented by the values within the principle diagonal. The findings of the correlation study of determinants of real exchange rate in Nigeria are not unexpected given the country's history. Because the research takes into consideration complicated monetary indicators, the

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presence of intrinsic multicollinearity is unavoidable in the results. However, with the exception of a few variables with a high degree of connection, there is a fairly high degree of association among variables in the research, which follows Kim and Lin (2011).

Table 2:
Correlation Matrix

Correlation Probability	RER	GDPG	INFL	INTR	TOP
RER	1.000000				

GDPG	0.933135	1.000000			
	0.0000	-----			
INFL	0.948555	0.977390	1.000000		
	0.0000	0.0000	-----		
INTR	0.369963	0.325267	0.354433	1.000000	
	0.0173	0.0380	0.0230	-----	
TOP	0.175436	0.025456	0.113977	0.207670	1.000000
	0.2726	0.8745	0.4780	0.1926	-----

Unit Root Results
The results of the unit root test are summarised in Table 3. As a consequence, there was a mixture of integration orders. The level and first differences (orders of integration I(0) and I(1)) of all of the variables are on the verge of being reached, as can be observed. In general, according to Pesaran, Shin, and Smith (2001), the usage of ARDL as an estimating approach is justified in terms of accuracy.

Table 3: Unit Root Test

Variable	ADF			PP		
	Level	First Difference	Remark	Level	First Difference	Remark
RER	----------	-4.1527**	I(1)	----------	-4.0992**	I(1)
LGDPG	----------	-3.6403**	I(1)	----------	-3.5699**	I(1)
INFL	----------	-5.5221**	I(1)	----------	-2.6044**	I(1)
INTR	-4.6186**	----------	I(0)	-4.6186**	----------	I(0)
TOP	-2.7836**	----------	I(0)	-2.7836**	----------	I(0)

Note: ADF and PP are Augmented Dickey Fuller and Philips-Perron unit root tests respectively while ***, ** and * represent 1%, 5% and 10% levels of significance, respectively. I(0) and I(1) represents stationary at levels and first difference respectively.
Source: Author's Computation (2022)

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Lag Length Selection

Following the findings of the sequential modified likelihood ratio test statistic (LR), final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SIC), and Hannan-Quinn information criteria (HSIC), the optimal lag length to be used is lag two and one. Despite the conflicting findings, we opted to stick with the LR, FPE, and AIC criteria for our final decision. Therefore, in order to meet the information requirement, the researchers utilised two delays in their investigation (see figure below) (Serena & Perron, 2001).

Table 4: Lag Order Selection Criteria

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-695.8391	NA	7.20e+09	36.88627	37.10174	36.96293
1	-488.8079	348.6841	503638.1	27.30568	28.59851	27.76566
2	-469.9994	26.72777	749637.0	27.63155	30.00174	28.47485
3	-440.5067	34.14947*	718475.2*	27.39509*	30.84264*	28.62170*

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Source: Author's Computation (2022)

Presentation and Discussion of Results

Determinants of real exchange rate in Nigeria was investigated as study's goal. Following the determination of the unit root result for all of the variables in the model, as well as evidence indicating that the unit root is both order I(0) and order I(1) in Tables 3, cointegration tests must be conducted to determine whether or not there is a long-run relationship among real exchange rate, GDP growth rate, interest rate, inflation rate, and trade openness. In this work, the existence of a long-run equilibrium relationship among variable of interest was studied utilising a cointegration technique based on bounds testing. Real exchange rate, GDP growth rate, interest rate, inflation rate, and trade openness are shown to be linked over a long period of time in Table 5. It is clear from the findings of Table 5 that the models are in a long-term relationship. At a 5% level of significance, the F-statistic of 5.1145 is greater than the critical values for the top and lower boundaries of the distribution at a level of significance equal to or greater than 5 percent. As a consequence, the null hypothesis, which states that there is no

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cointegration, is rejected. This demonstrates that in Nigeria, there is a long-term relationship among Real exchange rate, GDP growth rate, interest rate, inflation rate, and trade openness.

Table 5 ARDL Bounds Test

ARDL Bounds Test
Date: 04/06/22 Time: 10:38
Sample: 1982 2020
Included observations: 39
Null Hypothesis: No long-run relationships exist

Test Statistic	Value	K
F-statistic	5.114467	4

Critical Value Bounds

Significance	I0 Bound	I1 Bound
10%	2.45	3.52
5%	2.86	4.01
2.5%	3.25	4.49
1%	3.74	5.06

Source: Author's Computation

Having established a long run relationship among the chosen variables using ARDL Bounds Test. The coefficients for the short and long term were determined using an autoregressive distributed lags model, respectively. The ARDL findings in Table 6 demonstrated that the coefficient of error correction term is statistically significant, indicating that the variables are cointegrated and have a stable long-run connection, as shown by the coefficient of error correction term. The ECT had a statistically significant negative consequence, indicating that it was effective. The error correction term coefficient represents the rate at which the condition of equilibrium is being adjusted (-0.3412). A 34.12 percent rate of adjustment to long run equilibrium aftershock was revealed to be responsible for the aftershock.Table 6 and 7 show the short-run and long run consequences of the relationship among real exchange rate, GDP growth rate, inflation rate, interest rate and trade openness in Nigeria between the period 1980 to 2020 in Nigeria. In the short term, GDP growth rate has significant negative relation with real exchange rate. By implication, as GDP growth rate decreases so the real exchange rate reduces. Inflation rate has a significant positive relationship with real exchange rate; that implies as inflation rate increases so the real exchange rate increases in Nigeria. Also in the short run, interest rate has a significant positive relation with the exchange rate, meaning that as interest rate increases so also does exchange increases. While trade openness has an insignificant but negative relationship with real exchange. Furthermore, as shown in Table 7, the findings in the long run established that there is significant negative relationship between real exchange rate and GDP growth rate. It implies that as GDP growth rate declines so the real exchange rate increases. This is consistent with short run finding. Also, a significant positive relationship was established between real exchange rate and inflation rate. As shown by the long-term findings, an insignificant positive relationship was established between interest rate

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and real exchange rate in Nigeria. Also on the long run, a negative insignificant relationship was established between real exchange rate and trade openness.

Table 6 : ARDL Short Run Result on Determinants of Exchange Rate in Nigeria

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
ECT	-0.341170	0.150481	-2.267197	0.0313
DRER(-1)	0.956886	0.188183	5.084873	0.0000
DRER(-2)	-0.298056	0.160191	-1.860632	0.0733
DGDPG	-3.74E-12	1.38E-12	-2.712312	0.0113
DGDPG(-1)	2.36E-12	1.53E-12	1.543156	0.1340
DINFL	0.212554	0.204030	1.041781	0.3064
DINFL(-1)	1.245385	0.514270	2.421656	0.0222
DINTR	-0.069352	0.283966	-0.244228	0.8088
DINTR(-1)	0.230948	0.182868	1.262919	0.2170
DINTR(-2)	0.396381	0.185208	2.140195	0.0412
DTOP	-0.245778	0.252257	-0.974314	0.3382
C	13.07023	7.679115	1.702049	0.0998
R-squared	0.985149	Durbin-Watson stat	2.152978	
Adjusted R-squared	0.979845			
F-statistic	185.7349			
Prob(F-statistic)	0.000000			

*Source: Author's Computation (*2022).*2022)*

Table 7: ARDL Long Run Result on Determinants of Exchange Rate in Nigeria

Variable	Coefficient	Std. Error	t-Statistic	Prob.
GDPG	-0.000000	0.000000	-2.455449	0.0205
INFL	4.273358	1.154051	3.702921	0.0009
INTR	1.635480	1.118350	1.462405	0.1548
TOP	-0.720398	0.798535	-0.902149	0.3747
C	38.310064	27.188928	1.409032	0.1698

Source: Author's Computation (2022)

Residual Diagnostic Test Results

The residual diagnostic data are shown in Table 8 for the purpose of assessing the reliability and robustness of the estimations. On the basis of the findings of the normality tests, the results of the Jarque-Bera tests demonstrated that the error is normally distributed. In the serial correlation LM test, it was discovered that the model is free of serial correlation at a 5 percent level of significance, suggesting that the null hypothesis of no serial correlation cannot be rejected. Because the heteroscedasticity test does not impair the correctness of the derived parameters, as shown in Table 8, a heteroscedasticity test is not required. In a similar vein, the cumulative sum (CUSUM) and cumulative sum squares (CUMUSQ) of the recursive estimates were produced in order to

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confirm the parameter stability of the ARDL model, as described above. Results of the CUSUM and CUSUMSQ tests are shown in Figures 1 and 2 respectively. The findings of CUSUM and CUSUMSQ indicated that the plotted line falls inside the two vital lines in both CUSUM and CUSUMSQ, suggesting that the lines are within the 5 percent critical bounds in both CUSUM and CUSQ. This confirms that long run coefficients are stable when short run dynamics are taken into consideration

Table 8: Residual Diagnostic Test Results

Breusch-Godfrey Serial Correlation LM Test	1.0949 (0.2198)
Heteroskedasticity Test: Breusch-Pagan-Godfrey	0.5871 (0.7225)
Normality	127.0032 (0.6761)

Source: Author's computation (2022)

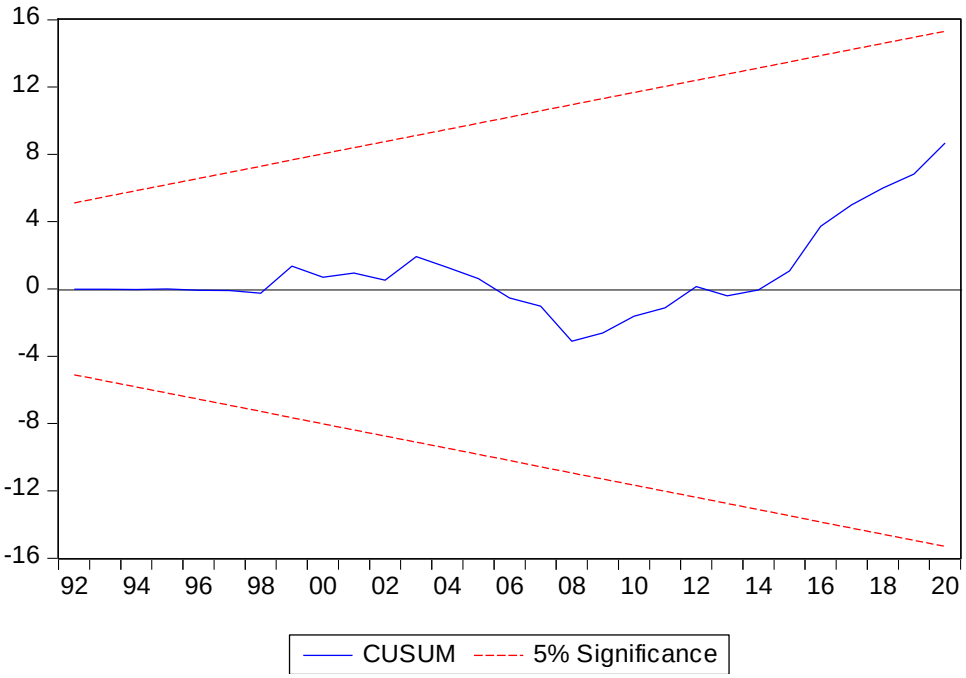

Figure 1:

Cumulative Sum Test

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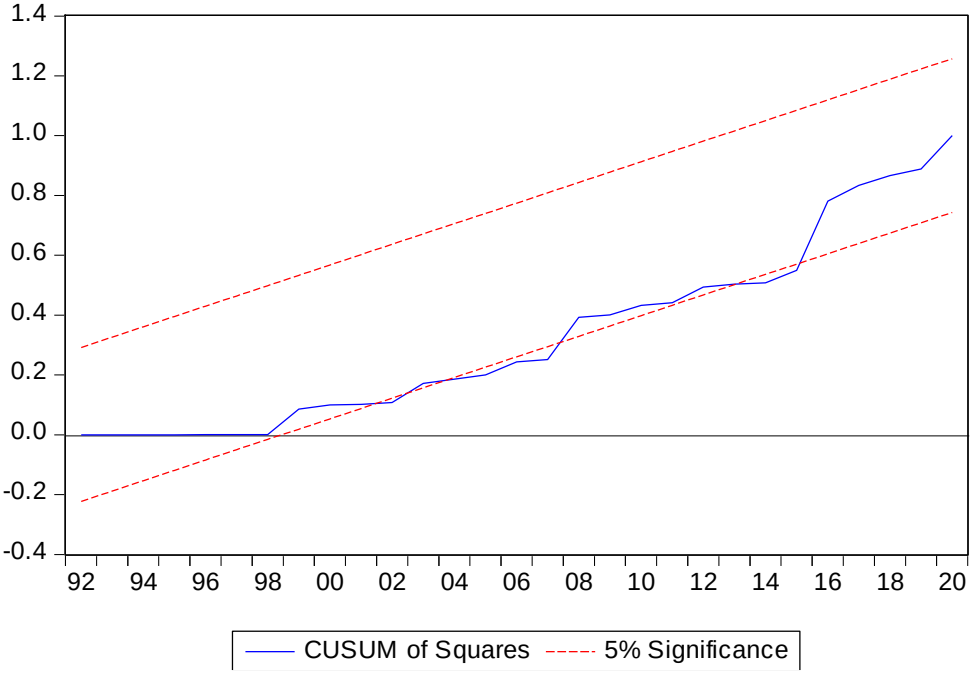

Figure 2: Cumulative Sum Square Test

Conclusion

Many theoretical and empirical research studies were conducted at national and international level related to real exchange rate and most of them were reviewed in the literature. This research study empirically analyzed determinants of exchange rate in Nigeria. The analysis relied on annual time series data over the period of 1980 to 2020. This study applied the Unit roots (ADF test and Philip-Peron) to check the stationarity of the data used in the analysis. Cointegration was used to analyze the long run relationship among the variables We have applied Autoregresive Distributed Lag Model (ARDL) regressions at variable mixture of level and first difference taking four lags. In the short run, the results of the model revealed that Gross Domestic Growth Rate is significant but negatively related to the real exchange rate. It implies that as GDPR reduces RER increases. Also, inflation rate is significant but positively related to the real exchange rate in Nigeria. By implication, inflation rate has a direct relationship with the RER. Whereas, interest rate is significant and positively related to the exchange rate during the study period in Nigeria. Also imply that Interest rate has a positive relationship with RER. We have seen here that in the regressions, trade openness is insignificant and their signs are not expected and according to economic theory. On the long run, the result of the relationship between inflation rate is positive and significantly related to real exchange rate. Also, GDPG is significant and positive related to RER. The results of both inflation rate and GDPG is consistent with the short run results. The result of interest rate is positive and significantly related RER.. Which deviated from short run result. The result of TOP is positive and insignificant related to RER; this is consistent with short run result.More over the different diagnostics used to detect multicollinearity indicates that there is no problem of multicollinearity in the explanatory variables and no problem of heteroskedasticity in the model. Therefore we can rely on this regression in case of co efficient signs and also their significance for policy making.

Policy Recommendations

One of the major questions asked by Nigerians every day is: why is naira losing value. We are taking a look at policies the Central Bank of Nigeria (CBN) can consider to increase the value of Nigerian Naira against other

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currencies. The question on the mind of investors is how can Nigeria's apex bank increase the value of Naira against the US dollars, Euro, Pounds, and other currencies? Below are some of measures authorities can take to increase the value of naira

Expanding exports: Encourage SMEs to produce goods that can be exported, motivate cocoa farmers, support groundnut farmers in the North. To achieve this, manufacturing companies in Nigeria should concentrate on producing quality goods that meet the global standard for exportation. This way, revenue generated from export will increase the inflows of FX instead of relying solely on the export of oil and the craze for forex will drastically reduce, thereby pushing the Naira up against the US dollar.

Ease pressure on the foreign exchange market: One of the ways to increase the value of Naira is to ease the pressure on the foreign exchange market in order to meet the high demand for hard currency in the country.

Sell foreign exchange assets and buy their own currency: The CBN, which is the official monetary advisor of Nigeria's government should encourage the Federal Government to toe the steps of China and buy US government bonds. For instance, the record shows that China has over $1 trillion of US government bonds..

Higher interest rates: Economists propounded that higher interest rates would attract some inflow of money, which occurs when banks and financial institutions move money to other countries to take advantage of a better rate of return on saving.

Reduce the country's gross demand for dollar: The fastest way to do this is by reducing importation of goods we have comparative cost advantage e.g crude oil, the refineries can be fixed so as to reduce dollars expended on re-importation of the finished products of crude oil (petroleum)

Currency Credible Assurance: When there is currency credible assurance from the government, this might encourage speculators to move money into Nigeria. Today, how many investors are buying Nigeria naira compared to Swiss Francs? This must also be done with caution so as not to cause a problem for exporters.

Naira Demonetization: Demonetization is not strange to Nigeria. In 1984, Nigeria underwent a demonetization process, when the government changed the colour of all currency notes in circulation. Demonetization could be carried out to curb money laundering and eliminate black money in the financial system.

Reduce inflation: Nigeria's inflation is relatively higher than competitors, some of the goods produced in Nigeria are even more expensive than the imported ones. Inflation has to be lower than competitors, that's when the countries goods will become more attractive and demand will rise because lower inflation tends to increase the value of the currency in the long term. Nigeria government can pursue tighter fiscal and monetary policy and also supply-side policies.

Long-term supply-side policies: To have a stronger exchange rate of Naira against other currencies, Nigeria will need a combination of low inflation, productivity growth, economic and political stability.

Reduce corruption: Corruption is gradually becoming synonymous to Nigeria because the political office holders are not ready to use the wealth to develop the country. Most of the political office holders prefer to invest

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in UAE, USA, China and patronise hospitals in UK, Germany and many thereby gradually pulling down Nigeria's Gross Domestic Product (GDP).

End insecurity: The success of the above measures largely depends on security. Farmers can't access their farmlands in some parts of Kaduna, Niger, Borno, Zamfara, Bauchi, Benue states that are food baskets of the nation. They were sacked by Boko Haram elements, terrorist herders among others.

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