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Impact Analysis of Trade Liberalization and the Naira Exchange Rate

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Abstract: ***The stability or otherwise of the naira exchange rate mirrors as well as predicts economic growth and the overall macroeconomic wellbeing of the Nigerian economy. This objective primarily motivated this investigation, which was to decompose the impact trade liberalization has on the naira exchange rate and what it portends to the Nigerian economy. Secondary time series data on exchange rate of naira to the US Dollar, foreign direct investment, degree of trade openness, rate of inflation and exchange rate were collated from the World Bank country reports, the CBN and NBS, for our estimation and analysis. The result of the Augmented Dickey Fuller unit root test, confirmed that all our variables were integrated of order zero I (0) and I (1). The study also deployed the ARDL bounds tests for the cointegration analysis, which the result confirmed long-run relationships among the variables.Chiefly, our investigation found degree of openness to have a negative and significant effect on naira exchange rate. Thus, degree of openness depreciates the exchange value of the naira. Inflation rate was also found to have negative and significant impact on the naira exchange rate. On the contrary, both FDI and interest rate were positive and significant. Given the peculiar nature of the Nigerian economy as an import based economy, the study concludes that degree of openness or trade liberalization causes exchange instability and is harmful to the economy. Depreciation of the local currency of an import based economy isn't beneficial as prices of imported goods and services are being determined by the cost of purchasing foreign exchange used for the payment of the imports. This introduces inflation and macroeconomic instability to the economy. The monetary authority is, therefore advice against full deregulation of the exchange market or policies that could depreciate the naira further.***

Keywords: exchange rate, degree of openness, ARDL and depreciation

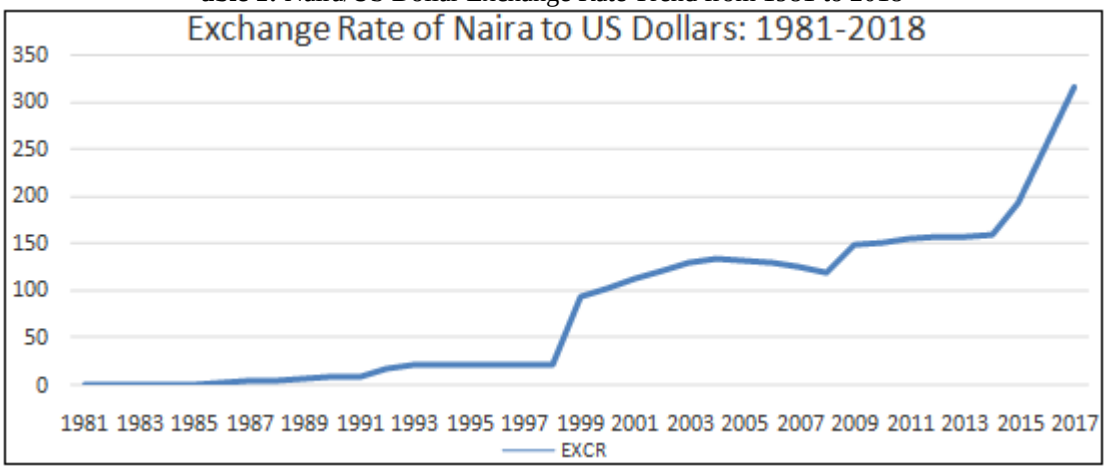
1. Introduction

The naira exchange rate measured chiefly in terms of the US Dollar, is one of the critical key macroeconomic variables of the Nigerian economy. Its stability or otherwise is a strong indication of how healthy, progressive and resilient the economy is in the face of external shocks inherent in the globalization and trade liberalization era. In terms of international trade, the domestic exchange rate plays a pivotal role to determine whether or not the Nigerian economy would gain from trading with the world- having favourable terms of trade and balance of payments (BOPs). This is so because exchange rate is a determining factor in the pricing of local goods and service as well as imported goods and services in the international trade arena.

In economic history and literature, David Ricardo's comparative advantage theory in 1817, is regarded as the pathfinder of international trade and/or trade liberalization. His theory posit that global trade partners could stimulate economic growth in their respective economies and would obviously be better off if they could specialize in the production of goods or services they have comparative cost advantage in producingover other economies, and allow trade exchange to take place amongst economies. This is seen as the bedrock of contemporary trade liberalization. By definition and practice, trade liberalization does no only remove barriers to trade, it also allows for transfer of technologies and integration of the world markets, hence, could lead to positive economic growth outcomes, if appropriate trade policy thrust is followed religiously.

Trade liberalization or openness and its impact on naira exchange rate in particular and on economic growth of Nigeria in general, has witnessed foray of empirical studies over the years. Notably, there has never been a consensus in terms of the findings, as there has been variegated methodologies, data and conclusions by scholars across the globe on this subject. Thus, although theoretically and predictably, trade is generally held to be positively related with growth (Smith, 1776), there has been dissenting evidences in economic literature to suggest otherwise. This was the bias of Thirlwall (2000) who believe that trade liberalization can be an ultimate goal, but the speed and manner of liberalization needs careful consideration on a country by country basis. Hence, each country should know when to adopt its own trade policy and strategize on when and how to open its markets taking into consideration changing macroeconomic variables, especially, the exchange rate variable, which exerts pronounced impact on the economy as a whole. Available statistics show that Nigeria's trade volumes have increased astronomically over the years. These increased trade volumes have coincided with chronic fluctuations, depreciations and devaluation of the naira. Thus, in the midst of the euphoria attendant in the expansion of Nigeria's trade indices, the value of the domestic currency- the naira has weakened alarmingly. For instance, prior to the introduction of the IMF/World bank induced Structural Adjustment Programme (SAP) in the twilight of 1985 and the early days of 1986, the exchange rate of the naira to the US Dollar was #0.61/$1, #0.673/$1, #0.724/$1, #0.765/$1 and #0.894/$1 in 1981, 1982, 1983, 1984 and 1985 respectively. Juxtapose with the figures ten years of post-SAP, the naira exchanged for#21.89/$1 in 1995 and #131.7/$1 in 2005. The exchange rate weakened to #192.44 in 2015 and by 2018, the rate has worsened to #315. It is noteworthy to state here that these rates are far below the rate at the parallel markets where the rate rose as high as #510/$1 between January and March, 2017, and currently exchanges in the range of #355-#365 per US dollar as at the first and second quarter of 2019 (CBN, 2017).

able 1: Naira/US Dollar Exchange Rate Trend from 1981 to 2018



Source: author's computation; data sourced from CBN Statistical Bulletin (Various) and World Bank country report.

A closer look at Figure 1 shows that the naira fluctuation has coincided with the Nigerian economy being relatively more open since 1986, as a result of policy actions deployed under the structural adjustment programme. The most significant factor accountable for the expansion in the trade volume and the prodigious upsurge in the openness index was the final removal of other restrictions on trade as a final measure of the Nigerian government in been admitted as a member of the World Trade Organisation (WTO) in 1995. This led to increased trade relations with other countries.

Accounting for the naira exchange rate fluctuations, juxtaposed with rising trade volumes, one could easily adduce that the major reason for the above sustained fluctuations is not unconnected with trade liberalization. As a developing and import dependent economy, the excessive demand for US dollars and other foreign currencies by local importers and manufacturers to pay for their imported goods and services, machineries and raw materials has resulted in the depreciation and outright devaluation of the naira against the currencies of Nigeria's trade partners. This condition may have as well resulted into secondary macroeconomic imbalances like rising inflation, interest rate (domestic and foreign) and contraction in FDIs (Foreign Direct Investments)- as most investors are skeptical of investing their funds in Nigeria for want of losing value and the bureaucracy involved in the repatriation of funds to overseas in Nigeria. There is utmost need, therefore, for a developing country like Nigeria who is import dependent, to pay needed attention on the impact trade openness exerts on the naira exchange rate fluctuations and economic growth in general.Relatedly, Nigeria has tested with different exchange rate regimes, which might have implications for the trade-exchange rate relationship. Given that our aprior assumptions are not enough evidence to analyse the impact factor of trade liberalization on naira exchange rate, there is the need for further empirical analysis to either affirm or discountenance our assumptions. This forms our research problem and the objective of our study.

2. Literature Review

In line with David Ricardo's comparative advantage theory (1817), international trade openness is perceived as the remedy for inefficiency. The theory underlined the importance of external trade and investment from overseas in the growth of each nation. For the neo-liberals, trade liberalization stimulates both local and international competition, hence, efficiency. Thus, the ensuing narrative is based on the expectation that entry and competition of local firm in foreign markets will lead to efficiency, improvement in the quality of goods, and a decrease in the cost of production. The theory further highlighted that entry into external market will necessitate the acquisition of new and modern technology for effective competition at the international market.(Thirlwall 2000; Adewuyi, 2000; Nteegah, Nelson & Owede, 2017).

Ricardo's theory was in contrast to Adam Smith's absolute advantage principle. It was indeed Adam Smith that first described the principle of absolute advantage in the context of trade, where he used labour as the only input, given that absolute advantage is a function of a simple comparison of labour productivities; this underlines the fact that it is possible for a country or party to have no absolute advantage in anything, in that case, according to the theory of absolute advantage no trade will occur with the other party. Succinctly captured, the principle of absolute advantage is the capacity of a party (an individual, or firm, or country) to produce more of a good product or service than competitors, using the same amount of resources, in this instance labour.

Evidently, David Ricardo's classical theory of comparative advantage capture why countries engage in international trade even when one country's labour are more efficient at producing every single good than labour in other countries. To him, if two countries capable of producing two commodities engage in the free market, then each country will increase its overall consumption by exporting the good for which it has a comparative advantage while importing the other good, provided that there exist differences in labor productivity between both countries. Ricardo's theory is broadly regarded as one of the most powerful yet counter-intuitive insights in economics, hence, the theory implies that comparative advantage rather than absolute advantage is responsible for much of international trade (Maneschi, 2004; Tabuchi, 2017 & Shiozawa, 2017).

Summarily, convergence of trade theories so far reviewed suggests that countries are not sufficiently endowed with all

the needed resources to stimulate and sustain growth and development. Given this position, trade is an essential instrument a country needs for growth. Thus, trade (international) would enable countries to produce and sell commodities it can produce at a relatively cheaper cost or has strong technical capacity to produce and import goods it cannot produce at a cheaper cost or has less technical ability to do so. In this course of trade, countries produced efficiently and earn higher income/growth. These theories in one hand forms the basis of the a-prior expectations, especially, when our chosen variables are functional relationship with economic growth.

Empirically, Gantman and Dabos (2018), employed a panel data consisting of a dataset of 101 countries over the 1960–2011 period, to investigate the relationship between the real effective exchange rate (REER), on the one hand, and trade openness, trade balance, the terms of trade, factor productivity, and exchange rate regime, on the other one. The findings of their study strongly support the hypothesis that an increase in trade openness produces a depreciation of the REER.Stotsky et al. (2012) studied the relationship between foreign exchange system and macroeconomic performance in seven East African countries with 5 of which foreign exchange regimes are liberalized using the generalized method of moment. The researchers deployed two distinct models; whereas one measured growth and its determinants which included inflation, nominal exchange rate and liberalization, the other model expresses inflation to its various determinants which included lagged inflation, exchange rate and liberalization among others. Their major finding was that investment and real exchange rate are the significant determinants of growth while the lagged inflation rate, nominal exchange rate and de facto regime are the significant determinants of inflation.

Folorunsho and Olajide (2016) studied price instability, exchange rate volatility and the Nigerian economy, while deploying the GARCH and ECM models. Their study found that the exchange rate in Nigeria is volatile, as the trend shows the fluctuation in price and exchange rate which of course may bear serious implications. Exchange rate instability, however, did not dampen investment and accordingly economic growth both in the short and long run. Additionally, trade openness significantly weakens growth in the short and long run suggesting the adoption of inward growth strategy.Ewubare and Merenini (2019) examined the impact of exchange rate fluctuations on foreign trade in Nigeria. The variables included in their model were Exchange Rate (EXR), Import (IMP) and Export (EXP) in international price level (PL) and Gross Domestic Production (GDP) from 1980-2014, while their major analytical tools were The Ordinary Least Square (OLS), co-integration/ECM and the Granger Causality test. The Parsimonious Error Correction Model (ECM) results, indicates that the dynamic model is a good fit. The coefficient of the error correction term appears with the right sign (negative) and statistically significant at 5 percent level. This shows that about 55 percent disequilibria in the foreign trade in the previous year were corrected for in the current year. The study recommended for the reduction of importation in Nigeria as it has negative effect on Nigeria's current account. The work of Oyovwi and Ukavwe (2013) examined exchange rate volatility effect on trade variations in Nigeria from the period, 1970–2010. The study used the unitroot and cointegration tests. Their findings showed that all variables were I (I), except import that is I(0) and are significant at 1,5,and 10 percent. Co-integration results revealed that a stable long run equilibrium relationship exists between the variables. However, adopting the error correction modeling, the result discovered that exchange rate volatility is insignificant in explaining variations in imports. Likewise, Olufayo and Fagite (2014) studied the effects of exchange rate volatility on the exports performance of both oil and non-oil sectors. The study deployedGARCH model in assessing volatility of exchange rate and apparently unrelated regression method in estimating the coefficient of the two system equation. The ARCHand GARCH results suggested that the exchange rate is volatile, while SUR model shows that exchange rate negatively affected the two sectors, but was statistically insignificant. Nkalu, Urama and Asogwa (2016) investigated the trade openness and exchange rate fluctuations Nexus in Nigeria using time series data covering from1984 to 2013. Their study used the Ordinary Least Square (OLS) method in the analysis of data and/or variables included in their model. Their major finding was that trade openness impacted positively on the exchange rate fluctuations or volatility in Nigeria.

From the foregoing, it is evident that there are divergent views and findings as there are many researchers that have studied this subject- trade and macroeconomic variables and their performances. Notably, few of the reviewed literature paid less emphasis on the effect of trade openness on exchange rate fluctuation. More so, given that there has not been a consensus as to the cause-effect of this subject, there is genuine need for further investigations, especially, using evidences from Nigeria, being a predominantly import dependent economy with higher degree of openness.Finally, the ****VAR method of analysis employed for this study is arguably superior to other known methods of analysis used by previous studies. The VAR is a notch higher because it does not just measure correlations and variations between exchange rate and trade openness, the variance decomposition analysis of the VAR is targeted at measuring the magnitude of variation by all the endogenous variables, including the exchange rate itself.

3. Methodology

The study employed the Autoregressive Distributed Lag to analyze our data. The required data on trade openness, foreign direct investment (FDI), exchange rate of the US dollar to the Naira, inflation rate and interest rate were sourced from the World Bank country reports and Central bank of Nigeria statistical bulletin, for various years.

The analysis started with descriptive interpretation of our data using the mean, minimum, maximum, standard deviation and kurtosis. In order not to estimate spurious and non-stationary data, which is mostly the characteristic of time series, the stationarity test was conducted using the Augmented Dickey Fuller (ADF) to determine the unit roots characteristics of the variables in the model. The level of integration of the residual error term of a set of non-stationary time series aggregate should be zero (i.e Ut~ 1(0))

in order to qualify as an error correction model. The analysis was concluded with test for autocorrelation, autoregressive, normality and heteroskedasticity (sensitivity analysis).

The Autoregressive Distributed lags (ARDL) Bound Testing procedure. The results of the unit roots tests indicate that all our variables including the dependent variable, EXCR, were stationary at levels and at first difference; thus, I(0))and I (1). This shows evidence that the residual error terms are Ut ~ 1(0). The autoregressive distributed lag (ARDL) bounds testing procedure introduced by Pesaran et al (2001) is preferred in testing for long-run relationships or cointegration. This technique is advantageous because it yields valid results regardless of whether the underlying variables are i(1) or i(0), or a combination of both. The autoregressive distributed lag (ARDL) model used in this study is:

The functional model of estimating the autoregressive distributed lag (ARDL) is specified below as thus;

EXCR = f (TOP, FDI, INF, INT) ……. (1)

In the process of estimation, parameters and a random term "U" are introduced into the model to capture variables not included in the model but influenced naira exchange rate. Hence, equation 1 above could be stated thus:

$EXCR_t = \alpha o + \alpha_1 TOP + \alpha_2 FDI + \alpha_3 INF + \alpha_4 INT + U_t$ 2

In order to estimate the above model using ARDL technique, equation (2) could be transformed into a log linear form by taking the natural log of the variables as follows:

$EXCR_t = \alpha o + \alpha_1 lnTOP + \alpha_2 lnFDI + \alpha_3 lnINF + \alpha_4 lnINTR + \varepsilon_t$

.....3

Where,
EXCR = Nominal Exchange Rate of naira to US Dollar
TOP = Degree of Trade openness
FDI = Foreign Direct Investment
INF = Inflation Rate
INT = Interest Rate
Ln = Natural logarithm,
U = stochastic term
α_1, α_2, α_3, and α_4 are elasticities of degree of trade openness, foreign direct investment, inflation rate, and interest rate in Nigeria.

Apriori expectation is that $\alpha_1<0$, $\alpha_2>0$, $\alpha_3<0$, and $\alpha_4<0$

We, therefore, proceeded with the implementation of the ARDL model of equation (1) thus;

$$\Delta lnEXCR_t = a_0 + \sum_{i=1}^{n} a_1 \Delta lnEXCR_{t-i} + \sum_{i=0}^{n} a_2 \Delta lnTOP_{t-i} + \sum_{i=0}^{n} a_3 \Delta lnFDI_{t-i} + \sum_{i=0}^{n} a_4 \Delta lnINF_{t-i} + \sum_{i=0}^{n} a_5 \Delta lnINT_{t-i} + \lambda_1 lnEXCR_{t-1} + \lambda_2 lnTOP_{t-1} + \lambda_3 lnFDI_{t-1} + \lambda_4 lnINF_{t-1} + \lambda_5 lnINT_{t-1} + \varepsilon_t \quad (4)$$

The following hypotheses are tested to investigate the existence of co-integration among the variables: the null hypothesis of no cointegration among the variables in Eq. (4) is $(H_o: a_1 = a_2 = a_3 = a_4 = 0)$ against the alternative hypothesis $(H_1: a_1 \neq a_2 \neq a_3 \neq a_4 \neq 0)$. The decision to reject or accept H_o (no co-integration among the variables) is based on the following conditions: if the calculated F-statistics is greater than the upper critical bound, then H_o is rejected and the variables are co-integrated, if the calculated F-statistics is less than the lower bound, then H_o is accepted and the variables are not co-integrated, but if the calculated F-statistics remains between the lower and upper critical bounds then the decision is inconclusive (Pesaran et al., 2001). For the parameter λ_i, i =1, 2, 3, and 4 are the corresponding long-run multipliers, whereas, for the parameter α_i, i =1, 2, 3, and 4 are coefficients of the short-run dynamic of the ARDL model. ε_t is serially uncorrelated stochastic term with zero mean and constant variance, and Δ is the first difference operator.

After testing for cointegration among the variables, the long-run coefficients of the variables are then estimated. The existence of cointegration between the variables implies that causality exist in at least one direction. This study uses Akaike Information Criterion (AIC) for selecting the optimal lag length. The error correction model for the estimation of the short run relationships is specified as:

$$\Delta lnEXCR_t = a_0 + \sum_{i=1}^{n} a_1 \Delta lnEXCR_{t-i} + \sum_{i=0}^{n} a_2 \Delta lnTOP_{t-i} + \sum_{i=0}^{n} a_3 \Delta lnFDI_{t-i} + \sum_{i=0}^{n} a_4 \Delta lnINF_{t-i} + \sum_{i=0}^{n} a_5 \Delta lnINT_{t-i} + \lambda_2 ECM_{t-1} + u_{2t} \quad (5)$$

ECM_{t-1} is the error correction term obtained from the cointegration model. The error correction coefficients $(\lambda_1 \text{ and} \lambda_2)$ indicate the rate at which the cointegration models correct previous period disequilibrium or speed of adjustment to restore the long-run equilibrium relationship. A negative and significant ECM_{t-1}coefficient implies that any short term movement between the dependent and explanatory variables will converge back to the long-run relationship.

Finally, the following diagnostic tests are conducted to ensure the acceptability of the empirical models: Breusch–Godfrey serial correlation LM test, ARCH test for heteroscedasticity, Jarque-Bera normality test and Ramsey RESET for specification error test. The stability of the long-run coefficients together with the short-run dynamics are tested using the cumulative sum of recursive residuals (CUSUM)test. If the plot of CUSUM statistic stays within the 5% range of the significance level, then all the coefficients in the error correction model are assumed to be stable, but if the plot of CUSUM statistic crossed the 5% range of the significance level, the coefficients in the error correction model are considered unstable.

4. Presentation and Discussion of Result

Table 1: Descriptive Statistics

	LOG (EXCR)	LOG (TOP)	FDI	INFL	INTR
Mean	3.359430	3.834024	2.905946	19.51976	17.76216
Median	4.529261	3.966322	2.530000	12.87700	17.58000
Maximum	5.722081	4.404399	10.83000	72.83600	31.65000
Minimum	-0.494296	3.031099	0.660000	5.382000	8.920000
Std. Dev.	1.961391	0.399036	2.246686	17.45033	4.901347
Skewness	-0.748306	-0.633162	1.792453	1.699733	0.205893
Kurtosis	2.241510	2.164582	6.406363	4.677362	3.614773
Jarque-Bera	4.340028	3.548143	37.70125	22.15360	0.844083
Probability	0.114176	0.169641	0.000000	0.000015	0.655707
Sum	124.2989	141.8589	107.5200	722.2310	657.2000
Sum Sq. Dev.	138.4940	5.732270	181.7135	10962.50	864.8354
Observations	37	37	37	37	37

Source: author's computation using E-views 10.0

From the table 1 above, the logged form of exchange rate had an average of 3.36, a maximum of 5.72 and a minimum of -0.49. The rate of inflation on the other hand had a mean value of 19.52, with a maximum and minimum values of 72.84 and 5.38 respectively. Likewise, the rate of interest averaged 17.76 with a maximum of 31.64 and a minimum of 8.92 during the study period. The mean value of FDI was 3.83 and peaked at 4.40 with a critical low of 3.03. In terms of volatility, INFL was the most volatile variable with a standard deviation of 17.45, followed by INTR and FDI respectively. However, degree of trade openness was the least volatile. It shows that TOP was relatively more stable within the study period as against the high variations in in the rate of inflation. The skewness statistic showed that only FDI, INFL and INTR were positively skewed, while the other two variables namely, TOP and EXCR were all negatively skewed. While the positive values indicated right tailed, the negative values showed left tail of the normal distribution. The (FDI, INFL and INTR) are leptokurtic as their values are greater than 3, while Log (EXCR) and Log (TOP) are mesorkurtic and this implies that they are normally distributed. Kurtosis statistic showed also that FDI and INFL had large tails (leptokurtic) suggesting that its distributions were peaked relative to normal distribution. On the other hand, all other variables, namely, EXCR, TOP and INTR all had thin tails (platykurtic), suggesting that its distributions were flat relative to normal distribution. Based on these observations, it is evident that the series are non-stationary, which is not surprising since it involves time series data. The presence of unit root (non- stationarity) is equally supported by the Jarque Bera statistic. For instance, JB value for FDI and INFL of 37.70 and 22.15 respectively are above 5.99 value or 5% critical value, hence both null hypotheses of a normal distribution are rejected. However, the null hypotheses of the other remaining variables cannot be rejected based on their probability values.

Table 2: ADF Unit Root Tests

Variables	ADF Statistic @ Levels	ADF Critical Value	Level of Significance	Order of Integration
EXCR	-3.851154	-2.945842	5%	I(1)
D(TOP)	-8.241876	-2.945842	5%	I(1)
FDI	-3.488586	-2.945842	5%	I(0)
INFL	-3.470100	-2.945842	5%	I(0)
INTR	-6.734444	-2.945842	5%	I(1)

Source: Author's computation using e-view 10.0

As presented in table 2 above, We have a combinations of I(0) and I(1) and this necessitated the application of ARDL model. This implies that all our variables were integrated at levels and at first difference, denoting that they were all stationary (no presence of unit root) at I(0) and I (1). The implication is that our outcome would be valid for policy implementations as they are no longer spurious. The uniqueness in the order of stability in the variables necessitate the use of ARDL in the estimation of the long run relationship among the variables and the error correction model.

Table 3: ARDL Bounds Test
Null Hypothesis: No long run relationship exists

Test Statistic	Value	k
F- Statistic	5.704583	4

Critical Value Bounds

Significance	I(0) Bounds	I(1) Bounds
10%	2.2	3.09
5%	2.56	3.49
2.5%	2.88	3.87
1%	3.29	4.37

Table 3 displays the calculated F- statistics (F-statistic = 5.704583), showing that the null hypothesis of no long run relationship is rejected at all critical levels (i.e. 10, 5, 2.5 & 1 percent). We arrived at this conclusion because the estimated bound test (F-calculated) is higher than the upper bound critical value of 4.68 as tabulated in Pesaran et al (2001). This result establishes the existence of a long run relationship or cointegration between exchange rate and degree of trade openness (TOP) as well as the other explanatory variables in Nigeria. Having established the long-run or cointegration relationship in our investigation, we now proceed to estimate the long run coefficients by estimating an ARDL of the order 1, 1, 2, 2, 0.

Table 4: Estimated Long-Run Coefficients of the ARDL (1, 1, 2, 2, 0)

Long run coefficients				
Variable	Coefficient	Std. Error	t-statistic	Probability
LOG(TOP)	-4.276132	1.92353	-2.223064	0.0359
FDI	1.20023	0.485822	2.470515	0.021
INFL	-0.200385	0.051194	-3.914271	0.0007
INTR	0.375251	0.124683	3.009636	0.0061

C	14.67371	5.791906	2.533485	0.0182
R^2 = 0.98; R^2 adjusted = 0.97; F- statistic = 154.66 (0.00000) Durbin Watson = 2.56				

Source: Author's computation using E-views 10.0

CointEq = LOG(EXCR) - (-4.2761*LOG(TOP) + 1.2002*FDI -0.2004*INFL + 0.3753*INTR + 14.6737)

Table 4 presents the he long-run result of our estimation. The result also shows that trade openness (TOP) which happens to be the major variable of interest had a negative and significant impact on exchange rate in Nigeria. This implies that the trade openness depreciates the naira exchange rate or value. Although this is in consonance with theoretical and a prior expectations, this result is harmful to the Nigerian economy. This is because, currency depreciation is only beneficial to an export based economy, with well-developed domestic productive capacity. As noted by Aliyu (2011) appreciation of exchange rate results in increased imports and reduced export while depreciation would expand export and discourage import. Also, depreciation of exchange rate tends to cause a shift from foreign goods to domestic goods. Hence, it leads to diversion of income from importing countries to countries exporting through a shift in terms of trade, and this tends to have impact on the exporting and importing countries' economic growth. However, the Nigerian case is a peculiar one that defeats economic logic. Nigeria is predominantly an import based economy, hence weakening the value of the naira would only have one outcome, which is making importation dearer, causing inflationary pressure (imported) and price instability into the Nigerian economy. This scenario is exactly what the Nigerian economy experiences presently. In contemporary Nigeria, prices of goods and services are not being determined by their cost of production or direct costs, rather they are being determined by the cost of purchasing the foreign currency (mostly US Dollars) used in the payment for the import. Therefore, most of the shocks or macroeconomic instability are eternally driven, especially through exchange rate fluctuations. The studies of Nteegah, Nelson and Owede (2017) and Ewubare and Merenini (2019) reported same findings. On the other hand, the works of Nkalu, Urama and Asogwa (2016), Oyovwi and Ukavwe (2013) reported positive outcomes respectively.

However, the coefficient of FDI was positive and significant during the sample period. This implies that an increase in FDI inflow in Nigeria other things being equal would exchange rate appreciation in Nigeria. This is in line with theoretical and a prior expectations. As expected theoretically and by a prior, inflation rate (INFL) during the study period had a negative and significant impact of the naira exchange rate, implying that increases in the rate of inflation causes exchange rate instability in Nigeria. The interest rate-exchange rate nexus reported positive and significant relationship, denoting that increase in the rate of interest will appreciate the naira exchange rate, other things remaining constant.

Table 4 also indicates that the overall exchange rate model is highly and well fitted as the explanatory variables for about 98 percent (R^2) of variation of the naira exchange rate within the study period.

Table 5: Error Correction Estimates of the ADRL Model

Dependent Variable: LOG(EXCR)				
Method: ARDL				
Sample (adjusted): 1983 2017				
Included observations: 35 after adjustments				
Variable	Coefficient	Std. Error	t-Statistic	Prob.*
LOG(EXCR(-1))	0.869929	0.033464	25.99582	0.0000
LOG(TOP)	-0.155778	0.229275	-0.679438	0.5034
LOG(TOP(-1))	-0.400423	0.220451	-1.816385	0.0818
FDI	0.040186	0.032891	1.221790	0.2337
FDI(-1)	0.049653	0.034888	1.423199	0.1675
FDI(-2)	0.066276	0.032379	2.046889	0.0518
INFL	-0.009046	0.004296	-2.105559	0.0459
INFL(-1)	-0.006909	0.005130	-1.346811	0.1906
INFL(-2)	-0.010110	0.004511	-2.241187	0.0345
INTR	0.048809	0.017542	2.782352	0.0103
ECM(-)	-0.130071	0.020226	-6.431036	0.0000
C	1.908627	0.732147	2.606889	0.0155
R-squared	0.984720	Mean dependent var		3.576835
Adjusted R-squared	0.978353	S.D. dependent var		1.781318
S.E. of regression	0.262083	Akaike info criterion		0.410965
Sum squared resid	1.648498	Schwarz criterion		0.899788
Log likelihood	3.808116	Hannan-Quinn criter.		0.579707
F-statistic	154.6669	Durbin-Watson stat		2.565580
Prob(F-statistic)	0.000000			

Source: Author's computation using E-views 10.0

In line with our interpretation and analysis of our result, and having established that our variables are cointegrated, we undertook the error correction model (ECM) that demonstrates the short run dynamics of the cointegrated variables towards their equilibrium values, as well as the speed of adjustment in the long-run. The result of the error correction model is presented in table 5 above. From table 5, it shows that the error term is negative and significant. The error term coefficient of -0.130071 shows evidence of low speed of adjustment towards long run equilibrium. The import of this statistic is that about 13 percent disequilibrium in the short-run dynamics is corrected on yearly basis by changes in exchange rate. This implies that if there is a shock, the long-run equilibrium will return to its steady state slowly. It would take relatively longer time to restore the steady-state relation if the system is distorted as indicated by the coefficient of the ECM. We also observed that both the short run and long run results yielded the same sign for the variables which signifies consistency in the effects of the independent variables on exchange rate in Nigeria.

Diagnostic Tests

Table 6: Breusch-Godfrey Serial Correlation LM Test

F-statistic	1.198264	Prob. F(2,22)	0.3207
Obs*R-squared	3.438131	Prob. Chi-Square(2)	0.1792

Table 7: Heteroskedasticity Test: ARCH

F-statistic	0.039427	Prob. F(1,32)	0.8439
Obs*R-squared	0.04184	Prob. Chi-Square(1)	0.8379

Table 8: Ramsey RESET Test

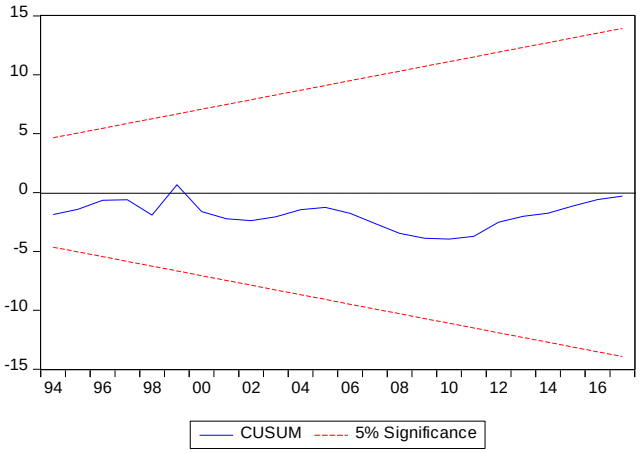
	Value	Df	Probability
t-statistic	2.525609	23	0.0189
F-statistic	6.378703	(1, 23)	0.0189

Source: Author's computation using E-views 10.0

The empirical estimations for autocorrelation, autoregressive, and heteroskedasticity (sensitivity analysis) are reported above to test the following null hypotheses:

- There is no serial correlation.
- There is no functional form misspecification.
- There is no heteroscedasticity. Thus, our model is homoscedastic.

The results of the above tests show that the short-run model passed the diagnostic tests. The results revealed that there is no trace of autocorrelation at 5% level of significance and that the model passes the test for normality, there is also evidence to show that the error term is normally distributed. While the Jargue-Bera statistic was deployed to investigate whether the errors of the ARDL ECM were normally distributed, the ARCH- Autoregressive Conditional Heteroscedasticity test was used to find out whether or not the variance of the residuals in the model was homoscedastic. Finally, Breusch-Godfrey Serial Correlation LM test was employed as a higher order test for serial correlation.



Figures 2: Stability Tests: CUSUM

Figures 2 was used to examine the stability of the coefficients of the independent variables in the ARDL model during the sample period. The CUSUM stability test was used which confirms the long run stability of the coefficients of the independent variables. We were able to discover the parameters of the independent variables in the short-run and long-run dynamic model are stable over the study period, given that the graph laid between the dotted lines for both tests. As shown in the graph, the recursive residuals and CUSUM lines stayed within the 5 percent critical bound. This conclusion was arrived given the fact that neither the recursive residual nor CUSUM plots cross the 5 percent critical lines, hence these statistics prove the stability of the long-run coefficients of trade openness (TOP), foreign direct investment (FDI), inflation rate (INFL) and interest rate (INTR) on exchange rate in Nigeria.

5. Summary, Conclusion and Recommendations

The study investigates the trade liberalization (openness) naira exchange rate nexus in Nigeria from 1981 to 2018. Secondary time series data on exchange rate of naira to the US Dollar, foreign direct investment, degree of trade openness, rate of inflation and exchange rate were collated from the World Bank country reports, the CBN and NBS, for our estimation and analysis. Primarily, the research set out to find empirical evidences on the impact degree of openness has on the naira exchange rate and what it portends to the Nigerian economy. The investigation began with the description of our variables in terms of their behaviour and proceeded to steady our time series data using the Augmented Dickey Fuller unit root test, where we found all variables being integrated of order zero and one. The study also deployed the ARDL bounds tests to establish that our variables are cointegrated or have long-run relationships, which was found to be positive. Using the ARDL to estimate our model, the study found degree of openness to have a negative and significant effect on naira exchange rate. Thus, degree of openness depreciates the exchange value of the naira. Inflation rate was also found to have negative and significant impact on the naira exchange rate. On the contrary, both FDI and interest rate were positive and significant. Given the peculiar nature of the Nigerian economy, the study concludes that degree of openness or trade liberalization causes exchange instability and is harmful to the economy. Depreciation of the local currency of an import based economy isn't beneficial as prices of imported goods and services are being determined by the cost of purchasing foreign exchange used for the payment of the imports. This introduces inflation and macroeconomic instability to the economy. The monetaryauthority is, therefore advice against full deregulation of the exchange market or policies that could depreciate the naira further.

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