THE INTERNATIONAL JOURNAL OF HUMANITIES & SOCIAL STUDIES

Variability of Exchange Rate Andnon-Oil Exports in Nigeria, 1986-2015

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Abstract:
This paper explores the link between dynamics of exchange rate and non-oil export in Nigeria using combinations of Ordinary Least Squares (OLS) and error correction mechanism (ECM). Data on each of the variables were obtained from Central Bank of Nigeria Statistical Bulletin. Prior to the estimation of the model, Augmented Dickey-Fuller (ADF) procedure was employed to examine the time series characteristics of the variables and the results show that the variables are fractionally integrated. The trace and Max-Eigen statistics of the Johansen-Juselius cointegration test demonstrate that the variables have long run relationship. The static regression result shows that exchange rate has significant positive impact on non-oil export. A percentage increase in exchange rate or depreciation of the naira induces 1.50 percent increase in non-oil export. However, degree of openness and inflation has no significant impact on non-oil export. The parsimonious ECM also shows that the current value of exchange rate has significant positive effect on non-oil export. It was evident from the parsimonious ECM that 1 percent change in exchange rate triggered 0.65 percent increase in non-oil export. The result also reveals that the effect of inflation on non-oil export is positive and significant. The estimated parsimonious ECM is found to be convergent as the error correction coefficient (-0.194) has the expected negative sign and significant at 5 percent level. In view of the findings, this paper recommends that the Central Bank of Nigeria and other stakeholders in the Nigerian financial system should strive to promote Nigeria exchange rate stability to boost the competitiveness of Nigeria's non-oil export at the international market.

1. Introduction

The implications of exchange rate variations on the performance of non-oil exports have continued to dominate public discourses in resource based economies as monetary authorities are concerned with evolving measures to ensure effective management of exchange rate with a view to stimulating export growth and improve balance of payment positions. Exchange rate have been identified in previous studies (Asinya and Takon, 2014; Akonji 2013) as a vital economic metric as it reflects the competitiveness a domestic economy globally. Regardless of whether exchange rate is fixed, it influences macroeconomic variables such as import, export, loan cost and so forth. Chong and Tan (2008) investigation uncovers that exchange rate account for changes in macroeconomic indicator for the developing economies.

Mehdi *et al* (2014) posit that the impact of the exchange rate on monetary development shifts in various nations attesting that one of the elements deciding the way fluctuations in exchange rate influence financial development is the extent of improvement in nation's budgetary activities, uncovering that new hypotheses highlight the relationship between economic fiscal policy stance and economic development. Researches related to exchange rate management still maintain significant stand in economic analysis, particularly in developing economies; regardless of a moderately colossal assemblage of literature in this aspect. This is partly because exchange rate in whatever conceptualization is not just a critical relative cost which connects domestic and world markets for merchandise, but impacts on domestic costs through its effect on total demand and supply. The higher cost of imported resources related with exchange rate depreciation raises marginal expenses and prompts higher costs in locally-made products (kandil, 2004).

Hasanov and Samadova (2012) note that growing non-oil export to overcome the challenge one-product economy has been regarded as an answer for financial improvement in oil producing and exporting nations worldwide. In an effort to achieve sound macroeconomic outcomes, Nigeria's monetary authorities have employed different exchange rate plans over the years, moving from a fixed administration in the 1960's to a pegged course of action between the 1970's and the mid 1980's as well as different sorts of the floating administration since 1986 (Eze and Okpala; 2014; Dada and Oyeranti, 2012). This is in response to the policy orientation of Structural Adjustment Program (SAP). The fixed exchange rate administration caused an overvaluation of the Naira and was upheld by trade control regulation that caused critical distortion in the economy. The Nigerian exchange rate policy was to a great extent an inactive one prior to the commencement of the Structural Adjustment Program (SAP).

One of the most sensational occasions in Nigerian history was the devaluation of the Nigerian naira following the kick-off of Structural Adjustment Program (SAP) in 1986 (Osuntogun; Edordu and Oramah 1993). A cardinal goal of the SAP was the diversification of the production base of the economy with a focus on non-oil exports. It is noteworthy that external trade strategy is an essential policy instrument as gives different signal to foreign consumers. Up to the era of SAP; the trade policy in Nigeria created the impression that Nigeria's exchange rate has the tendency of supporting over-valuation of the naira. This thusly supported imports and discouraged non-oil export with an attendant implication of reliance on imports. The requisite exchange rate policy that would ensure

macroeconomic balance in the medium and long termand encourage the accomplishments of certain Structural Adjustment Objectives, especially trade expansion seems to be lacking in Nigeria. Although different macroeconomic indicators are adduced for the dynamics of non-oil exports, controversies have trailed the centrality of exchange rate fluctuations in driving non-oil exports in Nigeria. Thus, this paper explores the link between exchange rate volatility and non-oil exports in Nigeria.

1.1. Statement of the Problem

Nigeria's exports can be comprehensively grouped into oil and non-oil export. Lately, the oil sector has turned into the real wellspring of the nation's trade earnings, a position it assumed from the agricultural sector starting from the 1970's. It is clear that non-oil exports have kept on declining because of the emphasis on oil. The share of oil in Nigeria's export was between 57.6% and 99.7%, while non-oil gross domestic product (GDP) export accounts for between 18% and 42.4% (CBN, 2004). The fall in non-oil exports has made the Nigerian economy to rely on oil exports as an important source of income. The creation of advertising board contributed significantly to the decrease of non-oil export since the board has the sole authority to export products. It is also important to note that the fixing of export item costs by the promoting board demoralized further private interests in the sector. For example, an exchange rate of a misleadingly abnormal state was kept up which thusly lessen the benefit of exports, raised domestic cost and contracted the competitiveness in the world market. Therefore, more attention was coordinated towards the advancement of non-oil exports, utilizing different macroeconomic policies, especially exchange rate policy. The question today is: to what degree has the changes in exchange rate policy influenced the performance of non-oil exports in Nigeria? Thus, this study provides plausible answer to this question and more with a focus on the Nigerian economy.

2. Literature Review

2.1. Theoretical Literature

2.1.1. Purchasing Power Parity (PPP)

This hypothesis was pioneered by Cassel (1918) as an extension of his work on hypothetical rate of exchange. Sarno and Taylor (2002) posit that the purchasing power parity (PPP) assumes that trade rates between monetary standards are in equilibrium when their purchasing power tends not to vary in each of the two nations. This is suggestive that exchange rate between two nations ought to be equivalent with the proportion of the two nations' price level of a fixed basket of commodities. Obviously, the rationale for PPP is the "law of one price". Without transportation and other exchange costs, aggressive markets will ensure equilibrium in the cost of the same item in two nations when the costs are communicated in the same currency.

The Purchasing Power Parity hypothesis is categorized into absolute PPP and relative PPP. The absolute PPP posits that currencies between two nations ought to be equivalent to the proportion of the price in the two countries. On the other hand, relative PPP states that the exchange rate between two nations is resolved at a point which clarifies the equality between the relative purchasing power of the two nations (Jhingan, 2006). It is imperative that the purchasing power is mostly dictated by the relative average cost for basic items and inflation rates in various nations.

Undoubtedly, the PPP is one of the important policy frameworks used to model a modern exchange rate determination. As a hypothesis of exchange rate assurance, the PPP, particularly the absolute PPP is predicated on universal multi-good rendition of the law of one price. The total PPP predicts that the exchange rate ought to change in accordance with the costs of national basket of commodities between two economies as a result of market forces driven by arbitrage. Despite its significant contributions to the development modern theories of exchange rate, the PPP theory is criticized for neglecting other important determinants of exchange rate as it focused largely on the relationship between purchasing power and exchange rate.

2.1.2. Balance of Payment Theory

The balance of payment (BOP) theory offers a traditional approach to the analysis of exchange rate behaviour based on equilibrium in the BOP positions. This theory assumes that movements in the balance of payment positions determine the appreciation of depreciation of the exchange rate. Deficits in the BOP positions tend to cause the domestic currency to depreciate in the near future while surpluses in the BOP positions enhance the appreciation of the exchange rate. A shortfall in the balance of payments position of a nation infers that interest for external trade surpasses its supply. Subsequently, the cost of foreign money as regards the exchange rate of domestic currency would decline.

Conversely, an excess in the balance of payments of a nation involves a more prominent interest for local currency in an international economy than the accessible supply. Accordingly, the cost of local currency as regards the rate of exchange improves. As observed by Jhingan (2006), ideal balance of payments prompts an expansion in the exchange rate while a horrible balance of payments reduces the exchange rate. The balance of payments hypothesis similarly accepts that the exchange rate is dictated by the interest for and the supply of international currency.

Chand (2015) argues the balance of payments theory of exchange rate holds that the price of foreign currency with regard to domestic currency is controlled by the free forces of demand and supply in the foreign exchange market. This suggests that international value of a nation's money depends on its demand and supply. This hypothesis reveals that balance of payments balance can be adjusted via revaluations and devaluations of currencies on account of favourable and unfavourable balance of payments respectively. The BOP hypothesis is commonly known as "Demand-Suppy Theory" given that it assumes that the rate of exchange is predicated on the supply of and demand for external currency and not the costs acquiring commodities between two nations as affirmed by the Purchasing

Power Parity Theory. The key drawbacks of this theory are the unrealistic assumptions of perfect competition and non-government intervention in the international exchange market.

2.2. Empirical Literature

Over the years, researchers have focused attention on the impact of exchange rate fluctuations on non-oil export. These researches are mainly anchored on the underlying theories of exchange rate variations, especially the purchasing power parity and balance of payment theories among others. Evidences from these studies, have been mixed, while some of the findings conform to the theoretical expectation, others deviated from it.

Imoughele and Ismaila (2015) analyzed the impact of exchange rate on non-oil export in Nigeria using annual time series data obtained from Central Bank of Nigeria for a period, 1986-2013. Augmented Dickey-Fuller stationary and Johansen's cointegration tests were used to check for time series properties and long run relationship among the underlying variables. The result shows three co-integrating equations which establish the existence of long run relationship among the variables. The results of the OLS show that effective exchange rate, money supply, credit to the private sector and economic performance have a significant impact on the growth of non-oil export in the Nigerian economy. Hence, the study recommended among others that monetary authority should strive to promote exchange rate stability in order to contain inflationary pressures in Nigeria.

Chukuigwe and Abili (2008) explored the implications of monetary and fiscal policies on non-oil exports in Nigeria using OLS as estimation technique. The study revealed that exchange rate involving contracts non-oil exports. They concluded that exchange rate is a major price that affects economic agents and institutions. Hence, the study suggested for the monitoring of real exchange rate movements.

Akinlo and Adejumo (2014) studied the effects of exchange rate movements on non-oil exports in Nigeria using dual techniques of OLS and error correction mechanisms. It was evident from the findings that exchange rate volatility has positive and significant effects on non-oil exports in the long run while the short run impact of the exchange rate movements on non-oil export is insignificant. Owing to the findings, the study concluded that the policy implication is that the exchange rate volatility is only effective in the long run but not in the short run.

Omojimite and Akpokodje (2010) analyzed how exchange rate reforms impacts on trade in Nigeria with the period of analysis spanning from 1986 to 2007. The estimation procedure relied on the OLS method. The results show that exchange rate reform has small positive impact on non-oil exports. The study however concluded that exchange rate reforms alone are inadequate in the efforts geared towards diversification of the Nigerian export base. Considering the findings, the study advocated for infrastructural development to boost output and competitiveness exports at the international market.

Nyeadi and Atogenzoyn (2014) employed the conventional OLS estimation technique to estimate the effects of exchange rate variations on exports in Ghana from 1990 to 2012. The requisite data sets were adapted from International Monetary Fund (IMF), United Nations Conference on Trade and Development (UNCTAD) and Bank of Ghana. It was uncovered from the result that exchange rate movement has no significant impact on volume of exports. On the strengths of the findings, the study recommends for consistency in exchange rate policy to engender competitiveness of exports.

Caglayan et al. (2013) utilized a two-step system Generalized Methods Moment (GMM) to analyze the impacts of real exchange rate variations on exports of manufacturers in a sample of twenty-eight emerging economies. Their findings supported the claims that exchange rate variations negatively affect trade flows in the sampled region. The study recommended more emphasis to be placed exchange rate stability in monetary policy coordination.

Isah and Raheem (2015) investigated the link exchange rate movements and non-oil exports in Nigeria over the period 1980-2013. The Autoregressive Distributed Lag (ARDL) model was adopted for the analysis. The study demonstrates that long run positive relationship exists between the Nigerian non-oil export and exchange rate fluctuations. The study however, concludes Nigeria seem to be very risk-averse as exporting economy.

Essien *et al.* (2011) used OLS to critically examine the impacts of variations in price and exchange rate on agricultural exports with particular emphasis on cocoa exports in Nigeria. The datasets were adapted mainly from Central Bank of Nigeria Statistical Bulletin and Annual Reports as well as IMF Financial Statistics. It was found from the empirical analysis that exchange rate variations and cocoa exports are positively related. The results also show that agricultural credit is significant in driving cocoa exports in Nigeria. Thus, the study recommends for more stable exchange rate policy and boosting of agricultural credit with a view to making cocoa exports more competitive globally.

3. Materials and Methods

3.1. Model Specification

This paper adopts a multivariate regression model which is anchored on the Purchasing Power Parity (PPP) theory. The purchasing power parity assumes that exchange rates between currencies are in equilibrium when their purchasing power is the same in each of the two countries. Notably, this paper builds on the earlier study by Akinlo and Adejumo (2014) which employed combinations of Ordinary Least Squares and error correction model (ECM) to estimate the short run and long run impacts of exchange rate on non-oil exports in Nigeria. This paper seeks to improve on their model by adding inflation as part of the explanatory variables. The functional representation of this model is stated as:

$$NOE = f(ECR, TOP, IFL) \quad (1)$$

Where: NOE = non-oil export

ECR = exchange rate
TOP = trade openness
IFL = inflation rate
Equation (1) above is formalized in a log-linear form below:

$$InNOE = a_0 + a_1 InECR + a_2 InTOP + a_3 IFL + e_t \quad (1.1)$$

Where: NOE, ECR, TOP and IFL are as previously defined in equation (1).
a_0 = Constant parameter
a_1–a_3 = Parameter estimates of the explanatory variables.
In = Natural log operator, introduced for transforming highly skewed variables to normal forms and to aid interpretation of the result using elasticity.
e_t = Stochastic error term
In accordance to a priori expectations, the hypothesized signs of the coefficients of the explanatory variables are: $a_1 > 0$, $a_2 > 0$ and $a_3 < 0$.
More importantly, an error correction mechanism (ECM) is employed to ascertain the speed at which the dependent variable adjusts to equilibrium given a change in any of the regressors. Thus, the ECM of the log-linear model in equation (1.1) is specified as:

$$\Delta \text{InNO}E_t = \beta_0 + \sum_{i-1}^{g} n_1 \Delta \ln \text{NO}\, E_{t-i} + \sum_{i-1}^{g} n_2 \Delta\, EXR_{t-i} + \sum_{i-1}^{g} n_3\, \Delta InTOP_{t-i} + \sum_{i-1}^{g} n_4\, \Delta IFL_{t-i} + ECM_{t-i} + \mu_t \quad (1.2)$$

Where: β_0=intercept
n_1-n_4= estimates of the explanatory variables.
Δ = first difference operator
g = optimal lag length
$\propto$= error correction coefficient which captures the speed of convergence to long run equilibrium.
μ_t=Random error term.

3.1.1. Description of Variables in the Model

A. Dependent Variable
i. Non-oil Exports: These include the exportation of the non-oil produce comprising agricultural, industrial and manufacturing outputs. It is a major component of the export and contributes largely to foreign exchange earnings.

B. Independent Variables
i. Exchange Rate: Exchange rate defines the rate at which one currency is exchanged for another. It is regarded as the value of a country's currency in terms of another currency. Exchange rates are determined in the foreign exchange market, which is open to a wide range of different types of buyers and sellers where currency trading is continuous. It is expected that increase in exchange rate or depreciation of the naira will boost non-exports by making the domestically produced commodities cheaper for foreign consumers.
ii. Trade openness: This refers to the ratio of country's total involving the sum of exports plus imports, to the country's gross domestic product. Also, trade openness involves a measure of economic policies that either restrict or invite trade between countries. Increase in trade openness or outward oriented trade policy is expected to generate net positive effect on non-oil exports.
iii. Inflation rate: This refers to continuous rise in the price of goods and services over a period of time. An increase in inflationary pressures will reduce the competitiveness of domestically produced goods due to increase in price.

3.1.2. Nature and Sources of Data
This study will employ annual time series data spanning from 1986 to 2015. The choice of this time frame was prompted by the systematic process of deregulating the Nigerian economy in 1986 and the adoption of more liberal exchange rate policy in response to the neoliberal logic of the Washington Consensus. More importantly this period witnessed tremendous reform to enhance diversification of Nigerian base. The required time series data for the study will be obtained from Central Bank of Nigeria (CBN) Statistical Bulletin and CBN Annual Report and Statement of Accounts various issues.

3.2. Method of Data Analysis
This paper employs combinations Ordinary Least Square (OLS) and Error Correction Mechanism (ECM) as techniques of data analysis. The choice of the OLS stems from its characteristics as the best linear unbiased estimator (BLUE) as outlined in the Gauss-Markov theorem. The ECM is considered very helpful for estimating the swiftness with which the dependent variable converges to equilibrium due to change in any of the explanatory variables. For proper diagnosis of the data and determination of the statistical significant of the estimated parameters, several tests were conducted. These tests are discussed as follows:

i. Unit root test:
This test is applied on each of the series to examine their respective time series characteristics. Specifically, the Augmented Dickey-Fuller (ADF) is adopted to find out the order of integration of each of the variables and the model with a drift and linear trend is expressed as:

$$\Delta R_t = \omega_0 + \omega_1 R_{t-1} + \sum_{i=1}^{b} \beta_i \Delta R_{t-i} + \lambda_t \quad (2)$$

Where: R_t= variables in the model
ω_1 and β_i= parameter estimate of the variables
b = lag length
Δ= First difference operator
λ_t = Random error term

The existence of a unit root implies that the variable in question is not stationary at levels. Taking the first difference of the variable can be helpful to determine the time series status of the variable if the order of integration is one.

ii. Cointegration test:

This test is relied upon to verify whether or not the relationship between the variables utilized is that of a long-run. It is very helpful as it provides the baseline for estimating the error correction model. Owing to its robustness in testing for cointegration in a multivariate model, the Johansen and Juselius (1990) procedure to co-integration test is applied in ascertaining the presence whether or not long-run relationship exists among the underlying series. Specifically, the null hypothesis of no cointegration is tested against the alternative hypothesis of cointegration at 5 percent level. The formal expression of Johansen-Juselius cointegration based on the test statistics of trace and maximum Eigenvalue is as follows:

$$\lambda_{trace}(r) = -T \sum_{i=r+1}^{n} In\left(1-\hat{\lambda}_i\right) \quad (3.1)$$

$$\lambda_{\max}(r, r+1) = -T\, In\left(1-\hat{\lambda} r+1\right) \quad (3.2)$$

where $\hat{\lambda}$ implies the estimated values of the characteristic roots obtained from and *T* denotes the number of observations. Basically, the trace statistic tests the null that the number of distinct cointegrating vectors is equal to or less than *r.* The further the estimated characteristic roots are from zero, the more negative is the greater the value of computed trace statistic. On the other hand, the Max-Eigen statistic tests the null that the number of cointegrating vectors is *r*, against the alternative of *r* +1. Notably, the critical values for both trace and Max-Eigen statistics have been calculated by Johansen and Juselius (1990). Evidence of at least one cointegrating vector at 5 percent indicates that the series have long run relationship.

4. Results and Discussion

4.1. Static Regression Result

The Ordinary Least Squares (OLS) methodology was employed for the estimation of the static regression model and the result is reported in Table 1.

Dependent Variable: LOG(NOE)				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LOG(EXR)	1.500991	0.214174	7.008271	0.0000
LOG(DOP)	-0.973943	1.055439	-0.922785	0.3646
IFL	-0.015190	0.011027	-1.377516	0.1801
C	-2.431325	1.439131	-1.689440	0.1031
R-squared	0.803923	Mean dependent var		3.809287
Adjusted R-squared	0.781299	S.D. dependent var		2.217243
S.E. of regression	1.036905	Akaike info criterion		3.033924
Sum squared resid	27.95450	Schwarz criterion		3.220751
Log likelihood	-41.50887	Hannan-Quinn criter.		3.093692
F-statistic	35.53361	Durbin-Watson stat		0.237783
Prob(F-statistic)	0.000000			

Table 1: Result of the multivariate static regression
Source: Computed by the Author with E-views statistical package

The static regression result reported in Table 1 shows that the coefficient of exchange rate appeared with the hypothesized positive sign. It was also uncovered that exchange is highly significant in explaining changes in non-oil export. This is in tandem with both a priori and statistical expectations. A percentage increase in exchange rate or depreciation of the naira induces 1.50 percent increase in non-oil export. Degree of openness on the other has an insignificant negative effect on non-oil export. This finding deviated from the theoretical expectations and claim by previous studies that openness to trade makes an economy an attractive environment for export growth. Similarly, inflation is negatively related to non-oil export, but its effects in not statistically significant at 5 percent. The coefficient of determination (0.803) indicates that 80.03 percent systematic variations in non-oil export are collective explained by exchange rate, and inflation rate. The F-statistics test for joint significant of the regressors shows that the variables are jointly

significant at 5 percent level in explaining changes in non-oil export. This is because the probability value (0.0000) of F-ratio is less than 0.05. However, the Durbin-Watson statistic (0.237) shows evidence of serial correlation. This could be adduced to the presence of unit root often associated with time series data.

4.2. Stationarity Test

The Augmented Dickey-Fuller procedure to stationarity test was employed to test the null hypothesis of a unit root (non-stationarity) against the alternative hypothesis of no unit root (stationarity) for each of the variables at 5 percent level. The results are displayed in Table 2.

Variables	Levels test result		1st difference test result		Order of integration
	ADF stat.	Prob-value	ADF stat.	Prob.-value	
LOG(NOE)	-1.717	0.4121	-6.140	0.0000	I(1)
LOG(EXR)	-2.002	0.5757	-6.915	0.0000	I(1)
LOG(DOP)	-5.773	0.0003	-9.185	0.0000	I(0)
IFL	-4.550	0.0059	-4.643	0.0048	I(0)

Table 2: Augmented Dickey- Fuller (ADF) test results
Source: Computed by the Author with E-views statistical package

The stationarity test was conducted in order to gain deeper insight into the characteristics of the series by testing the null hypothesis of unit root (non-stationarity) against the alternative hypothesis of no unit root (stationarity) at 5 percent level. The results of the Augment Dickey-Fuller test showed in Table 2 indicate that degree of openness and inflation rate are stationary at levels. This is because the associated probability values of their respective ADF statistics at levels test are less than 0.05. On the other hand, non-oil export and exchange rate are found to be stationary upon first differencing given that the corresponding probability values of their ADF statistics at first difference test are less than 0.05. It therefore follows from the results that inflation rate and degree of openness are integrated of order zero I(0) while the order of integration for non-oil export and exchange rate is one I(1).

4.3. Cointegration Test

The Johansen and Juselius (1990) cointegration methodology for multivariate model is used to ascertain whether or not the variables are cointegrated at 5 percent level. The result is showed in Table 3.

Series: LOG(NOE) LOG(EXR) LOG(DOP) IFL				
Trace test				
Hypothesized No. of CE(s)	Eigen value	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.658423	73.36172	47.85613	0.0000
At most 1 *	0.622060	43.28464	29.79707	0.0008
At most 2 *	0.345195	16.04005	15.49471	0.0414
At most 3 *	0.138811	4.184342	3.841466	0.0408
		Max –Eigen test		
Hypothesized No. of CE(s)	Eigen value	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.658423	30.07708	27.58434	0.0234
At most 1 *	0.622060	27.24459	21.13162	0.0061
At most 2	0.345195	11.85571	14.26460	0.1162
At most 3 *	0.138811	4.184342	3.841466	0.0408

Table 3: Summary of the Johansen-Juselius cointegration test result
Source: Computed by the Author with E-views statistical package
*Note: * denotes rejection of the hypothesis at the 0.05 level*

The cointegration test was carried out using Johansen-Juselius approach. The Trace and maximum Eigenvalue statistics is utilized for this test and their corresponding critical values have been computed by Johansen and Juselius (1990). From the results in Table 3, it was found from the Trace statistics that four co integrating equations exist in the model. This is because the computed trace statistics exceed the critical values at 5 percent level. Additionally, the Max-Eigen statistics shows evidence of three cointegrating equations. Hence, the null hypothesis of no cointegration is rejected at 5 percent levels. This is an indication that the variables have long run relationship and can be represented as an error correction model to deter the speed of convergence.

4.4. Parsimonious Error Correction Model

The parsimonious error correction model was arrived at after gradual removal of the highly insignificant variables from the over-parameterized ECM and it basically shows the dynamic relationship between the dependent variable and the outlined regressors. More importantly, it estimates the speed of adjustment evidenced in the error correction coefficient. The result of the parsimonious ECM is reported in Table 4.

Dependent Variable: DLOG(NOE)				
Variable	**Coefficient**	**Std. Error**	**t-Statistic**	**Prob.**
C	0.215992	0.102363	2.110073	0.0500
DLOG(NOE(-2))	0.173560	0.179672	0.965986	0.3476
DLOG(EXR)	0.659741	0.304618	2.165797	0.0448
DLOG(EXR(-1))	-0.261369	0.286603	-0.911956	0.3745
DLOG(EXR(-3))	-0.770566	0.411346	-1.873278	0.0783
DLOG(DOP(-3))	0.703263	0.404767	1.737454	0.1004
D(IFL(-1))	0.008498	0.006875	1.236074	0.2332
D(IFL(-3))	0.016682	0.005152	3.237842	0.0048
ECM(-1)	-0.194125	0.072078	-2.693270	0.0154
R-squared	0.593518	Mean dependent var		0.207488
Adjusted R-squared	0.402232	S.D. dependent var		0.437272
S.E. of regression	0.338079	Akaike info criterion		0.936350
Sum squared resid	1.943055	Schwarz criterion		1.371845
Log likelihood	-3.172547	Hannan-Quinn criter.		1.061757
F-statistic	3.102784	Durbin-Watson stat		1.945217
Prob(F-statistic)	0.023669			

Table 4: Result of parsimonious ECM
Source: Computed by the Author with E-views statistical package

The parsimonious ECM result reported in Table 4 followed a general-to-specific modeling approach. The result shows that the contemporaneous value of exchange rate has significant positive effects on non-oil export. This finding is consistent with the Ordinary Least Squares (OLS) result reported in Table 1. A percentage change in exchange rate triggered 0.65 percent increase in non-oil export. This indicates that non-oil export is largely predicated on exchange rate variability. Similarly, the third lag of inflation rate also exerts significant positive influence on non-oil export as 0.016 percent increase in non-oil export as caused by a percentage change in inflation. Although the third lag of degree of openness has positive relationship with non-oil export, its effects is statistically insignificant at 5 percent level. The R-squared (0.593) shows that 59 percent variations in non-oil export over the study period are collectively explained by changes in the explanatory variables. This is suggestive that the model is well fitted as the explanatory power is more than the benchmark of 50 percent. The probability value (0.023) of F-statistic falls below 0.05, indicating that at 5 percent level, the regressors are jointly significant in explaining changes in non-oil export. More importantly, the error correction coefficient (-0.194) appeared with the hypothesis negative sign and statistically significant at 5 level as the probability value (0.015) of its corresponding t-statistic (2.69) is less than 0.05. This is suggestive that any temporary disequilibrium in the system will be adjusted at speed of 19 percent. Thus, the model is not explosive as converges to long run equilibrium state.

4.4.1. Diagnostics Tests

In order to ascertain the reliability of the estimated regression model for macroeconomic prediction, it is subjected to diagnostics tests with emphasis on serial correlation, heteroskedasticity and normality tests. The results of these tests are reported as follows:

a. Normality test: The Jarque-Bera statistics was adopted to examine whether the residual term in the parsimonious ECM is normally distributed at 5 percent level. The result is presented below.

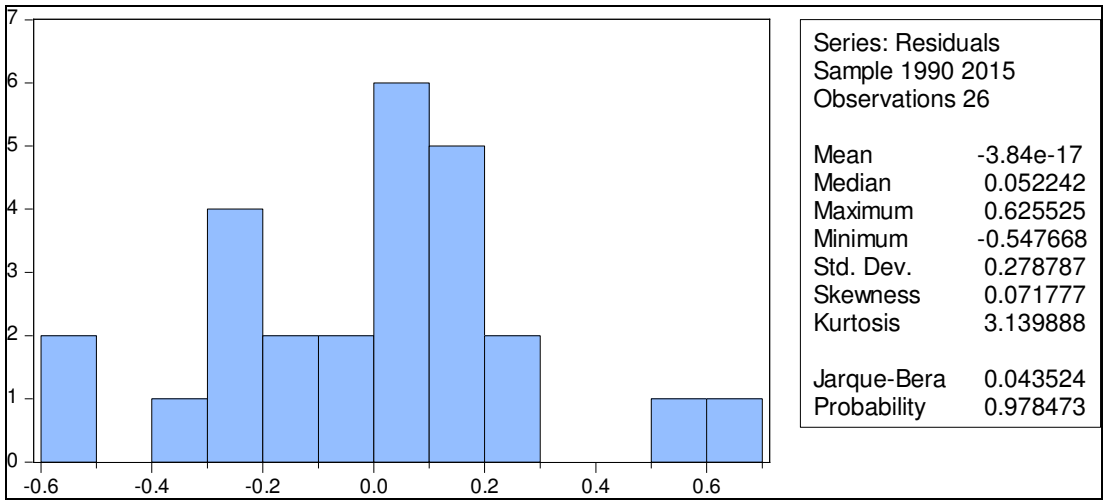

Figure 1
Source: Computed by the Author with E-views statistical package

b. **Serial Correlation test:** The Breusch-Godfrey serial correlation LM test is used to examine if the residual term is serially correlated at 5 percent level. The result is summarized in Table 5.

Breusch-Godfrey Serial Correlation LM Test:			
F-statistic	0.352323	Prob. F(2,15)	0.7087
Obs*R-squared	1.166585	Prob. Chi-Square(2)	0.5581

Table 5: Breusch-Godfrey serial correlation LM test result
Source: Computed by the Author with E-views statistical package

Heteroskedasticity Test: White			
F-statistic	0.429026	Prob. F(8,17)	0.8875
Obs*R-squared	4.367487	Prob. Chi-Square(8)	0.8225
Scaled explained SS	1.997762	Prob. Chi-Square(8)	0.9811

Table 6: White's Heteroskedasticity Test
Source: Computed by the Author with E-views statistical package

This paper employed higher order serial correlation test proposed by Breusch (1978) and Godfrey (1978) to test the null hypothesis of no serial correlation against the alternative hypothesis of serial correlation at 5 percent level. The result of Breusch-Godfrey serial correlation LM test reported in Table 5 shows that the residuals are not serially correlated at 5 percent level as the probability value (0.5581) of the chi-square distributed statistics exceeds 0.05. Also, the heteroskedasticity test which relied on White (1980) procedure indicates that the variance of the residuals is homoscedastic at 5 percent level. This is because the associated probability value (0.8225) of chi-square distributed statistics is more than 0.05. Lastly, the normality tests which relied on Jaque-Bera statistic provide evidence for accepting the null hypothesis of normal distribution for the residual term at 5 percent level. This is because the probability value of the Jarque-Bera statistic is greater 0.05. The results of the diagnostics tests are very satisfactory as they attest to the reliability and robustness of estimated model for predictions and policy purposes.

5. Conclusion and Recommendations

This paper focused attention on the impact of exchange rate on non-export following the currency differentials existing among countries across the globe. The findings indicated that exchange rate has significant positive effect on non-oil export in both short and long run. The significant positive impact of exchange rate on non-oil export in the long run is consistent with the findings of Akinlo and Adejumo (2014) that variability of exchange rate has positive and significant effects on non-oil exports in Nigeria in the long run. This suggests that currency differential form basis for foreign demand for domestically produced goods and services. However, degree of openness does not exert any significant effect on non-oil exports, indicating that openness to trade is not enough to make non-oil export competitive in the global market. As observed from the parsimonious ECM, inflation has significant positive effect on non-oil during the study period. In view of the findings, this paper concludes that exchange is an important predictor of Nigeria's non-oil exports competitiveness in the global economic environment. Therefore, it is recommended that the Central Bank of Nigeria and other stakeholders in the Nigerian financial system should strive to promote the stability of the naira to enhance the competitiveness of Nigeria's non-oil exports at the global market.

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