

## The Impact of Exchange Rate on Nigeria Non-Oil Exports

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**Abstract** *The study examines the impact of exchange rate on non-oil export. We used time series data obtained from CBN for a period of 27 years that is 1986 to 2013. Augmented Dickey-Fuller (ADF) test was used for the unit root test and Johansen's co-integration test was also conducted to establish short and long run relationships between non-oil exports and independent variables. The result shows three co-integrating equations which establish the existence of long run relationship among the variables. Ordinary Least Square statistical technique was used to assess the determinants of non-oil export in Nigeria. The results 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 and appreciation of exchange rate has negative effect on non-oil export which is consistent with the economic theory. Following this, the study recommended among others that monetary authority should ensure exchange rate stability in order to stem inflationary tendencies in Nigeria which have adverse effect on the growth of non-oil export.*

**Key words** Non-oil, Export, Economic Growth, Trade, Monetary Policy and Exchange Rate

DOI: 10.6007/IJARAFMS/v5-i1/1569

URL: <http://dx.doi.org/10.6007/IJARAFMS/v5-i1/1569>

### 1. Introduction

Research related to exchange rate management still remains of interest to economists, especially in developing countries, despite a relatively enormous body of literature in the area. This is largely because the exchange rate in whatever conceptualization, is not only an important relative price, which connects domestic and world markets for goods and assets, but it also signals the competitiveness of a country's exchange power vis-à-vis the rest of the world in a pure market. Besides, it also serves as an anchor which supports sustainable internal and external macroeconomic balances over the medium-to-long term. There is, however, no simple answer to what determine the equilibrium exchange rate, and estimating equilibrium exchange rates and the degree of exchange rate misalignment remains one of the most challenging empirical problems in an open economy like Nigeria (Williamson, 1994).

Nigeria overall economic performance since independence in 1960 has been decidedly unimpressive. Despite the availability and expenditure colossal amount of foreign exchange derive mainly from its oil and gas resources, economic growth has been weak and the incidences of poverty has increased. The objective of every independent nation like Nigeria is to improve the standard of living of its citizenry and promote economic growth and development of the country but due to vicious circle of poverty, scarcity of resources and the law of comparative advantage, countries depend on each other to foster economic growth and achieve sustainable economic development.

Hasanov and Samadova (2012) noted that expanding non-oil export to get rid of one-product economy has been known as a solution for economic development in oil producing countries which Nigeria is one of them and is the sixth largest oil producing and exporting countries in the world. According to export-led growth hypothesis, increased export can perform the role of "engine of economic growth" because it can increase employment, create profit, trigger greater productivity and lead to rise in accumulation of reserves allowing a country to balance their finances.

Hasanov and Samadova (2012) also revealed that there are some challenges for countries with natural resource abundance such as oil in comparison with other countries. The main point is that in

parallel with windfall of oil revenues these countries have to pay more attention to the development of the non-oil sector as well as its export performance. Because in the most of the cases oil driven economic development leads to some undesirable consequences such as Dutch Disease in the oil rich countries.

The Dutch Disease concept provides the relationship between the exchange rate and non-oil export. According to this concept the appreciation of a country's real exchange rate caused by the sharp rise in export of a booming resource sector draws capital and labour away from a country's manufacturing and agricultural sectors, which can lead to a decline in exports of agricultural and manufactured goods and inflate the price of non-tradable goods. Corden (1982); Corden and Nearly (1984) and Hassanov and Samadova, (2012) postulated that if we divide overall export of oil rich countries into oil and non-oil exports appreciation of real exchange rate which is specific for these countries negatively affects non-oil exports while export revenues of oil sector mainly depends on oil price in the world markets.

Experimental studies of the growth rates of countries endowed with natural resources have showed paradoxical finding that countries which are amply endowed with resources tend to grow slower than others. One economic explanation for this paradoxical phenomenon is that the resource exporter's real exchange rate co-moves with highly volatile commodity prices. In price upturns, the real exchange rate appreciates and undercuts the competitiveness of the domestic industry. Lost industry is then difficult to reconstruct when the commodity price falls and over several price cycles, the country loses its non-resource industrial base ((Sachs and Warner, 2005; Auty, 2001; Torvik, 2001; Collier and Goderis 2007).

Omojimito and Akpokodje (2010) asserted that the dependence of Nigeria on crude oil exports had important implications for the Nigerian economy since the oil market is a highly volatile one. For example, being dependent on the export of crude oil, the Nigerian economy became subject to the vicissitudes and vagaries of the international oil market such that international oil price shocks were immediately felt in the domestic economy. Coupled with this, Nigeria implemented a fixed exchange rate system that engendered overvaluation of the domestic currency, serving as a disincentive for increased exports through non-competitiveness of the country's non-oil exports. On the other hand, the overvalued exchange rate enhanced imports thereby exacerbating the already precarious balance of payment position.

The Nigerian government has over the years engaged in international trade and has been designing trade and exchange rate policies to promote trade (Adewuyi, 2005). Although a number of exchange rate reforms or depreciation has been carried out by successive governments, the extent to which these policies have been effective in promoting export has remained unascertained. This is because despite' government efforts, the growth performance of Nigeria non-oil export has been very slow. It grew at an average of 2.3% during the 1960 -1990 period, while its share of total export declined from about 60% in 1960 to 3.0% in 1990 (Ogun,2004). Looking at the sectoral contribution to non-oil export in the period before the introduction of the Structural Adjustment Programme (SAP) (1975-1985), it can be seen that agricultural sector contributed about 4.0% and Windfalls that result from volatile oil price surges/shocks overwhelmingly flow through the economy; expand the oil sector and penalise the non-oil sector (Mieiro and Ramos, 2010).

On this premise, this study will investigate the effect of exchange rate on non-oil export in the Nigerian economy. The need to correct the existing structural distortions and put the economy on the path of sustainable growth is therefore compelling. This raises the question of what else need to be done in order to diversify the economy and develop the non-oil sector to realize the potentials of the sector. The main objective of this research is to ascertain whether there is any relationship between Foreign Exchange rate depreciation (adjustments) and volume of Nigeria's non-oil export between the periods of 1986-2013.

## 2. Literature review

Exchange rate has been defined as the price of one currency in terms of another (Mordi, 2006). Fahrettin (2001) asserted that an exchange rate, as a price of one country's money in terms of another's, is among the most important prices in an open economy. It influences the flow of goods, services, and capital in a country, and exerts strong pressure on the balance of payments, inflation and other macroeconomic variables. Therefore, the choice and management of an exchange rate regime is a critical aspect of economic management to safeguard competitiveness, macroeconomic stability, and growth.

Furthermore, Hossain (2002) agreed that exchange rate helps to connect the price systems of two different countries by making it possible for international trade and also effects on the volume of imports and exports, as well as country's balance of payments position. AZeeZ, Kolapo and Ajayi, (2012) noted that When there is deviation of this rate over a period of time from the benchmark or equilibrium, exchange rate is called exchange rate volatility. It also indicates that misalignment of exchange rate as occurred where there is multiplicity of markets parallel with the official market.

Aliyu (2011) noted that 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 balance of payment.

Exchange rate plays a key role in international economic transactions because no nation can remain in autarky due to varying factor endowment (Ladipupo and Ogheneov, 2011). Movements in the exchange rate have ripple effects on other economic variables such as interest rate, inflation rate, unemployment, money supply; economic growth, balance of payment etc. These facts underscore the importance of exchange rate to the economic well-being of every country that opens to international trade in goods and services. Therefore, nations in the pursuit of the macroeconomic goals of healthy internal and external stability of her economy, find it imperative to articulate an exchange rate policy.

There is a growing literature on the relationship between exchange rate and export (Oil and Non-oil) in cross countries and country specific with varied submission and conclusion. For examples, Hassanov and Samadova (2012) Study the impact of the real exchange rate on non-oil exports in Azerbaijan by applying Vector Error Correction Model. The results showed that appreciated real exchange rate is one of major factors that impede non-oil export growth. Sorsa (1999) analyses Algerian non-oil export promotion issues in presence of oil sector dominancy of the economy and revealed that appreciation of real exchange rate is the main factor that impedes non-oil export growth and its diversification.

Chukuigwe and Abili (2008) empirically examined the impact of monetary and fiscal policies on non-oil exports in Nigeria Using Ordinary Least Squares (OLS) estimation, the study revealed that exchange rate, being proxies for monetary policy, negatively affect non-oil exports and concluded that exchange rate as a major price that affects all sectors of the economy and all economic agents, it is imperative to monitor the movements in the real exchange rate in order to foster competitiveness and improve the supply of exports in the medium to long term. Policies that at worst, keep the exchange rate stable are desirable. In this regard, The Central Bank of Nigeria should continue to intervene in the foreign exchange market to maintain stability. Shehu (2012) quantitatively assess the impact of exchange rate volatility on non-oil export flows in Nigeria. Employing quarterly data for twenty years, vector co-integration estimate revealed that the naira exchange rate volatility decreased non-oil exports and recommended measures that would promote greater openness of the economy and exchange rate stability in the economy.

Omojimate and Akpokodje (2010) study the effect of exchange rate reforms on Nigeria's trade performance during the period which spanned between 1986 to 2007 and found a small positive effect of exchange rate reforms on non-oil exports through the depreciation of the value of the country's currency and concluded that exchange rate reforms are not sufficient to diversify the economy and there is need for major incentives in the form of conducive environment for domestic production, especially effective infrastructure that could lead to significant improvement in competitiveness are required. Ettah, Akpan and Etim (2010) focused on the effects of price and exchange rate fluctuations on Agricultural exports (cocoa) in Nigeria. An export supply function for cocoa was specified and estimated using the Ordinary Least Squares Regression. Results showed that exchange rate fluctuations positively and significantly affect cocoa exportation in Nigeria and recommended that there should be free market determination of exchange rate for export of cocoa in the country.

Akinlo and Adejumo (2014) investigated the impact of exchange rate volatility on non-oil exports in Nigeria and found 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 volatility is statistically insignificant. The policy implication is that the exchange rate volatility is only effective in the long run but not in the short run in the Nigerian economy.

Yaqub (2010) postulate that exchange rate policy has been identified as one of the endogenous factors, which can affect the economic performances of a nation. In light of this perception, the Nigerian authority tried both the fixed and the market based exchange rate regimes so as to attain a realistic exchange rate that would ensure efficient allocation of foreign exchange resources and pave way for a non-inflationary growth. Despite the change from one regime to another, the economic performance of Nigeria was still epileptic. Using modified IS-LM framework to investigate the effect of exchange rate on output of different sectors from 1970-2007 found that exchange rate had significant contractionary effects on agricultural and manufacturing sectors. Similarly, Opaluwa, Umeh and Ameh (2010) examines the impact of exchange rate fluctuations on the Nigerian manufacturing sector during the period 1986–2005. The argument is that fluctuations in exchange rate adversely affect output of the manufacturing sector. This is because Nigerian manufacturing is highly dependent on import of inputs and capital goods. These are paid for in foreign exchange whose rate of exchange is unstable and concluded that there need to strengthen the link between agriculture and the manufacturing sector through local sourcing of raw materials there by reducing the reliance of the sector on import of inputs to a reasonable level.

### 3. Methodology of research

#### 3.1. Sources of data

The study employs annual time series data covering the period 1986-2013. This period is chosen as it corresponds to the period where Nigeria external sector was liberalized and consistent data on the relevant variables are available. More importantly, this period witnessed tremendous reformed to enhance diversification of Nigerian. Data for the study was obtained from Central Bank of Nigeria (CBN) statistical Bulletin and CBN Annual Report and Statement of Accounts various issues.

#### 3.2. Model specification

The objectives of this study are basically to examine the influence of exchange rate on Nigerian economy non-oil export. To achieve the above objectives, we develop economic aggregates in line with the theoretical framework and literature reviews.

The model which is used for investigating the economic effect of exchange rate on volume of non-oil export in Nigeria is based on that proposed by Safdari *et al.* (2011) and Yimka and Oluwaseun (2014) with some modification. They proposed that volume of non-oil export (NOE) is affected by the following variables: exchange rate (EXR), real gross domestic product (RGDP), inflation rate (INFR) and degree of economic openness (OPEN). In this study, one variable was added that is broad money supply (M2) and credit to the Private sector (CPS) that may significantly influence the volume of non-oil export are included. Based on this relationship a functional form of these variables on volume on non-oil export in Nigeria is stated bellow.

$$\text{Thus, NOE} = F(\text{EXR, RGDP, INFR, OPEN, M2, CPS}) \quad (1)$$

$$\text{NON} = \beta_0 + \beta_1\text{EXR} + \beta_2\text{RGDP} + \beta_3\text{INFR} + \beta_4\text{OPEN} + \beta_5\text{CPS} + \text{M2} + \text{Ut} \quad (2)$$

Adopted Error-Correction Model (ECM) for this study takes the following form:

$$\Delta \text{NON}_t = \alpha_0 + \sum_{i=1}^n \beta_i \Delta \text{EXR}_{t-1} + \sum_{i=1}^n \beta_i \Delta \text{LRGDP}_{t-1} + \sum_{i=1}^n \beta_i \Delta \text{INFR}_{t-1} + \sum_{i=1}^n \beta_i \text{OPEN}_{t-1} + \sum_{i=1}^n \beta_i \Delta \text{CPS}_{t-1} + \sum_{i=1}^n \beta_i \Delta \text{LGDP}_{t-1} + \sum_{i=1}^n \beta_i \Delta \text{LEXR}_{t-1} + \sum_{i=1}^n \beta_i \Delta \text{LM2}_{t-1} + \text{Ut} \quad (3)$$

Where:

GDP = Gross Domestic Product; Non = the Value of Non-Oil Export Ratio; EXR= Exchange Rate; OPEN = Openness of the Economy; CPS = Credit to the private sector; INF = Inflation Rate; M2 = broad money supply; Ut= Error Term.

### 3.3. Estimation Techniques

The estimation procedure adopted in this study is in three sequences.

To stem the problem of spurious regression, it is important that the time series properties of the data set employed in estimation of equation is ascertained. It might seem reasonable to test for the presence of a unit root in the series using the most general of the models as.

$$\Delta y_t = \alpha_0 + \gamma y_{t-1} + \alpha_2 t + \sum \beta_j \Delta y_{t-1} + e_t \quad (4)$$

Where  $y$  is the series  $t$  is (trend factor);  $\alpha_0$  is the constant term,  $e_t$  is the stochastic error term,  $\beta$  is the lag length. The Augmented Dickey Fuller (ADF) unit root test is employed to test the integration level in order to determine the order of integration of the variables.

If the data set indicates integration property of the order 1 (1) for the employed variable, there we proceed to test for co-integration among the variables employing Johansen and Juselius (1988, 1991) and Juselius (1990, 1992, 1994) to ascertain the co-integration among the estimating variables.

Assume the variable tested above are co integrated, we then estimate the ECM (Error Correction Model), which incorporates the full short run dynamic model;

$$Y_t = \alpha + \beta y_t + \xi_t \quad (5)$$

Therefore

$$\Delta y_t = U_{t-1} + \sum \beta \Delta x_{t-1} + \sum \alpha_i \Delta y_{t-1} + \epsilon \quad (6)$$

Here,  $U_{t-1}$  is the one period lagged value of the error term from co-integrating regression, while  $\Delta$  denotes the first differences operator.

### 4. Empirical results and interpretation

The time series properties of the variable equations and the estimated equations are examined.

#### *Time Series Properties of the Variables*

The time series properties of the variables are evaluated.

Stationary Test: The results are presented in Table 1

Table 1. Results of test for stationarity of variables

Variables	ADF	Order of integration
$\Delta$ NON	-5.8559	1(1)
EXR	-3.2033	1(0)
$\Delta$ OPEN	-8.4027	1(1)
INF	-4.1083	1(0)
$\Delta$ GDP	-4.8132	1(1)
$\Delta$ CPS	-4.1366	1(1)
$\Delta$ M2	-3.4898	1(1)

Source: Authors

Note:  $\Delta$  = indicating first difference

ADF critical value of 5 percent = -2.9750 including constant and trend.

The results in Table 1 shows that the variables are stationary at the first difference and are integrated in order 1(1) except exchange rate and inflation rate who is stationary at level 1(0).

#### *Co-integration Test*

Having established that the variables are integrated of order one and zero, we proceed to test for co integration. Co-integration analysis helps to test for the existence of long run relationship among or between variables. Individual series might not be stationary, but a linear combination of these series could

be stationary. This means that the variables are co-integrated. We therefore test for co-integration among these variables by using the reduced rank procedure developed by (Johanssen 1988; Juselius 1990). The Johansson method detects a number of co-integration vectors in non-stationary time series. It allows, for hypothesis testing regarding the element of co-integrating vector and loading matrix. This procedure is used to determine the long run relationship between the variables.

The result of Johansen co-integration test is shown in table 2 below.

Table 2. Johansen Co-integration test

Eigen Values	Likelihood ratio	5% percentage Critical value	1% Percent Critical Value	Hypothesized no of CE (s)
0.977329	165.3831	68.52	76.07	None**
0.836507	70.71683	47.21	54.46	At most 1 **
0.490396	25.44214	29.68	35.65	At most 2
0.289774	8.589116	15.41	20.04	At most 3
0.001392	0.034820	3.76	6.65	At most 4

\* (\*\*) denotes rejection of hypothesis at 5% (1%) significant level.

L.R test indicates 2 co-integrating equation (s) at 5% significant level.

The result shows that there exist two (2) cointegrating equation at 5% or 1% level of significance. This is because the likelihood ratio is greater than the critical value at 5% or 1%. This shows that there is long run relationship between total value of non-oil export and all the explanatory variables. In other words, they possess the characteristics that would cause them to converge in the long-run.

### 5. Presentation of regression result

Given the fact that the variables are co-integrated, the next step is the estimation of the short-run dynamics within the vector error correction model in order to capture the speed of adjustment to equilibrium in the case of any shock to any of the independent variables because applying the difference variable for regression would imply loss of valuable information about the long run relationship among the variables. In order to correct for such loss of information, the error correction estimation is used so as to integrate short-run dynamics with long run relationship (Iyoha and Ekanem 2001). The error correction estimation result is presented in table 3 below.

Table 3. Error-Correction Model of Non-oil Export Output Equation D(LNON) by OLS

Regressor	Coefficient	Std Error	T-statistic	Probability
C	0.0122	0.0601	0.2010	0.8422
D(LOPEN)	-0.5156	0.2877	-1.7922	0.0847
D(LGDP)	1.0126	0.3311	3.0586	0.0051
D(LCPS)	1.5324	0.5097	3.0065	0.0058
D(LM2)	1.7677	0.7212	2.4484	0.0214
D(LINF)	-0.0467	0.0648	-0.7202	0.4778
D(LEXR)	-0.2417	0.1115	-2.1679	0.0395
ECM(-1)	-0.5290	0.1990	-3.5300	0.0002

Source: Authors computation

$R^2 = 0.9351$

$R^2 = 0.8940$

F – Statistic = 88.16386

Prob (F – Statistic) = 0.0000

D.W Statistic 1.9913

From table 3, it could be observed that openness of the economy D(LOPEN) contradict its a priori predicted sign of positive. This shows that a positive change in D(LOPEN) variable will lead to negative change in the growth of non-oil export in Nigeria. Precisely, one per cent increase in D(LOPEN) will lead to

0.5156 per cent decrease non-oil exportation in Nigeria. The coefficient of D(LOPEN) is not significant at 0.05 significance level with a probability value of 0.0847. The implication of this finding is that openness of the Nigeria economy to the outside world has no significant effect on Nigeria non-oil exportation.

The coefficient of gross domestic product D(LGDP) is 1.0126. This implies that a one percent increase in D(LGDP) will result in a 1.0126 percent increase in Nigeria non-oil export. This variable was found to be statistically significant at 0.05 percent levels of significance judging from the low probability value estimate of 0.0051. The implication of this finding is that expansionary productivity in an economy promotes the growth of non-oil.

The estimated coefficient of broad money D(LM2) was found to be 1.7677. Thus, a direct relationship with non-oil export was established. This is consistent with the apriori expectation. The variable is significant at 0.05 per cent levels of significance due to the low value of the probability of 0.0214. The implication of this is that consistent expansion of monetary policy which encourages supply and demand of non-oil exportation has the capacity to promote diversification of Nigeria economy. This finding is consistent with Enoma and Isedu (2011) who reported that broad money supply has direct and significant impact on non-oil exportation in Nigeria

Credit to the private sector D(LCPS) has a very significant strong impact on non-oil exportation in Nigeria such that one percent increase in D(LCPS) will lead to 1.5324 percent increase in non-oil export. This is consistent with the apriori expectation.

The inflationary rate D(LINF) variable coefficient bears a negative sign. This is consistent with the apriori expectation. This implies that there is indirect relationship between inflationary rate and Nigeria non-oil export. The value of the coefficient is -0.0467. This implies that a one per cent increase in inflationary rate will lead to 0.0467 per cent decrease in non-oil export. The coefficient value of the variable is not significant at 0.05 significance level which is confirmed by the probability value of 0.4778. The non-robustness of this variable is an indication that macroeconomic instability reduces non-oil exportation in Nigeria.

The result also shows that exchange rate D(LEXR) has negative sign, which is consistent with the apriori expectation. The coefficient of this variable is statistically significant at 0.05 significance level. The magnitude of the coefficient is -0.2417, and by implication, one per cent increase in exchange rate will lead to 0.2417 per cent decrease non-oil export in Nigeria. This implies that exchange rate depreciation has no robust effect on non-oil export in Nigeria.

The result shows that the coefficient of error correction mechanism (ECM) is negative -0.5290 and significant at 0.05 per cent critical level as evident by the low probability value of 0.0002. This shows that about 53 per cent disequilibria in Nigeria's non-oil export in the previous year are corrected for in the current year. The significance of the ECM is an indication and a confirmation of the existence of a long run equilibrium relationship between value of non-oil export and all the explanatory.

The overall goodness of the model as shown by the adjusted coefficient of determination is 0.9351, which shows that about 94 percent of the variation experienced in the non-oil export of Nigeria for the period being investigated is explained by the independent variables included in the model.

The F-statistic which measures the joint statistical influence of the explanatory variables in explaining the dependent variable was found to be statistically significant at 0.05 percent level. The F-statistic figure of 88.16386 shows that the explanatory variables are important determinant of Nigeria non-oil exportation.

The value of Durbin Watson statistic is 1.9913. This implies that there is absence of autocorrelation among the explanatory variables in the model.

## 6. Conclusion and policy implication

This study examines the relationship between exchange rate and non-oil exportation in Nigeria. One of the important issues for Nigerian economy is the diversification of her economy as results of the incessant shock of the international oil market. Based on estimation outputs we can conclude that effective exchange rate, money supply, credit to the private sector and economic performance has statistically significant impact on non-oil export in the Nigerian economy. Furthermore, appreciation of exchange rate has negative effect on non-oil export which is consistent with economic theory and also for the reality of

Nigerian economy because appreciation of national currency has a negative affects export earnings of the country.

Following this, monetary authority should ensure exchange rate stability in order to stem inflationary tendencies in Nigeria which have adverse effect on the growth of non-oil export and finally, government should encourage stability in macroeconomic variables and employ such growth oriented and stabilization policies especially at macro level which will induce the diversification, growth and development of Nigerian economy.

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