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BUILDING FOREIGN RESERVE IN NIGERIA: THE ROLE OF OIL AND NON-OIL EXPORTS

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ABSTRACT: *This paper provides empirical evidence linking exports and foreign aid to international reserve accumulation. Country-specific data spanning from 1981-2015 on oil and non-oil exports and foreign aid in Nigeria were sourced from Central Bank of Nigeria Statistical Bulletin and analyzed using error correction mechanism (ECM) in addition to unit root and cointegration tests. As observed from the Augmented Dickey-Fuller test unit root, the variables are mixed integrated. Long run relationship was established amongst the series from the Johansen cointegration test result. The parsimonious ECM that lagged values of oil exports impact positively on foreign reserve holding. 1 percent increase in lag two of oil exports leads to 0.367 percent in the external reserve. Similarly, the first lag of non-oil exports is positively linked to external reserve. With 1 percent increase in non-oil exports, international reserve increases by 0.499 percent. The error correction estimate (-0.5099) indicates that the model is well behaved as any short run disequilibrium in the system is reconciled at the speed of 50.9 percent to achieve long run equilibrium position. On the basis of the findings, it is concluded that exports are helpful in boosting the foreign reserve holding in Nigeria. Thus, this paper recommends for the diversification of the export base in order to keep the foreign reserve holding on the path of rapid and sustainable growth.*

KEYWORDS: non-oil exports, oil exports, foreign reserves, foreign aid , Nigeria.

INTRODUCTION

Foreign reserves are foreign currency deposits held by central banks such as the dollar, pound sterling, euro and yen (IMF, 2009). These reserve currencies are used to back central bank's liabilities such as the local currency issued, the reserve deposits of various Deposits Money Banks (DMBs), government or other financial institutions. Foreign reserves are used to support monetary and foreign exchange policies in order to meet the objectives of safeguarding the domestic currency and fostering normal functioning of both domestic and external payment systems. Foreign exchange reserves accumulation in emerging economies is directly related to the rise in the current account deficit in countries whose currency is used for accumulation, especially the United States. Consequently, adjustments in the United States dollar have serious costs implications for other countries of the world, mostly in countries whose foreign exchange reserves accumulation is in dollars. The emerging economies experiences show the importance of the accumulation of foreign exchange reserves in order to solve precautionary problems, capital flows instability and other developments that may negatively affect expectations (Kruskovic &Tina, 2014).

Originally, foreign reserves were held in gold, but with the advent of the Bretton Wood system, the US dollar was pegged to gold and the gold standard was abandoned. Hence, the dollar appearing as

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good as gold became fiat and the most significant reserves currency. However, in today's world, large foreign reserves partly symbolize the country's strength as it indicates the strong backing the currency of the country has in terms of wealth accumulation. Hence, it attracts the confidence of the international community to the country while low foreign reserves elicit the opposite response.

For over thirty years in Nigeria, various policy initiatives and strategies have been employed in the administration of foreign exchange reserves. However, very marginal outcome was realized due to the fact that structures put in place could not provide enough support for efficient foreign reserves management. Since the 1970s, the Nigerian economy has consistently relied on oil exports as the major source of her foreign exchange earnings and local revenue source with the enormous cycles of economic booms and recessions. Fortunately for Nigeria and most oil dependent economies, world oil prices began to rise in 1999 resulting in a well-managed boom and unprecedented accumulation in the level of foreign reserves rising.

Aside the oil exports, non-oil exports constitute an integral part of the overall export. It plays important role in promoting industrialization and economic growth. This is because, non-oil exports are important sources of industrial development and enlarges market frontiers for domestic industrial output exports and by so doing boost investment, employment, output, and income. In addition to promoting the external reserve build-up, exports are believed to expand the production possibility frontiers and broaden the consumption basket of the people in the participating countries, thereby improving their welfare (Adewuyi and Adeoye, 2008). It is argued that export is a catalyst necessary for the overall development of an economy. This is because it increases the earnings of the country, thereby creating an avenue for growth and raise the national income of the country. It also increases the level of employment in the economy as higher demand for exports requires more production which in turn leads to employment of more people.

Exports also help a country to attain a favourable balance of trade and in turn improve the balance of payment position provided exports reasonably exceed imports. In a resource based economy such as those dependent on oil, exports are usually of two categories- oil exports and non-oil exports, with the source of foreign reserves usually skewed to oil exports. Nigeria's dependence on crude oil for foreign exchange earnings has posed a constraint to effective management of the international reserves due to the vulnerability of its foreign exchange earnings to shocks in the global crude oil market. For instance, foreign reserve in Nigeria declined from US$60,120,000,000 in 2008 to US$ 44,760,000,000in 2014 due to shocks in the global oil market (CIA, 2015). In the view of George (2007) the circumstances prevailing in the international oil market is mirrored in Nigeria through the foreign reserve holding. Swings in crude oil earnings often translate to poor reserve positions in Nigeria and contracts her credit worthiness in the international financial system.

While the oil exports constitute over 90 percent of the foreign reserves in Nigeria, it is argued that non-oil export has little or nothing to be desired in terms of generating foreign reserves (Onwe, 2013). Given the vagaries in exports and external reserves accumulation in Nigeria in the past two decades, it is necessary to investigate the impact of oil and non-oil exports on the level of foreign exchange

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accumulation in Nigeria in order to have a better understanding of how the international reserve have been affected by the various sources of exports. Thus, the specific objectives of this study are to estimate the effects of oil and non-oil exports on external reserve holding in Nigeria between 1981 and 2015.

LITERATURE REVIEW

Conceptual Literature

Otieno and Mudaki (2011) describe export earnings as a country's receipt from the export of goods and services. These goods and services cut across different sectors of the economy. Prominent among them are oil and non-oil exports. In most resource based economies, oil exports account for over fifty percent of the total exports, thus making them vulnerable to shocks in the global oil market. On the other hand, the non-oil exports comprise the export of agricultural produce and other related commodities. Exports of agricultural products are of great importance to the developing or transition economies. Gas and electricity exports are important sources of export earnings as they contribute to external reserve build-up. Problems of employment, balance of payments, income distribution, and price and income stabilization are often addressed through foreign exchange earnings from oil and non-oil exports.

The importance of export earnings in economic development is widely acknowledged. Ideally, export earnings stimulate growth in a number of ways by stimulating production and demand linkages, economies of scale due to larger international markets, increased efficiency, and adoption of superior technology embodied in foreign produced capital goods (Basu et al., 2000). The composition of export earnings is measured by the total quantity of goods exported or sold to another country less the cost of sales incurred in the producing country. When export earnings are high, the exporting country is likely to enjoy high investment and thus ensure a higher growth performance. However, a decline in export earnings would lead to a reduction in foreign exchange earnings. High foreign exchange earnings that are associated with export growth is perceived by advocates of international trade as the panacea for macroeconomic stability.

Additionally, Aluko (2007 as cited in Ebiringa; 2013) posits that external reserve played an important role in macroeconomic management by increasing the volume of money supply and improved the level of investment. This offers opportunity for employment generation as well as increasing the productive activities of the economy. Obaseki (2007) was of the opinion that external reserve if well managed serves as a buffer to balance of payment disequilibrium and help to overcome unforeseen volatility in future prices which will sustain natural wealth to the future generation. Odozi (2000) asserts that aside the decline in international reserve accumulation; countries are faced with the challenge of managing foreign reserve. Lizondo and Mathieison (1987) suggest that countries adopt a large and prompt build-up of their reserves to serve as "self- insurance" against risk of financial fragility and also to forestall foreign exchange appreciation.

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Empirical Review

Osuntogun, Edordu, and Oramah (1997) discovered that the core of the export-led strategy is the diversification of export products and export markets to minimize risks and ensure a more stable and sustainable current account position. Lewis (1980) also found that diversification of exports will help countries achieve and maintain a high level of economic growth. Opara (2010) posited that exports are the bed-rock of any economic development which is meaningfully centred on non-oil export in most countries of the world. Adding that promoting non-oil export will bring about a reduction of a nation's level of dependence on crude oil or what the study describes as, "monocultural foreign trade product".

Heller (1966) estimated the optimal stock of reserves by equating the marginal cost and marginal benefit of holding reserves following rational optimizing decision. The study compares actual reserves with results for each country to check for the adequacy of reserves. Frenkel and Jovanovic (1981) determined the actual optimal stock of reserves using a modified Heller's model based on the principles of inventory management. Employing pooled time series for the period 1971-1975 for twenty-two countries, they concluded that the estimated elasticities were close to their theoretical predictions.

In their study, Flood and Marion (2002) confirmed the applicability of the buffer stock model in the modern regime of floating exchange rate as it was during the Bretton Woods era. They submitted that with greater exchange rate flexibility and financial openness, the model will perform better if these variables were well represented.

Disyatat and Mathieson (2001) adopted Frenkel and Jovanovic model for fifteen countries in Asia and Latin America and found that the volatility of the exchange rate is an important determinant of reserves accumulation and that the financial crisis of the late 1990s produced no structural breaks. Abdullateef and Waheed (2010) investigated the impact of change in external reserve positions of Nigeria on domestic investment, inflation rate and exchange rate. Using a combination of ordinary least square (OLS) and vector error correction (VEC) methods, the study observed that change in external reserves in the country only influences foreign direct investment (FDI) and exchange rates and no influence of it was found on domestic investment and inflation rates.

Charles Anyaogu (2012) analysed time series data on external reserves and macroeconomic variables in Nigeria. The study employed econometric tools of VAR and Wald tests which pointed that past values of gross domestic product were significant in explaining the current values of foreign reserves. The model revealed that external reserve was statistically significant in the current year but statistically insignificant in previous years; while among the macroeconomic variables only inflation was significant to external reserves while trade balance and exchange rate where insignificant.

Osigwe, Okechukwu and Onoja (2015) modelled the determinants of Foreign Reserves in Nigeria. Using the Johansen cointegration approach established a long run relationship among the determinant variables. The results of the study indicated that real gross domestic product and oil exports are

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positive and significant determinants of foreign reserve in Nigeria. Exchange rate was found to be a significant but negative determinant while foreign direct inflows positively and significantly determined foreign reserve. Lending rate was discovered to be negative and insignificant as well as the coefficient of inflation rate. However, the coefficient of non-oil exports, though positive, was not significant a determinant of foreign reserve.

Ekesiobi *et al.* (2016) investigates the relationship between the non-oil exports and foreign reserves in Nigeria. The estimation technique follows through the Ordinary Least Squares (OLS), unit root tests, cointegration tests and ends with an error correction framework. The empirical results show that there exists a long run relationship between the variables under study. The results also found evidence of stability of both long run and short run foreign reserves during the investigated period. Although, a positive relationship exists between the non-oil exports and foreign reserves, this relationship is weak in Nigeria. This means that a non-oil export plays no significant part in determining the level of foreign reserves in Nigeria. However, the findings show a strong positive relationship between oil exports and foreign reserves in Nigeria. This implies that oil exports remain the major determinant of foreign reserves in Nigeria, making the economy vulnerable to oil market shocks. Based on these findings, the study therefore recommends an economic revamp of the decaying non-oil sector of the economy through a committed diversification policy.

Yin-Wong and Hiro (2006) conducted comprehensive cross-country study on the determinants of international reserves between 1975 and 2004. The study used data from more than 100 economies, including both developed and developing economies, to examine the effects on international reserves holding of three groups of determinants, comprising traditional macro variables, financial variables, and institutional variables.. The estimation results show that the explanatory power of the determinants changes across different time periods and also vary between developed and developing economies. The compositions of the significant determinants within each one of the three groups of explanatory variables also displayed substantial variations across subsample periods and country groups. The behavior of crisis-inflicted economies can be identified only in some cases but not uniformly. The results also suggest that, compared with a developing economy, a developed economy tends to hold a lower level of international reserves.

Khan, Ahmed & Kazmi (2005) explored the main determinants of reserves holding in Pakistan and also attempted to find the implications of the autonomy of State Bank of Pakistan for the traditional reserves demand theory. Specifically, the study estimates the long run cointegration relationship between reserves variable and other determinants such as balance of payments variability, money market rate, the average propensity to import, the level of imports and workers' remittances using quarterly data over the period 1982:1-2003:2. The study finds that there exists a stable long run reserve demand function in case of Pakistan. The estimated cointegrating relationship shows that all variables except remittances are significant. The variations in balance of payments and imports have positive relationship while money market rate has a negative impact on international reserves.

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MATERIALS AND METHOD

Nature and Source of Data

The study employs secondary sources of data from Central Bank of Nigeria Statistical Bulletin (2018) and World Bank for the years 1981 to 2015.

Model Specification

Given the critical role exports play in enhancing foreign reserve accumulation, this paper specified a functional nexus between foreign exchange reserve as dependent variable and export and foreign aid as independent variables thus:

$$FEXR = f(OEX, NOEX, FA) \quad (1)$$

Where:

OEX = Oil Exports
NOEX = Non-oil Exports
FA = Foreign aid

Therefore, equation (1) is transformed into econometrics form as follows:

$$FEXR = b_0 + b_1 OEX + b_2 NOEX + b_3 FA + u_t \quad (2)$$

Where

u_t =random variable
b_0 = constant parameter
b_1, b_2 & b_3 = estimated parameters of the independent variable
A priori expectation: $b_1 > 0$, $b_2 > 0$, and $b_3 > 0$

Data Analysis Technique

The paper employs the unit root test, cointegration test and error correction techniques. The aim of the cointegration analysis is to establish long run equilibrium relationship between variables. Co-integration ensures that the instability and anomaly usually arising from the characteristics of the time series data employed in the study are corrected. The Johansen methodology was preferred for this study because it has the advantage amongst others of allowing for more than one co-integrating vector. The error correction model (ECM) represent an alternative way of presenting long run equilibrium relationship between variables. It shows the dynamic error analysis of the cointegrated variables. As such, in this paper, the first step to the ECM analysis is the estimation of the cointegration equation. The ECM specification is provided as:

Δlog FEXR= $b_0 + b_1 \Delta log$ NOEX + $b_2 \Delta log$ OEX + $b_3 \Delta log$ FA + $\pi ECT_{t-1} + u$

$$\Delta \log FEXR = b_0 + \sum_{i=1}^{m} b_1 \Delta \log FEXR_{t-i} + \sum_{i=1}^{m} b_2 \Delta \log NOEX_{t-i} + \sum_{i=1}^{m} b_3 \Delta \log OEX_{t-i} + \sum_{i=1}^{m} b_4 \Delta \log FA_{t-i}$$

$$+ \quad \psi ECT_{t-1} + \lambda_{1t} \quad (3)$$

Where: Δ is the difference operator, ECT is the error correction term lagged for one period, ψ = estimate of speed of adjustment, U is the error term. The estimate of the error correction term in the equation represents the speed of adjustment from one period to another.

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Variable Description

Foreign Exchange Reserve: Foreign exchange reserves are the foreign currencies held by a country's central bank. They are also called foreign currency reserves or foreign reserves. There are seven reasons why banks hold reserves. The most important reason is to manage their currencies' values.

Foreign Aid: Foreign aid is money that one country voluntarily transfers to another, which can take the form of a gift, a grant or a loan. In the United States, the term usually refers only to military and economic assistance the federal government provides to other governments. Broader definitions of aid include money transferred across borders by religious organizations, nongovernment organizations (NGOs) and foundations.

Non-oil Exports: Non-oil sector comprises those groups of economic activities which are outside the petroleum and gas industry or those not directly linked to them. It consists of sectors such as manufacturing, agriculture, telecommunication, service, finance, tourism, real estate, construction and health sectors. Non-oil (mostly agricultural) products such as groundnuts, palm kernel, palm oil, cocoa, rubber, cotton, coffee, beans, hides, skin and cattle dominated Nigeria's export trade in the 1960s. But the discovery of crude oil in commercial quantity shifted the attention from non-oil export to a "petroleum mono-cultural economy" since the 1970s.

Oil Exports: These are mainly crude oil and its products that are refined and sold to other countries such as petroleum, diesel, liquefied gas, and kerosene and aviation fuel. Nigeria is one of the countries in the world that export oil since the 1970s when it was discovered and it is the major product we export, neglecting other sector's products. As a result of it being the major exported product of the country, it has resulted to the economy being a mono-economy.

RESULTS AND DISCUSSION

Descriptive Statistics

The results of the descriptive statistics are summarized in table 4.1.

Table 4.1: Descriptive statistics of the variables

	FEXR	FA	NOEX	OEX
Mean	1.77E+10	1.32E+09	225.3657	4057.037
Median	7.57E+09	2.88E+08	28.00000	1286.200
Maximum	5.36E+10	1.14E+10	1130.200	14323.20
Minimum	9.33E+08	31710000	0.200000	7.200000
Std. Dev.	1.82E+10	2.22E+09	343.9401	4893.700
Jarque-Bera	4.589433	235.1120	10.90496	5.411297
Probability	0.100790	0.000000	0.004286	0.066827
Observations	35	35	35	35

Source: Author's Computation 2019 using E-views 9.0

The descriptive statistics in the table above shows that all the variables are divergent from their respective mean values. This is because the standard deviations are greater than their corresponding

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mean values. Thus, it is an indication that the series varied overtime. Furthermore, the probability values of the Jarque-Bera statistics reveal that foreign reserve and non-oil exports are normally distributed whereas international aid and non-oil exports are not normally distributed at 5 percent level of significance.

Unit Root Test

The study deployed Augmented Dickey-Fuller (ADF) test to examine the stationarity of the time series and test the null hypothesis of unit root. The test is carried out at levels and first difference using t-statistic at 5 percent level of significance. The tests results are reported in table 4.2.

Table 4.2 Augmented Dickey-Fuller Unit Root Test Results

Variables	ADF	Critical Values	Order of Integration
FEXR	-4.340832	-3.544284	I(0)
NOEX	5.090963	-3.580623	I(1)
OEX	-5.617006	-3.557759	I(1)
FA	-3.731637	-3.540328	I(0)

Source: Author's computation using e-views 9.0

From table 4.2 shows the unit root results of each of the variables. It was observed that foreign reserve and foreign aid are stationary at levels. Thus, they do not contain unit and as such are integrated of order zero I(0). Additionally, the first difference test result indicates that oil and non-oil exports are stationary at first difference. Thus, they are integrated of order one I(1). From the results, it is found that the variables are mixed integrated.

Co-integration Test

The Johansen system of maximum likelihood cointegration test is applied in this study. The results are summarized in table 4.3.

Table 4.3. Johansen Cointegration Test Results

Trace Test k = 2				Maximum Eigenvalues Test k = 2			
H_0	H_A	(λ trace)	Critical Values (5%)	H_0	H_A	(λ Max)	Critical Values (5%)
$r \leq 0$	$r > 0$	48.03900*	47.85613	$r \leq 0$	$r > 0$	29.83125*	27.58434
$r \leq 1$	$r > 1$	18.20775	29.79707	$r \leq 1$	$r > 1$	11.87132	21.13162
$r \leq 2$	$r > 2$	6.336428	15.49471	$r \leq 2$	$r > 2$	5.412066	14.26460
$r \leq 3$	$r > 3$	0.924362	3.841466	$r \leq 3$	$r > 3$	0.924362	3.841466

Note: *r represents number of co-integrating vectors and k represents the number of lags in the unrestricted VAR model. * denotes rejection of null hypothesis at the 5% (1%) level.*

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Source: Author's Computation (2019) using e-views 9.0

The cointegration test in table 4.3 was performed at 5 percent level of significance. The trace test results show evidence of one co-integrating vector at 5 percent level of significance. It was further observed from the maximum eigenvalue test results that only one cointegrating equation exists in the model. In view of the findings, the null hypothesis of no cointegration is rejected. Hence, the variables have long run relationship and can be expressed as error correction mechanism in accordance with the postulation of Engle & Granger (1987).

Error Correction Model

The error correction model was estimated to capture the dynamic behaviour of the regressors. The parsimonious ECM is reported in table 4.4.

Dependent Variable: DLOG(FEXR)				
Method: Least Squares				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
DLOG(FEXR(-1))	0.290951	0.188483	1.543644	0.1384
DLOG(FA(-1))	0.173773	0.110084	1.578551	0.1301
DLOG(FA(-3))	0.206196	0.114386	1.802643	0.0865
DLOG(OEX)	0.272512	0.175615	1.551759	0.1364
DLOG(OEX(-1))	0.400153	0.200313	-1.997635	0.0595
DLOG(OEX(-2))	0.366542	0.164460	-2.228762	0.0375
DLOG(NOEX)	-0.212638	0.154016	-1.380621	0.1826
DLOG(NOEX(-1))	0.499054	0.161756	3.085221	0.0058
DLOG(NOEX(-2))	0.154412	0.160048	0.964785	0.3462
ECT(-1)	-0.509943	0.150965	-3.377881	0.0030
C	-0.010852	0.092892	-0.116826	0.9082
R-squared	0.657156	Mean dependent var		0.100071
Adjusted R-squared	0.485734	S.D. dependent var		0.452755
S.E. of regression	0.324681	Akaike info criterion		0.859477
Sum squared resid	2.108358	Schwarz criterion		1.368311
Log likelihood	-2.321891	Hannan-Quinn criter.		1.025344
F-statistic	3.833561	Durbin-Watson stat		2.301535
Prob(F-statistic)	0.005096			

Source: Author's computation using e-views 9.0

It was observed from the parsimonious ECM that lagged values of oil exports impact positively on foreign reserve holding. 1 percent increase in lag two of oil exports leads to 0.367 percent in the external reserve. This indicates that oil exports help in boosting the foreign reserve. Similarly, the first lag of non-oil exports is positively linked to external reserve. With 1 percent increase in non-oil exports, international reserve increases by 0.499 percent. However, foreign aid does not significantly impact on foreign reserve. This could be traced to the fungibility of aid that is prevalent in low income

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countries including Nigeria. The error correction estimate (-0.5099) indicates that the model is well behaved as any short run disequilibrium in the system is reconciled at the speed of 50.9 percent to achieve long run equilibrium position. The coefficient of determination indicates that 65.7 percent variations in external reserve are due to joint changes in the explanatory variables. Additionally, it was found from the probability value of the F-statistic that the overall is highly significant. This shows that the regressors are collectively important influencing changes in external reserve holding.

Post Estimation tests

The post-estimation tests focused mainly on the residual diagnostics tests. The results are summarized in table 4.5

Table 4.5. Post Estimation Test Results

Test Type	F-stat.	Prob.
Breusch-Pagan Heteroskedasticity Test	7.808676	0.6475
Breusch-Godfrey Serial Correlation LM Test	3.999708	0.1354

Source: Author's computation using e-views 9.0 (2019).

The results of the diagnostic test showed that the model does not have a serial correlation problem and is free of heteroscedasticity. Thus, the null hypothesis of no serial correlation and homoscedasticity are accepted. It therefore, follows that the residuals are serially independent and have constant variance. The implication of these findings is that the model is welcoming for long term prediction.

CONCLUSION

The role of exports in boosting external reserve accumulation cannot be overemphasized. In line with the growing recognition of exports-foreign reserve nexus, this paper offer more insights into the impact of exports on international reserve build-up. The findings revealed that both oil and non-oil exports exert significant positive impact on international reserve. The implication of these findings is that the hypothesis that exports buffer external reserve holds sway in Nigeria. However, foreign aid does not significantly affect foreign reserve accumulation over the study sample. This could be linked to the ineffectiveness of aid that is triggered by systemic corruption, allocation of aid to non-productive sectors and poor institutional quality. On the basis of the findings, it is concluded that exports are helpful in boosting the foreign reserve holding in Nigeria. Thus, this paper recommends for the diversification of the export base in order to keep the foreign reserve holding on the path of rapid and sustainable growth.

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