# Measuring the Effect of Foreign Exchange Policy on the Export of Crude Oil – Evidence from Nigeria

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#### Abstract

The study assesses the impact of foreign exchange policy on crude oil exports in Nigeria between 2007 and 2016. The paper dwelt on issues of foreign currency positions of successive Nigerian government in a mono-cultural economy. There was also a review of past work done by previous scholars in the area. In the process of developing of the model the first step is to identify the linear regression model requiring the inclusion of the dependent and independent variable and the attendant coefficient weights identified by using statistical method called Ordinary Least Squares (OLS). After analyzing the data using unit root test, granger causality test and the least square NLS ARMA methods the findings indicated that most of the crude oil variable changes could not be explained by the foreign exchange regimes for the period in question as the R2 and adjusted R2 was 28.6% and 19.7%. However this does not suggest that model hasn't the right goodness of fit when one considers that the AIC (22.89310), or Schwarz criterion (22.95362), shows that the difference between the two as being very negligible, an indicator of a near perfect model convergence near zero. The smaller they are the better the fit of your model is (from a statistical perspective) as they reflect a trade-off between the lack of fit and the number of parameters in the model. The conclusion was that devaluation did nothing increase Nigeria's exports and foreign exchange earnings in any case. Just recently in 2016, the monetary authorities pegged the official rate at 35% stronger than the black market rate. The policies sparked capital flight and hindered foreign investment flows. As a result of currency pegging and restrictions on foreign exchange market, a lot of speculative and precautionary demand was created as exporters and investors held on to already scarce dollar and naturally would be unwilling to sell at the rate it was officially pegged thereby causing a wider gap between the official rate and the black market rate. Furthermore, the country's foreign reserves by the first quarter of 2016 were not sufficient to keep the exchange rate at its official market level.

Among recommendations to policy is that the government should understand the importance of a lower inflation rate and low rate of unemployment and the global market conditions before considering devaluation of the local currency. The monetary authorities should cease and desist from constant manipulation of the cash reserve ratio and monetary policy rate but allow the markets to dictate the trend. This does not mean that the CBN should forgo their role of intervention where there is a red flag, but be innovative in merging theory with reality in their policy implementation even if it requires legislation.

Keywords: Measuring, effect, foreign exchange policy, export and crude oil

### **1.0 Introduction**

Because of the fact that Nigeria's oil export earnings constituted as much as 85% of the entire export earnings foreign exchange policies were determined in consonance with its impact on crude oil earnings. The Nigerian central monetary authority (CBN) since it's formation has been in-charge of articulating foreign policy as well as other macro-economic policies. The oil industry in Nigeria by the late 1970s accounted for 90% of the national income therefore most of the fixed investment hence the lop-sided concentration of capital in the sector. Not unlike other oil producing nations, Nigeria's growth of money supply has been consistent with the role of oil export earnings over the years to the neglect of other non –oil sectors. The public sector's contribution to the growth of money supply has been through domestic spending by the government at all tiers. Through the monetization of foreign exchange by the government the money supply expands further.

Because of the depreciation of the naira in the early 1980s occasioned by the oil glut, the countries export earnings and national income plummeted. At this point the elasticity of demand for crude oil by importing countries was also influenced by the restrictions by OPEC. The trends in exchange rate policies over the years have been many. In the 1960s there was parity with the pound, by the early 1970s with the internationalization of the dollar Nigeria's foreign exchange orientation changed. Towards 1985/1986 the Nigeria's monetary authorities took steps in adopting a more flexible foreign exchange regime through the enactment of the  $2^{nd}$  – tier foreign exchange an off-shoot of the Structural Adjustment Programme (SAP) at the time. The objectives of this policy were to achieve a realistic and sustainable exchange rate for the naira through the market mechanism of demand and supply thereby reducing wasteful utilization of foreign exchange. This was also aimed at reducing administrative bottlenecks and distortions in the operations of foreign exchange while enhancing revenue from crude oil proceeds according to Umoh (1989).

Ebong (1989) further confirmed that despite the market arrangement under Foreign Exchange market (FEM) and then Inter Bank Foreign Market (IFEM) THE Exchange value of naira was continuously depreciating. The SFEM alternatively embarked on a two exchange rate method which applied to the two foreign exchange market in an attempt to maintain the exchange rate value of the naira. The proceeds from the first exchange rate were utilized in servicing internal and external debts payment of subscription to international Organizations and settlement of transaction for which letters of credit were involved. The proceeds from the second rate were for domestic use. Banks were the major participants. Hence the second rate applied to the banks. Distinctively Banks were classified into big and small banks. The allocation of Foreign exchange however became inefficient because situations arose in which authorized dealer (or the big banks) tried to overbid exchange to the detriment of the small banks thereby causing excessive depreciation of the naira.

To save the market from total collapse marginal rate system of foreign exchange allocation was opted for the authorities concerned. But this system only encouraged price fluctuation from one bidding session to another. Subsequently, the Central Bank intervened the market was now under the independence control of the apex bank. It became apparent that the marginal rate system of foreign exchange allocation was no longer effective. This led to the introduction of the Dutch Auction System (DAS) In April 1987. The Dutch Auction System (DAS) initiated the settlement bids which had not actual demand bearing. The exchange rate system came under severe criticisms by foreign exchange market participants and financial analysis for instance Umoh (1988) argued that the (DAS) generated too many exchange rates

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from one bidding session to another even though these sessions were successful. There was a serious divergence among rate which financial observers saw as a negation of the primary objective of SFEM which -is to achieve a realistic and sustainable exchange rate value for the naira. Thus a wide difference existed between FEM and the autonomous foreign exchange market for instance in April 1988, the rate widened prospensively from 38.0 percent in April 1989. To reduce the difference which existed between the two markets, the market were merged on January 1989 to form the Inter-bank Foreign Exchange Market (IFEM) under IFEM exchange rate was autonomously determined by the CBN

Light monetary policy measures were being adopted to ensure that the relative stable exchange rate value for the naira is realized. In spite this; the naira has continued to suffer acute depreciation year after year.

### **1.2 Statement of research problem**

It is generally accepted by different economic schools of thought that one critical factor in determining currency value is a nation's balance of payment position. Nwinee (1999) opined that The balances of payment position of a particular country influence the rate which its currency is exchanged with others. If the trends position in the balance of payment account is unfavorable which implies that the country is spending more that is receives. The exchange rate of such currency is weakened and vice versa. The problem here is that the foreign exchange regime over the years which has been hinged on depreciation of the naira mainly has done little to positively impact on our earnings. By devaluing the naira, the Nigerian monetary authorities unwittingly triggered off a domestic monetary crisis. This opened the door to an economic chain reaction as import and domestic prices rose fuelling further speculations of further rise hence increasing hoarding and more import with the attendant exacerbating effect on the country's reserves. The devaluation of the naira did not in any way help in curbing the demand of imported items nor increases the nation's oil export and foreign exchange earnings because of the inelasticity of Nigeria's export products and cartel - tied prices. Where the nation's export products elastic at the time, devaluation would alter the exchange rate between the devaluing currency and the currencies of the rest of the world which did not devalue at the time. But time and time again Nigerian monetary authorities have treated devaluation in isolation of the aforementioned foreign exchange dynamics.

### 1.3 Statement of research objective

The objective of this research is to determine the impact of exchange rate policy on Nigeria's crude oil earnings

### **1.4 Statement of research hypotheses**

**H**[**a**]: The exchange rate policy has no significant impact on the Country's crude oil exports earnings

**H[b]:** The exchange rate policy has significant impact on the Country's crude oil exports earnings

### 2.0 Review of related literature

There has no standard or acceptable definition of exchange rate. A lot of scholars have defined exchange rate to mean what they believe. Ndugbu (2001) defined exchange rate as the price of one currency in terms of other currency. It therefore denotes the numerical value of the domestic currency of one country at any given time in relation to those countries with which the country in trade like. Ojugbe (2002) believes that Exchange rate are not only the prices at which different national currency units are exchanged, they are also the converters

or translators of the prices of goods and services stated in the domestic currencies of other countries. Obioma (2006) explains that the short term rate of Exchange is determined by the supply of and demand for foreign exchange in the foreign exchange market. The long term equilibrium foreign exchange rate is determined differently under different monetary system. Exchange rate is the domestic currency that wills purchases a unit of a foreign currency. This definition brings into contact two nations with sovereign national currencies in focus stressing that exchange rate determination is the inter play of their domestic currencies. The importance of exchange rate its in the fact that is the price that determines all other prices in the domestic economic of any nation. Based on this it provides a signal of local industries on what to produce and how to determine the prices of such products. Movements in the exchange rate are known to have ripple effects on other economic variable such as interest rate. Inflation rate, unemployment, money supply etc. this fact underscores the important of the exchange rate to the economic well being of every country that opens. Its doors to international trade in goods and services.

The main objective of a country's exchange rate policy is to have a stable and realistic exchange rate that is in consonance with other macro-economic fundamentals. This because exchange rate instability can have serious adverse consequences. On prices investments and international trade decision, Ndugbu (2001). In most economies of that is they exchange rate to attain free market equilibrium level without movement intervention. In some other economies the exchange rate may administratively determined in which the rate is fixed by fiat to one or more convertible currencies without due regard to the appropriate market value. Traditional, exchange rate can be determined by the purchasing power parity theory (PPT). the theory according to Artus (1978) is defined to mean either the country's price level ration to the reciprocal of the absolute PPT or the ratio of the product of the exchange rate in the based period to the reciprocal of the absolute PPP. In the PPP theory, the determination of exchange rate is a function of the demand for the foreign country. In the case is affected by international inflation. Thus is the deferential in rates of inflation between countries. Exchange rate can also be determined through the conventional demand and supply theory of foreign currencies that is (market forces). This implies a. free enterprise economic system. To explain this mechanism let us assume a two country exchange rate model but that is Nigeria and the United States. And that Nigeria only demand for dollars. When goods and services are from the United States. Similarly the demand for dollar arises only when United States residents seek goods service from Nigeria.

An exchange rate policy is that policy which provides the framework that determines, regulates and control the flow of foreign exchange in the country.

Generally, the objectives of exchange rate policy can be equated to economic policies. This is particularly so in developing countries whose economic are import dependent. Nigeria, the objectives of her Exchange rate include:

- **I.** The achievement of available balance of payment position which implies sustainable current /position.
- **II.** To improve the external reserves of the country that is maintaining of a stable exchange value for the naira.
- **III.**Reduction of dependence on importation and export. This implies a diversification of the nation's export base.
- **IV.** Reduction or elimination of the incidence of capital flight.
- **V.** Encouraging the local production of input or raw material needed by the industries thus reducing their procurement abroad.

**VI.**Reducing or eliminating the parallel market activities thereby improving resource allocation and enlarge the scope of legitimate foreign exchange transactions.

#### **Trends of Exchange Rate Policies in Nigeria Parity with Pounds (1960-1967)**

This was one of the foremost exchange rate policies adopted by Nigeria shortly after she gained independence. The British government played a significant role in the nation's exchange rate policy formulation and implementation. Thus, the country's exchange rate maintained parity with the British pounds sterling. When the country became a member of the international Monetary Fund (IMF) in March 1967, a par value for the Nigerian pound to British pound sterling was delayed. This was US \$20.80. This period lasted till November (1972) when the British pound was devalued by 14.3 percent. Nigeria however did not devalue her own currency because the decision according to OWOLABI (1972) was based on the fact that any hasty devaluation would not be the best interest of the Nigerian economy which had not made any significant impact of the lives of its citizenry.

### The Gold Content Approach (1967-1970)

According to Nwinee (1999) the Gold Content Approach emphasized the use of Gold to measure the value of the nation's currency. This was the Gold Bullion standard was still in operation Rates then were fixed by government on the quantities of grams of gold and the worth of such gold was equated with the nation's domestic currency. However, if cross rate were to be determined, the quantities of grams of gold will have to first equate the value of the dollar and then the dollar to the Nigeria pound.

The challenge of the Nigerian pounds to the naira in 1973 led to the drastic reduction of the gold value of the domestic currency from 2.48824 per gram of gold to 1.4414 per gram of gold. Subsequently, the exchange rate of the naira to the dollar and the pounds was fixed at the rate of the naira to the dollar and the pound was fixed at the rate of US \$1.5200 and \$0.5833 respectively.

## **The Dollar Peg (1971-1974)**

It was during this period that the country witnessed an official change of its currency from pound to naira which was now pegged to the dollar.

No sooner had the change from pound naira took place that the dollar began to decline in value in the International currency market. One of the factors responsible was the upward appreciation of other countries which began to acquire International recognition; one of this was the Japanese yen. The naira was therefore devalued by 10 percent in solidarity with the American Dollar, which had suffered serious depreciation during this period. Conversely, the naira began to encounter its own problems. In the first quarter of 1974 the Nigerian economy experienced inflation. This was as a result of the devaluation earl embarked upon. Thus as the politics of the international community intensified and began to complicate exchange rate management coupled with persistent floating of major international currencies the country discontinued the policy of fixing exchange rate value of the naira to the dollar. This was in April 1974.

### Pegging Against a Basket of Currencies (1974-1978)

After the dollar peg policy failed to provide the country whit a viable solution to her exchange rate problem. The naira become independently determined even up till the earlier part of 1976, fortunately, the naira for the gained some appreciation thereby encouraging

excessive import. The consequence was of course, the draining of the country's accumulated external reserves. The government therefore operated for the pegging of its exchange rate value of the naira against as basket currencies. The currencies were Deutschemark French franc, Japanese yen Swiss, franc and the Canadian dollar.

#### Import-Weighed Basket and the Colombian

Towards the later of 1970, the country continued in her bid for a realistic exchange rate value for the naira, precisely, in November, 1978 the import weighted basket Approach, a method similar to the IMF's standard basket method of special drawing Right (SDR) was adopted. The approach only recognized the existence recognized the existence of five major international currencies namely the US Dollar, British pounds sterling, Japanese yen, French franc and the German deutsche mark. This weight were attached to these country, this weights were attached to these countries in respect to their proportions in NIGERIA'S 1976 total imports.

### The Crawling Peg (1984-1986)

The government decide to discontinue the import weighted basket waited approach because of some observed setbacks prominent among these setbacks was fall in Nigeria's total import due to the growing inflationary trends in the Second tier foreign exchange market (SFEM) is the off short of SAP. The reason behind the introduction of SFEM lies in the fact the method of fixing exchange tare value of the naira by administrative fiat was clearly defective and the authorities saw the need to develop an institutional framework which will direct the country's exchange rate policy towards achieving its objectives.

### **Objectives of Sfem**

- **I.** Achieving a realistic and sustainable exchange rate value for the naira through the market mechanism of demand and supply.
- **II.** Restructuring the nation's foreign exchange resource allocation system thereby reducing wasteful utilization of foreign exchange.
- **III.** Deregulation and liberalization of exchange and trade controls thereby removing distortion and administrative bottlenecks on the operations of foreign exchange.
- **IV.** Enhance government revenue from crude oil proceeds (Odoli 1989). Unoh (1989) stated that the second tier Foreign Exchange market commenced operation on the 26<sup>th</sup> of September 1986. Market operations then were mostly weekly in which the foreign exchange available (usually \$50-80 million) for that week are auctioned to authorized foreign exchange dealers who have submitted successful bids.

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#### **Operations of Bureau De Change and Black Market in Nigeria**

Bureau De change are business firms that are officially licensed by the central bank of Nigeria (CBN) to deal in the purchase and sales of foreign exchange. The essence of Bureau de change is to fill the vacuum between the Autonomous foreign Exchange market and the interbank foreign exchange market since these foreign exchange 'markets only carter for the needs of institutional customers of foreign exchange outlets. Their foreign exchange transactions are usually on "cash and carry" basis and does not necessarily requires this disclosure of the source of individual selling of the foreign currencies. The spread between the buying and selling rates as mandated by the CBN is 2 percent. However, this is subject to adjustment from time to time as may be determine by the apex bank.

After some months of operation Bureau de change in Nigeria, the operators of these exchange rates outlets made challenging demands to the government which according to Ogunlowo (1989) amounted to a breach of agreement between the bureau de change operators and the government Ogunlowo 1989 reported: that

The Association of Bureau de change operator in Nigeria have presented demands which in nature scope and interest are rather disgusting and spells doom for exchange market. They are demanding among others that government should give them permission to sell travelers cheque other than just encasing them government should allow them operate foreign accounts like the conventional banks, government should relax its intense scrutiny on them and that government should deregulate the one percent profit margin allowed them. Already before this time operations of bureau de change in the foreign exchange market was becoming uncontrollable Bureau de operators have been violating some of the rules guiding their operators. For instance when they buy foreign currencies from the public, they hoard this currencies only to resell them to black market operator so as to make profit.

Thus, they were indirectly contributing to the depreciation of the exchange rate value

of naira. For this reason and many more the government has since terminated their operation in Nigeria.

#### Parallel Market (Black Market)

This is illegal market for the purchase and sale of foreign currencies and the operators are authorized persons who engaged in foreign currency dealings. The evolution of this foreign exchange market was as a result of the fall out in the regime of foreign exchange control and perhaps from the era of import licensing. It became obvious that at a point the government was not able to regulate foreign exchange transactions. This was eminent in the variations in exchange rate policies adopted by the country from one fiscal year to another. Here black marketing emerged.

Foreign exchange operation in the black market come to lime light in the late 80s when the cause of fluctuation in the exchange rate value of the naira was traced to the existence of some unscrupulous elements who traded illegally on foreign exchange. There is no specific market which these individual buy and sell foreign currencies. They hand out in major hotels and large cities all over the country, for example Presidential hotel in Port-Harcourt, Eko Maridean in Lagos etc.

Nevertheless, the government has since promulgated a law abolishing the activities of black market, yet this market unlike Bureau de change have continued to strive in Nigeria.

### Factors Affecting Exchange Rate Management in Nigeria

Nwinee (1999) identified four factors that are affecting exchange rate management in the country, they are discussed below

- I. Change in Parities: By change in parities we mean change in the unit of currency of the country with another country's unit of currency, for instance \$1 Dollar equals to #151 constant change in currency parity have affected exchange rate management. There is instability in parities between the domestic currency and other currencies. The foreign exchange policy formulators would have strived to maintain a certain range of parties between the local currencies and its international counter parts pay the dollar and the pound sterling over a reasonable period of time.
- **II. Import Surplus:** One of the fundamental rules about foreign exchange is that the subject should be the trends in international trade. An occurrence of import surplus in an indication of a weak domestic currency while the occurrence of export surplus is an indication of strong domestic currency. Nigeria situation is such that its' imports is in excess over its exports. This is due to the import dependent nature of the country's economy. Thus the exchange rate value of the naira is influenced by external control and manipulations.
- **III.Government over Spending Abroad:** Nigeria is one of the leading African Nation that mostly embarks on the disbursement of grants and aids to other countries. This is done without taking into consideration the stock of her external reserves which is continuously draining.
- **IV. Political Cause:** This does not affect foreign exchange directly, it is a well known fact that unsatisfactory and unstable political atmosphere in Nigeria have been known to accentuate foreign exchange fluctuation. Frequent change in government would mean frequent change in its policies with respect to foreign exchange.

### Impact of Foreign Exchange Fluctuation on Some Indicators of Economic Growth

**I. Gross National Product:** Specially GNP is defined as the total market value of all final goods and services produced in an economy during a given period says one year(Gbosi:1995)

GNP represents aggregate demand of the economy in monetary terms. Essentially aggregate demand in the Nigerian economy through GNP has increased in the last decade but not back up by effective demand. This is because the value of the naira has depreciated to the extent that it lacks effective purchasing power within the domestic economy.

**II. Balance of Payment (Bop)** The introduction of the structural adjustment program (SAP) in the Nigerian economy necessitated the adoption of a floating exchange rate policy where market forces are prevalent. In spite of this disequilibrium in the balance of payment has persisted. The nature of disequilibrium is a negative one. This means that new payment goes to other countries.

Disequilibrium in the Nigerian context occur as a response to changes in oil earnings and fill in export earnings. The demand for Nigeria's crude oil is increasing even though the market solution to fundamental disequilibrium in the BOP is devaluation. It may only be desirable at the point of introduction and once the disequilibrium is corrected, devaluation should be de-emphasized. But the exchange rate value of the naira has continued to depreciate thereby leading to the occurrence of a defeat in BOP.

### **Re-Introduction of the Flexible Foreign Exchange Regime in 2016**

The Central Bank of Nigeria (CBN) recently introduced a new foreign exchange (FX) regime and guidelines for the operations of the market-driven exchange rate for the Naira. The more flexible new foreign exchange regime replaces the de-facto fixed exchange rate regime, which officially pegged the nation's currency at a rate of N197 to the one U.S. dollar while the volatile parallel market rate reached as high as over N370 to the dollar. The actual rate of the naira would actually determine the reaction of foreign portfolio investors and conversely the value of the naira.

The greater flexible foreign exchange regime as announced by the Governor of the Central Bank, Godwin Emefiele has some positive features and attributes. The interbank market shall be the only official foreign exchange market in Nigeria. The determination of the currency rates shall be market-driven, although the Central Bank of Nigeria shall intervene in the market as need arises. The flexible foreign exchange regime further introduces long tenured foreign exchange forwards, which must be trade-backed with no pre-determined spreads, and bespoke over-the-counter foreign exchange futures.

Non-oil exporters would now have unrestricted access to exports proceeds via the interbank market. Previously, non-oil exporters had to grapple with surrendering their export proceeds at the official peg rate, while sourcing foreign exchange for some of their imports via the parallel market. Also, foreign portfolio investment is to be settled at daily inter-bank rate.

While the new foreign exchange regime should be welcome, there are matters arising from its operationalization as well as its attendant effects on the economy at large. Some selected banks were first envisaged to serve as primary foreign exchange dealers with large transactions of U.S.\$10 million, with no predetermined spread on transactions. It was initially projected that four large banks would meet outright the three criteria of minimum assets of

N200 billion, foreign exchange transactions of N400 billion, and liquidity ratio of 40 per cent. Additionally, two banks may meet two of the criteria.

In this context, a new flexible regime that is expected to foster competitive foreign exchange pricing would have ended up combining features of oligopsony, few buyers, with monopoly attributes as the central bank remains the dominant supplier of oil exports foreign exchange earnings. This naturally would have raised the issue of foreign exchange price-fixing cartel, collusion, and lack of transparency. It may also have sent the wrong signal that the non-primary dealing banks are not as healthy as the primary dealing banks. It is a welcome development, therefore, that reason prevailed and the system has now been opened up for participation by all the banks.

With greater flexibility, Nigerians should brace for more naira volatility. In the immediate and short term, the naira is likely to witness a sharp depreciation estimated at close to 50 per cent in the inter-bank market to between N270 and N300 in the first few weeks of the operations of the flexible regime. The gaps between the official interbank and parallel market rates should thereby narrow and discourage rent-seeking by those who divert foreign exchange from the official window to the parallel market. The parallel market may appreciate, but the appreciation would be checked by the fact that foreign exchange sourcing for the banned 41 items would remain active. The 41 banned items would not have access to the interbank foreign exchange market.

Over the medium term, it is expected that the official naira rate against the dollar should strengthen from the initial sharp depreciation as more foreign exchange proceeds from nonoil exports currently at about \$6 billion, diaspora remittances of \$22 billion, and foreign direct investments pass through the interbank market. On the other hand, foreign portfolio investors, although one of the most vocal in demanding for greater flexible exchange regime, are likely to adopt a wait and see attitude, and focus on developments in the global and emerging market economies and finance. As long as global uncertainties around the oil prices, U.S. interest rates, the debate over Britain's confirmed membership of the European Union , and China's economy remains elevated, the attraction of equity and bond securities in emerging markets including Nigeria would remain subdued at best.

In respect of the impact of the new foreign exchange regime on the real economy, the GDP would fall from around \$500 billion to about \$320 billion, threatening the nation's stand as Africa's largest economy. While government revenues should increase as devaluation provides more naira for the same oil export dollar earnings, the fall in projected oil production by more than a quarter would put a dent on these envisaged higher revenues. The government is likely, however, to find more positive reception for borrowing from multilateral sources.

Nigerians should brace up for more pains as the misery indices climb up and purchasing power drops. The inflation rate already at 15.7 per cent is expected to ramp up, with some suggesting close to 20 per cent. Manufacturers would experience higher cost of imported raw materials; and hopefully, would source more local materials. Interest rates are likely to go up as the central bank tries to fight the surge in inflation, further raising credit cost to businesses and household. Hopefully, counter-cyclical measures from the fiscal authorities would assist in ameliorating some of these side effects.

Over the longer term, the impact of greater flexible exchange regime would be mooted if not accompanied by other policy levers, including institutional and fiscal discipline, trade, and structural reforms, to address infrastructural constraints, cost of doing business and productivity, raising non-oil export foreign earnings and reducing import dependency.

Osuji (2015) examined the impact of oil price movements at the nature of causal link between oil prices and exchange rate. His work was similar with those of Oriavwote and Eriemo (2012). Empirical results from his study revealed that oil prices exert a significant effect on exchange rate. In addition, he observed a unidirectional causality running in each case from oil prices to exchange rate and from oil prices to foreign reserves. Osuji (2015) concluded by saying that the factors which influence the movement of oil prices are beyond the control of the Nigerian economic policy makers.

Osuji (2015) had his functional form of our model is stated as Exchange rate = f(Oil price and Imports) and used regression model specified as REER =  $\beta 0 + \beta 10ILP + \beta 2InIMP + \mu$  Where the predictor variables are oil prices (OILP) and the natural logarithm of imports (InIMP), the outcome variable is the natural logarithm of real effective exchange rate (InREER),  $\beta 0$ ,  $\beta 1$ , and  $\beta 2$  are model parameters and  $\mu$  is the model residuals. In investigating causality, he estimates a VAR model. Testing for Granger causality involves estimating a VAR model of the form specified below: Yt =  $\alpha 1 + \delta 1$ Yt-1 + $\delta 2$ Yt-2 +..... + $\delta n$ Yt-n + $\gamma 1$ Xt-1 + $\gamma 2$ Xt-2+..... + $\gamma n$ Xt-n+ $\mu t$  - - - - (1) Xt =  $\alpha 2 + \lambda 1$ Xt-1 + $\lambda 2$ Xt-2 + ..... + $\lambda n$ Xt-n + $\phi 1$ Yt-1 + $\phi 2$ Yt-2+..... + $\phi n$ Yt-n + vt - - - (2) Where Yt and Xt are the variables under observation,  $\alpha 1$  and  $\alpha 2$  are intercepts,  $\delta 1$ ,  $\delta 2$ ,  $\delta n$ ,  $\gamma 1$ ,  $\gamma 2$ ,  $\gamma n$ ,  $\lambda 1$ ,  $\lambda 2$ ,  $\lambda n$ ,  $\phi 1$ ,  $\phi 2$ , and  $\phi n$  are parameters of the system model while  $\mu t$  and vt are system residuals. The model above is only for illustration purposes and our ideal model will comprise a system of three equations to account for the three variables we are investigating. The causality test also involves computing an F-statistic for the joint null hypothesis H0:  $\gamma 1 = \gamma 2 = \gamma n = 0$ .

This is a test that the lagged values of Xt do not Granger because Yt and rejection of this null hypothesis is an indication that Xt Granger causes Yt (Giles, 2011). It is important to emphasize that the Fstatistic will deviate from its supposed asymptotic chi-square distribution under the null if all or some of the causal variables are not stationary according to Brooks (2008) & Giles (2011). Therefore, to avoid misleading inferences, it is necessary to ensure that variables are all stationary.

The importance of oil in the Nigerian economy cannot be over emphasized. From an agrarian economy in the 1960's the Nigerian economy has come to be known and identified as being oil- International Journal of Academic Research in Economics and Management Sciences 2015, Vol. 4, No. 3 ISSN: 2226-3624 13 www.hrmars.com powered, with oil receipts accounting for over 70 percent of federal revenue and over 90 percent of foreign earnings (Ani et al, 2014). This situation comes with its attendant consequences one of which is the exposure of key macroeconomic variables such as inflation rate and exchange rate to oil price fluctuations. Indeed, oil prices have become so important to the Nigerian economy that principal economic policy makers at the CBN and the Federal Ministry of Finance factor them into economic policy decisions. This is due to the inevitable direct impact which oil prices have on the national budget which in turn is an instrument of fiscal policy (Ani et al, 2014). There exists a sizeable volume of literature on the relationship between oil prices on the one hand and exchange rates or other macroeconomic variables on the other. We examine some of the on-going discussions below.

Umar and Abdulhakeem (2010) examined how oil price shocks affect the macro economy using a VAR approach and found that oil price shocks had strong impact on GDP and money supply. In a similar manner, Ayadi, (2005) studied how oil price movements affect the Nigerian economy using vector autoregressive model and found that changes in oil prices affect real exchange rates and industrial production. In addition, Igberaese, (2013) did a study on the impact of oil prices on Nigeria's economic growth and found out that oil prices significantly impacted growth. Specifically, in the short run, high oil prices spurred growth but not in the long run. Also, Muritala et al. (2012) studied how oil and stock prices affect economic growth using Johansen method of cointegration and found that the variables have long-run relationship.

However, as far as oil prices and exchange rates are concerned, there seems to be a general consensus that oil price increases favour oil exporting nations. For example, Ogundipe et al. (2014) highlighted Krugman's (1983) claim that increases in oil prices led to favourable exchange rate movements for oil-dependent economies while at the same time, falling oil prices favored the exchange rates of non oil-dependent economies. Furthermore, Sascha et al.(2012) stated that positive oil price shocks triggered currency appreciation for oil exporters and ultimately increased accumulated foreign reserves. In addition, several other studies report that oil prices strongly impact exchange rate (Englama et al, 2010).Nikbakht, (2009) studied the relationship between oil prices and exchange rate in OPEC countries using Johansen cointegration technique and found evidence in support of a long-run relationship between the variables.

Englama et al. (2010) did a study on the impact of oil prices on exchange rate volatility in Nigeria and found that oil price shocks impacted strongly on exchange rate volatility. Oriavwote and Eriemo, (2012) did another study that examined the relationship between oil prices and real exchange rate in Nigeria. The results not only showed evidence for a long run relationship between oil prices and real exchange rates but also showed a unidirectional causality from oil prices to real exchange rate. In their study, Adeniyi et al (2012) observed that the Nigerian Naira appreciated against the US Dollar in response to increasing oil prices. In addition, they reported that Amano and Van Norden (1998) investigated the causal link between oil prices and exchange rates in the USA, Germany and Japan and found that oil prices caused exchange rates in all three countries to fluctuate. Yoshizaki and Hamori (2013) had reported the observation of Gregorio and Wolf (1994) that the currencies of countries trading commodities responded to movements in the prices of those commodities. International Journal of Academic Research in Economics and Management Sciences 2015, Vol. 4, No. 3 ISSN: 2226-3624 14 www.hrmars.com. They however argued that there could be exceptions to this rule as evidenced by the studies of Habib and Kalamova (2007). Another example of this exception is evidenced by the work of Ani et al. (2014) which examined the nature of causal relationship between four macroeconomic indicators including inflation rate, exchange rate, interest rate and real GDP in Nigeria using ordinary least squares and Granger causality approach. Interestingly, their results show that oil prices have no significant effect on real GDP and exchange rate. In another development, Ogundipe et al. (2014) examined how oil prices affected exchange rate volatility in Nigeria and concluded that changes in oil prices led to more than proportionate changes in exchange rates. Finally, Yusuf, (2015) also conducted a study to investigate the relationship between oil prices, exchange rate and economic growth. The results show that the variables are cointegrated and that oil prices and exchange rate were significant in predicting the economic growth. In theory, changes in oil prices affect exchange rate through a country's terms of trade or through what we call "the wealth effect" in which there is a transfer of wealth from oil exporting nations to oil-importing nations when oil prices fall and vice versa (Sascha et al. 2015).

Also, in practice, oil-exporting nations usually accumulate foreign reserves when oil prices rise and during periods of falling prices, they tend to reduce foreign reserves holdings while trying to manage the depreciation of local currency caused by unfavorable exchange rate movement (Sascha et al. 2015). From our discussion above, it is evident that there exists a substantial amount of literature on the relationship between oil prices and macroeconomic variables especially exchange rate. Some of these studies were done for countries that were already industrialized and are not oil exporters. The uniqueness of this study lies in the fact that it focuses on an oil-exporting economy striving to be industrialized and considers the period after the 2008 economic crisis. In addition, while most empirical studies have focused on modeling the volatility of exchange rate occasioned by oil price shocks, this study examines the causal link between oil prices and exchange rate and the impact of Nigeria's continued dependence on imports as well as its implications for exchange rate management by the monetary authorities. Methodology our study uses monthly time series data of all the variables downloaded from the CBN database.

### **Existing Gap in Literature**

The study attempted to bridge the gap between literature on foreign exchange regime and crude oil exports. In trying to solve problems in measurement of the effect of foreign exchange policy on crude oil exports variables, the research looks at the differences time span as a well as differences in methods by trying to minimize as much as possible the differences between other authors research and this work.

The gap this research covers in literature is to compare previous work done on the subject with the current foreign exchange regime up on till 2016.

#### 3.0 Methodology of research

The methodology of research used the e-views statistical package in carrying out series of tests (including diagnostics). This research adopts the *ex-post facto* research design. In the context of social and educational research the phrase 'after the fact' or 'retrospectively' refers to those studies which investigate possible cause-and-effect relationships by observing an existing condition or state of affairs and searching back in time for plausible causal factors. Secondary data is data which has been collected by individuals or agencies for purposes other than those of our particular research study (Onwumere, 2005). The justification for the use of secondary data in this research is that; it is available and is entirely appropriate and wholly adequate to draw conclusions and answer the question or solve the problem; it is far cheaper to collect; the time involved in searching secondary sources is much less than that needed to complete primary data collection; secondary sources of information can yield more accurate data than that obtained through primary research; secondary data can play a substantial role in the exploratory phase of the research when the task at hand is to define the research problem and to generate hypotheses; and it will help define the population. Thus, the data used for this research was generated from the CBN statistical bulletin 2007 to 2016.

In the process of developing of the model the first step is to identify the linear regression model requiring the inclusion of the dependent and independent variable and the attendant coefficient weights identified by using statistical method called Ordinary Least Squares (OLS). These coefficient weights measure the strength of the relationship between independent and dependent variables. The two dimensions of the coefficients are direction and magnitude. The direction indicates whether variations in the dependent variable are caused by changes in the independent variable.

Generally, the magnitude of coefficients can be compared only if two independent variables have the same unit of measurement. Otherwise the variables need to be normalized to a standard scale to be compared to measure the strength of the relationship across different independent variables.

### Model specification

According to Onwumere (2009), regression is a statistical technique used in measuring the impact of one or more variables (otherwise known as independent variables or regressors) on another variable (the dependent variable or the regressand). The general linear regression model according to Koutsoyiannis (2006) and Onwumere (2009), is:

 $Y = \alpha_0 + \alpha_1 X + \mu$  - - - (i) Where Y is a function of X independent variable and  $\mu$  is the error term,  $a_0$  being the constant and  $a_1$  being the coefficient of the independent variable.

where;

Log Oil Exp	= Log of Oil Export	earnings (a proxy for	oil export earnings)
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Log Exh rate = Log of exchange rate (a proxy for the naira equivalent of the dollar (\$)

### **Model Assumption**

The model adopted are based on the following assumptions

- 1. There must be enough data available to compare with the number of parameters to be estimated. If there is too little data, then you end up with a system of equations with no unique solution. The ten-year data from 2007-2016 is sufficient to meet this assumption for this research. Though, this is a necessary but not a sufficient condition but if this condition fails this could lead to multicollinearity in the regressors.
- 2. The regressor is also assumed to be error-free. In standard regression models, regressors have been measured exactly, or observed without error; as such, those models account only for errors in the dependent variables, or responses. However since the figure will be computed from secondary sources, it is hoped that the problem will not arise.

### Variables

The variables used in the models are the Dependent and Independent, the former (Oil export earnings) represents the output or effects while the latter (Foreign exchange rate) represents the inputs or causes. And since the models are statistical the dependent variable is studied to see if and how much it varies as the independent variable varies.

#### 4.0 Data Analysis and discussion of results

As indicated in the descriptive statistics

## Table 4.1 DESCRIPTIVE STATISTICS

	NIGERIA_E			
	XCH_RATE			
	_\$	OIL_EXP		
Mean	164.0940	65591.00		
Median	155.7450	69989.50		
Maximum	272.0000	95620.00		
Minimum	116.8000	27788.00		
Std. Dev.	43.14325	23137.07		
Skewness	1.664700	-0.241685		
Kurtosis	5.097275	1.725623		
Jarque-Bera	6.451443	0.774035		
Probability	0.039727	0.679079		
Sum	1640.940	655910.0		
Sum Sq. Dev.	16752.06	4.82E+09		
Observations	10	10		

### Table 4.2 UNIT ROOT TEST

Group unit root test: Summary Series: NIGERIA\_EXCH\_RATE\_\$, OIL\_EXP Date: 03/13/18 Time: 21:54 Sample: 1 10 Exogenous variables: Individual effects, individual linear th Automatic selection of maximum lags Automatic lag length selection based on SIC: 0 to 1 Andrews automatic bandwidth selection and Bartlett kernel

Method	Statistic	Prob.**	Cross- sections	С		
Null: Unit root (assumes c	ommon un	it root pro	ocess)			
Levin, Lin & Chu t*	1.56712	0.9415	2	1		
Breitung t-stat	2.18997	0.9857	2	1		
Null: Unit root (assumes individual unit root process)						
Im, Pesaran and Shin W-						
stat	0.92327	0.8221	2	1		
ADF - Fisher Chi-square	2.63425	0.6208	2	1		

\*\* Probabilities for Fisher tests are computed using an as Chi

2.63367 0.6209

2

1

-square distribution. All other tests assume as normality.

#### Table 4.3 TESTS OF CAUSALITY Dairwige Granger Causality

PP - Fisher Chi-square

Pairwise Granger Causality Tests Date: 03/14/18 Time: 12:24 Sample: 1 10 Lags: 2

Null Hypothesis:			Obs	F-StatisticProb.	
OIL_EXP EXCH_RAT EXCH_RAT			e	Cause 8 OIL_EXP	0.03596 0.9651 0.84292 0.5123

Table 4.4Least Square NLS ARMADependent Variable: NIGERIA_OIL_EXPMethod: Least SquaresDate: 03/14/18 Time: 13:53Sample: 1 10Included observations: 10					
Variable	Coefficien	t Std. Error	t-Statistic	Prob.	
EXC_RATE C	-287.1314 112707.5		-1.793009 4.161561	0.1107 0.0032	
R-squared Adjusted R-squared S.E. of regression Sum squared resid Log likelihood F-statistic Prob(F-statistic)	0.286662 0.197495 2\0726.80 3.44E+09 -112.4655 3.214882 0.110729	Mean dependent var S.D. dependent var Akaike info criterion Schwarz criterion Hannan-Quinn criter. Durbin-Watson stat		65591.00 23137.07 22.89310 22.95362 22.82671 0.949284	

As shown on the descriptive statistics on table 4.1 there was a positive skewness in the foreign exchange variable and a not so marginal negative skewness in the oil export earnings for the period indicating that the degree of departure from the mean of the distribution is positive revealing that; overall, there wasn't a consistent impact on Nigeria's oil from 2007 to 2016. Though, as indicated by the Kurtosis which was 1.72 < 5.09 which is the normal value indicates that the degrees of peakedness within the period of this study were not normally distributed as most of the values did not hover around the mean. The Jarque-Bera statistic is an indication of the normality of distributions and was 6.45 and since the probability is slightly above zero (0), the distribution is normally distributed (see table 4.1)

In testing for the presence of unit root in the data (see table 4.2), it was to make sure the parameters estimated are stationary. The results assumed common unit process with high probabilities at 0.9 each for the Levin, Lin & Chu and Breitung t-stat and at the critical values of 1.56 and 2.18 respectively. Again on assumption of individual unit root process the Pesaran and Shin W-sat and the ADF –Fisher Chi- squared criteria has high probabilities of 0.82, 0.62 and 0.62 for the critical values of 0.9, 2.63 and 2.63 respectively. This suggests a high degree of stationarity. The granger causality test was conducted to test the causality of the effect of the independent variable on the dependent variable (see table 4.3). As indicated in the above table, it was revealed that oil price ratio does not granger cause oil exports (p – value 0.9651 > 0.05) also, the oil exports doers not granger cause the exchange rate values (p-value = 0.5123 > 0.05). Hence, there is a unidirectional relationship between dependent and independent variables.

In the testing for the autoregressive moving average using e-views (see table 4.4), it was apparent that the model for the study was well fitted giving the F-statistic of 3.214882.The Durbin Watson statistic is 0.94 (less than 1) indicating that there is a slight trace of spatial and serial autocorrelation. The Durbin Watson d statistics was taken into account using Newey West/Cochrane-Orcutt procedure and transformed to 2.21. of 0.95. The coefficient of

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determination or R2 and R2 adjusted reveals 0.286662 and 0.197495 respectively. This is a clear indication that most of the variations in the dependent variable was not explained by the independent variable for the period under study indicating that there might be other variables that do have impact on the dependent variable significantly, apart from the explanatory variable. However this does not suggest that model hasn't the right goodness of fit when one considers that the AIC (22.89310), or Schwarz criterion (22.95362), shows that the difference between the two as being very negligible, an indicator of a near perfect model convergence near zero. The smaller they are the better the fit of your model is (from a statistical perspective) as they reflect a trade-off between the lack of fit and the number of parameters in the model.

### **5.0** Conclusion

The study therefore concludes that the foreign exchange policy measures taken by the government over the years did not have a significant effect on the crude oil export earnings of Nigeria. Apart from other interplay of forces at the global scene, there have been blunders in the past which has spill-over effects on the countries assets and trade. In the devaluing the nation's currency in the 1970s and 1980s, the Nigerian monetary authorities did not take into consideration the inelasticity of Nigeria's exports and their attendant cartel-tied prices. This move altered the exchange rate between the devalued naira and the rest of the world that did nothing to devalue theirs. Of course the export products of the devaluing country become cheaper and more competitive in the international market. Devaluation is most beneficial if the devaluing nations export consumer goods are inelastic in nature such as countries that export industrial plant and machinery, house hold appliances, refrigerators, vehicles etc. Japan devaluation of yen over the dollar created wider market and export earnings at the expense of other competing countries as the United States. This mistake was to be repeated again in the mid 1980s during the introduction of the second-tier foreign exchange and the Structural Adjustment Programme (SAP). This fuelled more domestic monetary crisis as imports rose, hoarding of imports and speculation as import demand soared. The devaluation did nothing increase Nigeria's exports and foreign exchange earnings in any case. Just recently in 2016, the monetary authorities pegged the official rate at 35% stronger than the black market rate. The policies sparked capital flight and hindered foreign investment flows. As a result of currency pegging and restrictions on foreign exchange market, a lot of speculative and precautionary demand was created as exporters and investors held on to already scarce dollar and naturally would be unwilling to sell at the rate it was officially pegged thereby causing a wider gap between the official rate and the black market rate. Furthermore, the country's foreign reserves by the first quarter of 2016 were not sufficient to keep the exchange rate at its official market level. By the end of the first quarter of 2017, the CBN without changing course on their brand of restrictive policy relaxed some of the measures taken the previous year in a bid to curb speculative activities of exporters but the damage had already been done.

#### 7.0 Recommendations

It is evident that a further devaluation of the country's currency will not increase our export earnings and foreign exchange earnings in a mono-cultural economy as Nigeria especially given the elasticity of the nature of the country's exports. The government should understand the importance of a lower inflation rate and low rate of unemployment and the global market conditions before considering devaluation of the local currency. Nigeria's ranking as an investor's destination having plummeted severely over the last three years and this is not necessarily as a result in the drop in oil prices but the inability to diversify income over the years. The government should take steps towards diversification away from oil and ensure easier access to capital for small scale businesses. There is the need to create processes and institutions that can better manage a floating currency regime that does to reduce the undue rigidity in doing business for exporters. The monetary authorities should cease and desist from constant manipulation of the cash reserve ratio and monetary policy rate but allow the markets to dictate the trend. This does not mean that the CBN should forgo their role of intervention where there is a red flag, but be innovative in merging theory with reality in their policy implementation even if it requires legislation.

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