

# Foreign Exchange and Industrial Sector Growth in Nigeria (1981-2015)

Prof. P.N. Nnamocha

A Professor of Economics and Director for Development Studies,  
Imo State University, Nigeria

Asso. Prof. Benneth K. Obioma

Associate Professor of Economics, Imo State University, Nigeria

Asso. Prof. Andrew A. Igwemma

Associate Professor of Economics, Imo State University, Nigeria

Isaiah A. Nwoko\*

Staff, First Bank of Nigeria Ltd  
and a Doctoral Student at Imo State University, Nigeria

## Abstract

The study is on foreign exchange and industrial sector growth in Nigeria. Secondary data on industrial output, foreign exchange disbursement, foreign exchange rate and Nigeria foreign reserves 1981 -2015 were collected from the Central Bank of Nigeria Statistical Bulletin, 2015 edition. The E-view version 9 Econometric program was used to run a regression on the data collected. Foreign exchange availability (proxied by foreign exchange disbursement) was found to have no significant but positive influence on the Nigeria industrial sector growth. While foreign exchange rate and Nigeria foreign reserves were found to have positive and significant influence on the growth of Nigeria's industrial sector. It is recommended that the Nigerian government should take urgent steps to tackle the foreign exchange crisis and maintain a sustainable exchange rate. The government should also ensure that foreign exchange available to importers of industrial inputs and at the same time grow the country's foreign exchange reserves.

**Keywords:** Foreign Exchange, Industrial Sector, Exchange Rate, Foreign Reserves, Industrial inputs.

## 1. Introduction

The Nigerian industrial sector has always been in the front burners in every discourse aimed at seeking solutions to the monocultural state of the national economy. Every successive government in Nigeria has pursued at one time or the other economic growth and development through various policy formulations (implemented and non-implemented) and huge investments in the various sectors of the economy. However, and very unfortunately, the results from all these efforts have never at any time been commensurate with the resources committed. The "sickness" of single product economy has proved incurable over the years as the industrial (manufacturing) sector has continued to suffer structural defects. The product outputs of many Nigerian industries face unfavourable competitions from similar products imported from abroad due mainly to the many distortions traceable to unavailability of foreign exchange and unfavourable exchange rate of the Naira against the Dollar and other international currencies.

Nigeria is heavily dependent on importation of raw materials, machineries, spare parts and other direct inputs (including refined petroleum products) used for industrial production. Due to foreign exchange crisis, many Nigerian industries (manufacturing companies) are faced with high production cost and thus are edged out by competition from abroad.

Over the years Nigeria has from time to time adopted different foreign exchange systems (see section two). These foreign exchange systems have their unique benefits and challenges. The Central bank of Nigeria has claimed that the switch in method is determined mainly by the perceived efficiency of such method and the availability of foreign exchange. But since the introduction of the free floating foreign exchange policy by the CBN in June, 2016 – which freed the Naira from a band of N197 –N199 to the dollar, the naira has been in a free fall against other international currencies. From about N281 to the dollar at the beginning of the policy in June 2016, naira crashed to about N465 to a dollar on October 11, 2016 and still going down. The former Nigerian Finance Minister- Okonjo-Iweala in an interview captured by Premium Times (2016) has warned that if you don't pay attention to the fundamentals of having a stable and good exchange rate policy, inflation under control, manageable fiscal deficit and debts, there will continue to be trouble in the economy.

Nigeria as an import dependent economy, the relationship between foreign exchange availability, foreign exchange rate and foreign reserves and industrial sector growth is one that needs to be investigated. The intuition behind the choice of this approach is developed in subsequent sections. The study is divided into five sections.

Section 1 is the introduction; section 2 is the review of literature. In section 3, the method to the study is explained and justified; section 4 is the data analysis and in section 5 we state our conclusion, recommendations and relevant suggestions.

Nigeria is currently in recession and experiencing foreign exchange crisis. This has eroded investors' confidence in the stability of the national economy. The country is recording high volume of capital flight as foreign investors are moving their money out of the country. They sell off their domestic investments denominated in naira and convert those investments into foreign currency (US Dollar, British pounds etc.) and move them out of the country. This has caused the Nigerian foreign exchange rate situation to worsen by day resulting in a run on the naira and the national economy making it almost impossible for the country to finance its capital spending. As at March 2016, Nigeria recorded the lowest government revenue to GDP ratio in the world estimated at 7.8 per cent in 2015. This is projected by IMF to fall further to 5.9 per cent in 2016. Also Nigeria for some years has recorded the highest foreign direct investment (FDI) in Africa until 2012, now ranks fifth in the continent (Uddin and Inaolaji, 2016, Uddin, Inaolaji and Dibia, 2016).

This study has three broad objectives which are to: (i) evaluate the effect of foreign exchange availability on the industrial sector growth in Nigeria. (ii) examine the effect of foreign exchange rate on industrial sector growth in Nigeria. (iii) investigate the effect of Nigeria's foreign reserves on industrial sector growth.

## 1.2 Literature Review

### 1.2.1 The Structure and Evolution of Nigerian Foreign Exchange Market

Foreign exchange market, also known as currency market (or in short Forex Market, or FX Market) is a global decentralized market for the trading of currencies. The Nigerian foreign exchange market therefore is the market where the Nigerian Naira is exchanged with other international (other Countries) currencies such as the US Dollar, the British Pounds, Euro, et cetera.

The Nigerian foreign exchange market is comprised of three major segments- the Official Foreign Exchange Market, Autonomous Foreign Exchange Market and the Parallel Foreign Exchange Market. The autonomous market is made up of the Inter-bank and the Bureau de change. The Inter-bank market is the market where banks extend credit facilities among themselves to meet very short-term liquidity obligations ranging from overnight borrowing up to one year. The market is characterized by rapid transmission of information on rate to all the participants though dominated by few market leaders who influenced the borrowing rate (CBN, 2004). While the Bureau de change are private authorized dealers in foreign exchange. Their authorization dates back to 1989 as a fall out of the need to make for a broadened foreign exchange market thereby making for easy access foreign exchange by end users especially the small users who may not have easy access to foreign exchange through the conventional sources (Anyanwu et al, 1997).

Prior to the establishment of the Central bank of Nigeria (CBN) in 1958 and the enactment of the Exchange Control act of 1962, foreign exchange was earned by the private sector and held in balances abroad by Commercial banks which acted as agents for local exporters. It is worth knowing that during this period, agricultural exports contributed the bulk of foreign exchange receipts and the sector was the main stay of the Nigerian economy. The Nigerian pound that period was tied to the British Pound Sterling at par, with ease of convertibility. This delayed the development of active foreign exchange market for Nigeria. With the establishment of Central Bank of Nigeria in 1958, dealing in foreign exchange in Nigeria became centralized in the CBN and the determination of the exchange rate was based on local market conditions and the performance of the naira vis- a-vis the weighted basket of Nigeria's major trading partners' currencies. The need to develop a local foreign exchange market for Nigeria became very paramount when the CBN was established and the authority to solely deal on foreign exchange was vested on the bank.

Methods used for determining the exchange rate and the allocation of foreign exchange have varied from the hard and crawling peg regimes to the present flexible exchange rate policy unveiled on June 15, 2016 which would allow the foreign exchange inter-bank trading window to be driven purely by market forces. The switch in method according to CBN (2004) is determined mainly by the perceived efficiency of such method and the availability of foreign exchange. While Ochei, Areghan and Tochukwu (2016) observe that the evolution of the foreign exchange markets in Nigeria up to the present state was influenced by a number of factors which include the changing pattern of international trade, institutional changes and structural shift in production.

Before 1986, importer and exporters of non-oil commodities were required to get appropriate licenses from the Federal Ministry of Commerce before they could participate in the foreign exchange market. Generally, import procedures followed the international standard of opening letters of Credit (LCs) and subsequent confirmation by correspondent banks abroad. The use of Form M was introduced in 1979 when the comprehensive import supervision Scheme (CISS) was put in place to guard against sharp practices. At that time the authorization of foreign exchange disbursement was a shared responsibility between the Federal Ministry of Finance and the Central bank of Nigeria. While the Federal Ministry of Finance had responsibility for public sector applications, the CBN allocated foreign exchange in respect of private sector applications (CBN, 2016).

At this operating system and level, the foreign exchange market in Nigeria was not vibrant in supporting industrial sector growth.

However, with the introduction of Second – tier Foreign Exchange Market (SFEM) on September 26, 1986 and the permission granted Commercial banks by the CBN, the market became very vibrant due mainly to the free determination of the naira exchange rate by market forces. Oloyede (2002) has it that although what followed the SFEM immediately after its introduction was a regime of failed experiment of administrative management of the exchange rate of naira. Despite this assertion, we cannot rule out the fact that the modalities for the management of the Nigerian foreign exchange market have changed significantly since the introduction of the Second- tier Foreign Exchange Market (SFEM) which was in line with the principle of the 1986 introduction of the Structural Adjustment Programmed (SAP). The structural adjustment program emphasized the market oriented ( the invisible hand) approach to price determination. Other regimes of exchange rate management since the introduction of the SFEM (1986) are the Dutch auction System (DAS), April 1987, the Autonomous Foreign Exchange Market (AFEM), 1988, the Inter-bank Foreign Exchange Market (IFEM), 1989, Dutch Auction System (DAS) re-introduced 1990 and the “guided deregulation” based on the dual exchange rates regime. For the third time, the Dutch Auction System (DAS) was re-introduced on July 22, 2002 (Alabi, 2015).

According to Alabi (2015), the major reason for which the CBN jettisoned the Inter-bank foreign exchange Market (IFEM) was that it was characterized by multiple malpractices. The DAS re-introduction in 2002 was to enhance transparency in the management of foreign exchange and to achieve a realistic exchange rate for the naira and discourage speculative demand for foreign exchange. The Whole Sale Dutch auction System (WDAS) was further introduced alongside DAS on February 20, 2006. This further liberalized the foreign exchange market which according to the CBN (2016) made the market to witness unprecedented stability as a result of these achievements:

- Unification of exchange rates between the Official and Inter-bank markets and resolution of the multiple currency problems.
- Facilitation of greater market determination of exchange rates for the Naira vis-a-vis other currencies
- Parallel market appreciation first time in 20 years
- Sale of foreign exchange to Bureau de Change operators in an effort to increase access of foreign exchange to small end users, bridge the gap and develop the local Bureau de Change (BDCs).

Again in February, 2015 the CBN justifying their usual position that switch in method is determined mainly by the perceived efficiency of such method and the availability of foreign exchange closed down the Dutch auction System (DAS) segment of the foreign exchange market and introduced the flexible exchange rate policy on June 15, 2016. Uddin , Inaolaji and Dibia (2015), observed that the exchange rate unsurprisingly, took the head for a decline in the oil price and the depletion of foreign reserves, and despite the Central Bank of Nigeria’s contractionary policy stance, and the cancellation of the Dutch Auction System segment of the foreign exchange (Forex) market, the pressure on the naira exchange rate persists.

### **1.2.2 Overview of the Nigerian Manufacturing Sector**

The role of the manufacturing sector of any economy in the development of the overall economy cannot be over emphasized. More so, as it has now been widely accepted that export of manufactures is an important means of economic diversification, foreign exchange earnings and a major contributor to long term sustainable growth and poverty reduction (Adeoti, 2009). Also, the manufacturing sub sector has been identified as one of the most dynamic subsectors of the Nigerian economy. However, in 2008 for example, despite the nation’s respectable rank of 40<sup>th</sup> largest GDP in the world by the World Bank, the manufacturing sector contributed a mere 4.13 percent to national GDP. This poor performance of the sector is not surprising because at independence in 1960, the industrial sector of Nigerian economy was relatively insignificant in terms of contribution to the gross domestic product (GDP) as most of the earliest industries established by the colonial trading companies and a handful of other international firms, only concentrated on the production of light industrial commodities such as soft drinks, detergents, leather works, textiles and confectionaries oriented towards the adoption of import substitution strategy (ISS). The manufacturing sector of Nigeria was so narrow and pre-occupied with processing of agricultural and forestry products for domestic and foreign markets, as well dominated by a few European commercial firms with institutional impediments which characterized the British colonial administration (Olukoshi, 1991 and Adenikinju, 1997). The import-dependent industrialization strategy virtually came to a halt in the late 1970s and early 1980s when the liberal importation policy (which was a resultant effect of the oil boom of the mid 1970) expanded the imports of finished goods to the detriment of domestic production. Nigerians generally developed penchant for imported goods as people’s living standard was measured by their consumption of foreign made goods. This led to relative decline in manufacturing firms’ production of exportable and thus, little diversification in products and production processes was achieved.

The introduction of the Structural Adjustment Programme (SAP) in July 1986 as a medium- term strategic policy programme aimed at revamping an economy under persistent recession and setting it on the path of

sustainable growth. The policy was partly designed to revitalize the manufacturing sector by shifting emphasis to increased domestic sourcing of inputs through monetary and fiscal incentives, the deregulation of the foreign exchange market was also affected to make non-oil exports especially manufactures more competitive even though, this also resulted in massive escalation in input costs (Loto, 2012). Also because it is already known that developing countries (including Nigeria) are characterized by high birth and death rates, poor sanitation and health practices, poor housing, a high percentage of the population in agriculture, low per capita income, high rate of illiteracy, weak and uneven feelings of national cohesion, low status rating for women, poor technology, limited communication and transport facilities, predominantly exports of raw materials. Others include political instability, low savings and low net investment, military or feudal dominance of state machinery, wealth in the hands of a very few, poor credit facilities, prevalence of non-monetized production, wealth sometimes exported to save in developed countries, civil unrests such as the activities of militants in the Niger Delta and Boko Haram in the Northern Nigeria, and a host of others (Onah, 1979, Ewah & Ekeng, 2009). Therefore countries with these kinds of peculiarities find it difficult to development their manufacturing potentials.

It is a common knowledge that countries of the world had in one time undertaken one form of economic reform or another and Nigeria is not an exception. The goals of these reforms according to Loto (2012) may differ from country to country; nevertheless, they are all closely aligned towards putting their economies on a path of sustainable growth and development. But the key questions are why have these reforms not met their targets? Other countries have faced similar challenges in the past and yet have overcome them, what is holding Nigeria back from achieving the same growth? Why has the country continued to witness massive closure/relocation of manufacturing firms and other business outfits?

In spite of the sector's apparent poor performance so far and the inherent problems confronting individual firms operating in the sector, the development of the manufacturing sector is important for the Nigerian economy to the path of sustainable growth and development because: (i) the declining terms of trade faced by primary products in the global market; (ii) the direct linkage between manufactured exports and the economic growth performance is relatively established in economic literature; (iii) trade in non-primary exports constitutes the most dynamic part of world merchandise trade; (iv) the employment generation capacity of the sector when viewed in relation to the total labour force is low, the development of the sector will definitely increase labour absorption level of the sector and (v) the development of the manufacturing sector is needed to diversify the production and export base of the country away from oil, which has not induced substantial volatility in the economy. In recent years, the Nigerian government has taken various major steps to foster the non-oil (especially manufacturing) sector role in the country's economic and social development. It has been generally acknowledged that the path to economic recovery and growth require productivity improvement because many other countries that were in the present situation Nigeria has found herself were able to come out of it through productivity enhancement planning. Indonesia, South Korea, India, Malaysia, Brazil and Mexico are few examples of economies that have made high productivity an integral part of their national economic planning and today they have made significant progress and the results are noticeable.

The country is characterized by high birth and death rates, poor sanitation and health practices, poor housing, low per capita income, high rate of illiteracy, weak and uneven feelings of national cohesion, low status rating for women, poor technology, limited transport facilities, predominantly export of raw materials, political instability, low savings and low net investment, wealth in the hands of a very few, poor credit facilities, prevalence of non-monetized production, wealth sometimes exported to save in developed countries, civil unrests such as activities of militants in the Niger Delta, kidnapping and armed robbery in South East and activities of Boko Haram and Taliban terrorists in the Northern Nigeria and a host of others. It is easily observable that Nigerian organized private sector is suffering from inadequate infrastructure; under-investment in human resources, poorly conceived and executed development strategies and widespread corruption. A telling indicator in this regard has been the decline of the manufacturing sector from 8.8 percent of gross domestic product (GDP) in 1979 to only 4.3 in 2008.

### **1.2.3 Demand for Made-in-Nigeria Good**

It is often argued that as Nigeria is a large economy, its manufacturing sector can rely on the domestic market and that there does not need to be a concern with exporting. A product's origin was not a major issue internationally prior to World War I. After losing the war, however, all German exports were obliged to carry the English words: Made in Germany. The country-of-Origin mark was imposed by the victors as a punishment to German industry and a means of helping consumers in the rest of Europe and North America avoid products from the former enemy (Morello, 1984, Cai, 1994). Nagashima (1970:68) has defined the "Made In" image as the picture, the reputation, the stereotype that businessmen and consumers attach to the products of a specific country. This image is created by such variables as representative products, national characteristics, economic and political background, history and traditions. It has a strong influence on consumer behaviour in the international market, as it is associated with mass communication, personal experience, and views of national opinion leaders. Thus, made-in-Nigeria goods are those goods that are produced within Nigeria. Nigeria as a

third world country needs to produce her own goods and services so that the economy can grow, stabilize and develop. However, it has been empirically established that Nigerian consumers consider country of origin very significantly in their buying and consumption decisions. Most times they consider country of origin more important than price and other product attributes such as reliability and safety. Regrettably, this has not been to the favour of made-in-Nigeria goods as Nigerians have developed much penchant for foreign products than domestic products. To buttress the above point, research has shown that consumers in developed countries tend to prefer products from developed countries first and foremost from their own countries. While consumers in less developed countries view domestic products less favourably than products from more advanced countries. In fact it is generally felt that locally-made goods are only for the poor, uneducated, and those who are not fashionable, while the consumption of imported goods and services is taken as a status symbol for the elite and affluent in developing countries. Even when some countries products are of less quality when compared to similar local brands (Okechukwu & Onyemah, 1999, Ewah & Ekeng, 2009). Americans purchase and consume domestic products as a mark of responsibility for helping the economy and patriotism to their country. Japan has shown a way to succeed in developing their market share by enhancing the origin images of their products. Consumers were biased against products from Japan. Several decades later “made in Japan” means quality to consumers (Papadopoulos, 1993).

According to Njoku (2004), the Nigerian government in 1988 took a bold step to encourage favourable attitudes towards made-in-Nigeria goods in a bid to actualize the Enterprises Promotion Decree, the basis of this decree was to reduce foreign dominance on the economy, encourage local retention of profit and create employment opportunities amidst other objectives. One of the plans was to encourage the purchase of domestic or locally made goods or the import substitution strategy. In the late 1970s, the apathy of local consumers towards products produced locally for the market knew no bounds with consumers preferring foreign products over and above the locally produced ones. The deregulation policies of the federal government following the Structural Adjustment Programme (SAP) in 1986 ushered in the collapse of several local industries that could not face the onslaught from the deluge of imported products. Consequently, Nigeria became a trading rather than a production based economy. By 1995 with the tight economic situation experienced under the Abacha regime, it became more difficult for the importation of finished goods into Nigeria as exchange rate hit the roof. Nigeria once again unconsciously started shifting towards local production. Cottage industries started springing up in the areas of pure water packaging, food processing, cosmetics, textiles, shoes etc; but now they are being discouraged and many are folding up. The advent of civilian administration caused national borders to be wide open as free trade is embraced and products like peppermint, toothpaste, soaps, detergents are now being imported from Malaysia, Indonesia, India and China. The implication of this is that the attitude of Nigerians towards locally made goods is being again lowered.

#### **1.2.4 The Balance of payment (BOP) Model of Exchange Rate Determination**

In the Balance of payment method of exchange rate determination, the domestic price of international currency (foreign currency) is determined the same way the price of any good (commodity) is determined. The model relies on equilibrium in the foreign exchange market as determined by the factor of the appropriate exchange rate; that is by the intersection of the market supply and demand curves for the foreign currency. The traditional flow model relies on the determination by flows of currency created by international transactions on trade in goods and services, portfolio investment and foreign direct investment (FDI). The intersection between the supply and the demand equilibrium rate is regarded as the pure or market exchange rate. The point of intersection is derived from what has come to be known as the “Marshallian Scissors” which is the supply and demand schedules.

A common feature of the BOP model is that it adopts the assumption that an increase in the price of foreign exchange implies an increase in the relative price of a country’s imports in terms of its exports and an increase in the net inflow of foreign exchange arising from current account transactions. The equilibrium exchange rate in such a model is the exchange rate at which the net inflow of foreign exchange arising from current account transactions is balance by the net outflow resulting from capital account transactions.

#### **1.2.5 The Portfolio Balance Approach**

The portfolio balance approach relies substantially on the asset or portfolio market. The similarities between the behaviour of the portfolio market and the foreign exchange market is basically on the behaviour of the prices of items (assets) traded in the highly organized markets which suggests a common general approach to analyze the behaviour of such assets prices. The portfolio balance model holds that portfolio equilibrium position of wealth holders in each country simultaneously determines the exchange rates. The shift in the allocation of wealth between the domestic money base, domestic public bonds and net foreign bonds denominated in foreign currency influences the equilibrium exchange rate.

#### **1.2.6 Empirical Literature**

A recent study by Momodu (2015); on the impact of exchange rate on the output and growth in Gross domestic Product in Nigeria in which he adopted the Ordinary Least Square method of regression reveals that exchange rate regimes in Nigeria do not influence the level of output nor reduce the Gross Domestic Product contrary to

apriori expectations. He therefore recommends that future policies should focus encouraging local technology to improve productivity. He tried to find the influence of the various foreign exchange regimes in Nigeria on output. He identified the fixed exchange rate regime, floating exchange regime, managed floating exchange regime and the free floating system. However he failed to state the periods covering the various regimes and also only tested for 0.025 level of significance. He would have tested at 0.05 level of significance and compare the results.

Obi and Gobna (2010) adopted the Co-integration and error correction model to empirically analyse the determinants of exchange rate in Nigeria from 1970-2007. They hinged their analysis on the Balassa-Samuel hypothesis which states that increases in productivity differentials lead to exchange rate appreciation. Their estimation result reveals among other things that productivity differentials is statistically and economically significant in explaining exchange rate. They explained that a 1 per cent increase in productivity differentials in the previous two (2) years leads to approximately 0.39 percent appreciation in the exchange rate.

Fapetu and Oloyede (2014), conducted a study to examine Foreign Exchange Management and the Nigerian Economic Growth from 1970 to 2012. They adopted also like other above adopted the Ordinary Least Square estimation technique within the error correction model (ECM) framework and their result was not also different from those above. They also employed the Johansen- Joselius co-integration test to test for the presence of a long run relationship between the dependent variables. Their result shows that export and foreign direct investment are statistically significant in determining economic growth at 5% and 10 % levels of significance respectively. But exchange rate, import and inflation were found to be statistically non- significant. Although the study is found to be inconsistent with the original intention. Exchange rate was supposed to be the dependent variable, but the model estimated has GDP or Economic growth as the dependent variable instead while exchange rate, export, import, inflation and foreign direct investment are the explanatory variables.

From outside Nigeria, we look at the study by Magda, Hakan and Nergiz (2006) on the Effects of exchange rate fluctuations on economic activity in Turkey. The study specifically examines the effect of exchange rate fluctuations on real output, the price level and the real value of components of aggregate demand in Turkey. They adopted the Granger Causality technique to analyze the asymmetric effects of exchange rate shocks on relevant macroeconomic variables by decomposing the exchange rate shock to its positive and negative components. The positive component they termed exchange rate appreciation while the negative is the unexpected depreciation. Their study reveals in the case of Turkey though not different from what other studies on Nigerian have found that anticipated appreciation of the exchange rate, current and lagged, has a negative effect on output growth in Turkey. Also the unanticipated appreciation is not significant in explaining real output growth. However, their study shows that lagged unanticipated depreciation (a negative exchange shock) has a positive effect on output growth. Unexpected depreciation increases the cost of imported inputs, forcing reduction in the output supply. So for Turkey, the Wald test statistic indicates asymmetric effects of unanticipated currency appreciation and depreciation on output growth.

### 1.3 Method of Study

#### 1.3.1 Sources of Data

The data used for this study are secondary data sourced from the Central Bank of Nigeria (CBN) Statistical Bulletin for the year 2015, published in 2016. They are time series data spanning from 1980 to 2015. The primary aim of choosing a large data of 36 years is to satisfy the long-run requirement of econometric tests which give better results when the data are large.

#### 1.3.2 Data Analysis Techniques

To investigate the general influence of foreign exchange availability, foreign exchange rate and foreign reserves on industrial sector output; this study adopts the Augmented Dickey-Fuller (ADF) technique. The study adopted the Ordinary Least Square embedded in E-View Version 9 computer analytical tool and the Granger causality test is to enable us determine the direction of relationship between the explained variable- industrial sector output and the explanatory variables- foreign exchange availability, foreign exchange rate and foreign reserves. The t-test, Analysis of Variance (ANOVA), R-square and R-square adjusted were determined to aid us arrive at decisions and conclusion.

#### 1.3.3 Model Specification.

Haven stated some conceptual framework above, the functional form of this research model can be specified below. Foreign exchange availability was proxied by foreign exchange disbursement by Central Bank of Nigeria.

$$IDO = f(\text{FEA}, \text{FER}, \text{NFR}) \dots\dots\dots 1$$

The linear function is represented thus:

$$IDOt = \beta_0 + \beta_1 \text{FED}t + \beta_2 \text{FER}t + \beta_3 \text{NFR}t + Ut \dots\dots\dots 2$$

Where,

NIO = Nigeria Industrial output

FEA = Foreign Exchange Availability

FER = Foreign Exchange Rate (USD/NGN)

NER = Nigeria Foreign Reserves

### 1.3.4 Data Presentation, Analysis and Discussion of Results

**Table 1.1 Nigeria Industrial Output, Foreign Exchange Disbursement, Exchange Rate and Foreign Reserves (1981 – 2015)**

Year	Industrial Output (N' Billions)	Foreign Disbursement (Proxy for FX Availability) (US\$' Millions)	Exchange Exchange Rate (USD/NGN)	Foreign Reserves (USD' Billions)
1981	6,603.25	25,316.00	0.61	4,682.90
1982	6,272.83	18,879.20	0.67	1,027.02
1983	5,264.88	15,094.50	0.72	597.61
1984	5,621.18	11,656.90	0.76	456.64
1985	6379.60	11,724.80	0.89	984.80
1986	6,234.41	6,841.90	2.02	1,576.84
1987	6,135.33	5,312.80	4.02	5,212.85
1988	6,474.98	5,200.60	4.54	6,022.23
1989	7,100.76	5,837.00	7.39	3,662.76
1990	8,531.59	7,437.60	80.4	3,357.76
1991	8,094.63	8,208.10	9.91	4,051.66
1992	8,170.47	8,056.90	17.29	2,782.65
1993	8,122.08	5,621.40	22.05	4,902.01
1994	7,917.40	5,177.30	21.89	7,944.08
1995	7,985.54	20,456.50	21.89	2,695.41
1996	8,450.31	17,181.50	21.89	2,157.96
1997	8,561.92	9,995.30	21.89	6,124.34
1998	8,515.83	10,781.10	21.89	7,814.72
1999	8,031.92	10,129.80	92.69	5,309.10
2000	8,808.65	11,810.90	102.11	7,590.76
2001	9,351.86	14,737.20	111.94	10,277.48
2002	9,061.67	13,110.20	120.97	8,592.00
2003	10,893.91	16,314.40	129.36	7,641.80
2004	11,418.60	15,342.20	133.50	12,062.75
2005	11,674.74	24,307.50	132.15	24,320.77
2006	11,481.76	24,321.60	128.65	37,456.09
2007	11,332.36	24,356.70	125.83	45,394.30
2008	11,068.22	47,170.10	118.57	58,472.88
2009	11,353.42	36,513.10	148.88	44,702.35
2010	12,033.20	39,157.80	150.30	37,355.70
2011	12,874.25	41994.1	153.89	32,580.28
2012	13,028.05	45035.9	157.50	38,092.15
2013	13,014.51	84541.9	157.31	45,612.95
2014	13,791.25	114699	158.55	37,220.33
2015	13,319.13	122727.93	193.28	29,805.48

Source: Central Bank of Nigeria Statistical Bulletin 2015 published 27/7/2016  
[www.cbn.gov.ng/documents/statbulletin.asp](http://www.cbn.gov.ng/documents/statbulletin.asp)

**Table 1.2 Results Summary**

Variable	Coefficient	Standard Error	t-Statistic
C	<b>6537.338</b>	<b>210.044</b>	<b>31.123</b>
FED	<b>0.012</b>	<b>0.007</b>	<b>1.709</b>
FER	<b>26.298</b>	<b>3.591</b>	<b>7.323</b>
NFR	<b>0.029</b>	<b>0.0134</b>	<b>2.161</b>

Source: E-VIEW VERSION 9

Durbin-Watson (DW) = 0.087

R-Square (R<sup>2</sup>) = 0.904

Adjusted R-Square (Adj.R<sup>2</sup>) = 0.894

F. Statistic = 96.889

### 1.3.5 Discussion of Result

The Least Square regression equation:

$$IDO = B_0 + B_1FED + B_2FER + B_3NFR + U_t$$

shows that the three independent variables (FED, FER and NFR) all have positive relationship with the dependent variable (IDO). This means that any change (increase/decline) in any of the independent variables at separate times or simultaneously will cause a change (increase/decline) in the dependent variable.

The R-Square ( $R^2$ ) of 0.904 means that the independent variables in the model jointly contribute 90.4 per cent change in the independent variable while the remaining 9.6 per cent is caused by other stochastic variables not included in the model and are represented by  $U_t$ .

The study is very much related to that of Jongbo (2014) which investigated the impact of real exchange rate fluctuation on the industrial out in Nigeria. The result of his study is quite different from all other studies reviewed in the empirical literature in section two of this study. Others found exchange rate to be statistically insignificant in explaining either industrial output or gross domestic product (GDP). But this study and that of Jongbo (2014) found exchange rate to be statistically significant and has positive relationship with industrial sector growth in Nigeria.

The point of departure in the two studies is in the aspect of the impact of foreign exchange availability. While he proxied availability of foreign exchange by export lag for one year and found availability of foreign exchange to be one of factors that determine enhanced industrial output. But in this study, availability of foreign exchange was proxied by foreign exchange disbursement and was found to have no significant (but positive) influence on the Nigeria industrial growth. The reason for this difference could be from the variables used to proxy availability of foreign exchange in the two studies.

This is however contrary to apriori expectation because Nigeria as an import dependent economy requires that foreign exchange be made available to enable producers to be able to purchase the needed raw materials and spare parts meant for production.

### 1.3.6 Summary of Findings

This paper examined foreign exchange and industrial sector growth in Nigeria using data spanning from 1981 to 2015. The model analyzed specified industrial output as a function of foreign exchange disbursement (FED), foreign exchange rate (FER) and Nigeria foreign reserves (NFR).

The Ordinary least square regression result shows that there is a positive relationship between foreign exchange disbursement (proxy for foreign exchange availability), foreign exchange rate, Nigeria foreign reserves and industrial output.

The test for significance of fit using the adjusted R-square shows that the three explained variables included in the model accounted for 89.4 per cent variation in the dependent variable (industrial output).

The joint test (F-test) shows  $F_{-cal} -96.889 > F_{tab, 0.05, 3, 30} = 2.92$  meaning that we have to accept the alternative hypothesis and conclude that foreign exchange availability, foreign exchange rate and Nigeria foreign reserves jointly affect industrial sector growth in Nigeria.

However, the individual T-test revealed some interesting results. While foreign exchange availability (proxied by foreign exchange disbursement) was found to have  $t_{-cal} = 1.7089 > 1.96$  and made us accept the null hypothesis and thus conclude that foreign exchange availability has no significant influence on the Nigeria industrial sector growth within the period of study. Individual test for foreign exchange rate and Nigeria foreign reserves show these results:  $t_{-cal} = 7.32$  and  $2.16$  respectively and are greater than  $t_{tab} = 1.96$  and so we accept the alternative hypotheses and conclude that foreign exchange rate and Nigeria foreign reserves have significant impacts on the Nigeria industrial sector growth.

### 1.3.7 Summary and Conclusion

From the findings of this study and going by the regression equation result, it can be seen that movement in the foreign exchange availability (proxied by foreign exchange disbursement), exchange rate and Nigeria foreign reserves at different times or simultaneously cause(s) movement in the industrial output and thus spur growth in the sector. This means that Naira appreciation against the Dollar and other international currencies would enhance industrial productivity and overall increase in economic activities

Based on the findings above, the following recommendations are made:

1. The Nigerian government should take urgent steps to overcome the foreign exchange crisis and strive to maintain a sustainable exchange rate since it has been established that foreign exchange rate enhances industrial sector growth and possibly growth in the overall economy.
2. Since Nigeria is import dependent for raw materials and spare parts for industrial production, there should be appropriate policies to ensure that greater percentage of foreign exchange disbursed by the Central Bank of Nigeria (CBN) to the Deposit Money Banks for sale to Bureau de change operators, are sold to importers of industrial inputs.
3. The Nigerian government should gear towards building up foreign exchange reserves which is currently in a depleted position.



This means that Naira appreciation against the Dollar and other international currencies would enhance industrial productivity and overall increase in economic activities.

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### Appendix

Pairwise Granger Causality Tests

Date: 11/11/16 Time: 08:03

Sample: 1981 2015

Lags: 2

Null Hypothesis:	Obs	F-Statistic	Prob.
FNR does not Granger Cause IDO	33	0.81381	0.4534
IDO does not Granger Cause FNR		3.78009	0.0352
FER does not Granger Cause IDO	33	3.46228	0.0453
IDO does not Granger Cause FER		0.27895	0.7587
FED does not Granger Cause IDO	33	0.29798	0.7446
IDO does not Granger Cause FED		2.48781	0.1013
FER does not Granger Cause FNR	33	3.45181	0.0457
FNR does not Granger Cause FER		0.72465	0.4934
FED does not Granger Cause FNR	33	4.68653	0.0176
FNR does not Granger Cause FED		1.51468	0.2374
FED does not Granger Cause FER	33	0.59811	0.5567
FER does not Granger Cause FED		1.27531	0.2951

SOURCE: E-VIEW VERSION 9

Dependent Variable: IDO

Method: Least Squares

Date: 11/11/16 Time: 06:29

Sample: 1981 2015

Included observations: 35

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6537.338	210.0447	31.12356	0.0000
FED	0.011664	0.006826	1.708948	0.0975
FER	26.29814	3.591212	7.322915	0.0000
FNR	0.029341	0.013576	2.161311	0.0385
R-squared	0.903628	Mean dependent var		9227.843
Adjusted				
R squared	0.894301	S.D. dependent var		2497.847
S.E. of regression	812.0837	Akaike info criterion		16.34429
Sum squared resid	20443876	Schwarz criterion		16.52205
Log likelihood	-282.0252	Hannan-Quinn criter.		16.40566
F-statistic	96.88961	Durbin-Watson stat		0.869872
Prob(F-statistic)	0.000000			

SOURCE: E-VIEW VERSION 9