Effect of Exchange Rate Policy and its Volatility on Economic Growth in Nigeria

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Abstract

Exchange rate management in Nigeria has been influenced by several factors; economic and socio-political prior to independence in 1960. The primary focus of monetary policy is to determine the exchange rate that stabilizes prices, resulting to sustained growth in the economy. The problem of study is exchange rate volatility and the continued depreciation of the naira, surrounded by negative or sluggish growth indices. Nigeria has passed through different exchange rate regimes in order to find a realistic exchange rate for macroeconomic stability, but without remarkable success. Exchange rate steady fluctuations seem to have far reaching implications for inflation, price incentives, fiscal viability and competitiveness of exports in Nigeria. The main objective of this study is to investigate the effect of exchange rate policy/volatility on economic growth in Nigeria. The mechanism through which exchange rate volatility transmits on economic growth has to be understood within the framework of quantitative and qualitative analysis, anchoring on economic theories and principles. The model adopted is time series model; a dynamic distributed-lag model. It is a causal dynamic economic model that shows the long-run and short-run relationship as the parameters are restrictedly estimated, using secondary data. The results show negative relationship between exchange rate volatility and economic growth. The faster Nigeria evolves indigenous technology innovation in all sectors, with import substitution, the better for the country. This will insulate the economy from undue external dependency and currency manipulations.

Keyword: Exchange rate policy, Volatility, Economic growth, Nigeria

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Background of the Study

Foreign exchange rates are published daily, and appear in the currency trading column of banks, the Nigeria Stock Exchange, the Wall Street Journal, the New York Stock Exchange and others. The currency of a country is the economy's central nervous system. It promotes economic growth primarily by improving the efficiency of capital allocation. The major objectives of exchange rate policy are to preserve the value of domestic currency, maintain a favorable external reserves position and ensure external balance without compromising the primary interest of internal balance, and overall macroeconomic stability, (CBN,2017). Exchange rates are determined by the interaction of demand and supply in the foreign exchange markets. However, exchange rate management in Nigeria has been influenced by several factors; economic and socio-political prior to independence in 1960. The primary focus of monetary policy is to determine the exchange rate that stabilizes prices, resulting to sustained growth in the economy. Changes in the structure of the Nigerian economy from agriculture as the main source of foreign exchange to crude oil, as well as increased trade volume in the real sector required robust strategies in exchange rate control.

Prior to 1960, there was a global fixed exchange rate arrangement in which currencies were linked to gold, (Duke, Adesanya and Ahmadu, 2012). This allowed for unrestricted capital mobility and global stability in currencies and international trade. Similarly, Bakare, Adekunle and Akungba, (2011) posited that prior to 1986, Nigeria was on a fixed exchange rate determination system. At that time, the naira was very strong in reference to the US-Dollar. The exchange rate was one naira to one USD. For instance, the average annual official exchange rate for the years 1981, 1982, 1983, 1984 and 1985 which were pre-SAP era stood at N0.6100/1USD, N0.6729/1USD, N0.7241/1USD, and N0.8938/1USD, respectively. These were the hey days of the Nigerian economy, when the economy experienced a period of boom and the Naira had more value than the US dollar.

However, the 1986 Structural Adjustment Program (SAP) under military Head of State, General Ibrahim Babangida destroyed everything. From that time onward, the increasing demand for foreign exchange to import even what Nigeria could produce, including apple, rice, tin tomatoes, fish and frozen chicken, and the inability to diversify the economy for commensurate exports, rapidly depreciated the naira. The exchange rate control system lacked the ability to evolve an appropriate mechanism for foreign exchange allocation in consonance with the goal of internal balance. Consequently, the fixed exchange rate was discarded, and a new exchange rate regime was introduced. The fixed exchange rate regime had many variations, these included the Nigerian pound pegged at parity with the British Pound sterling, pegging against a basket of currencies and the import-weighted basket approach. The effects of this pegged exchange rate mechanism are legion: the naira became overvalued, the economy became distorted and there was unbridled importation of finished consumer goods which had dire consequences for domestic production. The level of external reserves and the balance of payment (BOP) position were negatively impacted. Sharp practices on the part of dealers and end users of foreign exchange compounded the problem leading to prolonged BOP

problem and general price instability. It was against this background that the market based Second-Tier Foreign Exchange Market (SFEM) was introduced in 1986. This liberalized regime was expected to solve the problem, mitigate the structural distortions in the economy, including finding a realistic value for the naira, ensuring competitiveness of goods produced in Nigeria in the international market. It was also aimed at addressing the problem of import dependence and capital flight, attracting foreign investment and reducing the disparity between the official and parallel market exchange rates. The exchange rate therefore depreciated sharply from N2.02/1USD in 1986 to N17.30/1USD by 1992 and further to N21.89/1USD by 1994. Following the economic recession in 2017, we have N350/1USD.

Under SFEM, the Central Bank of Nigeria intervened in the foreign exchange market on a weekly basis to sell foreign exchange to end users. The system led to spurious and multiple bidding by authorized dealers, thereby discrediting it and frustrating its objective of a realistic exchange rate. In a bid to ensure professionalism in bidding and to curb the propensity of high bids, the Dutch Auction System (DAS) was introduced in April 1987 under which the frequency of bidding was reduced from weekly to fortnightly. The DAS was hitherto abandoned because of teething problems associated with the deregulation of the foreign exchange market at its debut. In 1987, the dual exchange rate system was jettisoned as the first and second-tier foreign exchange regimes were merged into an enlarged Foreign Exchange Market with a unified rate, (CBN,2014). The year 1988 witnessed the adoption of the Autonomous Foreign Exchange Market(AFEM), where banks sold foreign exchange amongst themselves. This , amongst other reasons was to facilitate non-oil inflows into the Deposit Money Banks and curtail demand pressure.

However, the AFEM turned out to be riddled with speculative activities and was later transformed into the interbank foreign exchange market (IFEM) in January 1989. During this period, the CBN monitored developments in the exchange rate of the major international currencies as a guide to determining the appropriate level of the naira exchange rate. The IFEM was modified in December 1990, when the retail Dutch Auction System (DAS) was re-introduced. As a result of the persistent instability in the foreign exchange market, such as the rise in the parallel market premium from 20 percent in 1990 to 35.5 percent in February 1992, the CBN adopted a completely deregulated system of foreign exchange trading on March 5, 1992. In response to the existence of the wide arbitrage premium between the official and parallel market, the government in 1994 undertook a fundamental reform of the market by introducing a fixed exchange rate regime. It was formally pegged at N21.9060 per dollar and the pro-rata system of allocating foreign exchange was sustained. In 1995, the Exchange Monitoring and Miscellaneous Provisions Act was enacted, which gave legal backing to the creation of the Autonomous Foreign Exchange Market (AFEM) for trading privately sourced foreign exchange. The exchange rate was fixed at N22/1USD at the official window and for bona fide government transactions. The year 1999 witnessed a full deregulated exchange rate which was intended to reduce the rent-seeking behaviors and the establishment of some level of macroeconomic stability, (Duke et al, 2012). In 2002, the Retail Dutch Auction

(RDAS) was introduced to narrow the premium that existed between the official and the parallel market and to stem the rising demand for foreign exchange. Under the RDAS, the naira exchange rate moved from N92.69/1USD in 1999 to N133.50/1USD in 2004, and further appreciated to N118.92/1USD by 2008. By the end of 2009, the WDAS was reinstated to determine and manage the exchange rate. However, due to the inability of the WDAS to mitigate the demand pressures, it gave way again to the RDAS in October, 2013, and was withdrawn on February 17, 2015, following reforms in the market. Thus, the CBN closed the official window of the market and moved all demand for foreign exchange to the inter-bank market. Historically, the Naira reached a record low of 0.53/1USD in September, 1980, and an all time high rate of N365/1USD in August 2017.

From the foregoing analysis, it is evident that the exchange rate policy in Nigeria has undergone substantial transformation from the post-independence era to date. Different exchange rate policies have been used depending on the prevailing domestic economic circumstances, and at other times, in response to the changing exchange rate policies in the rest of the world, as the Nigerian economy is grossly dependent on the global economy. The economic, social and political considerations underpinning the exchange rate policy have always had important consequences and repercussions for the structure and growth rate of the economy, net exports, inflation, foreign reserves, and balance of payment.

Statement of the Problem
The problem of study is exchange rate volatility and the continued depreciation of the naira, surrounded by negative or sluggish growth indices. Nigeria has passed through different exchange rate regimes in order to find a realistic exchange rate for macroeconomic stability, but without remarkable success. Exchange rate steady fluctuations seem to have far reaching implications for inflation, price incentives, fiscal viability and competitiveness of exports in Nigeria. High inflation, interest rate differentials, depletion of foreign reserves, structural deficiency in the economy are among the factors responsible for exchange rate depreciation in Nigeria. Made-in-Nigeria goods have high prices due to high costs of imported raw materials, in turn caused by high exchange rate volatility, infrastructure problems and inadequate incentives. Other factors working against the strength of the naira at the foreign exchange market include corruption and expansionary fiscal operations by federal and state governments, reckless importation, unnecessary and avoidable foreign trips by political office holders, external debt and interest payment problems are also traced to mismanagement of exchange rate.

Also are, inadequate funding of the capital market and the roles of authorized and unauthorized dealers leading to frivolous demand for dollars and round tripping of funds obtained from official sources. Whenever the monetary authorities in Nigeria introduced a dual exchange rate regime, operators in the parallel market would take advantage of the usually wide gap between the two rates to round-trip by buying from the official market at a lower rate and then sell at the autonomous market so as to make profit from the margin. These have been difficult to control due to underdevelopment of the financial system and corruption. Besides, Nigeria's growth rate has not been sustainable, negative during

economic recession, in spite of the country's uncommon natural and human resources endowments. Import of finished consumer and capital goods is competing against agricultural and industrial producers, thereby worsening unemployment pressures. Agriculture as the most inclusive occupation is struggling in the face of high costs of imports of inputs as well as smuggling and dumping of finished products. It is in the light of these that this study seeks to investigate the effect of exchange rate policy and its volatility on economic growth in Nigeria between 1980 and 2017. The period of analysis is of particular significance because it covers the early 1980s when the naira had more value than the Us Dollars, through the mid and late 1980s when SAP destroyed the naira and up to the 2016-2017 era when the Nigerian economy entered its latest recession.

According to Obadan,(2007), Nigeria's foreign exchange market which is dominated by the Central Bank of Nigeria(CBN), in terms of supply of foreign exchange, and considering the pass-through effects of exchange rate on inflation, calls for the need to continuously manage the exchange rate control. In the view of this study, exchange rate, apart from its pass through effect on inflation, seems to have transmission mechanisms in the real sector's economic activities such as agriculture, manufacturing, petroleum, tourism, the other social sectors and aggregate net-exports. Consequently, effective exchange rate policies are required for sustained growth and macroeconomic stability in Nigeria.

Objective of the Study
The broad objective of this study is to investigate the effect of exchange rate policy/volatility on economic growth in Nigeria. The specific objectives include; examining the effect of exchange rate volatility on the real sector using selected macroeconomic variables such as inflation, balance of payment, imports and unemployment as the transmission mechanisms. The primary objective of monetary policy is to ensure price stability, which is inextricably intertwined with exchange rate stability. The study is to find out whether the objective of price stability in domestic trade as well as the value of the naira in comparison to the US Dollar and some foreign currencies has been achieved. This yardstick would determine the effectiveness of monetary and exchange rate policy in Nigeria. A fast depreciating local currency seems to create instability in macroeconomic variables, and a symptom of ineffective monetary and exchange rate policies. A flexible exchange rate, complementary with fiscal and structural policies should yield to macroeconomic stability. Specific objective is to find ways to determine and control exchange rate volatility or fluctuation in Nigeria.

Significance of the Study
Exchange rate and economic growth in Nigeria have been volatile and fluctuating over time. The volatility requires investigation given the time lag between the current study and other similar researches in the same area. Due to the wide spread effect of exchange rate volatility, its policy and development are a great concern to the government, the business sector, researchers, the household and the general public. More so, the task of managing the exchange rate is herculean for an economy struggling out of recession. The stability or appreciation of the naira is very important for many reasons; it provides the

barometer for measuring the resilience of the Nigerian economy boosts the confidence of investors, competitiveness of exports, positively impact on balance of payment, increases employment, productivity and directly reduces inflation. Under the President Buhari's regime, emphasis is placed on financial deepening and exchange rate control and management. However, there are difficulties faced in controlling the financial deepening variables such as the exchange rate, broad money supply, increasing the level of credit to the private sector, high inflation rate, external reserves, and the treasury single account(TSA) regulation. These make this study significant, not in solving all the problems or as a catch-all variable, but in the area of exchange rate policy and stemming its volatility. The study is significant to key stakeholders such as policy makers, regulators, operators, and markets.

Does Exchange rate Policy and its Volatility have a Causal Relationship with Economic Growth?

Exchange rate policy forms a significant part of monetary policy which as a whole is a measure of financial development. Some studies maintained that financial development will have a disproportionately beneficial impact on business expansion, income distribution, capital accumulation, poverty alleviation and economic growth; (Banerjee and Newman, 1993; Aghion and Bolton, 1997). Greenwood and Jovanovich,(1990), showed how the interaction of financial volatility and economic growth can give rise to an inverted U-shaped curve of income inequality and incidence of poverty in a non-linear relationship.There seems to be a direct causal relationship between exchange rate and economic growth in Nigeria. Exchange rate plays an increasingly significant role in the economy because other macroeconomic variables are either directly or indirectly affected by it. Domestic general price level, production decisions by the business sector, savings and investment, domestic trade, imports and exports, profitability of traded goods and services, consumption decision by household, government revenue and expenditure, employment decisions, entrepreneurship development are all affected. The exchange rates of currencies obtainable in developed economies are more stable, example the US dollar because they have been able to diversify their economy and the basket of commodities which they export is also diversified. This is the opposite, compared to emerging and developing economy like Nigeria. This could be confirmed with the following statistics on the exchange rate of selected countries:

Table 1: Exchange Rates of Selected Countries (Value in units of currencies to USD): 2013-2015

| COUNTRIES	CURRENCY	December 31, 2013	December 31, 2014	December 31, 2015	% Change Dec.2014	% Change Dec.2015
Nigeria	Naira	157.27	169.68	197	7.89	16.10
South Africa	Rand	10.32	11.57	15.48	9.98	38.79
Kenya	Shilling	86.3	90.6	102.3	4.98	12.91
Egypt	Pound	6.95	7.15	7.83	2.88	9.51
Ghana	Cedi	2.38	3.22	3.81	35.29	18.32
Canada	Dollar	1.06	1.16	1.38	9.43	18.97
Mexico	Peso	13.1	14.75	17.23	12.6	16.8
Brazil	Real	2.36	2.66	3.96	12.71	48.87
Argentina	Peso	6.52	8.47	12.93	29.91	52.66
Colombia	Peso	1929.51	2376.51	3174.5	23.17	33.58
United Kingdom	Pound	0.6	0.64	0.68	6.67	6.25
EU	Euro	0.73	0.83	0.92	13.70	10.84
Russia	Ruble	32.87	60.74	72.85	84.79	19.94
Japan	Yen	105.26	119.78	120.2	13.79	0.35
China	Yuan	6.23	6.05	6.49	-2.89	7.27
India	Rupee	54.78	61.8	66.15	12.81	7.04

In addition, the developed economies amongst others, have well developed financial and monetary system, highly liquid currencies, independent and insulated Central Bank, as well as highly globalized in trade. The stability of exchange rate of the naira is today a major challenge to the Central Bank of Nigeria due to the absence of the afore-mentioned indices. Table 2 shows the exchange rate movement in Nigeria since 2004.

Table 2: Exchange Rate Volatility in Nigeria 2004-2017(N/$)

| Year	Official	BUREAUX	Inter-Bank Rate
2004	133.50	140.85	134.67
2005	132.15	142.56	133.00
2006	128.65	137.10	128.67
2007	125.83	127.41	125.72
2008	118.57	120.71	119.00
2009	148.88	161.64	150.70
2010	150.30	153.06	151.89
2011	153.86	159.31	155.89
2012	157.50	160.86	158.84
2013	157.31	162.45	159.25
2014	158.55	171.45	164.88
2015	193.28	222.72	197.00
2016	253.49	305.86	250.74
2017	306.56	350.77	315.26

This agrees with Sanusi, (2004) that greater productivity, which is a necessary cause and effect of economic growth has been associated with less volatility in exchange rate. In 2017, there were major changes in the foreign exchange rate management, (Ukeje, 2017). The Central Bank of Nigeria, through its policy actions increased the hardship experienced by end-users of foreign exchange. This is because foreign exchange became even scarcer than before; in the academics for instance, even to pay for a publication in international journal, getting the US dollar at the official rate was almost impossible. Then one could imagine the hardship of small and medium scale industrialists who rely solely on imported raw materials. As at February, 2017, the CBN addressed the issues of foreign exchange sales for invisible transactions(IT), personal travel allowances(PTA) and business travel allowances(BTA), medical needs, and school fees, and emphasized that retail transactions to be settled at a rate not exceeding 20 percent above the interbank rate.

Fig. 1a:
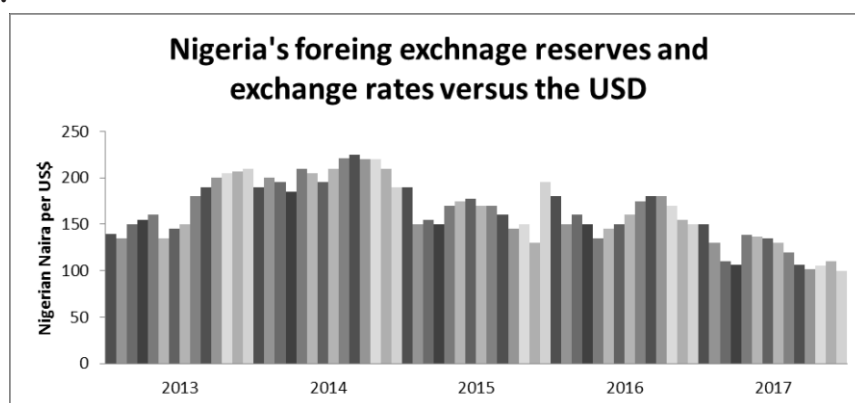
However, despite the efforts of the CBN to reduce the tenor of its forward sales from 180 days to 60 days from the date of transaction, foreign currency liquidity has not significantly increased, and it is still a problem to output and income growth in the real sector of the economy. Foreign purchases, agricultural and industrial exports are directly affected by exchange rate volatility. Given the requirements of finance in the real sector, very few farmers have capital to invest in agribusiness, and to advantageously use improved seeds, chemicals, fertilizers, irrigation and machineries in the value chain. Even those engaged in the fadama projects find it difficult to make reasonable profit due to the high costs of farm inputs, including high cost of imported refined petrol for irrigation, raising the total cost of production. The farmers' frustration is worsened by inadequate and non-availability of credits, as well as lack of access to market due to foreign competition. Exchange rate volatility tends to affect commodity prices in the domestic market.

Fig. 1b
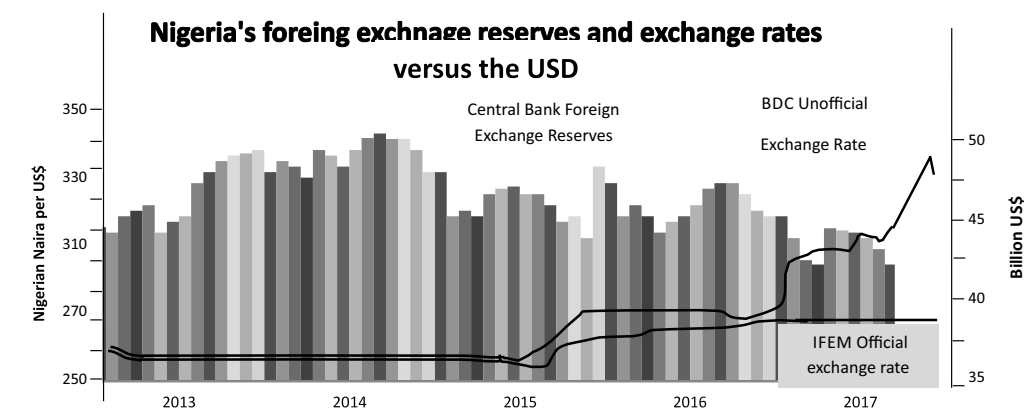
It has effect on government expenditure on infrastructure, responds to cost-push inflation and generally increases the cost of doing business in Nigeria. It affects the aggregate price level, aggregate income, and aggregate output in the economy. It also affects activities in the financial market where funds are transferred from the surplus spending units to the deficit spending units. These in turn, have not promoted greater economic efficiency; rather, the cyclical performance of the economy has landed in a recession with huge volatility and economic uncertainties. The nexus between exchange rate volatility and economic growth in Nigeria is proxied in the random movement of real gross domestic product (RGDP) thus:

Table3: Nigeria RGDP and Exchange Rate 1996-2016

Year	RGDP(N billion)	EXCHANGE RATE(%)
1996	3,779.13	21.8861
1997	4,111.64	21.8861
1998	4,588.99	21.8861
1999	5,307.36	92.6934
2000	6,897.48	102.1052
2001	8,134.14	111.9433
2002	11,332.25	120.9702
2003	13,301.56	129.3565
2004	17,321.30	133.5004
2005	22,269.98	132.1470
2006	28,662.47	128.6516
2007	32,995.38	125.8331
2008	39,157.88	118.5669
2009	44,285.56	148.8802
2010	54,612.26	150.2980
2011	62,980.40	153.8616
2012	71,713.94	157.4994
2013	80,092.56	157.3112
2014	89,043.62	158.5526
2015	94,144.96	193.2792
2016	101,489.49	253.4923

Source: Central Bank of Nigeria Statistical Bulletin, Vol.27, 2016

Fig.2 Nigeria:RGDP and EXCHR 1996-2016
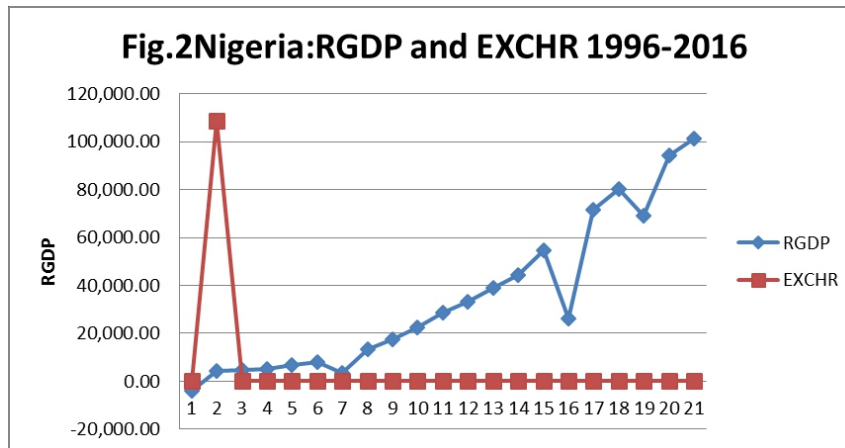
Source: Authors' computation,2018

Theoretical Framework

The purchasing power parity(PPP) theory was developed by Gustav Cassel in 1920 to determine the exchange rate between countries on inconvertible paper currencies. The theory states that equilibrium exchange rate between two inconvertible paper currencies is determined by the equality of their purchasing power. Put differently, the rate of exchange between two countries is determined by the relative price levels. According to the theory, the equilibrium exchange rate between two countries is determined at a point which expresses the equality between their respective purchasing powers of the two currencies. This is the purchasing power parity which is a moving par as under the gold standard. The most known theoretical explanation of long term stability and consistency of bilateral exchange rate is the purchasing power parity hypothesis. It is therefore rational to test for long run stability of PPP, (Dornbusch, 1986; Jhingan,2012; Duke, Adesanya and Ahmadu,2012). Other researchers, have used the PPP to link domestic economic development with international trade,(Babatunde and Akinwale,2010; Emerah, Adeleke and Olusegun, 2015).

The PPP hypothesis is directly significant to this study because the study is attempting to situate the parity of the naira in terms of other countries' currencies, in the face of its continuous depreciation. The nominal or real exchange rate between the naira and the US Dollar or the Pound Sterling for instance, should be equal to the ratio of goods and services in exchange, not an eroded value of the naira in favor of the other two currencies. Furthermore, the liquidity framework and the loanable funds framework are suitable for this study. The loanable funds framework determines the equilibrium interest rate, using the supply of, and the demand for financial assets. An alternative model developed by John Maynard Keynes is the liquidity framework which determines the equilibrium interest rate in terms of the supply of, and demand for money. The liquidity preference analysis of the financial market is closely related to the loanable funds framework. The starting point of Keynes analysis is his assumption that there are two main categories of assets that economic agents use to store their wealth: money and bonds or stocks. Exchange rate volatility affects the store value of wealth. Therefore, total assets in the

economy must equal the total quantity of money plus stocks supplied. Exchange rate volatility causes changes in the liquidity preference, money supply, inflation and quantity of stocks, which in turn affect interest rate and economic growth. This liquidity framework provides a simpler analysis of the effects from changes in income, the price level and the supply of money. The definition of money according to Keynes includes currency and checking account deposits which is time-lagged. As inflation rate rises, the expected returns money falls relative to the expected returns on bonds and bonds which depreciate. Consequently, the opportunity costs of doing business in Nigeria increases. The shortage in the supply of US dollars, British Pound sterling, and increases in their demand in Nigeria is evident of the challenges of exchange rate volatility.

Empirical Literature
Ugochuchukwu, (2015) in his study on exchange rate volatility and economic growth (1980-2012) adopted the general autoregressive conditional heteroscedasticity (GARCH) technique to estimate the relationship between the two variables. The results showed a negative response of economic growth to exchange rate volatility. This finding was contrary to Izilein and Okoh,(2015) who also employed the GARCH technique for the period 1980-2013, but rather found a positive relationship between exchange rate and economic growth in Nigeria. They recommended greater diversification of the productive and export base of the economy to bring about a stable exchange rate. A similar study was conducted by Jugu and Soeding, (2015) using multiple regression analysis, and covering 1981-2013. This study also confirmed the existence of a significant positive relationship between exchange rate and economic growth in Nigeria.

It recommended that the government and other relevant agencies should put measures in place that would boost exports of finished products. Adikibe, (2008) examined the impact of exchange rate instability on selected macroeconomic variables in Nigeria for the period 1990-2004, using the ordinary least square(OLS) technique in a regression analysis with time series data. The study confirmed the existence of significant positive relationship between exchange rate variability and economic growth, the latter proxied by Gross Domestic Product (GDP). The gap left by this study is that it concentrated only on foreign exchange mainly being demanded for investment purposes, whereas there are various purposes (social and political) for the demand for exchange rate in Nigeria, aside from investment.

Accordingly, policies should be directed towards encouraging foreign exchange demands for more capital goods than consumption goods. Oyovwi,(2012) in his study found mixed results; that in the short-run, exchange rate volatility has positive relationship with economic growth, while in the long-run, it has a negative relationship. Similarly, Akpan and Atan (2012) examined the effects of exchange rate movements on economic growth in Nigeria using the generalized method of moments (GMM) technique. The estimated results showed that there was no evidence of a strong direct relationship between changes in exchange rate and output growth. Their conclusion was that improvements in exchange rate management are necessary but not adequate to revive the

Nigerian economy. Isola et al, (2016) investigated exchange rate fluctuation and economic growth in Nigeria between 2003-2013. The autoregressive distributed lag (ARDL) model was employed for estimation and data analysis. The empirical results showed that exchange rate fluctuation has no effect on economic growth in the long run. They recommended that the Central Bank of Nigeria, (CBN) should strengthen exchange rate control policies. In a similar study on exchange rate volatility and economic growth in Ghana, Alagidede and Muazu, (2016) adopted the vector autoregression method. The results demonstrated that real exchange rate and real income were significantly co-integrated. The real exchange rate negatively and significantly impacted on economic growth, as a 1% increase in exchange rate volatility led to -0.8% (decrease) in economic growth, using GDP as a proxy for the latter. Thus, excessive exchange rate volatility is detrimental to economic growth.

They recommend, amongst other things, significant improvement in exchange rate modeling and forecasting by the Central Bank. Incorporating the impact of asset prices in domestic monetary policy could improve both the transparency and functioning of foreign exchange market. Musyoki, Pokhariyal and Pundo, (2012) studied the impact of real exchange rate volatility on economic growth in Kenya. They found that real exchange rate volatility reflected a negative impact on economic growth in Kenya Levy-Yeyati and Sturzernnegger, (2002) in their study using cross-country regression data indicate that for most developing countries, greater exchange rate volatility is strongly associated with higher growth and less output fluctuations. Celasun, (2003) in his research has shown that for oil-based economies, terms of trade and output volatility were often of significant consideration. For these economies, oil price increases often results in boom of domestic consumption, increased capital inflows and investment, real exchange appreciations that are harmful to development of the non-resource sectors, as predicted by the Dutch Disease hypothesis. Conversely, a fall in oil prices has the opposite effect. Overall, oil price volatility makes government revenues largely unpredictable and exchange rate volatility holds sway. However, these volatilities can be addressed through fiscal policies that promote domestic demand over time, thereby enabling the exchange rate play a supporting role of facilitating rapid real exchange rate adjustment. Azid et al.,(2005) investigated the impact of exchange rate volatility on economic performance in Pakistan, with a case study of the manufacturing sector. The study employed the GARCH method to test the relationship. The results obtained showed a positive but insignificant impact of exchange rate movement on manufacturing output performance.

Methodology
The mechanism through which exchange rate volatility transmits on economic growth has to be understood within the framework of quantitative and qualitative analysis, anchoring on economic theories and principles. Macroeconomic variables directly related to this framework of analysis are selected to include the real gross domestic product, exchange rate, interest rate, balance of payment and inflation rate. Others are credits to the private sector, index of agricultural production, foreign reserves and manufacturing output. Secondary data are being sourced for this study. Secondary, time series data are

used to capture the effect of exchange rate volatility. The model adopted is also time series model; a dynamic distributed-lag model. It is a causal dynamic economic model that shows the long-run and short-run relationship as the parameters are restrictedly estimated. In this method, the study also attempts to evaluate the multiplier, elasticity effects of exchange rate volatility on the real sector via the agricultural sector, small and medium scale industries and manufacturing subsector. The restricted long-run model is then imposed as a solution of a matching dynamic short-run. This restricted short-run model is an error correction model that captures the trend behavior of exchange rate, inflation, balance of payment and interest rates on the real sector of the economy, using the proxy of real gross domestic product (RGDP). The stability or non-stability was easily predicted in this form of estimation. This is not unusual in the empirical econometrics literature; Maddala and Kin,(1998), Hendry,(1995), and Hamilton,(1999).

Model Specification

This study adopts the multiple linear regression models. The functional relationship between the explained and the explanatory variables is stated thus:

$$RGDP = f(INFR, MANQ, INDAGRQ, CPS, BOP, FRS, EXCHR)\text{-------------1}$$

$$RGDP = f(EXCHR)\text{--------------------2}$$

Where RGDP= Real Gross Domestic Product
        INFR= Inflation Rate
        MANQ= Manufacturing Output
        INDAGRQ= Index of Agricultural Production
        CPS= Credit to the Private Sector
        BOP= Balance of Payment
        FRS= Foreign Reserves
        EXCHR= Exchange Rate

The two functions are transformed into regression models thus:

$$RGDP_t = \beta_0 - \beta_1 INFR_t + \beta_2 MANQ_t + \beta_3 INDARQ_t + \beta_4 CPS_t + \beta_5 BOP_t + \beta_6 FRS_t + \beta_7 EXCHR_t + \mu_t \text{------1b}$$

$$B_1 < 0, \beta_0, \beta_2, \beta_3, \beta_4, \beta_5, \beta_6, \beta_7 > 0$$
$$LRGDP_t = LEXCHR_t = LEXCHR_{t-1} = LEXCHR_{t-2}\text{----------------2b}$$

Where L= Lag operator
        Let EXCHR= X, and LRGDP$_t$ = Y$_t$
        $Y_t = L(LX_t) = LX_{t-1} = LX_{t-2}$--------------2c
        $Y_t = \beta_0 + \beta_1 X_{t-1} + \beta_2 X_{t-2} + \text{--------} + \beta_p X_{t-p}$ ---------2d

The notation of lag operator was introduced into the dynamic models so that the long-run multiplier effect of exchange rate volatility can be easily computed. Exchange rate

volatility in one time period(t) can extend its effect on economic growth beyond to other time periods (t-1, t-2, t-3) , and in the long run (t-p). Economic growth is affected through the exogenous explanatory variables such as the inflation rate (INFR), manufacturing output(MANQ), index of agricultural production (INDAGRQ), credit to the private sector(CPS), balance of payment(BOP), foreign reserves (FRS), and exchange rate (EXCHR). The short-run and long-run responses are presented in table 4.

Table 4: The Short-run and Long-run Responses

Period	Model1	Model2
t=1	L_0	L_0
t=2	L_0+L_1	$L_0+L_0\ \beta_1=L_0(1+\beta_1)$
t=3	L_0+L_2	$L_0+L_0\ \beta_1+L_0\ \beta_2=L_0(1+\beta_1+\beta_2)$
Long-run(tp)	L_0+Lp	$L_0(1-\beta p)$

Source: Authors' computation

The long-run multipliers $L_0 + Lp$ and $L_0(1-\beta p)$ depend on the values of the sample estimates of L_0 and βp.

Table 5: Data Presentation

Year	RGDP%	INFR %	MANQ %	INDAGRQ (1990 prices)	CPS%	BOP%	FRS $M	EXCHR N/USD
1996	2.4	30.4	-4.1	62.5	3.4	-0.7	4541.4	21.8861
1997	0.5	10.8	-2.5	64.7	5.2	-0.6	3403.9	21.8861
1998	1.4	7.9	-0.9	66.9	4.8	-0.2	7222.2	21.8861
1999	2.6	6.9	-4.6	69.3	9.5	-0.4	7107.5	92.6934
2000	4.5	7.1	-5.5	95.1	10.3	-2.5	5424.6	102.1052
2001	3.5	18.9	-3.8	100.0	12.5	-2.2	9386.1	111.9433
2002	2.8	13.1	1.1	111.5	16.2	-2	10267.1	120.9702
2003	6.3	13.9	-3.9	119.2	17.8	-2.1	7681.1	129.3565
2004	6.8	15.4	-2.5	122.6	13.1	-1.7	7467.8	133.5004
2005	5.2	16.9	-3.3	126.4	13.2	-1.8	16955.0	132.1470
2006	6.4	8.4	3.5	128.5	13.1	-1.2	28279.1	128.6516
2007	4.4	5.4	2.8	134.4	24.2	-2.3	51333.2	125.8331
2008	4.8	12.0	4.2	137.7	33.7	10.7	53000.4	118.5669
2009	4.2	12.6	6.4	141.0	38.4	9	42382.5	148.8802
2010	4.5	13.8	6.5	145.2	15.4	5.1	32339.3	150.2980
2011	3.7	10.9	6.8	149.2	12.5	3.9	32639.8	153.86716
2012	2.4	12.2	6.5	153.7	11.8	3	43830.4	157.4994
2013	3.6	9.0	6.4	154.9	12.6	4.4	42847.3	157.3112
2014	2.5	8.0	10.9	165.4	14.7	3.6	34241.5	158.5526
2015	1.6	9.0	7.3	175.5	14.2	0.2	28284.8	193.2793
2016	-5.4	16.0	-5.7	186.9	15.7	-1.8	26990.6	253.4923
2017	2.8	12.6	0.8	160.7	15.7	3.4	46210.2	350.6528

Sources: CBN Statistical Bulletin, 2018; CBN Annual Report and Statement of Accounts (Various Issues); CBN Money and Credits Statistics, (2013, 2015, 2017).

The trading of currency and bank deposits determined in particular currencies takes place in the foreign exchange markets. Transactions in the foreign exchange markets determine the cost of foreign goods and financial assets. From table ---, the balance of payments and other statistics show that Nigeria's international transactions are unfavorable for most of the times.

Regression Results

Dependent Variable: RGDP
Method: Least Squares
Date: 04/15/18   Time: 19:01
Sample: 1 22
Included observations: 22

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	6.188185	3.293261	1.879045	0.0812
INFR	-0.038968	0.125059	0.311596	0.7599
MANQ	0.366463	0.242997	1.508098	0.1538
INDAGRQ	0.056919	0.042315	-1.345116	0.2000
CPS	0.179485	0.106798	1.680610	0.1150
BOP	-0.265646	0.280368	-0.947489	0.3595
FRS	-1.98E-05	7.40E-05	-0.267545	0.7930
EXCHR	-0.010395	0.017361	0.598740	0.5589

R-squared	0.667022	Mean dependent var	3.250000
Adjusted R-squared	0.599467	S.D. dependent var	2.536730
S.E. of regression	2.659901	Akaike info criterion	5.069742
Sum squared resid	99.05100	Schwarz criterion	5.466485
Log likelihood	-47.76716	Hannan-Quinn criter.	5.163203
F-statistic	0.728594	Durbin-Watson stat	1.381382
Prob(F-statistic)	0.651430		

The la variables are used to determine and test for the order of integration of the non-staionary macroeconomic variables. No spurious regression was found, the variables after applying the lag operators have common trends and the residuals are stationary. Since the variables were integrated in the same manner, co-integration was adopted. The results are summarized as follows:

Dependent Variable: RGDP
Method: Fully Modified Least Squares (FMOLS)
Date: 04/15/18   Time: 19:09
Sample (adjusted): 2 22
Included observations: 21 after adjustments
Cointegrating equation deterministics: C EXCHR INFR FRS
Long-run covariance estimate (Bartlett kernel, Newey   -West fixed bandwidth
    = 3.0000)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
MANQ	0.400290	0.270079	1.482125	0.1621
INDAGRQ	0.051705	0.048782	-1.059921	0.3085
CPS	0.287015	0.121293	2.366302	0.0342
BOP	-0.448709	0.310758	-1.443917	0.1724
C	4.750767	3.599181	1.319958	0.2096
EXCHR	0.008752	0.019013	0.460307	0.6529
INFR	-0.017340	0.236633	0.073276	0.9427
FRS	2.47E-05	8.84E-05	-0.279432	0.7843

R-squared	0.776698	Mean dependent var	3.290476
Adjusted R-squared	0.566618	S.D. dependent var	2.592085
S.E. of regression	2.917240	Sum squared resid	110.6337
Durbin-Watson stat	1.703388	Long-run variance	8.406904

Dependent Variable: RGDP
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/15/18   Time: 19:13
Sample: 1 22
Included observations: 22
Convergence achieved after 39 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(9) + C(10)*RESID(-1)^2 + C(11)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	7.270675	2.445550	2.973022	0.0029
INFR	-0.038359	0.208103	-0.184326	0.8538
MANQ	0.378005	0.224261	1.685564	0.0919
INDAGRQ	0.065660	0.086737	-0.757006	0.4490
CPS	0.167521	0.089461	1.872563	0.0611
BOP	-0.109215	0.396822	-0.275224	0.7831
FRS	-1.27E-05	0.000139	-0.091739	0.9269
EXCHR	-0.013414	0.052593	0.255057	0.7987

	Variance Equation			
C	4.788332	5.424358	0.882746	0.3774
RESID(-1)^2	0.632278	0.685073	0.922935	0.3560
GARCH(-1)	-0.947182	0.913015	-1.037422	0.2995

R-squared	0.651170	Mean dependent var	3.250000	
Adjusted R-squared	0.573245	S.D. dependent var	2.536730	
S.E. of regression	2.862400	Akaike info criterion	4.969019	
Sum squared resid	114.7067	Schwarz criterion	5.514540	
Log likelihood	-43.65921	Hannan-Quinn criter.	5.097527	
Durbin-Watson stat	1.100900			

Models for time series data are tested for autocorrelation usually with the assumption of homoschedastic disturbances. This is why a form of heteroskedaticity that can be encountered in time series models as these, the autoregressive conditional heteroschedasticity(ARCH) and its generalized form(GARCH) are adopted for a separate regression presented in table -----. This concept by Engle (1982) is adopted and applied to data on exchange rate volatility because the foreign exchange market is a volatile market. In speculative markets like the exchange rate and stock markets, you can observe that large and small errors tend to occur in clusters. Macroeconomic data from the past and recent past most certainly influences the conditional disturbance variance. Therefore the conditional variance or the volatility in exchange rate is tested and regressed in this procedure. Two distinct model specification are onsidered; one for the conditional mean of the dependent variable (RGDP), and one for the conditional disturbance variance.

Dependent Variable: RGDP
Method: ML - ARCH (Marquardt) - Normal distribution
Date: 04/15/18   Time: 19:17
Sample: 1 22
Included observations: 22
Failure to improve Likelihood after 17 iterations
Presample variance: backcast (parameter = 0.7)
GARCH = C(3) + C(4)*RESID(-1)^2 + C(5)*GARCH(-1)

Variable	Coefficient	Std. Error	z-Statistic	Prob.
C	4.097516	1.095240	3.741203	0.0002
EXCHR	-0.005914	0.004943	-1.196436	0.2315
	Variance Equation			
C	3.450162	19.20181	0.179679	0.8574
RESID(-1)^2	-0.113461	0.942931	-0.120328	0.9042
GARCH(-1)	0.569482	2.358591	0.241450	0.8092

R-squared	0.731675	Mean dependent var	3.250000
Adjusted R-squared	0.616741	S.D. dependent var	2.536730
S.E. of regression	2.557876	Akaike info criterion	4.992242
Sum squared resid	130.8546	Schwarz criterion	5.240206
Log likelihood	-49.91466	Hannan-Quinn criter.	5.050654
Durbin-Watson stat	1.222567		

Discussion of Findings

The Nigerian economy seems to lack stability in growth due to the exchange rate volatility. The behavior of exchange rate is such that both in the short-run and long-run, it explodes in a volatile manner, does not converge in a straight or in a cyclical way. This volatile behavior is transmitted to economic growth through the explanatory or exogenous variables. An analysis of Nigeria's exchange rate behavior from 1970-2017 showed that there exists a causal effect/relationship between the exchange rate volatility and macroeconomic variables such as inflation, balance of payments, unemployment, and the gross domestic product(GDP) growth rate. The periods of analysis saw a fluctuation in the naira/USD and naira/Pound sterling exchange rates and other major international currencies. Economic growth and exchange rate volatility are inversely related. High volatility can diminish or dwarf economic growth, however, growth comes with volatility. Exchange rate volatility feeds on macroeconomic instability. Nigeria has suffered high inflation and unemployment rates which are transmitted by pass through effect of exchange rate volatility caused by global oil price fluctuations. The latter is caused by monolithic structural dependence on crude exports. Consequently, exchange rate volatility is a major cause of macroeconomic instability in Nigeria. For instance, while the exchange rate moved from N8.04/1USD in 1990, to N22.05/1USD in 1993, and again to N81.65/1USD in 1995, the inflation rate moved from 8.04% in 1990 to 57.2% in 1993 and 72.8% in 1995.

Exchange rate volatility has negative effects on real sector growth through import-export gap, domestic trade and capital flows, investment, investors' confidence, local enterprises' productivity, income, consumption as well as the balance of payment and general distortions in the economy. It is also found that bi-directional relationship exists between the real gross domestic product(RGDP) and exchange rate (EXCHR). The low demand for Nigeria's naira as a result of domestic structural deficiencies, penchant for the dollar and Nigeria being a demand side economy has led to the depreciation of the naira. This in turn has the following negative multiplier effects on the real sector of the economy; galloping and geometric rise in inflation rate due to the cost of hedging foreign exchange risk, a negative impact on Nigeria's stock market, sluggish growth in industrial and agricultural output, as well as a depletion in external reserves, a negative balance of payment and trade as a result of a fall in export trade in oil and non-oil exports, high interest rate that discourages investment, high cost of domestic production, and a fall in industrial sector output.This finding is in line with Anoka and Takon,(2014) who found that exchange rate, like other macroeconomic variables such as inflation rate, interest rate, unemployment

rate, money supply and balance of payment, is a strong indicator of macroeconomic performance. It can be used to evaluate the strength and weakness of the economy. If the domestic deficient factors leading to exchange rate volatility are treated, it would lead to macro-financial stability in Africa and Nigeria in particular. Exchange rate volatility affects growth in all sectors; agriculture, manufacturing, trade, transportation, information and communication, mining and quarrying, small and medium scale enterprises inclusive. On the other hand, adequate growth in these other sectors can improve exchange rate stability. It affects inflation, government expenditure on infrastructure, education and health, unemployment, investment, consumption, trade and import restrictions. The inflationary effect of fuel price increase for instance, has contributed to a rise in misery index due to exchange rate volatility. Inflation rate jumped from 8.7% in 2015 to 13.7% in 2016.Within the same period, Naira to USD exchange rate increased from N219 to N347 respectively. The RGDP growth rate fell from 3.96% in 2015 to -0.36% in 2016, accompanied by erosion in the value of the naira in the FOREX market, with an evaporation of confidence and falling foreign direct investment (FDI), due to exchange rate effect.

A comparative analysis of selected countries exchange rate shows that in Africa; the Nigerian naira, the South African rand, the Kenyan shilling, the Egyptian pound, and the Ghanaian Cedi, all depreciated against the US dollar, by 16.10%, 33.79%, 12.91%, 9.51%, and 18.32%, respectively. In North America; the Canadian dollar, and the Mexican peso depreciated respectively by 18.97% and 16.80%, against the US dollar.The Brazilian real, the Argentine peso, and the Colombian peso equally depreciated by 48.87%, 52.66% and 33.58%, respectively against the US dollar. The British pound sterling, euro, and the Russian ruble depreciated against the US dollar by 6.25%, 10.84% and 19.94% respectively. In Asia, the Japanese yen, the Chinese Yuan and the Indian rupee also depreciated against the US dollar by 0.35%, 7.27% and 7.04% respectively, against the US dollar. In all, the Japanese yen was the least depreciated among the currencies surveyed, while the Argentine peso witnessed the largest depreciation. China maintains an exchange rate that is virtually pegged to the U.S. dollar.

This led to pressures to devalue when the dollar was strong and China's competitors were devaluing and to appreciation pressures when the dollar weakened while China's trade surplus soared. In the days of central planning, when China was essentially a closed economy and all foreign trade was planned and carried out by government, the country maintained a fixed and over-valued exchange rate. For a remarkable fifteen years (1955-1970), it did not vary from 2.46 Yuan to the dollar. The foreign exchange system was gradually reformed with a view to removing disincentives to exports caused by the overvaluation. Foreign exchange retention schemes and foreign exchange swap markets were introduced in the 1980s, which, in addition to occasional devaluations of the official exchange rate, allowed for a further depreciation of the currency. Despite substantial liberalization, China's foreign exchange market remains a restricted one. Domestic enterprises do not participate directly, but must sell their foreign exchange to a designated bank, of which there are over 300, and buy foreign exchange upon proof of commercial

contracts. All trading is conducted among these banks. Each is assigned a foreign exchange position by the central bank, and must enter the market when it is not met, borrowing from banks with excess holdings or lending to those with a shortage. Any overall surplus is bought up by the central bank, and any deficit met by central bank sales, in order to maintain the RMB exchange rate with the dollar. Conversely, Nigeria is a dependent economy, and remains on the periphery of the world's capitalist economy. Infrastructural deficiency is holding down investment and industrial production, as well as non-oil exports. Government is expected to use the revenue derived from oil exports to fix the infrastructure problem, but this revenue is adversely affected by exchange rate volatility. Big and small businessmen are hard hit by exchange rate problems encountered in trade. Exporting and importing entrepreneurs and small scale industrialists are finding it difficult to cover their expenses, with dwindling local manufacturing. Export-oriented investment and reliance on domestic production for consumption and exports hold the key to putting the Nigerian economy on the path of recovery and sustained growth. This will ascertain the real value of the naira and make it competitive with foreign currencies such as the US dollar, Japanese yen, Chinese Yuan and the British pound. To allow a weak currency like the naira which is not known among the basket of recognized currencies of the Western world to be subject to the vagaries of the international market forces is very harmful to the domestic economy.

In international finance and monetary policy, exchange rate is the price of the naira in terms of other currencies. Its volatility affects the economy and our daily lives. Nigeria's business has become less competitive with their foreign counterparts. When the exchange rate is so high (say at N362/USD as at March 2018), the naira becomes less valuable relative to foreign currencies, foreign goods(including raw materials) become expensive(with low indigenous technology innovation) for Nigerian consumers and produces(entrepreneurs and industrialists), and Nigerian goods and services become more cheap for foreigners. The aggregate income earned by Nigeria is low, and the standard of living of Nigerians is low too. For the real sector impact, high exchange rate volatility increases credit risk, firms and enterprises run at very low or no profits. Credits to the private sector (CPS) are less productive, increasing the moral hazard (hazard of default) and problem of adverse selection associated with unsuccessful loans. CPS is used to import agricultural and industrial inputs (raw materials) which are very expensive due to high exchange rate volatility. The transmission mechanism is on low growth of RGDP.

Conclusion
Exchange rate policy and its volatility have many implications on the Nigerian economy. The key effects identified are on the manufacturing sector, agricultural sector, small and medium scale enterprises, and balance of payment, foreign reserves, net exports, oil revenue and inflation. In the foreign purchases or net exports, funds transferred from Nigeria to the trading partners have to be converted into US dollars or Euros in the foreign exchange market. Consequently, exchange rate volatility has produced substantial and instrumental fluctuations in the balance of payment, accompanied by inconsistent policies, as well as domestic structural inefficiencies and external economic dependency.

This is why the naira is weakened considerably instead of its appreciation. There is high cost of imports, including industrial raw materials and agricultural inputs, making domestic production highly non-competitive in the global and domestic markets and non-attractive too. On a more general level, high exchange rate volatility has an effect on the overall health of the economy; the interest rates, the willingness to save and invest. Most domestic and foreign investment that would ensure more jobs are put on hold or postponed, with negative multiplier effects on unemployment, reduced income and shrinking consumption that lowers the standard of living and limits economic growth. Exchange rate volatility has significant effects on individuals, households, businesses, financial markets, financial institutions and the overall economy. Aggregate investment is affected by uncertainty, ambiguity on exchange rate. Consumption is affected by foreign exchange shortages, increase in nominal price of petrol and high electricity tariffs. Export is affected by a fall in oil price as a major export commodity and product Ion shortfalls, inflation, petrol scarcity and depletion of foreign reserves. However, the positive side is that, it has reduced Nigeria's demand and supply of foreign currencies, goods and services, which might payoff for the real sector in the long run, if consistency and diversification is maintained.

Recommendations
The faster Nigeria evolves indigenous technology innovation in all sectors, the better for the country. This will insulate the economy from undue external dependency and currency manipulations. At this point, the level of imports will be lower than exports, the balance o payment, exchange rate, foreign reserves will improve. The exchange rate will be relatively stable and the real sector performance will be better for it. Exchange rate policy is connected analytically and practically with the maintenance of capital controls and to monetary policy. The monetary policy committee (MPC) is likely to ease its tightened monetary stance to ensure that new growth trajectory is sustained. The MPC decision on exchange rate policy and currency control should encourage investment and stock market activities. Flexible exchange rate policy has a long-term impact of attracting capital inflows. In so far as poverty reduction is dependent on economic growth, stability and the capacity to carry out an independent macroeconomic policy, it is also influenced through these linkages by exchange rate policy. Indeed, exchange rate policy should support or complement other domestic economic policies for achieving development goals, employment and poverty reduction. In this respect, the discussion of the future of the exchange rate regime in Nigeria cannot be disconnected from the issue of external financial liberalization and capital mobility.

Considered from a pro-poor growth perspective, exchange rate policy should stimulate domestic production and exports, including manufacturing or imports substitution. It means that a significant level of self-reliant production and consumption is required to conserve foreign reserves. Rural areas agricultural processing and development of infrastructure, health, telecommunication, transport, water production and supply can work towards rapid poverty reduction, enhance growth and bring benefits to the poor. This policy is aimed to achieve macroeconomic stability. In developing countries, an over-

valued exchange rate is often held to penalize farmers, small and medium scale enterprises, and devaluation in connection with stabilization and liberalization programs is thought to reduce urban bias. However, in the Nigerian context of significant inequality in the distribution of productive assets and in trade orientation, such a devaluation policy, as prescribed by IMF and World Bank, does not systematically benefit rural activities and incomes or reduce urban bias. If devaluation of the Naira must take place, then the preconditions would be to take care of various forms of inequality.

Without its considerable external financial strength (foreign exchange reserves), Nigeria's economy has become extremely vulnerable resulting to severe domestic financial fragility. In this scenario, devaluation implies disastrous vulnerability. Maintaining external financial strength through exchange rate policy during economic transition is imperative for Nigeria. Nigeria should accumulate large foreign exchange reserves through diversified aggressive exports like China. Large reserves would provide a buffer against potential speculative attacks upon the Naira. This study also recommends export promotion measures such as entrepreneurship development, export tax rebates and concessional loans to export enterprises.

References

Adikibe, N. K. (2008). *Impact of exchange rate instability on selected macroeconomic indices in Nigeria: 1990-2004*. Unpublished Masters Thesis. Federal University of Technology, Owerri: Nigeria.

Akpan, E. O. & Atan, J. A. (2012). *Effects of exchange rate movement on economic growth in Nigeria.* National Bureau of Economic Research, Cambridge.

Alagidede, P. & Muazu, I. (2016). *On the causes and effects of exchange rate volatility on economic growth: Evidence from Ghana.* WITS Business School, University of the Witwatersrand, Oarktown, Johannesburg, S. A. Working Paper.

Azid, T., Jamil, M, & Kousar, A. (2005). *Impact of exchange rate volatility on growth and economic performance: A Case of Pakistan.* The Pakistan Development Review, 44 (4), Pp749-775.

Babatunde, W. A. & Akinwade, A. A. (2010). Exchange rate volatility in nigeria: consistency, persistency and severity analyses. *CBN Journal of Applied Statistics,* 2 (2), PP29-47.

Bakare, A. S. & Olubokun, S. (2011). Exchange rate determination in Nigeria: The Purchasing Power Parity Option. *International Institute of Science and Technology Education (IISTE), 1* (2), Pp5-24.

Celasun .O. (2003). *The case for flexible exchange rate. essays in positive economics*, Chicago: University Press.

Central Bank of Nigeria (2017). *Exchange rate policy and macroeconomic management.* https//www.cbn.gov.ng/intops/exchratepolicy. Retrieved 15-12-2017.

Central Bank of Nigeria (2014). A review of Nigeria's exchange rate policies since deregulation in 1986. *CBN Economic and Financial Review,* 41 (3), Pp10-43.

Dornbusch, R. (1986). Multiple exchange rates for commercial transactions, in Babatunde .W.A and Akinwade. A. A. (2010), (eds). Exchange rate volatility in Nigeria: Consistency, persistency and severity analysis. *Central Bank of Nigeria Applied Statistics,* 2 (2), Pp29-47.

Duke, O. O., Adesanya, O. & Ahmadu, R. A. (2012). Still on the equilibrium real shock into domestic prices: Does it exist for Nigeria?, *Central Bank of Nigeria Economic and Financial Review, 50* (3), Pp203-233.

Engel. R. F. (1982). Autoregressive heteroskedasticity with estimates of the variance of United Kingdom Inflation, *Econometrica, 50,* Pp987-1008.

Hamilton, J. D. (1994). *Time series analysis,* Princeton: Princeton University Press.

Hendry, D. F. (1995). *Dynamic econometrics,* Oxford: Oxford University Press.

Isola, I. A., Oluwafunke, A. I., Victor, A. & Asaleye, A. (2016). Exchange rate fluctuation and the Nigerian economic growth. *Euro Economica, 35* (2), Pp1-15.

Izilien, E. I. & Okoh, E. N. (2015). Exchange rate volatility and economic growth in Nigeria, *Journal of Economic and Financial Issues, 3* (1), Pp128-140.

Jhingan, M. L. (2012). *Money, banking, international trade and public finance.* Delhi: Vrinda Publishing Press.

Jugu, Y. G. & Soepding, B. A. (2015). The effect of fluctuating foreign exchange rate on the Nigerian Economy, *Journal of Economics and Financial Issues, 3* (1), PP80-91.

Levy-Yeyati, E. I. & Sturzenneger, F. (2002). To float or to fix: Evidence of the impact of exchange rate regimes on growth, *American Economic Review, 12* (2), Pp3-24.

Maddala, G. S. & Ki-In, M. O. (1998). *Unit roots cointegration and structural chang*e, Cambridge: Cambridgeb University Press.

Musyoki, D., Pokhariyal, G. P. & Pundo, M. (2012). The impact of real exchange rate volatility on economic growth: Kenyan Evidence, *Peer-Reviewed and Open Access Journal 7* (1). Pp59-75.

Obadan, M. I. (2007). Exchange rate policy design: Choosing the right exchange rate response in a changing environment. *Central Bank of Nigeria Economic and Financial Review, 45* (4), Pp143-162.

Oyovwi, O. (2012). Exchange rate volatility and economic growth in Nigeria. *Mediterranean Journal of Social Sciences,* 3 (3), Pp11-21.

Sanusi, J. O. (2004). *Exchange rate mechanism: The current Nigerian experience.* Nigerian-British Chamber of Commerce and Industry, Abuja: Nigeria.

Ugochukwu, P. U. (2015). Exchange rate volatility and economic growth in Nigeria (1980-2012), *Research Journal of Economics, 4* (3), Pp1-13.

Appendices
EXCHR Volatility and Economic Growth
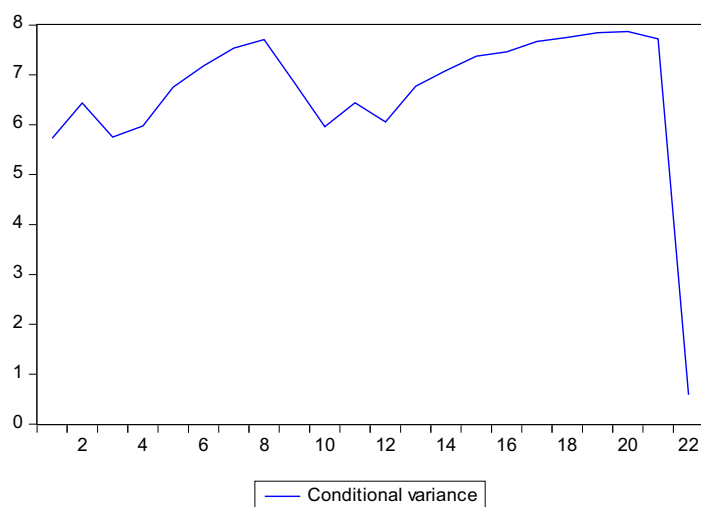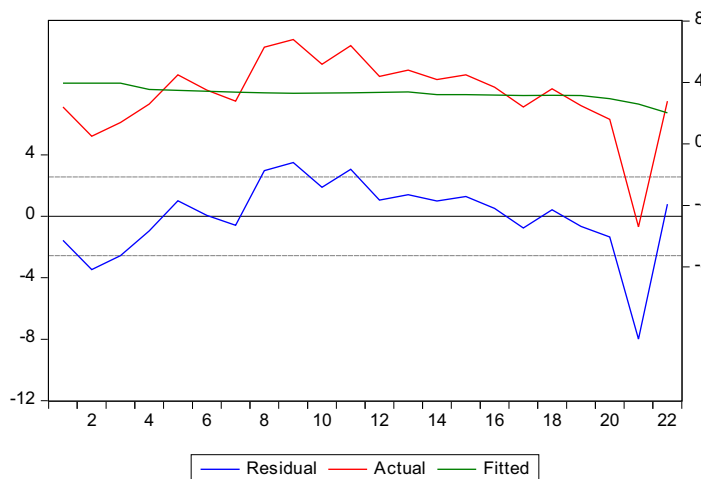
Gradients of the Objective Function