
The Impact of Variations in Exchange Rate on Price Stability in Nigeria

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Abstract

The research studied the impact of variations in exchange rate on price stability in Nigeria. The objective of the research being to examine the impact of exchange rate fluctuations on price stability in Nigeria. To answer the question as to the extent exchange rate fluctuation has whether positive and significant impact on price stability in Nigeria or otherwise. The review of literature was structured in conceptual, theoretical and empirical parts. The methodology adopted in this research was modeled on regression using macro-economic variables such as consumer price index, exchange rate, import rate and export rate, Ofurum and Tobira (2011). The two-stage least square (2LS). The statistical properties of the 2LS are contained in the popular Gauss- Markov theorem which sees the least squares estimators as unbiased linear estimator, having minimum variance. The model examines the relationship between a dependent variable and two or more regressor (independent variables). This suit the research since the intention of the researcher is to examine the impact of exchanges rate on these macro-economic variables on a variable by variable basis. In analyzing the data it was seen that exchange rate fluctuations has positive and non-significant impact on Nigeria's consumer price index (coefficient of EXR = 0.218, t-value = 1.327). This indicates that a one percent increase in consumer in Nigeria may be due to 0.22 percent increases in exchange rate fluctuations. The probability value of 0.199 > 0.05 confirms the non-significance of the result. The coefficient of determination which measures the goodness fit of the model as revealed by R-square (R^2) indicates that 65.9% of the variations observed in the dependent variable were explained by variations in the dependent variable. This is quite high could be attributed to the inclusion of control variables such export rate (EXPR) and import rate (IMPR). The test of goodness of fit as indicated by R^2 was properly adjusted by the Adjusted R-Square to 61.0%. In conclusion, Nigeria's over dependence in the Oil and Gas sector of the economy has affected the major macro economic variables and adverse foreign exchange rate regimes have affected the Nigeria economy over the years. Nigeria's failure to diversify its economy which would have helped cushion the effect of the constant changes in oil prices stems in part from weaknesses in the nation's small and insular private sector. The recommendations of study include the adoption of budgetary polices that will reduce deficits budget in Nigeria hence reduction in inflation rate. Another recommendation is that inclusion of the parallel exchange rate market on major macro economic variables in Nigeria. Finally, the study further recommends that more research be encouraged to examine the transmission mechanism of exchange rate on major macro-economic variables in Nigeria. The channels through which exchange rate impact on these major macroeconomic variables will determine the appropriateness of policies.

1.0 Introduction

In macroeconomic management, exchange rate policy is an important tool. This is derived from the fact that changes in the rate of exchange have significant implications for a

country's balance of payments position and even its income distribution and growth. It aids international exchange of goods and services as well as achieving and maintaining international competitiveness and hence ensures viable balance of payment position. It serves as an anchor for domestic prices and contributes to internal balance in price stability (CBN, 2011). Macroeconomic performances under different exchange rate regimes have been a subject of continuing research and controversy. Ghosh, et. al., (1996) using a three-way classification analyzed the link between exchange rate regimes, inflation and growth. The result indicates that pegged exchange rates are associated with lower inflation and less variability. They therefore argued that this was due to a discipline effect the political costs of failure of defending the peg induce disciplined monetary and fiscal policy and a confidence effect to the extent that the peg is credible, there is a stronger readiness to hold domestic currency, which reduces the inflationary consequences of a given expansion in money supply. The study also found that pegged rates are associated with higher investment but correlated with slower productivity growth.

On net, output growth is slightly lower under pegged exchange rates compared to floating and intermediate regimes (Ghosh, et. al., 1996). Also, using data from 159 countries for the 1974-99 periods, Levy-Yeyati and Sturzenegger (2000) reclassified the exchange rates into three groups (float, intermediate, fixed) and estimated the correlation between the actual (de facto) exchange rate regimes and macroeconomic performance. The main findings include: (a) fixed exchange rate regimes seem to have no significant impact on the inflation level when compared with pure floats, while intermediate regimes are the clear under-performers; (b) pegs are significantly and negatively correlated with per capita output growth in non-industrial countries; (c) output volatility declines monotonically with the degree of regime flexibility; and (d) real interest rates appear to be lower under fixed rates than under floating rates because of lower uncertainty associated with fixed rates.

Locally, in Nigeria, several works also exist. Ofurum and Torbira, (2011) examined the effect of the demand and supply of foreign exchange on the gross domestic product of the Nigerian economy over a fourteen (14) year-period (1995-2008), it was revealed that supply of foreign exchange has a positive and significant relationship with output level of Gross Domestic Product while the demand for foreign exchange has a negative relationship with gross demand product. This study implies that the growth in supply of foreign exchange has resulted in an increase in the Gross Domestic Product in Nigeria hence the determinants of the demand for foreign exchange should be annualized in order to understand what occasioned the negative relationship with Gross Domestic Product.

Looking at the impact of exchange on the manufacturing sector of Nigeria, Opaluwa, Umeh and Ameh (2010) argue that fluctuations in exchange rate adversely affect output of the manufacturing sector. This according to them is because Nigerian manufacturing is highly dependent on import of inputs and capital goods. These are paid for in foreign exchange whose rate of exchange is unstable. Thus, this apparent fluctuation is bound to adversely affect activities in the sector that is dependent on external sources for its productive inputs. The study actually shows adverse effect and is all statistically significant in the final analysis. They therefore advocated that there is the need to strengthen the link between agriculture and the manufacturing sector through local sourcing of raw materials thereby reducing the reliance of the sector on import of inputs to a reasonable level.

A cursory look at literature on exchange rate and macro-economic fundamentals indicate that most studies are on exchange rate volatility and its impact on these macro-economic indices

(Choo, Lee and Ung, 2011; Canales-Kriljenko and Habermeier, 2004). Where the study is not on volatility of exchange rate, it involves uncertainty in foreign exchange market on the domestic output of nations (see, Dunne, Hau and Moore, 2007), macro-economic and institutional factors (Claessens, Klingebiel, and Schmukler, 2003) impact on stock market indices (Gan, Lee, Yong and Zhang, 2006), development of government bond markets (Claessens, Klingebiel, and Schmukler, 2003), on alternative wage-setting regimes (Kouretas, 1991), exchange rate and inflation (Ghosh, Gulde, Ostry, and Wolf, 1996; Imimole and Enoma, 2011), exchange rate volatility, stock prices and lending habits of banks (Mbutor, 2010; Subair and Salihu, 2010). This study is an attempt to examine the impact of foreign exchange rate on major macro-economic variables from a holistic point, which is combining the macro-economic variables in the study. It is against this background that this study will investigate the impact of foreign exchange rates on major macro-economic variables in Nigeria.

1.1 Statement of research problem

Nigeria's over dependence in the Oil and Gas sector of the economy has affected the major macro economic variables and adverse foreign exchange rate regimes have affected the Nigeria economy over the years. The volatility of crude oil prices in the world market has made the Nigerian economy highly susceptible to the ever changing exchange rates thus affecting the prices of goods and services in the Nigerian economy. Nzekwe (2006) states that Nigeria's failure to diversify its economy which would have helped cushion the effect of the constant changes in oil prices stems in part from weaknesses in the nation's small and insular private sector. This has had a heavy toll on our foreign reserves and invariably, our balance of trade and balance of payment.

A proper foreign exchange rate management in many ways strives to balance the level of imports with that of exports of goods that the country has comparative advantage (Obadan, 2006). Such balance is necessary for an economy to develop to levels beyond subsistence. But because of lack of government support for the real sector of the Nigerian economy as a result of its focus on foreign exchange earned from oil has also contributed immensely to the abysmal performance of the all other sectors especially the manufacturing sector. Manufacturers, who account for substantial contributions to Nigeria's gross domestic product before now have been unable to produce hence the fewer jobs, are created.

1.2 Research Objective

The objective of the research is to examine the impact of exchange rate fluctuations on price stability in Nigeria. To answer the question as to the extent exchange rate fluctuation has whether positive and significant impact on price stability in Nigeria or otherwise.

1.3 Research Hypothesis

H0 Exchange rate fluctuations do not have positive and significant impact on price stability in Nigeria.

1.4 Scope of research

This study will cover the period 1991 to 2015. Before the introduction of the Structural Adjustment Programmes (SAPs) in 1986, the country operated a fixed exchange rate regime based on trade and exchange controls, which was anchored through import license controls regime. However, Nigeria adopted the freely floating exchange rate regime in 1986 and between 1986 and 1995; different exchange rate management regimes were introduced by the various governments in power at the time, including a dual exchange rate regime in 1988, the

Inter-Bank Foreign Exchange Market (IFEM) in 1989 and the reintroduction of a dual exchange rate system in 1995. Over this period, the demand for foreign exchange outstripped supply progressively. The demand for this foreign exchange is expected to have an effect on all macro-economic fundamental in Nigeria; hence this study will examine the impact of foreign exchange rate on major macroeconomic determinants after the introduction of SAP in 1991 to 2015 irrespective of the different exchange rate regimes in Nigeria in that period.

2.0 Conceptual literature

Therefore as argued by Devereux (2001) that the best monetary policy rule in an open economy is one which stabilizes non-traded goods price inflation and that policy of strict inflation targeting is much more desirable in an economy with limited pass-through. If the monetary authorities are concerned with consumer prices inflation then the flexible exchange rate regime brings some costs as well as benefits. Moreover, the same logic implies that a policy of strict inflation targeting is quite undesirable in an open economy, since it effectively amounts to a requirement of fixing the exchange rate. It stabilizes inflation at the expense of a lot of output instability. Therefore as opined by Obaseki and Bello (1996) exchange rate policy involves three elements, the policy environment the mechanism for exchange rate determination (exchange rate system), the policy instruments designed and course of exchange rate movements hence the policy environment sets the preconditions or minimum requirements for effective exchange rate management and stability, and ultimately determines the optimal exchange rate policy to pursue as the exchange rate mechanism depicts the system of exchange rate administration while the policies applied reflect the objective of moving the exchange rate through a defined path.

Financial conditions affect the impact of nominal exchange rate fluctuations on growth stability mainly through balance sheets effects and impacts on foreign currency-denominated debt in developing and emerging countries. The net impact of exchange rate fluctuations will depend on the relative importance of competitiveness changes and costs from balance sheets effects. Financial markets development affects economic performances through efficiency in the allocation of productive resources and adjustment to shocks and may result in a more stable or unstable growth (Dornbusch and Giovannini, 1990).

2.1 Theoretical literature

The evolution of the foreign exchange market in Nigeria to its present state could be described as having been influenced by a number of factors such as the changing pattern of international trade, institutional changes in the economy and structural shifts in production.

David and Guadalupe (2006) defining an exchange rate policy is one of the most important issues in the response of Trade Balance (TB) in term of trade or in general speaking, in Real Exchange Rate (RER) and with more than forty years literature, the impacts of currency depreciation on a country's trade balance have been an important and debate in the development of international economic and trade especially the traditional studied in the Marshall-Lerner condition (ML) and the J-curve theory and according to the (ML) condition, currency devaluation improves the trade balance in the long run only if the sum of the absolute values of imports and exports demand price elasticities exceeds unit hence, due to the lag dynamics structure (TB) can worsen in the short-run because of the inelastic demand for imports and exports in the immediate aftermath of an exchange rate change.

Bamidele *et. al.* (1998) argues that the basic objective of Nigeria's exchange rate policy has been to ensure both internal and external balance as well as overall macroeconomic stability through the preservation of the value of the domestic currency, maintenance of favourable

external reserves and price stability (see, Iyoha, 1998). For a developing country like Nigeria that is highly dependent on trade, the exchange rate, which is the price of foreign exchange, plays a significant role in the ability of the economy to attain its optimal productive capacity. In addition, the exchange rate level has implications for balance of payments viability and the level of external debt, for example, if the exchange rate is overvalued, then this will result in unsustainable balance of payments deficits an escalating external debt stock which will in turn, lead to a declining level of investment, thus, it is imperative to let the exchange rate find its equilibrium level (Iyoha, 1998).

According to Nnamdi, (2009), trading offers opportunities for international exchange of commodities and services. This tends to boost national economic growth when it is appreciably driven by relative advantages arising from the factor endowments prevailing in the producing regions and economies. From this premise, the foreign exchange process offers nations the opportunity to produce goods for wider markets and consequently realize higher prices compared to the prevailing domestic prices for goods and services. Greater opportunities also exist because the same country could take advantage of trade to import at lower prices, goods which under normal circumstances would attract higher prices if produced locally (Nnamdi, 2009).

Noor, Nugroho and Yanfitri (2010) examined the influence of forex demand and supply interaction on Singapore's exchange rate. Estimation results show that the movement of rupiah is influenced by the forex supply and demand, where the foreign players are dominating. Furthermore, the demand and supply of foreign exchange is asymmetric. Also, the paper also shows the impact of exchange rate movements on output is only in the short term with a more significant influence to the import, while the depreciation of the Singaporean currency has a larger impact than its appreciation (Noor, Nugroho and Yanfitri, 2010).

Rime (2007) was of the view that the order flow accumulation is empirically proven by that affects the exchange rate hence, the main explanation of explanatory power is an order containing a lot of information potentially affects the exchange rate, thus before ordering, the buyer has to obtain information, including information concerning macroeconomic fundamentals from various sources and then process (analyze) such information that eventually create future expectation of exchange rate.

Mundell (1963) and Fleming (1962) recognized and analyzed the different effects that stabilization policies can have on output and exchange rate of a small open economy when perfect capital mobility prevails in the world. Their analysis was done within the traditional Keynesian fixed wage – price world. Their results are well known today, namely, that fiscal policy is completely ineffective in stimulating output due to the complete crowding out generated by the appreciation of the exchange rate, while monetary policy is an expansionary policy, since an initial decline in the interest rate forces a depreciation of the exchange rate and a further increase in output. The Mundell and Fleming results had therefore provided the policy prescription for the years to come. However, the recession of 1974-75 which was attributed to rising oil prices and restrictive fiscal and monetary policies in the western economies, has caused concern amongst several economists of how appropriate it is to treat wages and prices constant in a world of accelerating inflation (Mundell, 1963; Fleming, 1962)

Meon and Rizzo (2002) assumed that the empirical findings on the determinants of exchange

rate regimes are numerous and controversial. The reason for the differences among the findings mostly depends on the country samples taken into consideration, time periods, regime classifications used in the analyses, estimation methods and assumptions of econometric models. The econometric methods and regime classifications used in the papers are different from each other. Thus, it creates different results.

Gosh *et al.*, (1995) insist that if a flexible exchange rate arrangement is able to reduce growth volatility, why do several countries have recourse to various forms of fixed exchange rate systems which, as aforementioned, can limit monetary autonomy in a considerable way? Credibility in exchange rates, monetary and financial policies serves sometimes as a justification to the choice of a fixed exchange rate regime. Nominal exchange rate fixity it is the argued goes enables a country to import the monetary policy credibility of the base country. This gain of credibility will guide economic agent's expectations and increase monetary policy efficiency, therefore allowing the smoothing of economic cycles. Through credibility and discipline effects on monetary and fiscal policies, fixed exchange rates help create a domestic economic environment favourable to investment and trade (see, Gosh, *et al.*, 1995) leading to a relatively sustained and stable growth. As a result, fixed exchange rate regimes reduce the risks of instabilities coming from profligate fiscal and monetary policies observed in many developing countries such as those in Latin America in the 1980's.

The existing empirical literature on terms of trade shocks tends to corroborate the aforementioned theoretical predictions. In a sample of 96 to 100 countries over 1974-2000, Edwards and Levy Yeyati (2003) find evidence that countries with flexible exchange rate regimes adjust relatively better to terms of trade shocks than those running rigid systems of exchange rates. Broda and Tille (2003) analyze 75 developing countries over an almost similar period. Their results suggest that terms of trade fluctuations contribute to 21.3% in the short term and to 30% in the long run to real GDP growth variability in fixed exchange rates countries. These contributions fall to only 2.4% and 9.6% in countries with flexible exchange rates. Edwards and Levy Yeyati further proved that this amplification of the impact of terms of trade shocks on growth volatility increases with the rigidity of nominal exchange rates in both developed and emerging economies (Edwards and Levy Yeyati, 2003).

A few researches according to Markiewicz (2006) considered specific country groups such as Latin American countries, Central American countries, transition economies and etc hence in the existing literature there are no studies focused on emerging market economies. Most studies considered some of the optimum currency area variables, such as trade openness, size of economy, degree of economic development and geographical concentration of trade. In addition, some studies also included such macroeconomic variables as inflation, foreign exchange reserves, domestic credit, real exchange rate, and terms of trade. Also, a few studies contained political or institutional variables.

Baxter and Stockman (1988) argue that the international transmission of real and monetary disturbances depends on the exchange rate regime of each country, so, the adjustment to shocks constitutes one of the mechanisms through which the exchange rate regime influences growth volatility. A fixed exchange rate regime looks more appropriate when domestic nominal shocks prevail and capital is mobile (Eichengreen, 1998). In the presence of frequent real shocks and foreign monetary perturbations, a flexible exchange rate becomes more appropriate (Mundell, 1962; Frankel, 2003).

Many approaches to explain and forecast the changes in exchange rates have been developed.

However, these approaches have had little a success in explaining currency movements only in the long-term. After the seminal work of Meese and Rogoff (1983), who concluded that forecasts based on monetary approach to exchange rate determination could not out-perform the random walk forecasts, the macro models lost its allure. Even after almost twenty years of this finding, there is no such claim that theories based on fundamentals can provide best forecasts for the exchange rate movement (see Mark, 1995; Mark and Sul, 2001; Cheng, Chinn and Pascual, 2002; and Chinn and Meese, 1995, Evans and Lyons, 1999).

Neely and Sarno (2002) argue that instead of forecasting exchange rates through fundamentals, the agents can directly predict output, inflation and uncovered interest rate parity (UIP), this view introduces the role of time horizon, thus as exchange rate is an output derived out of market behaviour, merely concluding that exchange rate follows a random walk would mean that the market forces behind this rate are erratic.

There are several macro models that deal with exchange rate determination (see Gandolfo, 2001 for detailed discussion on the macro models). It could be observe from all these approaches that it considers only macro variables such as relative incomes, relative prices, relative interest rate differentials, relative cumulated current account balances etc. But in practice, do the market participants (dealers) consider only macroeconomic fundamentals such as these or any other (Frankel and Froot, 1996).

In the literature it was found that more than macroeconomic fundamentals, the dealers consider other variables that are micro in nature (Lyons, 1995). The micro variables are bid-ask spreads, trading volume, own volatility, non synchronous trading, information (both private and public), inventory cost, etc. In the financial market literature, to study the behaviour of asset prices and the market participants the researchers mostly use the microstructure theory, which is the only theory that considers all the micro variables.

Market microstructure theory is defined as the study of the process and outcomes of exchanging assets (i.e., currency, stock, etc.) under explicit trading rules (O'Hara, 1995). Basically, it consists of two models *viz.*, the inventory model and the information model. The crux of the inventory model is the problem of optimisation as the dealers' objective is to maximise expected profit per unit of time. This model also explains the relationship between the transaction cost and the bid-ask spreads. Information models, which are based on the adverse selection problems, also explain the behaviour of market prices through information contents of the traders. Since there exist asymmetries of information between the dealers, their behaviour in making the quote will be different.

These information models explain how the equilibrium market prices emerge in the presence of asymmetric information. In microstructure theory there are two variables that play centre stage, which had no role in the macro approach. They are: (a) Order flow (b) Bid-ask spread. Both these variables are synonymous with the 'quantity' and 'price' in traditional microeconomics. Order flow, as used in microstructure theory, is a variant of a key term in microeconomics, "effective demand". It measures the net buyer-initiated orders and seller-initiated orders. Here the word 'initiated' is very important in differentiating between order flow and the effective demand. In microstructure theory, orders are initiated against a dealer. The dealer stands ready to absorb imbalances between buyers and sellers. These 'uninitiated' trades of the dealer account for the wedge between these two concepts.

After the publication of Messe and Rogoff (1983) there were number of studies that tried to

explain the behaviour of exchange rates only in terms of macro fundamentals. But in the beginning of 1990s, which coincides with the introduction of trading systems like Reuters and Telerates through which the market participants, mostly banks, can complete their transactions electronically in a short span, the studies on microstructure approach to exchange rates have begun.

One of the basic studies in this area is Goodhart and Figliuoli (1991). In this study, for the first time, high frequency data on exchange rates has been analysed and many issues have been raised for further research in this area. But the application of microstructure theory to exchange rates was initiated with a pioneering study by Lyons (1995). Till date there are few studies that applied microstructure theory but to the leading exchange rates like US dollar/UK Pound, deutsche mark/US dollar and Japanese Yen/US dollar. The review of some of the important studies can be found in Bhanumurthy (2003).

It is observed from the literature survey that the study on micro issues in foreign exchange market is limited to three major currencies and also on the information models. Only one study Evans and Lyons (1999) has tried to establish the relative importance of theories based on macro fundamentals and microstructures, where it was concluded that compared to macro fundamentals, micro variables have more significant impact on the exchange rate movement.

However, this kind of analysis would be incomplete if the perceptions of traders, who are the real decision makers in the market, about the importance of macro fundamentals in determining the exchange rates are not taken into account. Cheung and Chinn (1999) has recognized this issue and undertaken a survey on foreign exchange dealers in the United States. This study probes the causes and determinants of bid-ask spreads and the predictability of exchange rates in the short-run. It was found that majority of traders responded that predictability of exchange rate changes is very low in the intra-day. And in the medium and long run more than two-thirds of the traders view that exchange rates cannot be predicted. Though this study did not focus on the factors that determine exchange rates over the time horizon, this is the beginning of the survey-based studies in the foreign exchange market.

Cheung, Chinn and Marsh (2000) have done a survey on UK based foreign exchange dealers in 1998. This study focuses on three aspects: 1) the microeconomic operation of the foreign exchange market; 2) the beliefs of dealers regarding the importance of macroeconomic fundamentals in understanding exchange rate movements; and 3) microstructure variables in the foreign exchange market. The study found that majority of the dealers view non-fundamental factors dominates the short-term exchange rate movements. Alternatively, it was found that speculation is an important factor in the short-term market. Further, the dealers believe that fundamentals have significant effects on exchange rates in much shorter time than what the macro theorists' expect to be. Regarding the concept of purchasing power parity, the study concludes that though the dealers accept it as a representative of exchange rate's fundamental value, but the trading would not be based on this.

Lastly, market convention has been found as an important determinant of bid-ask spread. Cheung and Wong (2000) extended this survey to Hong Kong, Tokyo and Singapore foreign exchange markets. The findings of this study corroborates to the findings of Cheung, Chinn and Marsh (2000) that the short term exchange rate dynamics depend more on non-fundamental factors rather than on fundamentals. One extension of this study from Cheung, Chinn and Marsh (2000) is that it tried to examine the impact of speculation and central bank

intervention on the short-run market movements. It was found that both increases market volatility. Also it was found that speculation increases liquidity and efficiency in the market while central bank intervention helps to restore equilibrium.

The authoritative survey of the literature on the random walk hypothesis in Frankel and Rose (1995) concludes that attempts to overturn the results of Meese and Rogoff have failed. Further support for the random walk hypothesis is provided in Rogoff (1999). Here Rogoff states that, at least for the major currencies and more generally for countries with low inflation, the random walk model has not been overturned by more recent empirical work. He also argues that the difficulties in relating financial variables to fundamentals are a more general problem and not one confined exclusively to exchange rates. Over short time horizons and for countries without high inflation, exchange rate models that include macroeconomic fundamentals do not perform better than a random walk in out-of-sample forecasting. Exchange rate volatility is simply the standard deviation of the error term.

McDonald (1999) notes that there is by now considerable empirical work favoring the view that models of the exchange rate that include fundamentals can outperform the random walk even at short time horizons. Thus, he was of the opinion that macroeconomic fundamentals play an important role in explaining the behavior of exchange rates. Some authors hold that these fundamentals are important only in the long run but have little to offer in explaining short-run movements, while others believe that macroeconomic fundamentals have explanatory power both in the long run and the short run.

Lyons (2001) was of the view that neither macroeconomic fundamentals nor the random walk model adequately account for exchange rate behavior at short horizons. Rather, short-run exchange rate movements are attributed to market microstructure factors, including inventory management and information aggregation by foreign exchange dealers. Specifically, the microstructure approach suggests that non dealers learn about fundamentals affecting the exchange rate, and this knowledge is reflected in the orders they place with dealers. Dealers in turn learn about fundamentals from order flow. The outcome of this two-stage learning process results in the formation of a price.

2.2 Empirical literature

According to Dolan *et al.* (1991) economic growth is most frequently expressed in terms of increase in Gross Domestic Product (GDP), a measure of the economy's total output of goods and services. This GDP as a measure of economic growth, like any other economic quantities, must be expressed in real terms. That is, it must be adjusted for the effects of inflation so as for it to provide a meaningful measure of growth overtime.

Economic fluctuations influence decisions by economic agents, thereby modifying the efficient allocation of productive resources in the economy (IMF, 1998). Nevertheless, economists have long believed that growth volatility was neutral vis-a-vis growth, leading them to study both phenomena separately. Then, it was subsequently shown that volatility and growth are not really independent from each other and that the costs induced by volatility can be substantial. As a consequence, the study of business cycles has gained momentum. Indeed, Ramey and Ramey (1994) among others like Hnatkowska and Loayza (2004) have proved that growth volatility tends to reduce mean growth rates.

Hence Caporale and Pittis (1995) was of the opinion that changes in arrangement of exchange rate have an impact on economic growth or to investigate the extent to which volatility of

exchange rate may be responsible for changes in the rate of economic production because development strategies by many developing countries have either been changed or are under consideration to change. Increase in nominal and real exchange rate volatility accompany such moves Domestic and foreign investment decision both are negatively affected by exchange rate fluctuations. As the degree of variability associated with flexible exchange rate is relatively high, so this matter becomes more important for the countries which switched from fixed exchange rate regime to flexible exchange rate regime (Coes 1981; Brada and Mendez 1988; Caballero and Corbo 1989; Cote 1994; Baum et al 2001; Arize, Osange, and Slottje 2004).

Harberger (2003) say while exchange rate regimes have much weaker impact on economic performance in industrial economies, hence, Harberger (2003) studied the impact of economic growth on real exchange rate. He found that there is no systematic connection between economic growth and real exchange rate. Husain *et al.* (2004) found in their study that little access to international capital is available for the weaker and less developed countries, so low rate of inflation and higher level of durability is associated with fixed exchange rate regime in those countries. However, they found no robust relationship between economic performance and exchange rate regime in the developing economies. They also found that advanced economies may experience durable and slightly higher level of growth rate without higher level of inflation in flexible exchange rate regime.

Michael *et al.*, (2003) also posits that literature seems to suggest that keeping the real exchange rate at competitive levels and avoiding excessive volatility are important for growth though the statistical evidence is not overwhelming. But this fact, in and of itself, conveys an important message. A stable and competitive real exchange rate should be thought of as a facilitating condition for economic growth. Keeping it at competitive levels and avoiding excessive volatility facilitate efforts to capitalize on economic growth enhancing fundamentals: human capital, savings and investment, and the institutional capacity to assimilate and generate organizational and technological knowledge, *inter alia*. The transmission mechanism in which devaluation or real exchange rate volatility can affect economic growth has however been a subject of theoretical debate with inconclusive empirical findings.

Ofurum and Torbira, (2011) empirically examined the effect of the demand and supply of foreign exchange on the Gross Domestic Product of the Nigerian economy over a fourteen (14) year-period (1995-2008). Employing the use of Vector Auto Regression (VAR) models on the time series data, the result reveal that supply of foreign exchange has a positive and significant relationship with output level of Gross Domestic Product while the demand for foreign exchange has a negative relationship with Gross Domestic Product. Their study implies that the growth in supply of foreign exchange has resulted in an increase in the Gross Domestic Product in Nigeria hence the study recommends that the determinants of the demand for foreign exchange should be annualized in order to understand what occasioned the negative relationship with Gross Domestic Product.

When the results of previous studies are considered, no results appear to be reasonably robust to changes in country coverage, sample period, estimation method, and exchange rate regime classification. Therefore, Von Hagen and Zhou (2005) was of the view that there is a negative association with the probability of adopting a flexible regime as explained by Rizzo (2002) who posited that size of economy (Gross Domestic Product) is found to be positively associated with floating regimes in almost all studies, but not always significantly. Economic

development (GDP per capita) is found to be significantly associated with floating regimes by four studies (Edwards, 1996,) significantly associated with fixed regimes by three studies (Rizzo, 1998) and not significantly associated with any particular regime by another two studies (Poirson, 2001).

Tenreyro (2006) have studied that exchange rate instability does not affect the trade volume which indicates that stable exchange rate is not necessary for increasing the level of international trade. These results are also consistent with the model proposed by Bacchetta and Wincoop (2000) which concluded that stability of exchange rate may not impact the volume of trade in state of general equilibrium. Azid *et al.* (2005) have found the effect of volatility of exchange rate on growth and economic performance and concluded that economic growth of Pakistan has been effected positively by flexible exchange rate arrangements. However, evidence of exchange rate volatility effect on manufacturing production of Pakistan has been traced as by Dorants and Pozo (2001).

The earliest theory regarding the determination of price level, and changes in price level is the quantity theory of money. This theory in its simplest form postulates a direct proportional relationship between money supply and price level. According to the theory if money supply were doubled, prices would increase proportionately. Several studies after this formulation have shown that money supply is significant in explaining inflation in both advanced and developing economies. Among such studies are those of Owosekun and Odama, 1975; Osakwe 1983; Adeyokunu and Ladipo, 1982 and Aigbokhan, 1991).

According to Von Hagen and Zhou (2005) inflation is always positively and significantly associated with floating except for one study. Similar results are valid for the other variables (the other macroeconomic, political and institutional variables). This suggests that the macroeconomic, political and institutional variables are not robust predictors of exchange rate regime choice. On the other hand, it doesn't mean this denies the potential importance certain variables for specific groups of countries, in certain time periods, or across some of the regime categories. For instance, trade openness is positively associated with the probability of adopting a flexible regime (Von Hagen and Zhou, 2005)

Friedman (1953) was the first to assume that although the long run equilibrium of the economy is independent of the exchange rate arrangement, the adjustment to real shocks in the short and medium runs differs because of nominal rigidities. In a flexible system, the nominal exchange rate depreciates following an adverse external real shock thereby reducing the depreciation of real exchange rate realized via domestic prices and the real economy. Instead, the adjustment will take place through changes in quantities if the nominal exchange rate is fixed leading to a more relatively unstable output growth. Uncertainty about the equilibrium real exchange rate which varies over time and the persistence of shocks hitting the economy as well as political costs of devaluation reinforce the appropriateness of flexible exchange rates

In the international economics literature, there are several macro models that deal with exchange rate determination (see Gandolfo, 2001). One can observe from all these approaches that it considers only macro variables such as relative incomes, relative prices, relative interest rate differentials, relative cumulated current account balances etc. But in practice, do the market participants (dealers) consider only macro-economic fundamentals such as these or any other variables (that are micro in nature)? Particularly, in the short run, market participants do not in fact all use a common agreed-upon model for thinking about the

foreign exchange market and do not all share the same expectations at any point of time (Frankel and Froot, 1996). Now the question is, in the short run, what are the factors that affect the dealers' decision making?

Krichene (1998) studied the exchange rate determination and price interdependence in five African countries. He employed monthly data of bilateral real exchange rate for the period from 1979 to 1996. The finding of the study was that bilateral real exchange rates revert to long-term equilibrium.

Calvo and Reinhart (2002) mentioned that the monetary framework such as an inflation targeting strategy can reduce the advantages implied by exchange rates flexibility. Exchange rates flexibility and furthermore the discretion in policy-making it brings will harm growth stability if the government is unable to pursue consistent policies. Fear of floating highlighted by and a high pass-through of exchange rate movements to domestic prices in small countries tend to reduce or overturned the advantages provided by a flexible exchange rate arrangement. It should also be noticed that the timing and the coordination of economic policies

Countries or groups of countries linked by specific exchange rate arrangements have also been studied. Devarajan and De Melo (1990) have observed that French speaking African countries exhibit a revealed aversion to inflation that is unusually very high relative to other African countries with similar structural characteristics. Given these preferences, these countries experienced more volatile growth rates than their African counterparts with more flexible exchange rate systems. This negative impact of the fixity of nominal exchange rate on growth volatility does not carry over in other developing countries with fixed exchange rate arrangements (Bleaney and Fielding, 2002).

Piazzesi and Schneider (2006) held that inflation can also enter into the stochastic discount factor via its dynamic interactions with the real production. This was also supported by Duffee (2007) where he held that the short-term interest rate is typically viewed as a macro variable reflecting monetary policy. Hence, it seems there is a clear trade-off between output/consumption volatility and inflation volatility. With a very high exchange rate pass-through, all monetary rules face a significant trade-off. The nature of the trade-off is also seen between fixed and flexible exchange rates. The central argument is that the nature of the trade-off will be quite different in mature industrial economies than in emerging market or transition economies.

Ang, Dong, and Piazzesi (2007) say that to a two-country framework in order to help identify the time-varying market prices of risks, which in turn amplify roles of macroeconomic innovations on exchange rate changes. This is important since ignoring risk premia or assuming constant market prices of risks may mislead to a conclusion that exchange rates are not linked to macroeconomic fundamentals (see, Diebold, Rudebusch and Aruoba, 2005).

Kouretas (1991) analyzed the price and output effects of monetary and fiscal policy in a small open economy with perfect capital mobility, flexible exchange rates and alternative wage - setting regimes. The results showed that the effects of monetary and fiscal policy depend not only on the wage regime that prevails, but also on the assumptions about the form of the demand for money function.

Dornbusch and Giovannini (1990) assumes that the real effects of monetary policy stem from

nominal rigidities and international capital mobility When prices and nominal wages are rigid changes in money supply modify real money balances which in turn induce changes in real expenditure. Interest rates changes result in capital movements that accentuate the evolution of the exchange rate and so, have a tendency to reinforce monetary policy effects on the economy (this was collaborated by Mundell, 1963).

Several empirical studies that have undertaken to identify the possible determinants of inflation in Nigeria and elsewhere have identified exchange rate as another inflation determining variable. Honoham and Lane (2003) for instance, reported a variety of regressions, explain annual inflation differentials across the Eurozone over the period 1999-2001, and found a substantial role for the variation in nominal effective exchange rate movements in explaining divergent inflation rates.

Honoham and Lane (2004) in a related study confirm that exchange rate matter for EMU inflation rates during the periods of Euro appreciation (2002-2003) as well as during the periods of Euro depreciation (1999-2001). Aigbokhan (1991) showed that the level of real exchange rate was a primary determinant of the rate of inflation in Mexico during the 1980s and 1990s.

Chhibber (1990) developed a detailed econometric model, which takes into account both monetary and structural factors while investigating the causes of inflation in Zimbabwe. Their investigation shows that monetary growth, foreign price, exchange rate, interest rate, unit labour cost and real income, are the chief determinants of inflation in this country.

A similar macroeconomic model of inflation was employed for Ghana by Chhibber and Shafik (1990). This study, which covered the period 1965–1988, suggests that the growth of money supply is one key variable explaining the Ghanaian inflationary process. Such variables as official exchange rate and real wages could not exert any significant influence on inflation. However, significant positive relationship was found between the parallel exchange rate and the general price level. Still on the issue of inflation, Chhibber (1990) proposed that there is only one relationship between exchange rate and price inflation. Basing his argument on empirical studies of some African countries, one of his main conclusions is that devaluation could exert upward pressure in the general price level through its increased cost of production in the short-run. As far as Chhibber is concerned, the extent to which devaluation of a local currency will engender inflation is largely a function of the impact of such policy measure on the revenues and expenditures (budget) of government, together with the monetary policy that is simultaneously pursued.

Elbadawi (1990) writing on inflationary process, stabilization and the role of public expenditure in Uganda showed that the precipitous depreciation of the parallel exchange rate was the principal determinant of inflation. This conclusion obviously agrees with the findings of Chhibber and Shaffik (1990) with respect to Ghana. A major factor identified in almost all these studies is the strong influence of imported inflation as a propagating factor in inflationary process. Since the incidence of imported inflation is synonymous with fixed exchange rate regime, a case for policy of flexible exchange rate was suggested as an anti-inflation measure.

Supporting this conclusion, Owosekun (1975) argued that flexible exchange rates would minimize the impact of imported inflation. Traditional economics has it that the aim of devaluation is to make import dearer and export cheaper, and that to make devaluation

effective, domestic prices must remain unchanged. A situation where devaluation of a national currency is found to be affecting domestic prices does not go well with any country, as the impact of such a measure is sure to be compounded, as each successive devaluation will create its own price spiral until the initial effect is neutralized. However, this will not arise if domestic production is enough to match the extra demand created by the devaluation. It has been observed that the trend in the Nigerian economy following the introduction of Structural Adjustment Programme (SAP), and the associated massive devaluation accompanied by subsequent oil subsidy removal is in consonance with the above view. According to him, the devaluation of the naira is supposed to work without changing domestic prices, but devaluing the naira leaves the price of oil unchanged internationally as the price of oil is always determined in US Dollar.

The devaluation of the naira was also recognized in the work of Moser (1995) as an important variable in the inflationary process in Nigeria. It was found that concurrency fiscal and monetary policies had a major influence on the impact of the depreciation of the naira on inflation. As observed by Oyejide (1989) exchange rate depreciation often leads to increased local currency cost of imported inputs (raw materials and intermediate capital goods) and final goods via the cost-push inflation channel. He noted that since non tradable goods cannot be imported, an excess demand for them would translate into increased prices given the fixed nature of domestic supply in the short-run. This price increase according to him feeds directly into domestic inflation via the demand-pull route.

Omotor (2008) examined the impact of price response to exchange rate changes in Nigeria using annual from 1970-2003. Evidence from the paper revealed that exchange rate policy reform is important in the determination of inflation in Nigeria. Other studies, which have reached similar conclusions, are Odedokun (1996), Odusola and Akinlo (2001), Nnanna (2002), Lu and Zhang (2003).

Kouretas (1991) posits that the intellectual debate about the effectiveness of alternative macro stabilization policies has been going on for many decades, but it was only in the 1950s that macroeconomic models of a closed economy were widened to embrace fully the presence of a foreign trade sector. It was the time that the world was moving from exchange controls and trade discrimination to a situation which could be characterized by increasing openness. Although international transactions were governed, at that time, by a fixed exchange rate regime, the feeling was that the international economy was moving towards a more flexible exchange rate that could reflect the changes in the demand and supply in the foreign exchange market and that eventually the world financial markets will become highly integrated, both features being very familiar today (see, Kouretas, 1991).

Meese and Rogoff (1983) say in the area of international economics, one of the basic issues that were not resolved till now is what are the determinants of exchange rate? Many approaches to explain and forecast the changes in exchange rates have been developed. However, these approaches have had little a success in explaining currency movements only in the long-term. After the seminal work of Meese and Rogoff (1983), who concluded that forecasts based on monetary approach to exchange rate determination could not out-perform the random walk forecasts, the macro models lost its allure. Even after almost twenty years of this finding, there is no such claim that theories based on fundamentals can provide best forecasts for the exchange rate movement.

Neely and Sarno (2002) posits that one important question often raised on the relationship

between macroeconomic fundamentals and exchange rate is why should macro fundamentals forecast exchange rate movement? They thus argued that there is a need to address this very basic issue to strengthen the research in exchange rate economics and also to lay the future direction for this area. Assuming exchange rate forecast is necessary to the policy makers to determine output and inflation and to the fund managers for their asset allocation, there were of the opinion that instead of forecasting exchange rates through fundamentals, the agents can directly predict output, inflation and uncovered interest rate parity (UIP). Hence, as exchange rate is an output derived out of market behaviour, merely concluding that exchange rate follows a random walk would mean that the market forces behind this rate are erratic. This is a conclusion to be contested and to be answered both at theoretical and at empirical level. On the other hand, over dependence on macro theories that it can explain and forecast exchange rates near-accurately at all time horizons is also not completely acceptable. In the short-run, the recent studies, particularly after the introduction of on-line trading systems that made the tick-by-tick (high frequency) data available, have shown that macroeconomic fundamentals are barely useful in predicting the rate movement.

Lyons (1995) says in literature it is found that more than macroeconomic fundamentals, the dealers consider other variables that are micro in nature. The micro variables are bid-ask spreads, trading volume, own volatility, non synchronous trading, information (both private and public), inventory cost, etc. In the financial market literature, to study the behaviour of asset prices and the market participants the researchers mostly use the microstructure theory, which is the only theory that considers all the micro variables.

O'Hara (1995) defined market microstructure theory as the study of the process and outcomes of exchanging assets (i.e., currency, stock, etc.) under explicit trading rules and say it consists of two models *viz.*, the inventory model and the information model. The crux of the inventory model is the problem of optimisation as the dealers' objective is to maximise expected profit per unit of time. This model also explains the relationship between the transaction cost and the bid-ask spreads. Information models, which are based on the adverse selection problems, also explain the behaviour of market prices through information contents of the traders. Since there exist asymmetries of information between the dealers, their behaviour in making the quote will be different. These information models explain how the equilibrium market prices emerge in the presence of asymmetric information.

After the publication of Messe and Rogoff (1983) there were number of studies that tried to explain the behaviour of exchange rates only in terms of macro fundamentals. But in the beginning of 1990s, which coincides with the introduction of trading systems like Reuters and Telerates through which the market participants, mostly banks, can complete their transactions electronically in a short span, the studies on microstructure approach to exchange rates have begun. One of the basic studies in this area is Goodhart and Figliuoli (1991). In this study, for the first time, high frequency data on exchange rates has been analysed and many issues have been raised for further research in this area. But the application of microstructure theory to exchange rates was initiated with a pioneering study by Lyons (1995). Till date there are few studies that applied microstructure theory but to the leading exchange rates like US dollar/UK Pound, deutsche mark/US dollar and Japanese Yen/US dollar. The review of some of the important studies can be found in Bhanumurthy (2003).

Evans and Lyons (1999) tried to establish the relative importance of theories based on macro fundamentals and microstructures were it was concluded that compared to macro fundamentals, micro variables have more significant impact on the exchange rate movement.

But this kind of analysis would be incomplete if the perceptions of traders, who are the real decision makers in the market, about the importance of macro fundamentals in determining the exchange rates are not taken into account.

Cheung and Chinn (1999) has recognised this issue and undertaken a survey on foreign exchange dealers in the United States. This study probes the causes and determinants of bid-ask spreads and the predictability of exchange rates in the short-run. It was found that majority of traders responded that predictability of exchange rate changes is very low in the intra-day. And in the medium and long run more than two-thirds of the traders view that exchange rates cannot be predicted. Though this study did not focus on the factors that determine exchange rates over the time horizon, this is the beginning of the survey-based studies in the foreign exchange market.

Cheung, Chinn and Marsh (2000) in a survey on UK based foreign exchange dealers in 1998 focused on three aspects: 1) the microeconomic operation of the foreign exchange market; 2) the beliefs of dealers regarding the importance of macroeconomic fundamentals in understanding exchange rate movements; and 3) microstructure variables in the foreign exchange market. The study found that majority of the dealers view non-fundamental factors dominates the short-term exchange rate movements. Alternatively, it was found that speculation is an important factor in the short term market. Further, the dealers believe that fundamentals have significant effects on exchange rates in much shorter time than what the macro theorists' expect to be. Regarding the concept of purchasing power parity, the study concludes that though the dealers accept it as a representative of exchange rate's fundamental value, but the trading would not be based on this. Lastly, market convention has been found as an important determinant of bid-ask spread.

Cheung and Wong (2000) extended this survey to Hong Kong, Tokyo and Singapore foreign exchange markets. The findings of this study corroborates to the findings of Cheung, Chinn and Marsh (2000) that the short term exchange rate dynamics depend more on non-fundamental factors rather than on fundamentals. One extension of this study from Cheung, Chinn and Marsh (2000) is that it tried to examine the impact of speculation and central bank intervention on the short-run market movements. It was found that both increases market volatility. Also it was found that speculation increases liquidity and efficiency in the market while central bank intervention helps to restore equilibrium.

Li and Yin (2008) investigated the relationship between short-run exchange rate dynamics and macroeconomic fundamentals by adopting a no-arbitrage international macro-finance approach, under which the macroeconomic fundamentals enter into the exchange rate dynamics in a nonlinear form. Based on empirical analysis using an enriched dataset including exchange rates, yields of zero-coupon bonds, and macroeconomic variables of the US and the Euro area, the paper finds a close link between macroeconomic fundamentals and the exchange rate dynamics. The model-implied monthly exchange rate changes can explain about 57% variation of the observed data. Having been amplified by the time-varying market prices of risks, the macroeconomic innovations help capture large volatility of exchange rate changes. The foreign exchange risk premium can largely alleviate the forward premium anomaly (see, Li and Yin, 2008).

Frenkel (1979), Dornbusch, (1976) state that the existence of a long-run equilibrium relationship among relative money supplies, relative income levels and the nominal exchange rate hence new open economy macroeconomics models attempts to explain exchange rate

movements by incorporating imperfect competition and nominal rigidities in a general equilibrium open economy (Obstfeld and Rogoff, 2003).

Marcello and Taboga (2009) were of the view that in line with different model settings of exchange rate, there is has a nonlinear relation with macroeconomic fundamentals. In contrast to uncovered interest parity, our model indicates that the expected exchange rate changes are determined by both the interest rate differential of two countries and the foreign exchange risk premium and that the unexpected exchange rate changes are also driven by the fundamental innovations, whose roles are amplified by the time-varying market prices of economic risks. However, these models cannot find empirical evidence on a close relationship between short-run exchange rates movements and macroeconomic fundamentals (Engel and West, 2005). Furthermore, they fail to capture the volatile time-varying foreign exchange risk premium, implied by the well documented forward premium anomaly in foreign exchange markets (see, Bekaet, 1996).

Edwards (1998), Berger *et. al* (2000) used a simple binary structure to classify exchange rate regimes into either fixed or flexible ones while the others (Von Hagen and Zhou, 2007) used an ordered-choice or multinomial-choice structure in order to classify the regimes. Besides, the studies also differ from each other in terms of estimation methods. Due to technical difficulties in the estimation of panel data models, especially due to the heavy computational burden of numerical integrations, panel data models are rarely implemented in the literature, few of the studies in the literature (Von Hagen and Zhou, 2007) employed panel data models in order to empirically analyze the determinants of exchange rate regimes.

3.0 Research methodology

The research design adopted in this research is the *ex-post facto* research design. This is the type of research involving events that have already taken place, data exists as no attempt is made to control or manipulate relevant independent variables apparently because these variables are not manipulatable. Also, as described by Kerlinger (1970), the *ex-post facto* research design also called causal comparative research is used when the researcher intends to determine cause-effect relationship between the independent and dependent variables with a view to establishing a causal link between them. Hence, the justification for the adoption of this research design hinges on the unmaniputability of data and the intention of the researcher to determine cause-effect relationship of the impact of exchange rate on macro-economic variables in Nigeria from 1991-2015.

The nature of data for any study depends entirely on the objectives of the research and the type of research undertaken. Consistent with the above therefore and in line with researches conducted in this area of finance in Nigeria where most data utilized were obtained from the Central of Nigeria Statistical Bulletin for the relevant periods the nature and sources of data for this type of research will be secondary data. Hence, secondary data will be used in this research and are data already processed and collated.

3.1 Model Specification

This study will adopt Ofurum and Torbira (2011) ordinary regression model in line the works of Bakare (2011), Accam (1997), Serven and Solimano (1992) and Akpan (2009) to examine the impact of exchange rate on macro-economic variables such as gross domestic product growth rate, balance of trade positions of Nigeria, consumer price index, foreign private investment in Nigeria. Ofurum and Tobira (2011) model is represented as;

$$GDP = a + a_2 DFE + a_3 SFE + U_t \dots\dots\dots (i)$$

- where GDP = Gross Domestic Product
- DFE = Demand for Foreign Exchange
- SFE = Supply of Foreign Exchange
- a = Equation Constant
- a₂...a₃ = Coefficient of independent variables
- u_t = Error Term

For the research hypothesis which states that exchange rate in Nigeria does not have positive and significant impact on the maintenance of internal balance in price stability in Nigeria.

$$CPI = a + b_1 ER + b_2 EX + b_3 IMP + \mu \dots\dots\dots (ii)$$

where;

- CPI = Consumer price index
- ER = Exchange rate
- a = Constant of the regression function
- b₁-b₃ = Coefficient of the independent variables
- EX = Export rate
- IMP = Import rate
- μ = Error term

3.2 Assumptions

A model according to Yomere and Aghonifoh (1999) is a simplified view of reality designed to enable the researcher describe the essence and inter-relationship within the system or phenomenon it depicts. The underlying assumptions for the modified Ofurum and Tobira (2011) model to be used in this study are:

- i. It is a linear function of a random variable
- ii. It is unbiased. Thus its average or expected value are equivalent to its true value
- iii. It has minimum variance, i.e, it is an efficient estimator, given an unbiased estimator with the least variance (See Onwumere, 2009).

3.3 Description of Explanatory Variables

3.3.1 Dependent Variables

Consumer Price Index (CPI)

Inflation could be described as the increase in prices of goods and services in a country. One commonly used proxy for the measurement of inflation is the consumer price index. The consumer price index is a close measure of the rate of inflation in an economy and is therefore the consumer price index as quote in CBN statistical bulletin will be adopted in line with the works of Barbosa-Filho (2006) and Frenkel and Taylor (2006), who used the proxy in their works.

3.3.2 Independent Variable

Exchange Rate

The exchange rate is the rate at which a country's currency trades with the currency of other countries. Literature seems to suggest that keeping the real exchange rate at competitive levels and avoiding excessive volatility are important for growth though the statistical evidence is not overwhelming. But this fact, in and of itself, conveys an important message. A stable and competitive real exchange rate should be thought of as a facilitating condition for economic growth (Onwumere, 2009). Keeping it at competitive levels and avoiding excessive volatility facilitate efforts to capitalize on economic growth enhancing

fundamentals: human capital, savings and investment, and the institutional capacity to assimilate and generate organizational and technological knowledge. Therefore, adopting works of Aguirrea and Calderon (2006) and Herve, Shen and Amed (2010), the annualized real exchange rate will be adopted as a measure of exchange rate.

3.4 Control Variables

Export Rate

An export of a good occurs when there is a change of ownership from a resident to a non-resident; this does not necessarily imply that the good in question physically crosses the frontier. Export of goods is a major source of foreign exchange to any nation. It determine the volume of foreign exchange available to that country hence a major determinant of exchange rate. In this study, total export ratio will be measure by Nigeria's total export divided gross domestic product by (Singh, 2002).

$$EX = \text{Total Export/GDP} \dots\dots\dots (ix)$$

Import Rate

An import of a good occurs when there is a change of ownership from a non-resident to a resident; this does not necessarily imply that the good in question physically crosses the frontier. Importation of goods and services is a major source of depletion of a country's foreign currencies hence has an impact on exchange rate. In this study, the total import ratio will be measured by Nigeria's Total import divided by gross domestic product (Singh, 2002).

$$IMP = \text{Total Import/GDP} \dots\dots\dots (x)$$

4.0 Data analysis and Discussions of findings

Three steps were used to test the research hypothesis. In step one; the hypothesis was restated in null and alternate forms. In step two, the results were analyzed while in step three, decisions were made. The decision rule involved the rejection or acceptance of the null or alternate hypothesis based on criterion of the techniques of analyses.

Test of Research Hypothesis

Step One: Restatement of the Hypothesis in Null and Alternate forms:

H₀₃: Exchange rate fluctuations do not have positive and significant impact on price stability in Nigeria.

H_{a3}: Exchange rate fluctuations have positive and significant impact on price stability in Nigeria.

Step Two: Presentation and Analysis of Result

Table 4.1 Regression Results for Hypothesis Three

Dependent Variable: CPI

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXR	0.218477	0.164626	1.327116	0.1987
EXPR	0.061485	0.042116	1.459909	0.1591
IMPR	0.006711	0.066412	0.101048	0.9205
C	0.920906	0.191639	4.805414	0.0001
R-squared	0.658806	Mean dependent var		1.626800
Adjusted R-squared	0.610064	S.D. dependent var		0.579653
S.E. of regression	0.361964	Akaike info criterion		0.951100
Sum squared resid	2.751370	Schwarz criterion		1.146120
Log likelihood	-7.888753	F-statistic		13.51618
Durbin-Watson stat	0.224331	Prob(F-statistic)		0.000039

Source: E-view Result

As revealed from table 4.8, exchange rate fluctuations has positive and non-significant impact on Nigeria's consumer price index (coefficient of EXR = 0.218, t-value = 1.327). This indicates that a one percent increase in consumer in Nigeria may be due to 0.22 percent increases in exchange rate fluctuations. The probability value of 0.199 > 0.05 confirms the non-significance of the result. The coefficient of determination which measures the goodness fit of the model as revealed by R-square (R^2) indicates that 65.9% of the variations observed in the dependent variable were explained by variations in the dependent variable. This is quite high could be attributed to the inclusion of control variables such export rate (EXPR) and import rate (IMPR). The test of goodness of fit as indicated by R^2 was properly adjusted by the Adjusted R-Square to 61.0%.

4.2 Discussion of results

Research objective: To examine the impact of exchange rate fluctuations on price stability in Nigeria.

Studies on the impact of exchange rate fluctuations on inflation have been based on the regime of exchange rate practiced by these countries (see, Devarajan and De Melo, 1990; Calvo and Reinhart, 2002 and Krichene, 1998). Calvo and Reinhart (2002) mentioned that the monetary framework such as an inflation targeting strategy can reduce the advantages implied by exchange rates flexibility hence exchange rates flexibility through policy-making of different brings negatively impact on stability if the government is unable to pursue consistent policies. Fear of floating produced a pass-through of the exchange rate movements to domestic prices in small countries and this reduce or overturned the advantages provided by a flexible exchange rate arrangement.

Devarajan and De Melo (1990) observed that French speaking African countries exhibit a revealed aversion to inflation that is unusually very high relatively due to government policy of enhancing fixed exchange regimes with similar structural characteristics and given these preferences, countries experienced more volatile prices than their African counterparts with more flexible exchange rate systems however, the negative impact of the fixity of nominal exchange rate on price does not carry over in other developing countries with fixed exchange rate arrangements (Bleaney and Fielding, 2002).

Again, according to Piazzesi and Schneider (2006) inflation can also enter into the stochastic discount factor via its dynamic interactions with the real production. This was also supported by Duffee (2007) where he held that the short-term interest rate is typically viewed as a macro variable reflecting monetary policy. Hence, it reveals that there exist a clear trade-off between output/consumption volatility and inflation volatility because with a very high exchange rate pass-through, all monetary rules face a significant trade-off. The nature of the trade-off is also seen between fixed and flexible exchange rates. The central argument therefore is that the nature of the trade-off will be quite different in mature industrial economies than in emerging market or transition economies. The findings of this study suggest that exchange rate fluctuations have positive and non-significant impact on inflation in Nigeria. This was confirmed Kouretas (1991), Dornbusch and Giovannini (1990). Kouretas (1991) analyzed the price and output effects of monetary and fiscal policy in a small open economy with perfect capital mobility, flexible exchange rates and alternative wage - setting regimes and the results showed that the effects of exchange rate on inflation depend not only on the wage regime that prevails, but also on the assumptions about the form of the demand for money function while Dornbusch and Giovannini (1990) assumes that the real impact of exchange rate fluctuation stem from nominal rigidities and international capital mobility

hence, when prices and nominal wages are rigid changes in money supply modify real money balances which in turn induce changes in real expenditure.

5.0 Conclusions

Exchange rate fluctuations have positive and non-significant impact on Nigeria's consumer price index. Nigeria's over dependence in the Oil and Gas sector of the economy has affected the major macro economic variables and adverse foreign exchange rate regimes have affected the Nigeria economy over the years. Nigeria's failure to diversify its economy which would have helped cushion the effect of the constant changes in oil prices stems in part from weaknesses in the nation's small and insular private sector. This has had a heavy toll on our foreign reserves and invariably, our balance of trade and balance of payment. Nigeria major foreign earning is from oil; hence, volatility of crude oil prices in the world market has made the Nigerian economy highly susceptible to the ever changing exchange rates thus affecting the prices of goods and services in the Nigerian economy.

6.0 Recommendations

- Fluctuations in exchange rate in Nigeria results to an increase in cost of production in an economy which subsequently led to increases in prices. Again, with increased cost of production, the propensity to import increases and this leads to deficit. Deficit budget is often associated with increases in prices. These have been quite common in Nigeria. Therefore, the study recommends budgetary polices that will reduce deficits budget in Nigeria hence reduction in inflation rate.
- The parallel market in Nigeria is very vibrant and active; however, the specific focus of this study was to examine the impact of exchange rate fluctuations on major macro-economic variables in Nigeria based on the official quote of exchange rate in Nigeria. Therefore, for a further study, this study recommends an inclusion of the parallel exchange rate market on major macro economic variables in Nigeria.
- Again, this study recommends a study that will examine the transmission mechanism of exchange rate on major macro-economic variables in Nigeria. The channels through which exchange rate impact on these major macroeconomic variables will determine the appropriateness of policies.

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