EFFECT OF REAL EXCHANGE RATES ON ECONOMIC GROWTH OF NIGERIA (1960-2016)

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Abstract
This study on the effect of real exchange rates on economic growth of Nigeria was conducted for the period 1960 - 2016 to determine the nature of the relationship between real exchange rates and economic growth as well as ascertain the causal relationship between them. Annual time series data sourced from World Development Indicators and Central Bank of Nigeria Statistical Bulletins were used in this study. The problem was that the real exchange rate of Naira was far from being competitive and was both unstable and unsustainable to the economic growth of Nigeria as it had neither substantially promoted exports nor reduced imports. Ordinary least squares were employed to estimate the multiple regression models with the aid of Eviews application software for windows version 9, followed by Pairwise Granger causality test and robustness tests. Major findings were that real exchange rates had insignificant relationship with economic growth under the fixed exchange rates regime; but had significant negative effect on economic growth; significant negative relationship with savings and significant positive relationship with real interest rates under the free exchange rates regime. Granger Causality results showed that no causal relationship existed between real exchange rates and economic growth under both fixed and real exchange rates regimes and for the whole period. The conclusion was that real exchange rates had neither a significant effect nor a causal relationship with economic growth. The main recommendations are: to sustain free exchange rates regime as it has been more beneficial to our economic growth; not to reintroduce fixed exchange rates regime again; to maintain competitive real interest rates and continually promote savings to attract investments and promote economic activities.

Keywords: Real Exchange Rates, Economic Growth, Central Bank of Nigeria and World Development Indicators.

Introduction
The real exchange rate refers to the weighted average of a country’s currency relative to an index or basket of other major currencies adjusted for the effects of inflation. It serves as an international price for determining the competitiveness of a country. It plays a crucial role in guiding the broad allocation of production and spending in the domestic economy between foreign and domestic goods (Takaendisa, 2006). The nature of the relationship between real exchange rates and economic growth is fast becoming an important area of study in both developed and developing countries (Akpan, 2008 as cited in Sibanda, 2012). There appears to be a significant divide between policy makers and economists/financial experts regarding the effects of foreign exchange rates on economic growth. Whereas laymen and politicians are intimately convinced that a lower exchange rate will spur growth, economists are generally skeptical that the relative price of currencies may be a fundamental driver of growth over the long-run (Habib, Mileva & Stracca, 2016).

The exchange rates of Naira relative to other major currencies have been everything but stable. It has been substantially fluctuating/depreciating since 1986. The rate is not encouraging. In fact, many Nigerians spend more buying less in recent times, an act that should not be. Sherif (2017) attributes the sources of devaluation/depreciation to Nigerian obsession for foreign products, looting of public funds, falling oil prices
and government economic policies. Many Foreign investors have lost trust in the Nigerian economy and have refused to invest. There is therefore need for the citizens of Nigeria and the government to join hands to shore up the exchange rate of Naira to other currencies before it becomes an object of ridicule. The exchange rate of naira per US dollar had depreciated from 1 Nigerian naira (NGN) per US dollar (USD) in 1986 to 101.75 NGN/1 USD as at 2nd June, 2000 to 369.056 NGN/1 USD as at 1st August, 2017 (Mataf.net, retrieved on 7th February, 2017). In the same vein, Nigeria’s real GDP growth fluctuated substantially in recent years. It tended to decrease through 1997-2016 period, ending at −1.5% annual changes in 2016. The GDP growth rates (annual change elsewhere) in 2016 were 4.3% in Egypt, 0.7% in Zimbabwe, and 3.7% in Algeria (World Data Atlas, retrieved from knoema.com/atlas on 3rd August, 2017. The continual downward trends in the naira exchange rates relative to other major currencies and the declining GDP growth rates in recent times have contributed to the need for this study. Furthermore, although the literature contains ample studies on the effect of real exchange rates on economic growth, there is no consensus on the right exchange rate regime/policy that guarantees a sustainable and competitive exchange rates at all times.

Most countries are recognizing that competitive exchange rates are an important macro-economic instrument in ensuring low inflation, promoting exports and enhancing economic growth. The Nigerian government, through the Central Bank of Nigeria, introduced the flexible exchange rate policy on 15th June, 2016. The policy was designed to effectively remove controls on the Naira and allowing increased dollar supply that would help strengthen the country’s weak currency (Emefiele, 2017).

Nigeria is an open and emerging market economy that participates greatly in international trade. It depends heavily on imported capital goods and consumer goods, and exports crude oil, other minerals and commodity exports. It is important for Nigeria to maintain a highly competitive exchange rate in order to gain from the trade, that is, the exchange rate that is neither too strong nor too weak. An overvalued currency can be very dangerous to the economy of Nigeria. A strong currency negatively affects exports (Old Mutual, 2009). The rational is that a strong currency makes exports expensive and imports cheap. It contributes to an import boom, which in turn, deteriorates the current account of foreign reserves and the balance of payments.

It is essential to understand how exchange rates affect real GDP growth in Nigeria. One of the macro-economic objectives of Nigeria is to maintain sustainable economic growth. High economic growth helps to maintain an adequate level of foreign reserves and to create and maintain a sustainable internationally competitive exporting sector that will contribute to the creation of jobs and high incomes.

The continual downward trends in the naira exchange rates relative to other major currencies of the world and the declining GDP growth rates in recent times have necessitated this study on the effect of real exchange rates on economic growth. Although the literature contains ample studies on the effect of real exchange rates on economic growth, there is no consensus on the right exchange rate regime or policy that constantly guarantees a sustainable and stable exchange rate at all times. It is based on the above reasons that this study on the effect of real exchange rates on economic growth is being undertaken. This introduction is followed by the review of related literature in section 2. Section 3 deals with methodology. Section 4 covers presentation and interpretation of results while section 5 contains summary of findings, conclusions and recommendations.

Statement of the Problem
The stark reality is that the real exchange rate of the naira is very far from being competitive. It is both unstable and unsustainable to the economic growth of Nigeria. It has neither substantially promoted exports nor reduced imports. It is even an arduous task to obtain foreign exchange for the settlement of foreign exchange obligations. The real foreign exchange rates of naira relative to major foreign currencies have continually depreciated from 1986 up to August 2017. It depreciated from 1 NGN per 1 USD in 1986 to 101.75 NGN per 1 USD as at 2nd June, 2000 and 369.056 NGN per 1 USD as at 7th August, 2017 (Mataf.net, retrieved on 7th August, 2017). In the same vein, Nigeria’s real GDP growth fluctuated substantially in recent years. It tended to decrease through 1997-2016 period, ending at −1.5% annual changes in 2016. The GDP growth rates (annual changes) elsewhere in 2016 were 4.3% in Egypt, 0.7% in Zimbabwe, and 3.7% in Algeria (World Data Atlas, retrieved from knoema.com/atlas on 3rd August, 2017). The foreign reserves

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of Nigeria had declined from $42.8 billion in January, 2014 to $26.7 billion as at June, 2016 with average monthly inflow falling from $3.2 billion to below one billion dollars per month. Despite these outcomes, the demand for foreign exchange rose from an average import bill of N148.3 billion in 2005 to about N917.6 billion per month in 2015 (Emefiele, 2017). Empirical evidences and theories present inconclusive results about the relationship that exists between economic growth and exchange rates. The traditional approach to exchange rate posits that devaluation has expansionary effects on the economy (Salvatore, 2005), while the structural approach to exchange rates holds that devaluation has a contractionary effect on the economy (Acar, 2000). The absence of consensus in literature (from both theoretical and empirical studies), provide justification for demands by stakeholders in Nigeria on how to deal with the weak and falling naira. Nigeria runs an open economy; as a result, competitive real exchange rates are very crucial variables in the growth process. It is based on the above problem that this study is conducted to ascertain the effects of real exchange rates on economic growth of Nigeria.

Statement of Hypotheses

The following null hypotheses are formulated to guide this study:

i. there is no significant relationship between economic growth and the variables of real exchange rates, real interest rates, trade openness, broad money supply (M2), and domestic savings in Nigeria;

ii. There is no causal relationship between economic growth and the variables of real exchange rates, real interest rates, trade openness, broad money supply, and domestic savings, in Nigeria.

Foreign Exchange Rate is the price of one currency in terms of another; the rate of transformation of one currency to another or the rate at which one currency is exchanged for another (Nzotta, 2004). The bottom line in any international business relation is that goods sold and services rendered must be paid for. In making payment from one currency into another, there must be a basis of conversion which both the seller and buyer are agreeable to (not necessarily happily) and that is the exchange rate for the currency desired (Esezobor, 2004). The exchange rate of any country mirrors the strength of that country’s economy among other things. The exchange rate can be real rate or nominal rate of exchange. This study considers the real exchange rate. The real exchange rate is the rate of exchange adjusted for purchasing power. In other words, real exchange rates are the nominal rates adjusted for differences in price levels.

Real exchange rate (RER) is a relative price of traded goods to non-traded goods. It describes how many of a good or service in one country that can be traded for one of that good or service in another country. An increase in RER enhances the relative profitability of the traded goods sector and causes it to expand at the expense of non-traded goods sector. RER is the nominal exchange rate adjusted for differences in price. In other words RER is the nominal exchange rate that takes the inflation differentials among the countries into account. It is used as an indicator for competitiveness in the foreign trade of a country. RER = \( \frac{P_I}{R_n} \) where \( P_I \) is the price of tradable goods, \( P_n \) is the price of non-traded goods.

The real effective exchange rate (REER) is the weighted average of a country’s currency relative to an index or basket of other major currencies adjusted for the effects of inflation. The weights are determined by comparing the relative balance of a country’s currency against each country within the index. In practice, the real exchange rates are usually cultivated for all goods and services in an economy, rather than for a single good or service. This can be accomplished by using a measure of aggregate prices (such as the consumer price index (CPI) or gross domestic products (GDP deflator) for the domestic and foreign country in place of the price for a particular good or service.

Forms of Exchange Rates Adjustment Policies

The exchange rate adjustment policies that have been in vogue from time to time with the establishment of the IMF can be classified into three: fixed, flexible and multiple exchange rates.
a). **Flexible exchange rate** policy also referred to as floating or fluctuating exchange rates are determined by market forces. The monetary authority does not intervene for the purpose of influencing, the exchange rates. Under a regime of freely floating exchange rates, if there is excess supply of a currency, the value of that currency in foreign exchange (Forex) markets will fall. It will lead to depreciation of the exchange rate. Consequently equilibrium will be restored in the exchange made. The practical use of the flexible exchange rates is severely limited. Depreciations and appreciations lead to fall and rise in prices in the countries adopting them. They lead to severe depressions and inflations respectively. This is mainly due to speculation in forex which destabilizes the economies of countries adopting flexible exchange rate. Many governments favour fixed exchange rates which require adjustments in the balance of payments by adopting policy measures. The international experience with floating rates is difficult to evaluate hence it has been punctuated by large shocks, high inflation rate and deep recessions. Even the efforts of governments to limit exchange rate fluctuation have been marked by disagreements and have not been successful (Jhingan, 2003).

b). **Fixed Exchange Rate Policies:** Under fixed or pegged exchange rates system, all exchange transactions take place at an exchange rate that is determined by the monetary authority. It may fix the exchange rate by legislation or intervention in currency markets. It may buy or sell currencies according to the needs of the country or may take policy decisions to appreciate or deprecate the national currency. The monetary authority (CBN) holds foreign currency reserves in order to intervene in the foreign exchange market when the demand and supply of foreign exchange (say pounds) are not equal at the fixed rate.

c). **Multiple exchange rate system (between countries)**

This is a system under which a country adopts different rates of exchange rate for import and export of different commodities. A country may adopt controlled rate of exchange with some countries and free exchange rates with others. This system and use no longer in use as it has been criticized on the grounds of misallocation of resources, reduction in economic efficiency and gains from trade of countries adopting it. Nigeria adopted fixed exchange rates system from 1960 to 1985 and flexible exchange rate system from 1986 to date. Our nation did not practise multiple exchange rate system between countries. This study aims at assessing the effect of real foreign exchange rates on economic growth of Nigeria under both fixed and flexible exchange rates system from 1960 to 2016.

**Concept of Economic Growth**

The overall economic trend in a country is the most important element of its business environment. A growing economy with a considerably high and sustained growth rate in its GDP over a long period of time provides a promising business prospect and builds business confidence. In general, economic growth means percentage increase in GDP or GNP on year-to-year basis. In real sense of the term, however, economic growth means a sustained increase in per capital national output or net national product over a long period of time. It implies that the rate of increase in total output must be greater than the rate of population growth. On the contrary, a down trend in the economy or recession reduces business activities and confidence, reduces overall consumer demand and therefore business prospects. This is even more important where business decisions have long-run repercussions (Dwivedi, 2008).

The proxies to measure economic growth include gross domestic product -- real or nominal or gross national product.

**Real Gross Domestic Product (RGDP)**

This is a measurement of economic output that accounts for the effects of inflation or deflation. It reports GDP as if prices never went up or down, which gives a more realistic assessment of growth. Otherwise, it
could seem as if a country is producing more when it is only that prices have gone up. Real GDP is pure growth while nominal GDP includes both prices and growth. The formula for real GDP is nominal GDP divided by the deflator, that is \( R = \frac{N}{D} \).

Real GDP tells us how much the economy is producing and can be used to compare the size of economies throughout the world. This study therefore uses the real GDP because it will help to make the results of the study to be internationally comparable (Amadeo, 2017). Nigeria’s GDP annual growth rates and GDP per capita growth (annual) have been unstable, fluctuating/swinging from negative to positive, from 1961 to 2016. It was –1.8% in 1961, 2.22% in 1970, -15.5% in 1981, -2% in 1990, 5% in 2010, 1.5% in 2012, 0% in 2015 and 2016. The unstable nature of both Nigeria’s exchange rates and economic growth rates accentuated the need to research on the effects of real exchange rates on economic growth (proxied by real GDP growth rates).

**Theoretical Framework**

The theories of the determination of foreign exchange rate on which this study is anchored are: the monetary model, the balance of payments (BOP) Model, the purchasing power party model (PPP) and export-led growth hypothesis.

**The Monetary Model:** This model posits that the changes in the money supply affect the exchange rate in one way or the other. The model tries to explain the changes in exchange rates in terms of changes in the demand for the supply of money between two currencies (Olisade, 1991 as cited in Nzotta, 2004). Conceptually, an increase in real income given a fixed nominal money supply, leads to a fall in prices, thus making rates to appreciate. Conversely, an increase in money demand leads to increase in prices which eventually lead to exchange rates depreciation. The drawback of this theory is that it does not consider how differences in interest rates and yields affect the determination of exchange rate (Nzotta, 2004; Jhingan, 2003).

**Balance of Payment Theory**

According to this theory, under a freely floating exchange rates regime, the exchange rate of the currency of a country depends upon its balance of payments. A favourable balance of payments raises the exchange rates, while an unfavourable balance of payments reduces the exchange rate. This theory implies that the exchange rate is determined by the demand for and the supply of foreign exchange. The exchange rate is in equilibrium where the supply equates the demand of foreign exchange. This theory has been criticized by scholars for assuming that: the balance of payments is independent of the exchange rates; ii there is an equilibrium exchange rate where the balance of payments balances; iii for neglecting the role of the price level in influencing the balance of payments of a country and thus the exchange rate in developing countries; and for assuming that there must be free trade (Nzotta, 2004; Jhingan, 2003).

**The Purchasing Power Parity Theory**

This theory states that the equilibrium exchange rate between two inconvertible paper currencies is determined by the equality of the relative change in relative prices in the two countries. The two versions of this theory are the absolute and the relative. The absolute version states that the exchange rate between two currencies should be equal to the ratio of the price indexes in the two countries. This version is not used because it ignores transportation costs and other factors which hinder trade, traded goods, capital flows and real purchasing power. The relative version is the one being used by economists. According to this theory, the exchange rate between two countries is determined at a point which expresses the equality between the respective purchasing powers of the two currencies. This is the purchasing power party (PPP) which is moving par and not fixed par as under the Gold Standard. Thus, with every change in price level, the exchange rate also changes (Nzotta, 2004; Jhingan, 2003).
Export Led Growth Hypothesis (ELGH)
The export led growth hypothesis postulates that export expansion is a key factor in promoting long-run economic growth (Sibanda, 2012). According to Medina-Smith (2001), the export led growth hypothesis postulates that export expansion is one of the main determinants of growth. This view holds that countries do not only grow by increasing the amounts of labour and capital within the economy, but also by expanding exports. The advocates of export led growth hypothesis argue that the exports can perform as an “engine of growth” (Schweicker et al., 2006). Aranjo and Soares (2011) cited in Sibanda (2011) contend that stronger exposure to international competition by high exports is considered to increase the pressure on the export industries to keep costs low and provide incentives for the introduction of technological change. In this way, the growth of exports is seen to have a stimulating influence on productivity of the economy as a whole through externalities of exports on other sectors.

Empirical Review of International Studies
Petreski (2009) conducted a study on exchange rate regime and economic growth: A review of the theoretical and empirical literature and find that: at theoretical level, the directions in which the regime may impinge on productivity, investment, trade and thus on the output growth are plentiful. In addition, the review of the empirical studies however, came to a conclusion neither. Whereas one group of studies finds that a pegged exchange rate stimulates growth while a flexible one does not, another group concluded the opposites held.

Goldstein (2002) as cited in Petreski (2009) asserts that as a nominal variable, the exchange rate regime does not affect long-run economic growth. In addition, the empirical evidence is condemned because of growth framework, endogeneity, sample selection bias and the so-called peso problem (which arises if the sample period does not include instances of the kind of secure economic stress that can lead to foreign exchange system demise). Moreover, in the majority of the studies, the parameters in the regression are time invariant which might be problematic because conditions in the world capital market changed especially since the end of the Bretton Woods System.

According to Petreski (2009), addressing all flaws identified in the empirical literature might be a good basis for unveiling the relationship between exchange rate regime and growth at an empirical level. On the other hand, the inconclusiveness of the manner in which exchange rate regime affects growth in the theory and practice, gave rise to the belief that exchange rate, similarly to inflation could not affect the long-run growth performance of an economy, but rather its short-term departure from the long-run trend.

Tarawalie (2010) conducted a study on real exchange rate behaviour and economic growth in Sierra Lone and South Africa and finds that the real effective exchange rate correlates positively with economic growth with a statistical significant coefficient and that the evidence of the REER causing economic growth is profound.

Sfaxi, Sophia and Redzepagic (2010) studied exchange policy and economic growth, effect of the real effective exchange rate misalignment on the growth of Tunisia for period 1975 – 2007 using OLS method, and find that the real effective exchange rate misalignment has negative effect on the economic growth.

Hua (2011) carried out a study on the economic and social effects of real exchange rate: Evidence from the Chinese Provinces for the period 1987 – 2008 using GMM system estimation and panel data for 29 Chinese provinces and finds that: i the real exchange rate appreciation has a negative effect on economic growth, higher in coastal provinces than in inland provinces contributing to a minimizing of the gap of GDP per capita between two kinds of the provinces; ii that the real exchange rage appreciation has a negative effect on employment.

modeling, co-integration and OLS) and find that both oil prices and the real effective exchange rates have strong significant impact on economic activity and that Vietnamese economic activity is influenced more by changes in the value of Vietnamese currency than the fluctuations of oil prices.

Sibanda, K. (2012) conducted a study on the impact of real exchange rates on economic growth in South Africa using Johansen co-integration test and error correction model for the period 1994 – 2010 and finds that: exchange rate, gross fixed capital formation and real interest rate have positive long-run impact on economic growth while money supply and trade openness have negative long-run impact on economic growth in South Africa; ii) the regression results reveal that undervaluation of the currency significantly hampers growth in the long-run while it significantly enhances growth in the short-run and concludes that the policy of depreciating the exchange rates to achieve higher growth rates is only effective in the short-run and is not sustainable in the long-run.

Jones (2012) researched on exchange rate depreciation and the South-African economy: Growth, inflation and interest rates for the period 1990 Q1 – 2012 Q1 using VAR and structural analysis tools like impulse response function (IRF), Forecast Error Variance Decomposition (FVD) and dynamic multiplier function (DMF) and find that: i) depreciations of the exchange rate have not been found to consistently result in higher level of economic growth. These ambiguous findings persist even when depreciations result in a reduction of a real exchange rate- overvaluation or an increase in the degree of undervaluation; ii) in the SA case too, depreciations of the exchange rate have not been found to robustly stimulate economic growth; iii) and price level is found to be significantly affected by the exchange rate, specifically depreciations of the exchange rate are found to be inflationary.


Sibanda, Nasirpour and Jorjorzadeh (2014) studied the effect of exchange rate fluctuations on economic growth considering the level of development of financial markets in selected developing countries for the period 1986 – 2010 and find that the effect of exchange rate fluctuations on economic growth is negative and significant and that the mutual effect of exchange rate fluctuations and financial development on economic growth is positive but the effects in the countries studied is so small that it is not statistically significant.

Abu, Ahmad, Almasaied and Elgazoh (2014) conducted a research on the real effective exchange rate impact on ASEAN – 5 economic growth for the period 1991 Q1 to 2006 Q2 using quarterly time series data and applying ARDL, co-integration technique and multiple regression (MR) and find that real effective exchange rate and money supply are the long-run and short-run variables that have positive and significant impact on ASEAN -5 countries’ real domestic products growth rate.

Shafik and Liu (2014) studied the impact of oil prices and risk exposures of exchange volatility on economic growth in Russian economy for the period 1971 – 2012 and the Engle Granger results indicate that the relationship is significant in the long-run and its error adjusted mechanism indicate that it is significant in the short-run and correctly signed for Russia.

Papanikos (2015) carried out a study on the real exchange rate of Euro and Greek economic growth and find that: the real effective exchange rate of Euro is 20% overvalued and this has had a negative impact on Greek economic growth, and that a 10% undervaluation would have increased the rate of growth of per capital GDP by almost an additional 1.25% per annum. The researcher contends that a large part of the current Greek economic crisis can be explained by an overvalued Euro.
Izatov (2015) conducted a study on the role of oil prices, real effective exchange rate and inflation on economic activity of Russian. The results reveal the existence of long-run co-integration between economic activity and the oil prices over the period. In addition, the effect of these factors on economic input is positives. In the short-run, only the real effective exchange rate has an effect on the economy of Russia.

Habib, Elitza and Linio (2016) studied the impact of movements in the real exchange rates on economic growth based on five year data for a panel of over 150 countries in the post Bretton Wood period 1970 – 2010 and find that: i) a real appreciation (depreciation) reduces (raises) significant annual real GDP growth more than in previous estimates; ii) a strong and statistically significant positive (negative) effect of real depreciation (appreciation) on real per capita growth over five- year average periods. The effect is visible in developing countries and pegs, and is not significant in advanced countries and floats; the effect appears to be approximately symmetric between appreciations and depreciations, although large depreciations appear to have a stronger impact than large appreciations on average. They conclude that the real exchange rate does not matter for growth in developing economies but substantially less so in advanced ones, which confirms and strengthens the conclusions of Rodrik (2008).

Empirical Review of Local Studies

Akpan and Atan (2012) conducted a study on effects of exchange rate movement on economic growth in Nigeria for the period 1986 -2010 using quarterly time series data, generalized method of moments(GMM) and ordinary least squares (OLS) techniques, The results suggest that there is a statistically significant direct relationship between the two variables. The Vector Auto-regression results demonstrate that real exchange rate and real income are significantly co-integrated. In the long-run, the exchange rate and income may drift apart, but in the short run their relationship is strong and direct.

Ngerebo and Ibe (2013) studied exchange rate and macroeconomic performance in Nigeria for the period 1987-2011 using annual time series data, Augmented Dicky-Fuller, multiple regression (MR) and OLS, and find a unidirectional causality from exchange rate to gross domestic product growth rate, balance of payments and external reserves.

Attah- Obeng, Enu, Osei-Gyimah, and Opoku (2013) undertook a study on an economic analysis of the relationship between GDP growth rate and exchange rate in Ghana for the period 1980-2012 using scatter diagram of the two variables, simple linear regression to OLS, and find that there is a positive relationship between GDP growth rate and exchange rate in Ghana. This confirms the theory that undervaluation (high exchange rate) stimulates economic growth in the short-run.

Eze and Okpala (2014) conducted a study on the quantitative analysis of the impact of exchange rate policies on Nigeria’s economic growth for the period 1970-2011 using the Chow test procedure to determine the structural stability of the relationship and find that the relationship between exchange rate and economic growth performance in Nigeria has not undergone any significant structural change. The implication, according to them, is that no matter the exchange rate regime, whether fixed or flexible, what matters is the effectiveness of the management.

Fapetu and Oloyede (2014) studied foreign exchange management and the Nigerian economic growth using OLS for the period 1960-2012 and find that the nexus between economic growth and foreign exchange management is a short-run relationship.

Adeniran, Yusuf, and Adeyemi (2014) conducted a study on the impact of exchange rate fluctuation on the Nigerian economic growth for the period 1986-2013 using OLS estimation condition and multiple regression, and find that the exchange rate has positive impact but not significant and that interest rate and the rate of inflation have negative impact but not significant. According to them, this result affirms the previous studies that developing countries are relatively better off in the choice of flexible exchange rate.
Ali, Ajibola, Omotosho, Adetuba, and Adeleke (2015) studied real exchange rate misalignment and economic growth in Nigeria for the period 2000-2014 using quarterly data and the results show negative impact of real exchange rate misalignment on economic growth; and that Naira was on the average overvalued by 0.17% during the period 2000-2013.

Okorontah, and Odoemena (2016) carried out a study on effects of exchange rate fluctuations on economic growth of Nigeria for the period 1986-2012 using the techniques of OLS, Johansen Co-integration tests and Error Correction Mechanism and the results show that there is no strong relationship between exchange rates and economic growth of Nigeria.

Obi, Oniore, and Nnadi (2016) conducted a study on the impact of exchange rate regime on economic growth of Nigeria for the period 1970-2014, and find that: deregulated exchange rate regimes spur economic growth in Nigeria; As against the whole period and fixed exchange rate regime, they find that: fixed exchange rate constrains the performance of the Nigerian economy as the real exchange rate depicts inverse relationship with economic growth during the whole period and period of fixed exchange rate regime. They also find that there is bi-causality relationship between real exchange rate and economic growth.

Summary of Related Literature
The theoretical literature and empirical studies carried out by previous researchers on the effect of real exchange rate on economic growth (real growth) were reviewed. The theoretical literature helped in identifying the potential variables to be included in the model. The theoretical literature included the monetary model which postulates that an increase in real income given a fixed nominal money supply leads to a fall in prices, thus making rates to appreciate, while an increase in demand for money leads to increase in prices which eventually lead to exchange rate depreciation. The balance of payments theory holds that, favourable balance of payments raises the exchange rate while an unfavourable balance of payments reduces the exchange rate. The Export led growth hypothesis holds that exports play a great role in the economic growth of a country. The relative version of the purchasing power party theory holds that the exchange rate between two countries is determined at a point which expresses the equality between the respective purchasing powers of the two currencies.

The findings of previous empirical studies were inconclusive and can be grouped into three: The first group of researchers found that real exchange rates have a negative effect on economic growth (Sfaxi, Sophia & Redzepagic, 2010; Basirat, Nasirpour &Jorjorzadeh (2014), Papanikos, 2015; Izatov, 2015; Ali, Ajibola, Omotosho, Adetuba & Adeleke, (2015). The second group of researchers found a positive relationship between real exchange rate and economic growth (Trung and Vinh, 2011; Sibanda, 2012; Attah-Obeng, Enu, Osei-Gyimah & Opoku, 2013; Eze & Okpala ,2014; Adeniran, Yusuf & Adeyemi 2014). The third group found that real exchange rate has no effect on economic growth (Jones, 2012; Okoronta & Odoemena, 2016; Fapetu & Oloyede, 2014).

As regards the direction of causal link or causal relationship between real exchange rates and economic growth, Mahmoudinia, Soderjani and Pourshahhabi (2011) find a unidirectional causality from exchange rate to economic growth. Obi, Oniore and Nnadi (2016) find a bi-causality link between exchange rates and economic growth.

Research Methodology
This study employs ex post facto research design to source requisite information needed to address the research problem. An ex post facto research design is a systematic empirical enquiry that requires the use of variables which the research does not have the capacity to change its state or direction in the course of the study.

The secondary data sourced for this study were obtained from World Development Indicators 2016 and CBN Statistical Bulletins 2016. The study covered a period of fifty-five years from 1960 to 2016. The variables
classified in the model specification were drawn based on the objectives, research questions and the hypotheses to be tested.

**Model Specification**
A model is specified if it is in a particular form enabling unique estimates of the parameters to be subsequently estimated from a sample data. This study adopts the model used by Sibanda (2012) with slight modification. The modification is the replacement of fixed capital formation with savings. The functional form of the model is:

\[
\text{GDPG} = f(\text{RERN}, \text{RIRN}, \text{TOPN}, \text{MSIN}, \text{SAVN}).
\]

The operational form of the model is as follows:

\[
\text{GDPG} = b_0 + b_1 \text{RERN} + b_2 \text{RIRN} + b_3 \text{TOPN} + b_4 \text{MSIN} + b_5 \text{SAVN} + e_1
\]

Where: \(b_0 = \text{intercept} ; b_1, b_2, b_3, b_4, b_5 = \text{coefficients of the explanatory variables} ; e_1 = \text{error term which represents omitted variables in the specified model} \)

\[
\text{GDPG} = \text{real gross domestic product which is the real output.}
\]

RERN = Real exchange rates; RIRN = Real interest rates; TOPN = Trade Openness; MSIN = broad money supply (M2); SAVN = Saving.

The above multiple regression models will be used to estimate the nature of the relationship between:

1. Real GDP and the explanatory variables of RERN, RIRN, TOPN, MSIN and SAVN under the period of fixed exchange rates regimes 1960 to 1985.
2. Real GDP and the explanatory variables of RERN, RIRN, TOPN, MSIN and SAVN under the period of free exchange rate regime in Nigeria 1986 to 2016.
3. Real GDP and the independent variables of RERN, RIRN, TOPN, MSIN and SAVN for the whole period 1960 to 2016.

**A Priori Expectations**
The parameter \(b_1\) indicates the effect of real exchange rate on output growth (GDP growth). The sign of this parameter is critical in this research work. A positive sign will indicate an expansionary while a negative sign will indicate a contractionary effect. The expected sign is (+/-). A rise in real interest rates increases the cost of capital and can have a contractionary effect. Hence, \(b_2\) is expected to be negative (-). \(b_3\) is expected to be positive (+). The Money supply, \(b_4\) is expected to have a positive (+) effect on GDPG while saving is expected to be positive as an increase in savings can lead to increase in the country’s capital stock and hence its capacity to produce a greater quantity and quality of goods over time positively. \(b_5\) is expected to be positive (+) as an increase in saving is expansionary to economic growth.

**Method of Data Analysis**
This study employs the method of least squares in estimating the multiple regression models specified in this study. The regression model will be estimated for the effect of real exchange rate on economic growth under: fixed exchange rates regime in Nigeria (1960 – 1985); free/Flexible exchange rates regime 1986-2016; and for the whole period covering both fixed and flexible exchange rates regimes 1960 to 2016. The regression models will be estimated with the aid of Eviews application software for windows version 9. The test of significance of the hypotheses is at \(p \leq .05\). The statistical tools employed in this study are simple descriptive statistics, and Ordinary least squares(OLS). The variables are to be subjected to robustness tests which include Chow Breakpoint test, Multicollinearity test, Breusch-Godfrey serial correlation LM test, Breusch-Pagan-Godfrey Heteroskedasticity test. The Pairwise Granger causality test will be used to ascertain the direction of causality between real exchange rates and real gross domestic product growth rates under fixed, flexible and whole period exchange rates regimes in Nigeria from 1960 to 2016.

**Results and Discussion**

**Chow Breakpoint Test**
Exchange rate policies can be broadly grouped into fixed exchange regime and freely floating exchange regime. It is evident that these two regimes are at variance with each other thus it is expected that there will
be change in trends and their effects on the growth of an economy. As a result, this study first employs the chow test to know whether there is change in trends. The year 1986 was chosen as a breakpoint. The result of Chow test for test of breakpoints in the time series trends on exchange rates is shown on Table 2. The breakpoint year used is the 1986 in which Nigeria assumed the free market economy. The analysis was aimed at finding out whether there is a break in the trend of the data indicating change in trends as a result of policy change (introduction of free exchange rate regime).

**Chow Breakpoint Test: 1986**

Null Hypothesis: No breaks at specified breakpoints
Varying regressors: All equation variables
Equation Sample: 1960 2016

<table>
<thead>
<tr>
<th></th>
<th>F-statistic</th>
<th>Prob. F(6,45)</th>
<th>Log likelihood ratio</th>
<th>Prob. Chi-Square(6)</th>
<th>Wald Statistic</th>
<th>Prob. Chi-Square(6)</th>
</tr>
</thead>
<tbody>
<tr>
<td>F-statistic</td>
<td>2.610666</td>
<td>0.0295</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Log likelihood ratio</td>
<td>17.02521</td>
<td>0.0092</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Wald Statistic</td>
<td>15.66400</td>
<td>0.0157</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

The results are as follows:  
F-statistics (6,45) = 2.610666  
P–Value = 0.009

The result showed an F-statistics value that was significant at 5% level of significance, thus giving adequate information to reject the null hypothesis which asserted that there was no parameter instability in the model tested, implying that indeed the introduction of free exchange rate lead to changes in the macroeconomic indicators employed in this model.

**Descriptive Characteristics Of The Variables**

Table 3: Descriptive Statistics of the Variables

**Fixed Exchange Rate Regime**

<table>
<thead>
<tr>
<th></th>
<th>GDPG</th>
<th>RERN</th>
<th>RIRN</th>
<th>TOPN</th>
<th>MSIN</th>
<th>SAVN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>0.917308</td>
<td>84.92808</td>
<td>-1.746154</td>
<td>0.362692</td>
<td>14.41115</td>
<td>8.753462</td>
</tr>
<tr>
<td>Maximum</td>
<td>22.17000</td>
<td>546.0500</td>
<td>11.73000</td>
<td>0.500000</td>
<td>23.89000</td>
<td>18.44000</td>
</tr>
<tr>
<td>Minimum</td>
<td>-17.56000</td>
<td>-33.35000</td>
<td>-29.27000</td>
<td>0.270000</td>
<td>9.320000</td>
<td>1.960000</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>9.196894</td>
<td>180.3082</td>
<td>9.663295</td>
<td>0.065211</td>
<td>3.785252</td>
<td>4.651346</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>0.879920</td>
<td>10.16250</td>
<td>11.21306</td>
<td>1.934000</td>
<td>4.290072</td>
<td>2.731459</td>
</tr>
<tr>
<td>Probability</td>
<td>0.644062</td>
<td>0.006212</td>
<td>0.003674</td>
<td>0.380222</td>
<td>0.117064</td>
<td>0.255194</td>
</tr>
</tbody>
</table>

Observations 26 26 26 26 26 26


**Free Exchange Rate Regime**

<table>
<thead>
<tr>
<th></th>
<th>GDPG</th>
<th>RERN</th>
<th>RIRN</th>
<th>TOPN</th>
<th>MSIN</th>
<th>SAVN</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mean</td>
<td>2.044194</td>
<td>110.9723</td>
<td>0.292581</td>
<td>0.516129</td>
<td>14.48613</td>
<td>11.33774</td>
</tr>
<tr>
<td>Maximum</td>
<td>30.34000</td>
<td>272.3400</td>
<td>25.28000</td>
<td>0.880000</td>
<td>21.29000</td>
<td>23.32000</td>
</tr>
<tr>
<td>Minimum</td>
<td>-13.07000</td>
<td>49.74000</td>
<td>-43.57000</td>
<td>0.180000</td>
<td>9.150000</td>
<td>4.980000</td>
</tr>
<tr>
<td>Std. Dev.</td>
<td>6.960647</td>
<td>58.59246</td>
<td>17.94496</td>
<td>0.173045</td>
<td>3.930841</td>
<td>4.145820</td>
</tr>
<tr>
<td>Jarque-Bera</td>
<td>92.33242</td>
<td>19.08686</td>
<td>4.509592</td>
<td>0.928702</td>
<td>3.536455</td>
<td>6.865350</td>
</tr>
<tr>
<td>Probability</td>
<td>0.000000</td>
<td>0.000072</td>
<td>0.104895</td>
<td>0.628543</td>
<td>0.170635</td>
<td>0.032300</td>
</tr>
</tbody>
</table>

282
Observations | 31 | 31 | 31 | 31 | 31 | 31 | 31
Source: Computer output of descriptive analysis using EViewa Application software for windows

The result on table 3 is the descriptive statistics of the variables. The result shows that Exchange rate has a mean value of (84.92808), maximum and minimum value of 546.0500 and 33.35000 respectively, during the fixed exchange rate regime. In the Free exchange rate regime, it has a mean of 110.9723, with maximum and minimum values of 272.3400 and 49.74000 respectively. This indicates that real effective exchange rate was high in the fixed exchange regime compared to the free exchange rate regime. Figures 1 and 2 showed the trends of exchange rate movement in both regimes. In the fixed exchange rate regime, the real effective exchange rate was relatively stable and static from 1960 up to late 70s. In the free exchange rate regime, it was very flexible and highly volatile. This indicates that exchange rate movement is a source of market risk for the economy in the free exchange rate regime than in the fixed regime.

ROBUSTNESS TESTS
Multi-collinearity Test
The reliability of the model for the study was validated using the test of multi-collinearity. Symptoms of multi-collinearity may be observed in situations where: (i) small changes in the data produce wide swings in the parameter estimates; (ii) coefficients may have very high standard errors and low significance levels even though they are jointly significant and the $R^2$ for the regression is quite high; (iii) coefficients may have the “wrong” sign or implausible magnitude (Greene, 2000: 256). If these statistics are wrongly given, then the result becomes unreliable. The Variance Inflation Factor (VIF) was used for the test of multi-collinearity in the model. The variance inflation factors are consistently smaller than ten indicating complete absence of multi-collinearity (Neter, Kutner, Nachtsheim & Wasserman, 1996). This shows the appropriateness of fitting the model of the study with the five independent variables. Thus for both regimes, the model is suitable for testing the effect of exchange rate on growth.

Table 4: Variance Inflation Factor

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>RERN</td>
<td>6.142033</td>
<td>1.152445</td>
</tr>
<tr>
<td>RIRN</td>
<td>1.208646</td>
<td>1.137617</td>
</tr>
<tr>
<td>TOPN</td>
<td>1.436731</td>
<td>1.687892</td>
</tr>
<tr>
<td>MSIN</td>
<td>1.597726</td>
<td>1.760572</td>
</tr>
<tr>
<td>SAVN</td>
<td>5.746151</td>
<td>1.322038</td>
</tr>
<tr>
<td>C</td>
<td>NA</td>
<td>NA</td>
</tr>
</tbody>
</table>

Heteroskedasticity Test
Breusch-Pagan test was used to confirm whether heteroskedasticity exists in the models for fixed and free exchange rate regimes respectively. The insignificant p-value shows that the variance of error terms is constant and thus null hypothesis would be accepted. Table 6 indicates that p-value is significant at $p <0.01$, therefore the null hypothesis has to be rejected and shows the presence of heteroskedasticity.

Table 6: Heteroskedasticity test
---|---
F-statistic | 0.891177 (0.5055) | 0.691640 (0.6345)

**Serial Correlation Test**

Table 7 shows the Breusch-Godfrey result of test for serial correlation of firm performance. The insignificant p-value shows that there is no first-order autocorrelation and thus the null hypothesis would be accepted. According to the result of serial correlation test, the p-value is significant at p<0.01 and null hypothesis has to be rejected and shows the presence of serial correlation.

**Table 7: Breusch-Godfrey Serial Correlation LM Test**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>F-statistic</td>
<td>0.695212 (0.5119)</td>
</tr>
</tbody>
</table>

**Model Estimation**

**Table 8:**

<table>
<thead>
<tr>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Coefficient</td>
<td>t-Statistic</td>
</tr>
<tr>
<td>RERN</td>
<td>-0.011538</td>
<td>-0.480665</td>
</tr>
<tr>
<td>RIRN</td>
<td>-0.393522</td>
<td>-1.980588</td>
</tr>
<tr>
<td>TOPN</td>
<td>-59.89604</td>
<td>-1.865862</td>
</tr>
<tr>
<td>MSIN</td>
<td>0.441192</td>
<td>0.756520</td>
</tr>
<tr>
<td>SAVN</td>
<td>-0.041832</td>
<td>-0.046478</td>
</tr>
<tr>
<td>C</td>
<td>16.94199</td>
<td>1.540039</td>
</tr>
</tbody>
</table>

R-squared | 0.278810 | 0.386805 |
F-statistic | 1.546388 | 3.154010 |
Prob(F-statistic) | 0.220589 | 0.024194 |
Durbin-Watson stat | 1.810153 | 1.910604 |

Source: Researchers extraction from regression analysis using Eviews Application software version 9.

**Testing of Hypotheses**

The hypotheses stated in chapter one were tested at p ≤ .05 or ≤ 5% under fixed and free exchange rates regimes and for the whole period.

**Hypothesis one**

Decision rule: Reject null hypothesis and accept alternative hypothesis if the P-value of regression result is significant at p ≤0.05 or 5%, and accept the null hypothesis and reject the alternative hypothesis if the p-value of the regression is not significant at p≥.05 or ≥ 5%.
H0: there is no significant relationship between economic growth and the variables of real exchange rates, real interest rates, trade openness, broad money supply (M2), and domestic savings;
H1: there is significant relationship between economic growth and the variables of real exchange rates, real interest rates, trade openness, broad money supply (M2), and domestic savings.

From the estimation results of the model in table 8, under the fixed exchange rates regimes 1960 – 1985, there was no significant relationship between GDP and any of the variables of RERN, RIRN, TOPN, MSIN and SAVN. In fact, the main explanatory variable which is the real exchange rate (RERN) has no significant effect on economic growth of Nigeria proxied by real GDP growth rates. Under the free exchange rates regime, the model estimation revealed that RERN had significant negative relationship with economic growth; real interest rates showed significant positive relationship while savings (SAVN) revealed significant negative relationship with economic growth. The model estimation for the whole period 1960-2016 covering both fixed and flexible exchange rates regimes did not reveal any significant relationship between the explanatory variables and economic growth. RERN had insignificant negative relationship with economic growth in the whole period model estimation.

**Hypothesis Two**

H0: there is no causal relationship between economic growth and the variables of real exchange rates, real interest rates, trade openness, broad money supply (M2), and domestic savings;
H1: there is causal relationship between economic growth and the variables of real exchange rates; real interest rates, trade openness, broad money supply (M2), and domestic savings.

**Results of Pairwise Granger Causality Test.**

The causal relationships among the variables were evaluated using the probability values at 5% level of significance. When the probability is more than 5%, we accept H0. If it is less than 5%, we reject H0 and accept the alternative (H1).
Table 9: Pairwise Granger Causality Tests (1986 – 2016)

<table>
<thead>
<tr>
<th>Null Hypothesis:</th>
<th>Obs</th>
<th>F-Statistic</th>
<th>Prob</th>
<th>Remark</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Free exchange rates regime 1986-2016</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RERN does not Granger cause GDPG</td>
<td>29</td>
<td>0.58005</td>
<td>0.5675</td>
<td>No causality</td>
</tr>
<tr>
<td>GDPG does not Granger cause RERN</td>
<td></td>
<td>0.34938</td>
<td>0.7086</td>
<td></td>
</tr>
<tr>
<td><strong>Fixed exchange rates regime 1960 – 1985</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RERN does not Granger cause GDPG</td>
<td>24</td>
<td>1.36610</td>
<td>0.2790</td>
<td>No causality</td>
</tr>
<tr>
<td>GDPG does not Granger cause RERN</td>
<td></td>
<td>0.52978</td>
<td>0.5972</td>
<td></td>
</tr>
<tr>
<td><strong>Whole period exchange rates regime</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>RERN does not Granger Cause GDPG</td>
<td>55</td>
<td>2.37908</td>
<td>0.1030</td>
<td>No causality</td>
</tr>
<tr>
<td>GDPG does not Granger Cause RERN</td>
<td></td>
<td>1.65584</td>
<td>0.2012</td>
<td></td>
</tr>
</tbody>
</table>

The above summary results of Pairwise Granger Causality tests reveal that there is no causal relationship between GDPG and RERN or between RERN and GDPG as the P-value of the F-statistic under the three regimes analyzed above is insignificant. From the results obtained, there is no Granger causality relationship among the variables under the fixed and flexible exchange rate regimes and for the whole period 1960 – 2016. This is an indication that the changes in RERN, RIRN, TOPN, MSIN and SAVN do not granger cause real GDPG. This is in line with the finding of Deeviya and Gisele (2018) who found that only export granger caused real exchange rate in Sierra Leone. In the contrary, Ngerebo and Ibe (2013) find a unidirectional causality from exchange rate to gross domestic product in Nigeria, while Obi, Oniore & Nnadi (2016) find that there is a bi-causality between real exchange rate and economic growth. Mahmoudinia, Soderjani & Pourshahabi (2011) find a unidirectional causality from exchange rates to economic growth in MENA zone using panel causality techniques.

**Summary of findings**

i). There exists no significant relationship between economic growth and real exchange rate (RERN), real interest rate (RIRN), trade openness (TOPN), Money supply (MSIN) and domestic savings (SAVN) under the fixed exchange rate regime in Nigeria from 1960 – 1985.

ii). There is a significant negative relationship between economic growth and real exchange rate (RERN) as well as Savings (SAVN); and a significant positive relationship with real interest rate (RIRN) under the flexible exchange rates regime in Nigeria.

iii). The estimation of the model for the whole period 1960 – 2016 does not indicate any significant relationship between real GDPG and the five independent variables used in the estimation.

iv). There is no Granger Causality link between real GDPG and real exchange rates for the two exchange rate regimes being studied. However, unidirectional Granger Causality relationship exists between real exchange rate and TOPN & MSIN from RERN to TOPN and MSIN. In addition, Money Supply (MSIN) Granger causes TOPN under fixed exchange regime and it is unidirectional from MSIN to TOPN. For the whole period, 1960 – 1986, RERN Granger causes TOPN and MSIN and is unidirectional from RERN to
TOPN and MSIN while Money Supply Granger causes TOPN and is unidirectional from MSIN to TOPN.

**Conclusion**

The conclusion drawn from this study is that real exchange rate does not have any significant effect on real gross domestic product which is a real measure of economic growth in Nigeria and does not have any Granger causality relationship with GDPG during the fixed and flexible exchange rates regimes as well as for the whole period 1960 – 2016. RERN may have an indirect influence on real GDP growth since it Granger causes TOPN, MSIN and SAVN which are some of the factors that can promote economic growth.

**Recommendations**

The following recommendations are made based on the findings and in line with the objectives of the study:

- Since the real exchange rate has significant effect on economic growth during the free exchange rates regime only, the monetary authorities and the government should sustain the implementation of the free exchange regime as it is more beneficial to the economic growth of our nation. In this regard, the policymakers should continually monitor movements in real exchange rates to ensure its international competitiveness through measures that include export promotion and establishment of import substitution industries; creating conducive business environment such as regular energy supply, good and efficient transportation system, regular water supply and efficient taxation system.

- The policymakers should avoid a reintroduction of fixed exchange rates regime in Nigeria in the future as it has no significant effect on economic growth as manifested by all the explanatory variables in this study.

- Government and the Monetary Authorities should strive to maintain competitive real interest rates at all times and continually promote savings mobilization starting from the grassroots level as these two variables have significant effect on Nigeria’s economic growth under the free exchange rates regime. Furthermore, competitive real interest rates would enhance the attraction of investors and investments while effective and efficient saving culture would help to mobilize idle funds of the citizens to finance investments in order to promote economic activities and improve economic growth.

**References**


