

The Impact of Exchange Rate Regimes on Economic Growth in Nigeria

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Abstract

The choice and management of an exchange rate regime is a critical aspect of economic management to safeguard competitiveness, macroeconomic stability, and sustainable development. But rather, the country has continued to be at disadvantage in terms of macroeconomic performances as the different regimes have been accompanied by instability and uncertainties, *hence the need for the present study to examine the relationship between exchange rate regimes and output growth in Nigeria in different periods from 1970 to 2014. The study employs the Generalized Method of Moments (GMM) to estimate economic growth equation as a result of endogeneity problem. In contrast with previous findings, our study strongly suggest that exchange rate regimes indeed matter in terms of real economic performance in Nigeria as the results reveal that deregulated exchange rate regime spur economic growth in Nigeria as against the whole period and fixed exchange rate regime. All in all, the findings suggest that fixed exchange rates constrain the performance of the Nigerian economy as real exchange rate depicts inverse relationship with economic growth during the whole period and period of fixed exchange regime. It is against this background, that we recommend the sustainability of the regime of exchange rate liberalization that has been in operation from 1986*

Keywords: Exchange Rate, Monetary Policy, Fiscal Policy, Economic Growth, Endogeneity

JEL Codes: D51, E52, E62, O4, and C26

1. Introduction

The Nigerian economy ambitiously aspires to become one of the twenty largest economies in the world by 2020 and the 12th largest economy by 2050 (CBN, 2009).

One of the surest ways to achieve the afore-stated goal is to pursue vigorously rapid and sustainable economic growth and development via well managed exchange rate policy. In recognition of this role, Rodrick (2007) argues that poorly managed exchange rates can be disastrous for economic growth. The exchange rate thus, serves as an international price for determining the competitiveness of a country. Similarly, Takaendesa (2006) explains that exchange rate plays a crucial role in guiding the broad allocation of production and spending in the domestic economy between foreign and domestic goods.

Exchange rate is among the most important prices in an open economy. It influences the flow of goods, services, and capital in a country, and exerts strong pressure on the balance of payments, inflation and other macroeconomic variables. The choice and management of an exchange rate regime is a critical aspect of economic management to safeguard competitiveness, macroeconomic stability, and growth. Therefore, the impact of the exchange rate regime on economic performance is probably one of the most controversial issues in macroeconomic policy with empirical studies providing mixed results. One strand of the literature provides evidence that floating regimes are associated with higher growth (see, for instance, Odusola and Akinlo 2001; Eichengreen and Leblang, 2003; Levy-Yeyati and Sturzenegger, 2003; Reinhart and Rogoff 2004; Miles, 2006; and Rano-Aliyu 2009).

Among all macroeconomic variables, effects of changes in nominal and real exchange rates on macroeconomic conditions have become important due to the integration of financial markets and acceleration of capital flows. The end of the Bretton Woods system has been strictly followed by the adoption of floating exchange rate system in major industrial economies and the other emerging countries over time. Since then, the issue of exchange rate fluctuations given its impacts on price and aggregate output has attracted great attention. Economists have developed several explanations for the prominent factors of exchange rate fluctuations which have hindered the potential positive outcomes of efficient macroeconomic management strategies as one of the major determinants of aggregate demand and supply. Empirical studies accounting for the reasons of these fluctuations have generally been concentrated on two main approaches. First one suggests that real exchange rate fluctuations result from nominal shocks referring the variation in relative prices of traded goods across countries (Dornbusch, 1976; Krugman, 1990, 1993; Engel, 1993; Eichenbaum & Evans, 1993; Bayoumi & Eichengreen, 1994; Engel, 1999; Roger, 1999). In this vein, Clarida and Gali (1994) obtained similar results, exposing that

monetary policy authority affects the real exchange rate by changing price level and nominal exchange rate via its policy instruments. The second insight from empirical researches emphasizes that real shocks, namely productivity-motivated surges, clarify the fluctuations in either real or nominal exchange rates (Balassa, 1964; Samuelson, 1964; Lastrapes, 1992; Inoue & Hamori, 2009).

The potential causes of exchange rate fluctuations has also lead to examination of the theoretical basis of exchange rates determination since exchange rates fluctuations partly reflect deviations from the ground on which exchange rates are determined. One of the theories explaining the determination of real exchange rates is purchasing power parity (PPP) theory based on the presumption that a commodity should be sold at same price in various countries excluding transaction costs when measured in a common currency. As one of leading considerations explaining deviations from PPP condition is the Balassa-Samuelson effect. According to this effect, commodity prices are influenced by relative production costs which are determined by relative productiveness in the sectors producing traded and non-traded commodities. The impact of the tradable sector on the real exchange rate reveals that an increase in the productivity and competitiveness of the tradable sector with respect to foreign countries puts a downward pressure on the real exchange rates (Ricci and MacDonald, 2005). Thus, production process is likely to have a major role in exchange rate fluctuations. The other insight which accounts for deviations from PPP is the monetary approach developed by Mussa (1986), Frenkel (1976) and Bilson (1978, 1979) stating that while prices are sticky in the short run, the exchange rate returns to its equilibrium value and PPP holds as prices adjust in the long run.

According to Reinhart and Rogoff (2004) countries with intermediate regimes grow faster, Levy-Yeyati, and Sturzenegger (2003) found out that for developing countries, less flexible exchange rate regimes are associated with slower growth, as well as with greater output volatility and for industrial countries, regimes do not appear to have any significant impact on growth, Miles (2006) argue that the effect of fixed exchange rates on growth in emerging markets is not direct, but rather contingent on the existence of macroeconomic imbalances and other distortions in place in the domestic economy, Rano-Aliyu (2009), in a study carried out in Nigeria, found that the appreciation of exchange rate exert positive impact on real economic growth in Nigeria and Odusola and Akinlo (2001), found a mixed result on the impacts of the exchange rate depreciation on the output in Nigeria. Whereas Bailliu; Lafrance; and Perrault (2003) find that fixed rates are associated with higher growth. Several studies report insignificant growth effects of exchange rate regimes (Ghosh; Gulde; Ostry; and Wolf 1997; Edwards and Magendzo, 2006; De Grauwe and Schnabl, 2008; Klein and Shambaugh, 2010).

In view of the fact that exchange rate policy in Nigeria has oscillated basically between the fixed exchange rate system since the immediate post independence era in 1960 and then from 1986 when a market based exchange rate system was introduced in the context of the structural Adjustment Programme (SAP), there has been a controversy as regards output of goods and services under the flexible exchange rate system and under the fixed exchange rate system. Exchange rate reforms according to Bakare (2011) were expected to put the Nigerian economy on the path of macroeconomic stability, recovery and sustainable development. But rather, the country has continued to be at disadvantage in terms of macroeconomic performances. The different regimes have been accompanied by instability and uncertainties. The uncertainties in exchange rates which followed the macroeconomic reforms may be decomposed into two components. The first reflects systematic movement of the exchange rate and the second, exchange volatility. Volatility of the exchange rate impacts on economic performance through a variety of channels, including savings, lending rate and inflation. All in all, Nigeria continues to be confronted with a number of economic maladies with the exchange rate reforms. Among these problems are low level of savings and investment, high rate of inflation, high level of unemployment and poverty.

Even though economic literature, if anything, seems to offer stronger arguments favouring the idea that fixed exchange rates may lead to higher growth rates, in the end, the question of whether or not there exists a link between regimes and growth can only be resolved as an empirical matter. It is therefore, the purpose of this paper to address this issue by examining the relationship between exchange rate regimes and output growth in Nigeria from 1970 to 2014. The rest of this paper is organized as follows: Section 2 presents the literature review. The analytical framework of the study is discussed in section 3. In section 4 we carry out the data analysis and discuss the findings. The paper ends in section five with concluding remarks and policy options.

2. Literature Review

2.1. Conceptual Framework

Conceptually, an exchange rate implies the price of one currency in terms of another. Exchange rate is the ratio between a unit of one currency and the amount of another currency for which that unit can be exchanged at a particular time (Ngerebo-a and Ibe, 2013). In other words, exchange rate is the price of one currency vis-à-vis another and is the number of units of a currency required to buy another currency (Mordi, 2006). Exchange rate of currency is the link between domestic and foreign prices of goods and services. Also, exchange rate can either appreciate or depreciate. Appreciation in the exchange rate occurs if less unit of domestic currency exchanges for a unit of foreign currency while depreciation in exchange rate occurs if more unit of domestic currency

exchanges for a unit of foreign currency.

In this paper, devaluation will be used interchangeable with depreciation. While devaluation means reduction in the value of a currency in terms of a designated unit of gold, depreciation means reduction of the value of a currency in terms of a specific foreign currency. Since IMF stopped measuring currencies in terms of gold in 1984, these terms are generally used interchangeably.

Economic history has shown that there are two common concepts of exchange rate namely nominal exchange rate and real exchange rate. The nominal exchange rate (NER) is a monetary concept which measures the relative price of two countries' moneys or currencies, e.g., naira in relation to the U.S. dollar (e.g., #198.00: US\$ 1.00) and vice versa. But the real exchange rate (RER), as the name implies, is a real concept that measures the relative price of two goods-tradable goods (exports and imports) in relation to non-tradable goods (goods and services produced and consumed locally) (Obadan, 2006). Also, the nominal exchange rate is the number of unit of domestic currency that must be given up to get a unit of foreign currency. In other word, nominal exchange rate is the price of domestic currency in term of foreign currency. It is denoted as E . The real exchange rate is the relative price of foreign goods in term of domestic goods. In other word, it is the exchange rate adjusted for price. It is denoted as; $e = E p^*/p$. Where E = nominal exchange rate, p^* = foreign price and p = domestic price.

More complex measurements of exchange rates go beyond bilateral comparisons to include multilateral comparisons and a good example in this direction is real effective exchange rate. The real effective exchange rate is a weighted average of the bilateral real exchange rates taking into consideration the trade share of its partners in the country's total trade.

There is also the need to look at the issue of currency convertibility. Convertibility of a currency simply means the currency can easily be converted to other currencies without government imposing any restrictions.

2.2. Foreign Exchange Rate Management in Nigeria

Exchange rate policy in Nigeria has undergone a good number of changes. It has developed from a fixed parity in 1960 when it was solely tied with the British Pound Sterling. By 1967, following the devaluation of the Pound Sterling the US dollar was included in the parity exchange. In 1972, the parity exchange with the British Pound was suspended as a result of the emergence of a stronger US dollar.

In 1973, Nigeria reverted to a fixed parity with the British Pound following the devaluation of the US dollar. In 1974, in order to minimize the effect of devaluation of a single individual currency, Nigerian currency was tied to both the pound and dollar. Almost throughout the 1970s there was persistent appreciation of the nominal exchange rate of the naira occasioned by increases in the price of oil in the international market. These appreciations in the nominal exchange rates gave rise to over-reliance on imports with its accompanying capital flight, discouraging non-oil exports which ultimately led to Balance of Payments problems and depletion of external reserves. The increase in the marginal propensity to import collapsed the agricultural sector in Nigeria Osaka, Mashe, and Adamgbe (2003). In 1978, the naira was pegged to a basket of 12 currencies comprising Nigeria's major trading partners. However, the 1978 policy was jettisoned in 1985 in favour of quoting the naira against the dollar.

Before 1986, the prevailing exchange rate policies encouraged over-valuation of the naira. To solve the problems associated with the over-valuation the naira was deregulated in September 1986 under the Structural Adjustment Programme Package. To enhance the implementation of the Structural Adjustment Programme was the introduction of the Second-tier Foreign Exchange Market (SFEM). SFEM was expected to usher in a mechanism for exchange rates determination and allocation in order to ensure short term stability and long term Balance of Payments equilibrium.

As stated by Mordi (2006) the essential objectives of SFEM include to achieve a realistic naira exchange rate through the market forces of demand and supply, more efficient allocation of resources, stimulation of non-oil efforts, encourage foreign exchange in flow and discourage outflow, eliminate currency trafficking by wiping out unofficial parallel foreign exchange market, and lead to improvements in the Balance of Payments.

Several modifications were made in order to achieve the objectives of SFEM, from Foreign Exchange Market (FEM) to Autonomous Foreign Exchange Market (AFEM), to Dutch Auction System and, to the wholesale Dutch Auction System. The FEM was introduced as a result of the problem arising from the first and second tier market rates in July 1987. Bureau de change was introduced in 1989 with a view to enlarging the scope of FEM. In 1994, the fixed exchange rate system was reintroduced. In 1995 there was a policy reversal of guided deregulation referred to as the Autonomous Foreign Exchange Market (AFEM). In 1999 was the reintroduction of the interbank foreign exchange market (IFEM). This brought about the merger of the dual exchange rate, following the abolition of the official exchange rate from January 1, 1999. In 2002 was the re-introduction of the Dutch Auction System (DAS) as a result of the intensification of the demand pressure in the foreign exchange market and the persistence in the depletion of the country's external reserves. Finally, was the introduction of wholesale DAS in 2006, which further liberalized the market in an attempt to evolve a realistic

exchange rate of the naira. Up till now, exchange rate regime in Nigeria is characterized as oscillating between fully managed and freely floating regimes. Table 1 below present the scheme of events in exchange rate management in Nigeria.

Table 1: Scheme of Events in Exchange Rate Management in Nigeria

S/N	Year	Event	Remark
1	1959 – 1967	Fixed Parity Solely with the British Pound Sterling	Suspended in 1972
2	1968 – 1972	Included the US dollar in the parity exchange	Aftermath of the 1967 devaluation of the pound and the emergence of a strong dollar.
3	1973	Revert to fixed parity with the British Pounds	Devaluation of the US dollar
4	1974	Parity to both pounds and dollars	To minimize the effect of devaluation of the individual currency
5	1978	Trade (import) – Weighted basket of currency approach.	Tied to seven currencies; British Pounds, US Dollars, German Mark, French Franc, Japanese Yen, Dutch Guilder, Swiss Franc.
6	1985	Reference on the dollar	To prevent arbitrage prevalent in the basket of currencies
7	1986	Adoption of the second tier foreign exchange market	Deregulation of the economy
8	1987	Merger of the first and second tier markets	Merger of rates
9	1988	Introduction of the interbank foreign exchange market	Merger between the autonomous and the FEM rates
10	1994	Fixed Exchange rate	Regulate the economy
11	1995	Introduction of the Autonomous Foreign Exchange Market (AFEM)	Guided Deregulation.
12	1999	Re-introduction of the inter-bank foreign exchange market (IFEM).	Merger of dual exchange rate, following the abolition of the official exchange rate from January 1st.
13	2002	Re-introduction of the Dutch Auction System (DAS).	Retail DAS was implemented at first instance with CBN selling to end-users through the authorized users (banks)
14	2006 - 2010	Introduction of Wholesale DAS	Further liberalized the market

Source: Central Bank of Nigeria Bullion (2006)

Exchange rate policy in Nigeria, as observed by Sani (2006) has gone through many changes but spanning between two major regimes, namely, the fixed and flexible exchange rate regimes. The fixed exchange rate system was adopted between 1960 and 1985, while the flexible system has remained in use from 1986 till date however, with series of modification.

2.3. Theoretical Literature

The output effect of exchange rate changes has long been recognised in the literature but there is however, no consensus as to the direction of the effects while the traditionalists argued that exchange rate depreciation would promote trade balance, alleviate balance of payments difficulties and accordingly expand output and employment provided the Marshall-Lerner conditions are met (Marshall-Lerner condition states that depreciation would lead to expansion in output if the sum of price elasticity of demand for export and the price elasticity of demand for imports is greater than unity). The mechanism behind these positive effects, according to Taye (1999) is that devaluation switches demand from imports to domestically produced goods by increasing the relative prices of imports and making export industries more competitive in international markets thus stimulating domestic production of tradable goods and inducing domestic industries to use more domestic inputs. The monetarists on the other hand argued that exchange rate changes have no effect on real variables in the long run. The monetarists view is that exchange rate devaluation affect real magnitudes mainly through real balance effect in the short run but leaves all real variables unchanged in the long run Domac (1977). This approach is based on the assumption that the purchasing power parity (PPP) holds. It predicts that in the short run an increase in the exchange rate leads to increase in output and improves the balance of payments but in the long run the monetary consequence of the devaluation ensures that the increase in output and improvement in BOP is neutralized by the rise in prices.

2.4. Empirical Evidence

On the empirical side, the controversy of the effect of exchange rate variation is equally not resolved. Although

many researchers found evidence for contractionary effect of depreciation for example Diaz-Alejandro (1963), Pierrer-Richard (1991) and Kandil (2004), Yaqub (2010), Bakare (2011) Adelowokan, Adesoye and Balogun, 2015. Also a pocket of studies found evidence for expansionary effects of exchange rate depreciation for example Fry (1976), Edwards (1992), Lyons (1992), Adewuyi (2005) and Bahmani-Oskooee & Kandil (2007), Opaluwa, & Ameh (2010), Ehin omen, and Oladipo (2012)

Ghosh; Gulde; Ostry; and Wolf (1997) provides a descriptive analysis (means and standard deviation comparisons across regimes) of the growth performance under alternative regimes in 145 IMF-member countries for 30 years after 1960 and found a slightly higher GDP growth under a float (1.7% under floating compared to 1.4% under a peg). The study concludes that as investment rates contributed two percentage points of GDP, then the lower output growth under a peg must be a result of a slow productivity growth. Higher productivity growth under a float also supported the growth of external trade. However, the evidence is not overwhelming. Surprisingly, growth appeared to be the highest (2%) under an intermediate regime (soft pegs of managed float). Switching to a floating regime resulted to improved growth by 1 percentage points.

Moreno (2001) in his study, using descriptive statistics, measured how the regime (actual behaviour) affected GDP growth and volatility on a sample of 98 developing countries and East-Asian countries, respectively, over the period 1974-1999. His work supports the view that real growth used to be higher under a peg by 1.1% and 3% respectively. The difference is robust to excluding the periods of currency crises preceded by a peg and excluding the top 1% high-inflation episodes. However, Moreno accounts for the so-called survivor bias (excludes sharp devaluation episodes which could be attributed to policies adopted while pegging) and finds that *then* growth difference between regimes significantly narrows. The study do not provide sufficient evidence that growth is a causal effect of the exchange-rate regime; in addition, as the growth of investment and output are opposite under certain regimes, the study prescribes the result on productivity, which is the residual. However, there are no any figures to confirm neither this nor an explanation of how the exchange-rate regime effect might be channelled to productivity.

Levy-Yeyati, and Sturzenegger (2003) in their study of to float or fix: evidence on the impact of exchange rate regime on growth using a new de facto classification of regimes based on the actual behaviour of the relevant macroeconomic variables found out that for developing countries, less flexible exchange rate regimes are associated with slower growth, as well as with greater output volatility and for industrial countries, regimes do not appear to have any significant impact on growth.

Eichengreen and Leblang (2003) in their panel study showed the existence of a strong negative relationship between exchange rate stability and economic growth for 12 countries over a period of 120 years. They finally concluded that the results of such estimations strongly depend on the time, people, and the sample.

Miles (2006) in a study titled to float or not to float? Currency regimes and growth argue that the effect of fixed exchange rates on growth in emerging markets is not direct, but rather contingent on the existence of macroeconomic imbalances and other distortions in place in the domestic economy. For him these results seem to conform more closely with exchange rate theory, which posits mostly positive, and few negative channels for pegged currencies to impact growth over the long run.

Rogoff, Husain, Mody, Brooks, and Oomes (2003) study the evolution and performance of exchange rate regimes using recent advances in the classification of exchange rate regimes. Their study finds no support for the popular bipolar view that countries will tend over time to move to the polar extremes of free float or rigid peg. Rather, intermediate regimes have shown remarkable durability. The analysis suggests that as economies mature, the value of exchange rate flexibility rises. For countries at a relatively early stage of financial development and integration, fixed or relatively rigid regimes appear to offer some anti-inflation credibility gain without compromising growth objectives. As countries develop economically and institutionally, there appear to be considerable benefits to more flexible regimes. For developed countries that are not in a currency union, relatively flexible exchange rate regimes appear to offer higher growth without any cost in credibility.

Huang and Malhorta (2004) examine the relationship between exchange-rate regime and growth by paying attention on two aspects: exchange-rate-regime classification and differentiation between developing and developed economies. The study uses 12 developing Asian countries and 18 advanced European economies over the period 1976-2001. It utilizes descriptive statistics and regression variables such as per capita growth, financial crisis; openness; government consumption; initial GDP; fertility rate; secondary school enrolment ratio; and exchange rate dummies. Findings suggest that the exchange-rate regime matters for developing economies: fixed and managed floating regimes outperform the others in terms of growth. However, for advanced economies, no significant regularity is discovered.

Miles (2006) in a study titled to float or not to float? Currency regimes and growth using panel regressions argue that the effect of fixed exchange rates on growth in emerging markets is not direct, but rather contingent on the existence of macroeconomic imbalances and other distortions in place in the domestic economy. For him these results seem to conform more closely with exchange rate theory, which posits mostly positive, and few negative channels for pegged currencies to impact growth over the long run.

The study of Bleaney and Francisco (2007) also pays attention to the regime classification. It utilizes de-facto classification carried out by previous studies, including 91 developing countries over the period 1984-2001. They regress the growth rate on its lagged value, exchange-rate dummies and time dummies and exclude high inflation-periods. Findings are that pegs are associated by significantly slower growth than soft pegs or floats. However, no theory-consistent growth framework is applied; there are many insignificant variables, suggesting that the specification might suffer from high level of colinearity; endogeneity is not considered; robustness checks are not offered. It could be argued, the study cannot see the forest from the trees: it pays too much attention on the classification schemes and too little to other important issues.

Bahmani-Oskooee and Kandil (2007) using annual data on real and nominal measures of the effective exchange rate for Iran between 1959 and 2003 examined the effects of exchange rate fluctuations on output in oil-producing countries: the case of Iran over time adopting a new test for cointegration. The study found no evidence of cointegration between output growth and the parallel rial-dollar exchange rate, both real and nominal and that currency appreciation is contractionary in the long run and expansionary in the short-run.

Yougbaré (2008) carried an empirical reappraisal of the linkages between growth, volatility and the exchange rate system. The results reveal that fixed exchange regimes raise growth in a heterogeneous manner, the impact being concentrated at lower growth rates. As regard the second goal, pegged exchange systems are shown to amplify the negative direct and indirect growth-effects of volatility. All in all, the findings suggest that fixed exchange rates constrain the ability of the economy to adjust to shocks and volatility.

Bakare (2011) carried out an empirical analysis of the consequences of the foreign exchange rate reforms on the performances of private domestic investment in Nigeria adopting the ordinary least square multiple regression analytical method. The multiple regression results showed a significant but negative relationship between floating foreign exchange rate and private domestic investment in Nigeria. The findings and conclusion of the study support the need for the government to dump the floating exchange regime and adopt purchasing power parity which has been considered by researchers to be more appropriate in determining realistic exchange rate for naira and contribute positively to macroeconomic performances in Nigeria.

Fapetu, and Oloyede (2014) examined foreign exchange management and the Nigeria economic growth from 1970 to 2012 using the ordinary least square estimation techniques within the error correction model (ECM) framework. The study reveal that managing the economy's foreign exchange rate does affect quite a number of economic variables, which in turn affects growth in the economy.

Eze and Okpala (2014) carried out a quantitative analysis of the impact of exchange rate policies on Nigeria's economic growth: a test of stability of parameter estimates using the Chow test procedure to determine the structural stability of the relationship between exchange rate and output of goods and services. Their study revealed that, apart from government expenditure (GEX), both exchange rate (EXR) and money supply (M2) are highly significant in the determination of Nigeria's economic growth performance. Also, the conducted Chow test showed that the relationship between exchange rate and economic growth performance in Nigeria have not undergone any significant structural changes. The implication is that no matter the exchange rate regime, whether fixed or flexible, what matters is the effectiveness of the management. Nigeria can substantially improve on its economic growth performance through improvements in the overall management of its exchange rate policy.

Adelowokan, Adesoye and Balogun (2015) in their of the effect of exchange rate volatility on investment and growth in Nigeria using the vector error correction method found out that exchange rate volatility has a negative effect with investment and growth while exchange rate volatility has a positive relationship with inflation and interest rate in Nigeria.

Apart from the controversy surrounding the effect of exchange rate variation on output that exists in empirical and theoretical literature, it must be stated that a lot of works has been done on the impact of exchange rate on economic growth in Nigeria and outside Nigeria. But the authors are not aware of any study which examines the link between exchange rate regimes and economic growth in Nigeria in different periods and also considering the common problems of exchange rate regimes classification as well as endogeneity of exchange rate regimes. This study finds it expedient to fill this gap in the literature.

3. Analytical Framework

3.1. Theoretical Framework, Model Specification and Method of Study

A theoretical linkage between exchange rate and output in the literature is the standard IS-LM model. To motivate the empirical investigation, we draw on the implications of the theoretical model in Kandil and Mirzaie (2002). A summary of the theoretical implications is as follows. The model was developed based on the assumption of fixed money wages and prices which implies a perfectly elastic aggregate supply curve where output is determined by the position of the aggregate demand curve. The main advantage of this model over some other models is that it includes consumption, investment, government spending, taxes, exports, imports, interest rate exchange rate, current account balance, capital account and national output in a single framework. In

this model exchange rate does not affect output directly, it affect it indirectly through the import-export and money supply channels. Depreciation is theoretically expected to have positive effect on export since it makes domestic goods cheaper to foreign consumers.

It is expected that depreciation would reduce import as a result of the higher relative price of imported goods. Depreciation would thus increase net export and income where the Marshall-Lerner condition is satisfied. Where this condition holds, domestic income (output) would increase with depreciation through the goods market. Exchange rate can also affect domestic money supply and through it affect domestic income. Depreciation is theoretically expected to be accompanied by increase in domestic currency that is increase in money supply. This is expected to lead to reduction in interest rate and increase investment.

Increase in investment would lead to increase in national income and output given the national income identity. The interest rate effect of exchange rate changes can also work through the capital flows in the BP equation. With depreciation and the consequent reduction in interest rate due to its expansionary effect on money supply, domestic interest rate becomes lower relative to international interest rate. This is expected to lead to capital flight and reduction in domestic income and output. Hence, the effect of exchange rate on output in this model cannot be determined on a priori ground.

In theory, the combination of demand and supply channels indicates that real output depends on unanticipated movements in the exchange rate, the money supply, and government spending. In addition, supply-side channels establish that output varies with anticipated changes in the exchange rate.

Given demand-side channels, aggregate demand increases with an increase in government spending or the money supply, increasing output and price in the short-run.

In light of the theoretical predictions, we study the impact of exchange rate regimes on economic growth in Nigeria using an empirical model that replicates the reduced-form solution of the theoretical model in Kandil and Mirzaie (2002) as follows:

$$\ln RGDP = \beta_0 + \beta_1 \ln REXR + \beta_2 \ln M_2 + \beta_3 \ln TGE + \beta_4 \ln DOP + \mu \text{-----} (1)$$

In is natural logarithm of variables, Real output, RGDP varies with four policy variables. The log of Real exchange rate denoted by REXR, Broad money supply (M_2), approximates monetary policy. Fiscal policy is measured by total government spending, TGE , and degree of openness to capture the import-export channel in the model. Other fluctuations in real output growth is measured by μ .

It is expected that depreciation would reduce import as a result of the higher relative price of imported goods. Depreciation would thus increase net export and domestic income (output) would increase with depreciation through the goods market. In view of Bahmani-Oskooee and Kandil (2007) expansionary monetary and fiscal policies could boost output growth in the long-run.

The coefficient associated with trade openness and economic growth is ambiguous (Berg and Krueger, 2003). The log transformation of all the variables allows us to interpret the coefficients as elasticities.

One possible problem with Equation (1) is that it assumes that all of the right-hand side variables in the model are exogenous to real gross domestic product. However, it is possible that the explanatory variables can be individually or jointly endogenous with the dependent variable, real gross domestic product; hence, we have to control for the biases resulting from simultaneous or reverse causation. Reverse causality may be taking place.

The impact of exchange rate regime on macroeconomic performance is plagued by some common problems such as the classification of exchange rate regime, endogeneity of exchange rate regime and Lucas critique. Lucas critique postulates that in case of a policy switch the coefficients associated with policy variables should change. For example, the coefficients of policy variables like broad money supply and degree of openness in the manufacturing sector growth equation will be different under different exchange rate regime and as a result, there will be different response of manufacturing sector growth performance to these policy variables under different exchange rate regimes Mohanty and Bhanumurthy (2014). In the choice of methodology of estimation of the economic growth equation, most of the studies have some or other form of simultaneous equation framework to address the issue of endogeneity. While some studies Coudert & Dubert(2005), Ghosh; Gulde; Ostry; and Wolf (1997), Levy-Yeyati, and Sturzenegger (2003) have used 2-Stage IV (2SIV) estimation technique, other studies Bailliu; Lafrance; and Perrault (2003) have used GMM technique to address endogeneity. For the problem of classification of exchange rate regime, empirical studies have used either *de jure* classification of IMF or *de facto* classification based on some indicators of observed exchange rate volatility. To overcome the issue of endogeneity and problem of classification of exchange rate regime, we adopt the fixed and flexible exchange rate regimes and the Generalized Method of Moments (GMM) to estimate economic growth equation. The GMM estimator is considered appropriate as it is a generalized instrumental variable technique whose coefficient estimates possess the desirable properties of consistency, asymptotic efficiency and asymptotic normality. Further, we examine the exchange rate regimes-economic growth relationship in different periods.

The study broke down data in three periods. That is the whole period (1970 -2014), the period of exchange rate regulation regime (1970-1985) and deregulation regime (1985-2014) since exchange rate policy in Nigeria, as observed by Sani (2006) has gone through many changes but spanning between two major regimes, namely, the fixed and flexible exchange rate regimes. The fixed exchange rate system was adopted between 1960 and 1986, while the flexible system has remained in use from 1986 till date however, with series of little modification.

Data Description and Source of Data

Variable	Definition	Source
Real Gross Domestic Product	Measure of economic performance	CBN
Real Exchange Rate	This is the relative price of foreign goods in term of domestic goods. In other word, it is the exchange rate adjusted for price. It is denoted as; $e = E_p^*/p$	CBN
Broad Money Supply	M_2 measures total monetary liabilities	CBN
Total Government Expenditure	Total government expenditures (both capital and recurrent expenditures)	CBN
Degree of Openness	Trade openness calculated as the ratio of import plus export to GDP (%)	World Bank

4. Empirical Results

4.1. Descriptive Analysis

The empirical section will begin by analyzing the summary statistics and correlation matrix of all the variables in order to determine their inter-relationships. The summary statistics and correlation matrix is presented below.

Table 4.1: Summary Statistics Results

	RGDP	REXR	M2	TGE	DOP
The Whole Period (1970 -2014)					
Mean	11762028	51.62805	2435349.	7047.093	0.491161
Std. Dev.	22663800	62.73189	4640443.	4523.610	0.396503
Skewness	2.269701	0.681527	2.001309	-0.001625	2.187671
Kurtosis	6.945001	1.654521	5.716748	1.802202	8.038496
Jarque-Bera Probability	67.81725	6.877927	43.87813	2.690120	83.49387
Observations	45	45	45	45	45
The Period of Exchange Rate Regulation Regime (1970-1985)					
Mean	107324.9	0.664456	9300.983	7285.925	0.620337
Std. Dev.	216506.7	0.082638	7356.669	4591.215	0.631576
Skewness	3.296086	1.243213	0.346876	-0.102027	1.014114
Kurtosis	12.65094	4.923146	1.729884	1.811509	2.674145
Jarque-Bera Probability	91.06489	6.587201	1.396324	0.969432	2.813261
Observations	16	16	16	16	16
The Period of Exchange Rate Deregulation Regime (1986-2014)					
Mean	18192209	79.74589	3773858.	1585382.	0.419892
Std. Dev.	26204837	62.29774	5349748.	1817512.	0.136258
Skewness	1.608435	-0.056100	1.339349	1.044382	-0.126583
Kurtosis	4.175825	1.234700	3.367849	2.722824	2.634083
Jarque-Bera Probability	14.17473	3.780722	8.833809	5.364707	0.239235
Observations	29	29	29	29	29

Source: Researcher's Computation (2016)

Table 4.1 shows the summary of descriptive statistics of the variables included in the model for the whole period (1970 -2014), the period of exchange rate regulation regime (1970-1985) and deregulation regime (1985-2014). It shows the existence of wide variations in the variables as whole period (1970 -2014) has higher average values followed by the period of exchange rate regulation regime (1970-1985) and deregulation regime (1985-2014). The analysis carried out in the above table shows that the standard deviation of the exchange rate has been unusually high particularly during deregulation regime (1985-2014). This depicts a high degree of volatility in the exchange rate during the period under investigation. The analysis was also fortified by the value

of the skewness and kurtosis of all the variables involved in the model. All the distributions are positively skewed with the exception of TGE that is negatively skewed during the first two periods, while REXR & DOP were negatively skewed during deregulation regime and variables with value of kurtosis less than three are called platykurtic (fat or short-tailed) and REXR, TGE, DOP & M2 variables qualified for this during the first, second and third periods respectively. On the other hand, variables whose kurtosis value is greater than three are called leptokurtic (slim or long tailed) and RGDP, M2, DOP & REXR variables qualified for this during all the study periods. Jarque-Bera test revealed that most of the data sets are normally distributed. This is so because the probability values of the variables exceed 5%.

Table 4.2: Correlation Matrix

	RGDP	REXR	M2	TGE	DOP
The Whole Period (1970 -2014)					
RGDP	1.000				
REXR	0.773485	1.000			
M2	0.982640	0.797776	1.000		
TGE	0.965865	0.876888	0.986120	1.000	
DOP	-0.089151	-0.044164	-0.073131	-0.064614	1.000
The Period of Exchange Rate Regulation Regime (1970-1985)					
RGDP	1.000				
REXR	-0.284354	1.000			
M2	0.413582	0.435649	1.000		
TGE	0.610918	0.109539	0.887034	1.000	
DOP	-0.420423	-0.179689	-0.604164	-0.518920	1.000
The Period of Exchange Rate Deregulation Regime (1986-2014)					
RGDP	1.000				
REXR	0.735943	1.000			
M2	0.979580	0.766053	1.000		
TGE	0.962960	0.845263	0.987006	1.000	
DOP	0.029910	0.484989	0.093195	0.207202	1.000

Source: Researcher's Computation (2016)

A correlation matrix which shows the magnitude and direction of the relationship between each pair of variables being analysed is presented in Table 4.2 above. A negative sign of a correlation coefficient shows there is an inverse relationship between the two variables. The above correlation matrix shows that there exist a strong positive relationship between real gross domestic product and real exchange rate variations of about 77% during whole period (1970 -2014), negative relationship of 28% during regulated regime and 74% during deregulated era. In summary there exists a stronger positive correlation between real exchange and output during whole period and the period of exchange rate deregulation.

Following Kelbore, Z.G (2014), we employed Granger Causality test to find out the presence of reverse causality between exchange rate regime and economic growth. Table 4.3 reports the causality results for the model during the whole period.

Table 4.3: VAR Granger Causality/Block Exogeneity Wald Tests for the Whole Period (1970 TO 2014)

Dependent variable: D(RGDP)				
Excluded	Chi-sq	df	Prob.	
D(REXR)	13.92204	2	0.0009	
D(M2)	217.4237	2	0.0000	
D(TGE)	25.80297	2	0.0000	
D(DOP)	0.142893	2	0.9310	
All	446.6342	8	0.0000	

The causality results show that economic growth does granger cause exchange rate regime and, hence, there is endogeneity problem. The results confirm that there is a bi-causality relationship between real exchange rate and economic growth (see Table 4.3). Also, it appears that broad money supply and total government expenditure does Granger-cause economic growth. These results indicate that the relationship among the two variables of interest is nonlinear with potential reverse causality and warrant an estimation technique that account for the endogeneity among the variables.

For this reason, the GMM is estimated in levels where the potentially endogenous variables were instrumented by their lags. The estimation results are presented in Table 4.4.

Table 4.4: Result of Estimated Equation
Dependent Variable = RGDP

The Whole Period (1970 -2014)			The Period of Exchange Rate Regulation Regime (1970-1985)		The Period of Exchange Rate Deregulation Regime (1986-2014)	
Variables	Coefficients	t-values	Coefficients	t-values	Coefficients	t-values
C	-3.806*	-1.787 [0.08]	1.935	0.920 [0.38]	-3.560***	-2.934 [0.00]
LOG(REXR)	-0.284	-1.255 [0.217]	-3.719	-0.591 [0.56]	0.013	0.063 [0.94]
LOG(M2)	-0.603	-1.392 [0.17]	1.796	0.588 [0.57]	-0.708**	-2.400 [0.02]
LOG(TGE)	2.087***	3.202 [0.00]	-1.135	-0.321 [0.75]	2.058***	5.255 [0.00]
LOG(DOP)	-1.058***	-5.966 [0.00]	-0.861***	-4.192 [0.00]	-1.534***	-7.730 [0.00]
$R^2 =$	0.97		0.96		0.95	

Note: *, **, *** indicate significance at 10, 5 and 1 percent respectively. p-values are reported in parentheses.

Source: Researcher's Computation (2016)

From the result of the estimation presented in Table 4.4 above, degree of openness is important in explaining economic growth in Nigeria during the three periods and total government expenditure influences economic growth during the whole period and the period of exchange rate deregulation. With an explanatory power of 97 percent, 96 percent and 95 percent during the whole period and both regimes, it can be said that the endogenous variable has been predicted reasonably well.

The variable of interest is the real exchange rate. Interestingly, the negative sign of the coefficient during the whole period and the period of exchange rate regulation regime is not consistent with economic theory. An increase in real exchange rate by 1% led to a decrease in economic growth by 0.28% and 3.72% during the whole period and the period of exchange rate regulation regime in Nigeria. This implies that depreciation of the currency in Nigeria does not stimulate economic activities during the whole period and the period of exchange rate regulation regime. This finding is in line with Yougbaré (2008) who argued that that fixed exchange rates constrain the ability of the economy to adjust to shocks and volatility. But an increase in real exchange rate by 1% led to an increase in economic growth by 0.01% during the period of exchange rate deregulation regime in Nigeria. This suggests that exchange rate depreciation stimulates economic growth during period of exchange rate deregulation regime and it is in consonance with the aspirations of policy makers in the adoption of exchange rate reforms. This finding goes to justify the deregulation of the exchange rate embarked upon by the Federal government in 1986. Interestingly, the above findings is in line with Levy-Yeyati and Sturzenegger (2003) who argue that for developing countries, less flexible exchange rate regimes are associated with slower growth, as well as with greater output volatility and for industrial countries. Also, Rogoff, Husain, Mody, Brooks, and Oomes (2003) argue that as countries develop economically and institutionally, there appear to be considerable benefits to more flexible regimes. For developed countries that are not in a currency union, relatively flexible exchange rate regimes appear to offer higher growth without any cost in credibility.

The coefficient of broad money supply (M2) shows a negative relationship with economic growth during the whole period and the period of exchange rate deregulation. This implies that an increase in broad money supply by 1% led to a decrease in economic growth by 0.60% and 0.71% during the whole period and the period of exchange rate deregulation regime in Nigeria. Similarly, government total expenditure depicts a direct relationship with economic growth during the whole period and the period of exchange rate deregulation as a unit increase in government spending will led to both 2.09% & 2.06% in economic growth respectively. But a unit increase in government spending will led to 1.14% during the period of exchange rate regulation.

Another important dimension of our results relates to the negative and significant effect of degree of openness on economic growth in Nigeria. During the whole period, period of exchange rate regulation and deregulation a unit increase in degree of openness will led to 1.06%, 0.86% & 1.53% decrease in economic growth in Nigeria respectively This indicates that the recent trade liberalization efforts in Nigeria have not resulted in better economic growth and benefited the poor.

6. Concluding Remarks and Policy Options

The study carried out a comparative analysis to examine the relationship between exchange rate regimes and output growth in Nigeria in different periods from 1970 to 2014. The study broke down data in three periods. That is the whole period (1970 -2014), the period of exchange rate regulation regime (1970-1985) and

deregulation regime (1985-2014) since exchange rate policy in Nigeria has gone through many changes but spanning between two major regimes, namely, the fixed and flexible exchange rate regimes. It employed the Generalized Method of Moments (GMM) to estimate economic growth equation as a result of endogeneity problem with 1970-2014 data sourced from CBN statistical bulletin and World Bank's World Development Indicators for Nigeria. In contrast with previous findings, our study strongly suggests that exchange rate regimes indeed matter in terms of real economic performance in Nigeria as the results reveal that deregulated exchange rate regime spur economic growth in Nigeria as against the whole period and fixed exchange rate regime. All in all, the findings suggest that fixed exchange rates constrain the performance of the Nigerian economy as real exchange rate depicts inverse relationship with economic growth during the whole period and fixed exchange rate regime. It is against this background, that we recommend the sustainability of the regime of exchange rate liberalization that has been in operation from July 1986.

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