
**ASSESSING THE IMPACT OF REAL EXCHANGE RATE ON
ECONOMIC GROWTH IN NIGERIA: A COINTEGRATION
ANALYSIS**

MIFTAHU IDRIS

Department of Economics, Faculty of Social and Management Sciences,
Taraba State University, P.M.B 1167 Jalingo; Nigeria.

ABSTRACT

This study investigates the impact of real exchange rate on economic growth in Nigeria by assessing the long-run and the short-run impacts of the variables using the Johansen cointegration test and the Vector Error Correction Model (VECM). The analysis is based on the annual time series data of real exchange rate and the real GDP covering the sample period of 1980 to 2017. Result shows the existence of long-run and equilibrium relationship between the variables under consideration. In addition, the model established the presence of positive and significant impact of exchange rate on the economic growth in Nigeria. As such, policy makers in Nigeria should be extremely critical in decision makings particularly on matters related to exchange rate in order to benefit from its positive and valuable impact towards generating a sustainable economic growth. A considerable and rational appreciation of the domestic currency is essential in encouraging rapid growth in the long-run period.

Keywords: Exchange rate, economic growth, Cointegration test, VECM model, Nigeria.

1.0 INTRODUCTION

Exchange rate is an important financial element that determines the investment decisions of foreign and local investors, policy makers and financial institutions across the globe. Given the period of globalisation and financial liberalisation, exchange rate plays a significant role in international finance for small open economies like Nigeria. This is because, exchange rate movement affects the earnings of conglomerates and raised the level of exposure among financial institutions. However, unstable and fluctuating exchange rate affects the value of international investment portfolios, produce an undesirable impact on macroeconomic fundamentals, increased the cost of tourist relative to the value of their currencies, decreased the competitive drive of the economy, and leads to changes in economic policy and resource allocation. This may eventually causes a macroeconomic disequilibrium that would lead to real exchange rate devaluation to correct for external imbalances. Moreover, exchange rate fluctuations are attributed to various elements that differ according to the time series. Not only that there are factors that affect the long-run stability of exchange rate such as inflation, but, other short-run factors such as cash flows can influence the situation. Conceptually, exchange rate is the price of a domestic currency expressed in terms of a foreign currencies

usually the US dollar, pound or euro. It determines the relative prices of domestic and foreign commodities and also the strength of external sector participation in the international trade.

Undoubtedly, when the exchange rate of a particular country is high, its export becomes expensive in the international market but at the same time, the value of its import becomes cheaper and inexpensive thereby encouraging the local consumers to patronise imported goods while neglecting the domestically produced commodities. On the other hand, when a nation's exchange rate is low, its export becomes cheaper and attractive to foreign consumers but at the same time making the imports to become expensive in the local market thereby affecting the disposable income and economic welfare of the citizenry. Therefore, the exchange rate has more significant impact for developing countries than the developed economies. Furthermore, there is a general consensus among the global policy analyst that a competitive exchange rate is healthy for sound economic growth. It is also argued that competitive or depreciated exchange rate is a major driving factor in the success of export-led growth strategy adopted by the East Asian economies.

In recent years, the Nigerian economy has experienced a number of exchange rate manipulations from the fixed regime to a flexible exchange rate with the view to improving the level of aggregate output. This development which can be traced back to 1960's is largely influenced by a number of factors including the changing pattern of global trade, institutional variations and structural changes in production which was then agriculturally dominated and provides the lion share of foreign earnings. Subsequently, with the oil discovery in 1970's; it provides a flourishing inflow and encourage the dynamics of exchange rate management with the view to ensuring adequate response to macroeconomic fundamentals. This is in accordance with the public sector policies to provide an effective structure for the exchange rate that would encourage sustainable economic growth as well as improving and diversifying the productive base of the economy. The exchange rate is considered by the government to be a significant macroeconomic element for guaranteeing a stable financial system, low inflation and raising economic growth.

Generating a sustainable growth has become a major challenge in the Nigeria's developmental strategy, and the role of exchange rate policies toward attaining the desired growth level is still debated in the international economics literature. Whereas unprofessional and statesmen are often persuaded that a lower exchange rate will increase growth, academic scholars are largely doubtful that the relative price of two currencies could possibly become a necessary driver of growth over the long-run period. Undeniably, realising a long-term growth in developing countries is significantly related with the ability to ensure a competitive exchange rate (Rodrik, 2008). But it appears very difficult in Nigeria given the non-competitive exchange rate that suppressed the development of tradable non-natural resources resulting to little or no diversification with low productivity. The limited capacity of diversification has weakened the long-term economic growth and intensified the problems of dependence on the country's terms of trade, further resulting to high volatility in macroeconomic indicators.

In assessing the impact of real exchange rate on the Nigerian economic growth, there are scanty empirical studies conducted on this issue. In order words, limited studies that examined the influence of exchange rate behaviour on economic growth largely emphasises on elucidating the determinants of exchange rate behaviour with particular consideration to the influence of macroeconomic variables such as monetary policy shocks. While Adeniran,

Yusuf and Adeyemi (2014) show positive impact of exchange rate on economic growth, Ogunsola, Olofinie and Adeyemi (2017) indicate a negative relationship between the variables in Nigeria. On the other hand, Tang (2015) shows no direct relationship between exchange rate and economic growth. Therefore, the existing empirical evidence in the literature provides conflicting results as to the exact impact and relationship between the examined variables. Hence, the ambiguity and inconsistent findings emanating from the various studies call for further research on this domain.

However, efforts by the present Nigerian government to raise productivity level, creates wider employment and improves economic welfare as contained in the Economic Recovery and Growth Plan (ERGP) have yielded an insignificant outcomes. In addition, the local currency (Naira) has been depreciating relative to the US dollar resulting in increased labour and production cost, respectively. This scenario has consequently affected the economic and social platforms designed towards realising a rapid and sustainable growth in the country. Therefore, it is evidently important to evaluate the reaction of the Nigeria's exchange rate and how its affect the aggregate productivity within the market-oriented economy using recent and up-to-date data. In view of this, this study examines the short-run and the long-run impact of real exchange rate on the economic growth in Nigeria for the period under consideration. The results not only have impact on the study of exchange rate in developing countries but also for policy analysis relating to financial development and economic diversification.

Nevertheless, the remaining parts of this study is divided into different sections: section 2 deals with the review of the literature taking into consideration the impacts of fluctuation and misalignment of exchange rate on economic growth; section 3 deals with the methodology and sources of data; section 4 presents the empirical results and other related findings; and section 5 provides the concluding remarks.

2.0 REVIEW OF THE LITERATURE

There are mixed and inconsistent findings from the previous literature on the relationship and causal impact of real exchange rate towards sustainable economic growth. Certain literature shows evidence in favour of positive effects while others support the negative impact of exchange rate on output growth. A number of these studies are classified according to 1) fluctuating impact of real exchange rate on output growth, and 2) misalignment of real exchange rate on the economic growth.

2.1 Impact of Real Exchange Rate on Economic Growth

Across the globe, various literature indicate the essential impacts of real exchange rate on the economic growth. But the results remain inconsistent and divergent, hence indicating a positive and negative relationship between the two phenomena. Example of these studies include the followings: AbuDalu, Ahmed, Almasaied and Elgazoli (2014) empirically analyse the impact of real exchange rate, foreign interest rate, domestic money supply, domestic interest rate, net foreign assets, inflation rate and terms of trade on the economic growth of ASEAN-5 countries. By adopting a quarterly time series data ranging from 1991:Q1 to 2006:Q2, the ARDL model is employed to estimate the coefficients. Finding indicates that real exchange rate has a positive and significant impact on the economic growth of ASEAN-5 countries. Similar to this, Adeniran, Yusuf and Adeyemi (2014) examine the of exchange rate fluctuations on the Nigerian economic growth for the period spanning 1986 to 2013. Using

the correlation and regression analysis to estimate the collected data, result indicates that exchange rate has a positive but insignificant impact on the economic growth.

Furthermore, Goncalves and Rodrigues (2017) investigate the impact of exchange rate misalignment on the economic growth of several developed and developing countries covering the period of 1950 to 2014. Using the panel methodology, results indicate that the relationship between exchange rate misalignment and economic growth for a broad panel of countries is very weak. In addition, the real exchange rate deviations are positively related with the economic growth, but the impact becomes statistically insignificant when saving is included as a regressor in the model. Likewise, Rapetti, Skott and Razmi (2011) evaluate the relationship between real exchange rate and economic growth among panel of developing countries. The authors adopt the three-step methodology developed by Rodrik (2008) to estimate the equation; and the result indicates the presence of positive and significant relationship between real exchange rate undervaluation and the economic growth. More so, Mahmoudinia, Soderjani and Pourshahabi (2011) examine the long-run and causality relationship between tourism receipts and economic growth in 17 MENA selected countries during period of 1995 to 2007. Using a panel cointegration technique, the results show that in the MENA countries, there is unidirectional causality running from exchange rate to economic growth and tourism receipts. In addition, there are the bidirectional causality between tourism receipts and economic growth in long run and short run.

Similarly, Shingil and Panshak (2017) investigate the relationship between the real effective exchange rate and economic growth in Turkey covering the sample period of 1970 to 2015 by utilising the annual time series data. Using the ARDL model and the Toda-Yamamoto (TY) Granger non-causality test, findings indicate the existence of negative relationship between real effective exchange rate and economic growth in the short run, but the impact remains positive and significant on economic growth in the long-run. Further results show a unidirectional causality running from real exchange rate to GDP growth rate. In addition, Asid, Razi, Mulok, Kogid and Lily (2014) examine the impacts of exchange rate and foreign direct investment on the economic growth in Malaysia covering the sample period of 1970 to 2011. By utilising the ARDL model to establish the long-run relationship and the direction of causal impact among the variables, the estimated model shows the evidence of long-run and cointegrated relationship between the variables. Further results indicate that exchange rate depicts a positive but insignificant impact on the economic growth particularly in the long-run while foreign direct investment remains positive and significant both in the short-run and long-run.

Besides, Saidi et al. (2017) examine the effect of stock prices and exchange rates on the economic growth of Indonesia using quarterly time series data covering the period of 2004q1 to 2015q4. By using the Autoregressive Distributed Lag (ARDL) model to depict the possible connection between the variables, results indicate the existence of long-run relationship between exchange rate, stock prices and economic growth. More so, further result shows that exchange rate has a positive and significant impact on economic growth. Correspondingly, Selimi and Selimi (2017) investigate the effects of exchange rate on the economic growth of Macedonia using the OLS regression approach, dynamic VAR model and the granger causality test. The authors adopt a quarterly data series spanning the period of 1998q1 to 2015q4 obtained from the national bank and the state statistical office. Results show the presence of positive relationship between real exchange rate and economic growth in

Macedonia hence, supporting the argument that fix exchange rate regime promotes the macroeconomic stability of the country.

To provide further evidence on the positive impact of exchange rate on growth, Aman, Ullah, Khan and Khan (2017) examine the relationship between exchange rate and economic growth in Pakistan covering the sample period of 1976 to 2010. By utilising the simultaneous equation model, Two and Three Stage Least Square (2SLS and 3SLS) techniques, results show existence of positive relationship between exchange rate and economic growth. The positive impact is transmitted through the channels of export promotion incentives, encouraging the inflow of FDI, expanding the volume of investment and promoting import substitution strategies. Comparable to that, Krušković and Maričić (2015) evaluate the effect of accumulating foreign exchange reserves on economic growth among various emerging countries using a balanced panel data covering the period of 1993 to 2012. By adopting the OLS regression to estimate the nexus between changes in foreign exchange reserves and economic growth, results indicate that an increase in foreign exchange reserve lead to increase in real GDP. By implication, it implies the existence of positive relationship between the variables under consideration. Alike, Koitsiwe and Adachi (2015) assess the dynamic relationships between mining revenue, government consumption, exchange rate and economic growth in Botswana using quarterly data covering the sample period of 1994q1 to 2012q4. The collected is analysed by the VAR modelling technique including the granger causality test. Empirical findings show that exchange rate and revenue granger cause economic growth within the period under consideration.

In the views of Guellil, Marouf and Benbouziane (2017), exchange rate regime is a fundamental component in the process of directing economic policies in both developed and developing economies due to its impact on economic performance. The authors investigate the impact of the exchange rate regimes on the economic growth of developing countries using a panel data consisting of 38 economies covering the sample period of 1980 to 2013. By adopting the panel fully modified least squares to estimate the regression coefficient, results indicate the existence of positive relationship between exchange rate regimes and economic growth. In addition, Habib, Mileva and Stracca (2017) examine the impact of movements in the real exchange rate on economic growth based on five-year average data for a large panel of 150 countries in the post Bretton Wood period covering 1970 to 2010. The authors employ an external instruments to deal with possible reverse causality from growth to the real exchange rate. Findings indicate that the exchange rates has significant impact on the economic growth of developing countries but substantially less in advanced economies. Likewise, Lee and Yue (2017) explore the impact of the USD exchange rate on economic growth and the environment in the United States by using a Structural Vector Autoregression (SVAR) on the quarterly country-level data spanning the period of 1989 to 2015 including 105 observations for 27 years. Results show that the USD exchange rate is positively related to economic growth.

According to Guzman, Ocampo and Stiglitz (2018), pursuing a stable and competitive exchange rates can promote economic development. Given the uncertainty of world financial markets, there is need for flexible and sustained interventions, and the interventions instrument to be utilised in combination with other monetary, macroeconomic and industrial policies. Using a contextual analysis to evaluate the impact of real exchange rate policies towards encouraging economic development, the authors conclude that a stable and competitive real exchange rate policy may correct externalities and other related market

failures. Also, Elbadawi, Kaltani and Soto (2012) develop an exchange rate misalignment series for a large panel of sub-Saharan African countries and studies the relation between the misalignment and growth while also exploring possible interaction effects between exchange rate misalignment with foreign aid and financial development. Using the error correction and long-run regression estimates based on the annual data covering the period of 1980 to 2004 for 83 countries, results indicate that both the short-run and the long-run coefficients are significant with expected signs, supporting the economic theory.

On the other hand, enormous literature support the negative impacts of real exchange rate on the output growth among various countries, hence, including the followings: Shu-ping and Xiao-meng (2017) examine the relationships between exchange rates, economic growth and foreign direct investment using monthly data from China for the period covering 2001 to 2016. By employing a time-variant parameter VAR model to estimate the coefficients, results show that an increase in the real exchange rate resulted to a negative impact on China's economic growth for the period under consideration. Similarly, Musyoki, Pokhariyal and Pundo (2012) investigate the impact of real exchange rate volatility on the economic growth of Kenya covering the sample period of 1993 to 2009. The authors employ the Generalized Autoregressive Condition of Heteroscedasticity (GARCH) and computation of the unconditional standard deviation of the changes to measure volatility and Generalized Method Moments (GMM) to assess the impact of the relationship. Finding indicates that real exchange rate appears very volatile within the study period. This implies that the real exchange rate volatility inflicted a negative effect on the economic growth of Kenya.

Moreover, Papanikos (2015) examine the impact of real effective exchange rate of euro on the economic growth of Greece. By adopting the model as generated by Rodrik (2008), the authors utilised the annual data spanning 1995 to 2014. Result indicates that the real effective exchange rate of euro was 20% overvalued and that has established a negative impact on the economic growth of Greece. Besides, Manalo, Perera and Rees (2014) employ the structural VAR (SVAR) model to characterise the aggregate and industry effects of exchange rate movements on the Australian economy. The model coefficients are estimated using the seasonally adjusted data based on quarterly frequencies for the period covering 1985:Q1 to 2013:Q2. Results show that a temporary 10% appreciation of the real exchange rate that is unrelated to the terms of trade or interest rate differentials lowers the level of real GDP over the subsequent years by 0.3%.

In addition, Barguelli and Ben-Salha (2018) investigate the impact of exchange rate volatility on economic growth using a sample of 45 developing and emerging economies over a sample period covering the 1985 to 2015. The authors adopt the difference and system GMM estimators to measure the model coefficients; hence, results show that nominal and real exchange rate volatility has a negative impact on economic growth. In addition, the effect of exchange rate volatility is largely influenced by the exchange rate regimes and financial openness. Similar to this assertion, Janus and Riera-Crichton (2015) investigate the impact of real effective exchange rate volatility on economic growth as well as the euro's impact on real effective exchange rate volatility. Using a panel data of selected OECD countries from 1981 to 2011, results show that real effective exchange rate volatility is negatively associated with growth.

Furthermore, Basirat, Nasirpour and Jorjorzadeh (2014) evaluate the fluctuating effect of exchange rate on economic growth based on the development rate of financial markets

among 18 developing countries over the period covering 1986 to 2010. By adopting a panel regression analysis, finding reveals the existence of negative and significant relationship between exchange rate fluctuations and economic growth among the countries under consideration. Equally, Wang, Ye and Li (2017) investigate the impact of real effective exchange rate volatility on the economic growth of China over the sample period spanning 1995 to 2014 using the process of RMB internationalization. The authors employ the VAR model to estimate the model coefficients hence, results show the existence of positive impact of real effective exchange rate on economic growth during the short-run period, but established a negative and significant impact on economic growth during the long-run period.

By challenging the traditional assumption of a linear relationship between exchange rate volatility and economic growth in South Africa, Fourie, Pretorius, Harvey, Van Niekerk and Phiri (2017) investigate the impact of exchange rate volatility and economic growth using annual data covering the period of 1970 to 2016. The authors employ a smooth transition regression model and established the existence of nonlinear relationship between the exchange rate and economic growth for the period under review. More so, Ogunsola, Olofinie and Adeyemi (2017) examine the effects of oil price and exchange rate volatility on the economic growth of Nigeria using the cointegration analysis and the VAR model. Findings reveal that oil price volatility has a negative but insignificant impact on economic growth. On the other hand, exchange rate volatility has insignificant adverse effect on real GDP as one percent increase in exchange rate volatility leads to 2.6 percent reduction in economic growth.

Correspondingly, Ubah (2015) examine the effects of exchange rate volatility on the economic growth of Nigeria using annual time series data covering the period of 1980 to 2012. The author adopts the cointegration test and the Autoregressive Conditional Heteroscedasticity (GARCH) technique to generate exchange rate volatility. Results indicate that the existing relationship between exchange rate volatility and economic growth is negative both in the short-run and the long-run. This implies the presence of inverse nexus between the variables; for the period under consideration. Alike, Irsania and Noveria (2014) explore the relationship between Foreign Direct Investment (FDI), inflation rate, unemployment rate, exchange rate and the economic growth in Indonesia using the multiple linear regression model. Findings indicate that inflation rate, FDI, unemployment rate and exchange rate have a significant impact on economic growth. When exchange rate and inflation increases, the rate of economic growth decreases; implying the existence of inverse and negative relationship between the variables.

Similarly, Khandare (2017) examines the impact of exchange rate fluctuations on the economic growth of India covering the sample period of 1987 to 2014. The author employs the multiple regression model and correlation analysis to evaluate the possible connection between the examined phenomena. While the correlation analysis indicates a positive (but insignificant) relationship between exchange rate and GDP growth, the regression estimates show a negative linkage between the two variables. Also, Chipeta, Meyer and Muzindutsi (2017) investigate the effect of real effective exchange rate and economic growth on the employment status of South Africa using quarterly data spanning the period of 1995q1 to 2015q4. The authors employ the VAR estimation technique and the multivariate cointegration approach to assess the impact and the responsiveness of employment level to economic growth and real exchange rate. Findings indicate that employment level has a positive impact on economic growth but negative on the exchange rate both in the short-run

and the long-run. Further result shows that the effect of economic growth in creating jobs is not significant enough in stimulating job creation in South Africa.

2.2 Misalignment of Exchange Rate

Certain literature discussed and examined the misalignment of real exchange rate towards economic growth among developed and developing countries with divergent results. A good number of these studies includes: Sallenave (2010) investigates the growth effects of real effective exchange rate misalignments for the G20 countries covering the sample period of 1980 to 2006. To achieve this aim, the author estimates the real effective equilibrium exchange rates relying on the behavioural approach BEER, from which misalignments are derived, and further evaluates a dynamic panel growth model including a measure of misalignment. Results show that the degree of misalignment is more noticeable in the case of emerging countries than the industrialised nations. Further result from the regression equation show that misalignments have a negative effect on the economic growth. In addition to this, Glüzmann, Levy-Yeyati and Sturzenegger (2012) examine the impacts of exchange rate undervaluation on the economic growth. Following the measure adopted by Rodrik (2008) together with initial per capita GDP and time and country fixed effects as controls, the authors estimate the regressions of the growth rate and establish that undervaluation is positively and contemporaneously associated with growth.

Similarly, Waheed (2016) investigates the impact of real effective exchange rate misalignment on economic growth in Nigeria using an annual data covering the sample period of 1960 to 2011. The author adopted an augmented growth model using the approaches of purchasing power parity and the GMM. Using the result of GMM estimates, findings indicate the existence of negative and significant impact of real exchange rate misalignment on the economic growth within the sample period under investigation. Equally, Svilokos and Tolić (2014) examine the impact of currency misalignment in the Croatian kuna and indicates whether it affects the economic growth within the sample period of 2001q1 to 2013q3. Using the cointegration techniques, VAR model and the granger causality test to estimate the model coefficients, results for the whole period indicate that the granger causality goes from misalignments to GDP growth under the 10 percent significance level. Further results indicate that currency misalignments in the observed period are relatively small.

However, Bohl, Michaelis and Siklos (2016) examine the relationship between real per capita GDP growth, exchange rate regimes, and the incidence of crises among 47 countries covering all regions in the world for the period of 1980 to 2010. The authors further evaluate the role of the exchange rate regime to explain the empirical link between financial crises and economic activity. Even though exchange rate regimes of all types can encourage economic growth positively, variations in regional location produces a different outcome. Pegged regimes is essential and more imperative to emerging market economies while crawling regimes has more propensity to encourage economic growth in G20. Findings show a significant interaction between exchange rate and financial crises, while pegged exchange rate regime established a negative impact on economic growth. In a similar case, Habib, Mileva and Stracca (2016) examine the impact of movements in the real exchange rate on economic growth based on the five-year average data for a panel of over 150 countries in the post Bretton Woods period. To differ from the existing literature, the authors used the external instruments to deal with possible reverse causality from growth to the real exchange

rate. Results show that real exchange rate appreciation (depreciation) significantly reduces (raises) the annual real GDP growth. The result is more pronounced in developing countries with pegs exchange rate.

In a related development, Razzaque, Bidisha and Khondker (2017) assess the effects of exchange rate movements on the economic growth of Bangladesh based on annual data covering the period of 1980 to 2012. Using a suitable analytical framework to derive an empirical specification, the authors construct a real exchange rate series and employ cointegration techniques to determine the output response to Bangladeshi currency depreciations. Findings show that depreciation of real exchange rate is associated with higher economic growth. More to that, Wong (2013) examine the impact of real exchange rate misalignment on the Malaysian economic growth using annual data covering the period of 1971 to 2008. By adopting the ARDL model and the generalised forecast error variance decomposition, result shows that an increase in real exchange rate misalignment will lead to a decrease in the economic growth. In other words, real exchange rate devaluation might encourage economic growth while appreciation may dampens the economic growth. As supported by Jakob (2015) who investigates the effects of exchange rate regimes on economic growth among the selected 74 developed and developing countries within the year 2012 except for data on human capital. Using the regression analysis to estimate the model coefficients, result shows the existence of positive and significant relationship between pegged exchange rate and GDP growth.

According to Hua (2011), if the appreciation of real exchange rate causes positive impact on economic growth, it established a negative impact by weakening the international competitiveness of tradable sector thereby hampering output level. The author adopts the General Method of Moment (GMM) technique on the panel data of 29 Chinese provinces covering the sample period of 1987 to 2008. Findings indicate that real exchange rate appreciation has a negative effect both on the employment level and economic growth. However, Tipoy, Breitenbach and Zerihun (2018) examine the transmission mechanism of real exchange rate misalignment on economic growth across various emerging economies using annual data spanning the period of 1970 to 2014. Based on the endogenous growth model, result indicates the presence of a positive and significant relationship between exchange rate and economic growth. Further result shows that the size of the tradable sector is the operative channel through which undervaluation impacts growth. Accordingly, weaker currencies tend to increase economic growth due to its effect on the tradable sector as they make exporting firms more competitive.

Moreover, Abida (2011) examine the role of real exchange rate misalignment on the long-run growth in three economies of the Maghreb countries (Tunisia, Algeria and Morocco) over the sample period of 1980 to 2008. By adopting a dynamic panel growth model, findings reveal the existence of negative relationship between real exchange rate misalignment and economic growth. Implying that more depreciated (appreciated) real exchange rate supports (hinders) long-run growth. In addition, Hend and Srdjan (2010) examine the effects of exchange rate misalignment on the economic growth of Tunisia based on the OLS regression analysis. The authors employ annual time series data covering the period of 1977 to 2007 with the view to determining the relationship. By further specifying an equation of economic growth of Tunisia, results show that real effective exchange rate misalignment has a negative effect on the economic growth, for the period under consideration.

Similar evidence as supported by Sibanda, Newadi and Mlambo (2013) who evaluate the impact of real exchange rates on economic growth in South Africa based on the quarterly data spanning the period of 1994q1 to 2010q4. In order to estimate the possible relationship among the variables, Johansen cointegration and the vector error correction mechanism are employed. Findings show that real exchange rates have a diminishing long-run impact on the economic growth of South Africa. Further result indicates that while undervaluation of the currency significantly improves economic growth in the short-run, it significantly hinders growth in the long-run. More so, Hamid and Mir (2017) investigate the impact of overvalued exchange rate on the economic growth of Pakistan using a contextual analysis by discussing on the various exchange rate regimes and its implications on economic growth. The authors conclude that exchange rate overvaluation has produced an adverse impact on exports and the manufacturing sector. In other words, the overvaluation has resulted to establishing a negative effect on the country's long term growth and also heighten the short term risk of a balance of payments crisis.

Likewise, Papanikos (2015) investigates the impacts of real exchange rate on the economic growth of Greece using annual data covering the sample period of 1995 to 2014. Result shows that the euro-dollar misalignment has a negative impact on Greek economic growth. Further result indicates that the real effective exchange rate of euro was 20% over valued and resulted to a negative effect on the Greek economic growth. However, a 10% undervaluation would have risen the per capita GDP growth rate by almost an additional 1.25% per annum. Equally, Sekkat (2016) uses a different explanations to the lack of consensus on the impact of exchange rate misalignment on export diversification in developing countries to further investigate the conditions under which misalignment could affect export diversification. The author also examines whether the impact depends on the level of financial development or on the quality of institutions of the exporting economy. Using the causality test and regression estimates, results indicate support to the effect of undervaluation on share of manufactures in total exports, but no support is found for an impact of misalignment on exports diversification. In a similar manner, Nourira, Plane and Sekkat (2011) examine the impact of exchange rate policy on manufactured exports and economic growth as well as estimating the equilibrium real exchange rate and potential misalignment on a sample of 52 developing countries from Africa, Asia and Latin America over the period of 1980 to 2005. Findings indicate that during the period 1991 to 2005, a number of developing countries have used undervaluation to foster the price competitiveness of manufactured export with the target of fostering development through expansions.

On the contrary, certain studies appears neutral in their findings as no relationship is identified among the variables. This empirical assertion is support by: Tang (2015) examines the relationship between the real exchange rate and economic growth in China by applying a cointegrated VAR (CVAR) approach using data covering the sample period of 1994 to 2012. The author emphasised on the long-run equilibrium and short-run dynamics between the real exchange rate and economic growth rather than evaluating the nexus between exchange rate volatility and growth. Results indicate that no direct relationship exist between the real exchange rate and growth in the long run. Only that the long-run equilibrium exchange rate is jointly determined by the foreign trade, foreign reserves and the foreign direct investment.

3.0 METHODOLOGY

This study follows a quantitative approach based on the time series data covering the period of 1980 to 2017 for real effective exchange rate and real GDP at a constant basic price using the 2010 base year. The data is obtained from the official publications of the Central Bank of Nigeria (CBN). The sample range covers the major economic and political circumstances in 1980's and the recent recessionary period that hit the Nigerian economy.

The study adopts Johansen cointegration technique and the Vector Error Correction Model (VECM) to determine the long-run and the short-run impact of exchange rate on the economic growth in Nigeria and further applies the maximum likelihood estimation to a VECM to simultaneously determine the long-run and short-run determinants of the variables in a model. For the Johansen cointegration, the null hypothesis is H_0 : there is no cointegrating relations among the variables; while the alternative hypothesis is H_1 : there is cointegrating relations among the examined variables. Where there is no cointegrating relationship between the variables concern, the VAR model is more suitable and appropriate than the VECM (Brooks, 2008). Similarly, if the linear combination of non-stationary series does not have any unit root difficulty, then, there is an existence of cointegrating relationship among the variables concern. To determine the existence of cointegrated relationship, a formulated model is specify as follows:

$$RGDP = f(EXR) \quad (1)$$

To express the model using econometrics formulation, eq. (1) is further stated from a functional form to an algebraic expression as follow:

$$RGDP_t = \beta_0 + \beta_t + \beta_1 EXR + \varepsilon_t \quad (2)$$

Where, RGDP = economic growth at time t; β_0 = intercept or constant term; β_t = parameter that captures the linear trend in the model; EXR = exchange rate; ε_t = error term with the assumption of zero mean and constant variance.

The dependent variable is economic growth (proxy by RGDP) as explained by the movement in independent variable (exchange rate). In order to obtain the elasticity coefficients and remove the effect of outliers, the variables are transformed into logarithm form. The model specification in log-linear form is presented as follows:

$$LRGDP_t = \beta_0 + \beta_t + \beta_1 LEXR + \varepsilon_t \quad (3)$$

The aforementioned model is estimated to determine the short-run and the long-run impact of exchange rate on the economic growth in Nigeria using the cointegration approach and VECM technique.

4.0 RESULT AND DISCUSSION

In this section, the estimated results are presented based on the unit root testing, cointegration analysis and the VECM approach with the view to determining the long-run and the short-run relationship among the variables.

4.1 Unit Root Testing

To determine the stationary properties of the variables, Augmented Dickey-Fuller (ADF) test is utilised. The ADF test is extensively employed to examine the order of integration for each time series data. In the case of this study, the test is conducted on real GDP and exchange rate

according to levels and first difference stationarity. The test is further specified without linear trend and with the inclusion of linear trend. Result for the test is presented as follows:

Table 1.1: Unit root test

Variables	Augmented Dickey-Fuller (ADF) test			
	Without trend		With trend	
	Level	First difference	Level	First difference
LRGDP	0.9817	0.0199*	0.1582	0.0510**
LEXR	0.2867	0.0008*	0.2476	0.0044*

Note: ** indicates stationary at 10% level of significance

* indicates stationary at 5% significance level

Table 1.1 presents the results of unit root testing based on the ADF approach both at level I(0) and at first difference I(1). At level, all variables exhibit a non-stationary behaviour as their corresponding p-values are insignificant both with and without linear trend, implying no rejection of null hypothesis at 5% significance level. At first difference, all the examined variables are stationary at 5% and 10% significance level since the resultant p-values are lower than 0.05 except for the coefficient of real GDP that is significance at 10% level; meaning that the series show no evidence of unit root and the null hypothesis is therefore rejected. Interestingly, either trend is included in the model or otherwise; the results are similar across all observations. Since all the variables are integrated at the same order; that is first difference stationary, the next step is to test for the presence of long-run relationship using the Johansen cointegration analysis.

4.2 Result of the Cointegration Test

To test for the presence of long-run relationship among the examined variables, this study adopts the Johansen cointegration approach. The estimated findings are presented as follows:

Table 1.2: Cointegration test

Hypothesised no. of CE	Trace test			Maximum Eigenvalue		
	Trace statistic	5% critical value	Probability value	Max-Eigen statistic	5% critical value	Probability value
None*	30.79676	15.49471	0.0001**	23.76312	14.26460	0.0012**
At most 1*	7.033643	3.841466	0.0080**	7.033643	3.841466	0.0080**

Note: * denotes rejection of the hypothesis at 5% significance level

** Mackinnon-Haug-Michelis (1999) p-values

CE = Cointegrating Equation

Result in Table 1.2 shows the estimated findings of trace statistic and its corresponding maximum eigenvalue statistic for the Johansen cointegration test. For the trace statistic, results indicate the presence of two (2) cointegrating equations at 5% significance level. This is evidenced by the high value of trace statistic over its corresponding critical values. In addition, the maximum eigenvalue statistic also shows the existence of two (2) cointegrating equations since the p-values are lower than 0.05 ($p < 0.05$). Given these findings, the null hypothesis of no cointegration is therefore rejected. This implies the existence of cointegrating and long-run relationship among the variables. This result is consistent with the literature as evidenced by Saidi et al. (2017); Asid et al. (2013); Wong (2013).

Furthermore, the presence of a cointegrating relationship between the exchange rate and real GDP implies that the examined variables under consideration explain the long-run equilibrium in real GDP. The equation for the long-run equilibrium relationship is expressed as follows:

$$\text{LRGDP} = -1.2248 + 13.6755(\text{LEXR}) \tag{4}$$

By implication, there is a presence of positive relationship between exchange rate and economic growth, *ceteris paribus*. Meaning that, increase in the level of exchange rate leads to a corresponding increase in economic growth at the long-run period. Such that, one percent increase in exchange rate leads to 13% increase in economic growth. This finding is consistent with the literature as supported by Shingil and Panshak (2017); Koitsiwe and Adachi (2015); AbuDalu et al. (2014).

4.3 Result of the VECM

Given the existence of cointegrated relationship among the variables, the short-run impact is explained by the VECM approach. This is because, while certain variables may have a long-run relationship on other variables; they may equally have a short-run effect with different impact on macroeconomic indicators (Gujarati & Porter, 2009). A negative coefficient of the error correction term and a significant value of the t-statistic is a necessary condition for explaining the short-run adjustment towards long-run equilibrium state. To obtain the resultant p-values of this test, the value of standard errors are divided by their corresponding value of t-statistics; the obtained result is the p-value which may be significant either at 1%, 5% or 10% levels, respectively. Nevertheless, the short-run adjustment is estimated and presented as follows:

Table 1.3: Error correction model

Error correction	D(LRGDP)	D(LEXR)
CointEq1	-0.002509* (0.00489) [-0.51336]	-0.172793* (0.05556) [-3.10986]
D(LRGDP(-1))	-0.710552** (0.26531) [-2.67815]	3.128918 (3.01649) [1.03727]
D(LRGDP(-2))	0.098736 (0.29889) [0.33034]	-0.615530 (3.39824) [-0.18113]
D(LRGDP(-3))	-0.112164 (0.30230) [-0.37103]	6.299961 (3.43702) [1.83297]
D(LEXR(-1))	-0.046040* (0.04170) [-1.10408]	-1.249209 (0.47411) [-2.63486]
D(LEXR(-2))	-0.042170* (0.04388) [-0.96108]	-1.203376 (0.49886) [-2.41224]
D(LEXR(-3))	0.036587* (0.03941)	-1.114456 (0.44806)

	[0.92839]	[-2.48730]
C	40.66459	

Note: * indicates significance at 5% level
 ** indicates significance at 10% level

Results in Table 1.3 indicate that CointEq1 comprises of two equations that are significant at 5% level which explain the presence of short-run adjustment towards the long-run equilibrium state in LRGDP and LEXR. These findings also provide a strong set of evidence for the existence of error correction in the cointegrating equation. Both the coefficient of LRGDP and the LEXR established a negative impact of -0.002509 and -0.172793 with corresponding p-values of 0.0095 and 0.0178 ($p < 0.05$) significant at 5% level. More so, the coefficient of real exchange rate and the real GDP show the evidence of error correction, and this implies that an equilibrium is restored both in real exchange rate and the real GDP. By implications, less than one percent (0.2%) of the disequilibrium in LRGDP is corrected annually, while 17% of the disequilibrium in LEXR is adjusted in each year until full equilibrium is restored. The low adjustment speed by the LRGDP indicates the presence of other determinants that can suitably explain the phenomenon of economic growth in Nigeria but are unaccounted in this model.

5.0 CONCLUSION

The real exchange rate has plays a significant role in the development process of many countries both developed and developing especially where the productivity growth is limited. In the last decade, a large number of studies have examine the causal link and the impact of exchange rate on economic growth. However, evidences resulting from this empirical literature indicate that exchange rate depreciation encourages economic growth while exchange rate appreciation hinders growth. In order to attain sustainable growth along with external and internal balances, the exchange rate must be align with long-run equilibrium state. The extent at which the real exchange rate of a country deviate from the equilibrium state would determine the level of economic imbalance in a country. In view of that, this study examines the impact of real exchange rate on the economic growth of Nigeria by assessing the short-run and the long-run impact of the variables. Using annual time series data covering the sample period of 1980 to 2017, results from the cointegration test indicate the existence of long-run relationship among the examined variables. In addition, the model established the presence of positive and significant impact of exchange rate on the economic growth in Nigeria for the period under consideration. While the VECM established the presence of short-run dynamics among the variables with significant p-values at 5% level. Therefore, policy makers in Nigeria should be extremely critical in decision making particularly on matters related to exchange rate in order to benefit from its positive and advantageous impact on the economic growth. A considerable and rational appreciation of the local currency is essential in encouraging sustainable growth in the long-run period. In order to strengthen the international competitiveness through appropriate macroeconomic policies, there is need for government to avoid unnecessary spending that has no benefit of raising aggregate growth. In addition, financial development should be accorded high priority in Nigeria by developing the capital market; providing more financial instruments to safeguard against the risk of exchange rate; and improving the activities of banking institutions.

REFERENCE

- Abida, Z. (2011). Real exchange rate misalignment and economic growth: An empirical study for the Maghreb countries. *International Journal of Economics and Finance*, 3(3), 190 -201.
- AbuDalu, A., Ahmed, E.M., Almasaied, S.W., & Elgazoli, A.I. (2014). The real effective exchange rate impact on Asean-5 economic growth. *International Journal of Economics & Management Sciences*, 3(2), 02-11.
- Adeniran, J.O., Yusuf, S.A., Adeyemi, O.A. (2014). The impact of exchange rate fluctuation on the Nigerian economic growth: an empirical investigation. *International Journal of Academic Research in Business and Social Sciences*, 4(8), 224-233.
- Aman, Q., Ullah, I., Khan, M.I., Khan, S. (2017). Linkages between exchange rate and economic growth in Pakistan (an econometric approach). *Eur J Law Econ*, 44, 157-164.
- Asid, R., Razi, M.H.F.A., Mulok, D., Kogid, M. & Lily, J. (2014). The impact of foreign direct investment and real exchange rate on economic growth in Malaysia: Some empirical evidence. *Malaysian Journal of Business and Economics*, 1(1), 73-85.
- Barguelli, A., & Ben-Salha, O. (2018). Exchange Rate Volatility and Economic Growth. *Journal of Economic Integration*, 33(2), 1302-1336.
- Basirat, M., Nasirpour, A., & Jorjorzadeh, A. (2014). The effect of exchange rate fluctuations on economic growth considering the level of development of financial markets in selected developing countries. *Asian Economic and Financial Review*, 4(4), 517-528.
- Bohl, M.T., Michaelis, P., & Siklos, P.L. (2016). Austerity and recovery: Exchange rate regime choice, economic growth, and financial crises. *Economic modelling*, 53, 195-207.
- Brooks, C. (2008): *Introductory Econometrics for Finance* (2nd edition). ICMA Center University of Reading; Cambridge university press; New York.
- Chipeta, C., Meyer, D.F., & Muzindutsi, P. (2017). The effect of exchange rate movements and economic growth on job creation. *Studia Universitatis Babeş-Bolyai Oeconomica*, 62(2), 20-41.
- Elbadawi, I.A., Kaltani, L., & Soto, R. (2012). Aid, real exchange rate misalignment, and economic growth in Sub-Saharan Africa. *World development*, 40(4), 681-700.
- Fourie, J., Pretorius, T.T, Harvey, R., Van Niekerk, H., & Phiri, A. (2017). Nonlinear relationship between exchange rate volatility and economic growth: A South African perspective. Department of Economics, Finance and Business Studies, CTI Potchefstroom Campus, North West, South Africa.
- Glüzmann, P.A., Levy-Yeyati, E., & Sturzenegger, F. (2012). Exchange rate undervaluation and economic growth: Díaz Alejandro (1965) revisited. *Economics Letters* 117, 666-672.
- Goncalves, C.E., & Rodrigues, M. (2017). Exchange rate misalignment and growth: A myth? International Monetary Fund (IMF) working paper series, paper no WP/17/283.

- Guellil, Z., Marouf, F.Z., & Benbouziane, M. (2017). Exchange rate regimes and economic growth in developing countries: An empirical study using panel data from 1980 to 2013. Management International Conference, Monastier di Treviso (Venice), Italy 24-27 May 2017.
- Gujarati, D.N., & Porter, D.C. (2009). Basic econometrics, 5th ed. New York: McGraw-Hill. ISBN: 978-007-127625-2.
- Guzman, M., Ocampo, J.A., Stiglitz, J.E. (2018). Real exchange rate policies for economic development. *World Development*, 110, 51-62.
- Habib, M.M., Mileva, E., & Stracca, L. (2016). The real exchange rate and economic growth: Revisiting the case using external instruments. Working paper series, paper no 1921. European Central Bank; EuroSystem.
- Habib, M.M., Mileva, E., & Stracca, L. (2017). The real exchange rate and economic growth: Revisiting the case using external instruments. *Journal of International Money and Finance*, 73, 386-398.
- Hamid, N., & Mir, A.S. (2017). Exchange Rate Management and Economic Growth: A Brewing Crisis in Pakistan. *The Lahore Journal of Economics*, 22:SE, 73-110.
- Hend, S., & Srdjan, R. (2010). Exchange policy and economic growth: effect of the real effective exchange rate misalignment on the growth of Tunisia. *Economic Analysis*, 43(3-4), 15-28.
- Hua, P. (2011). The economic and social effects of real exchange rate- Evidence from the Chinese provinces. International Conference on Social Cohesion and Development, 20 -21 January 2011, Paris, France. OECD Development Centre, with the financial support of Fundación Internacional y para Iberoamérica de Administración y Políticas Públicas (FIIAPP).
- Irsania, D.V., & Noveria, A. (2014). The relationship among foreign direct investment, inflation rate, unemployment rate, and exchange rate to economic growth in Indonesia. *Journal of Business and Management*, 3(5), 499-510.
- Jakob, B. (2015). Impact of exchange rate regimes on economic growth. *Undergraduate Economic Review*, 12(1) Article 11, 01-23.
- Janus, T., & Riera-Crichton, D. (2015). Real exchange rate volatility, economic growth and the Euro. *Journal of Economic Integration*, 30(1), 148-171.
- Khandare, V.B. (2017). The impact of exchange rate fluctuations on the economic growth of India. *International Journal of Academic Research and Development*, 2(2), 80-84.
- Koitsiwe, K., & Adachi, T. (2015). Relationship between mining revenue, government consumption, exchange rate and economic growth in Botswana. *Contaduría y Administración*, 60(S1), 133-148.
- Krušković, B.D., & Maričić, T. (2015) Empirical analysis of the impact of foreign exchange rate reserves to economic growth in emerging countries. *Applied Economics and Finance*, 2(1), 102-109.

- Lee, J. & Yue, C. (2017). Impacts of the US dollar (USD) exchange rate on economic growth and the environment in the United States. *Energy Economics*, 64, 170-176.
- Mahmoudinia, D., Soderjani, E.S., & Pourshahabi, F. (2011). Economic growth, tourism receipts and exchange rate in MENA zone: Using panel causality technique. *Iranian Economic Review*, 15(29), 130-146.
- Manalo, J., Perera, D., & Rees, D. (2014). Exchange rate movements and the Australian economy. Research Discussion Paper, paper no 11. Reserve Bank of Australia.
- Musyoki, D., Pokhariyal, G.P., & Pundo, M. (2012). The impact of real exchange rate volatility on economic growth: Kenyan evidence. *Business and Economic Horizons*, 7(1), 59-75.
- Nouira, R., Plane, P., & Sekkat, K. (2011). Exchange rate undervaluation and manufactured exports: A deliberate strategy? *Journal of Comparative Economics*, 39, 584-601.
- Ogunsola, A.J., Olofinie, G.D., & Adeyemi, P.A. (2017). Effect of oil price and exchange rate volatility on economic growth in Nigeria. *International Journal of Economics, Commerce and Management*, V(2), 312-328.
- Papanikos, G.T. (2015). The real exchange rate of euro and Greek economic growth. *The Journal of Economic Asymmetries*, 12, 100-109.
- Rapetti, M., Skott, P., & Razmi, A. (2011). The real exchange rate and economic growth: Are developing countries different? Economics Department Working Paper Series. Paper no 115, 01-19. University of Massachusetts Amherst.
- Razzaque, M.A., Bidisha, S.H., & Khondker, B.H. (2017). Exchange rate and economic growth: An empirical assessment for Bangladesh. *Journal of South Asian Development*, 12(1), 42-64.
- Rodrik, D. (2008). The real exchange rate and economic growth. *Brookings Papers on Economic Activity*, 365-412.
- Saidi, L., Adam, P., Rostin, Saenong, Z., Balaka, M.Y., Gamsir, asmuddin, Salwiah (2017). The effect of stock prices and exchange rates on economic growth in Indonesia. *International Journal of Economics and Financial Issues*, 7(3), 527-533.
- Sallenave, A. (2010). Real exchange rate misalignments and economic performance for the G20 countries. *Economie internationale*, 1(121), 59-80.
- Sekkat, K. (2016). Exchange rate misalignment and export diversification in developing countries. *The Quarterly Review of Economics and Finance*, 59, 1-14.
- Selimi, S., Selimi, V. (2017). The effects of exchange rate on economic growth in the republic of Macedonia. *FCOFORUM*, 6(3/13), 50-55.
- Shingil, M.E., & Panshak, Y. (2017). Exchange rate dynamics, inflation and economic growth: empirical evidence from Turkish economy. *IOSR Journal of Humanities and Social Science (IOSR-JHSS)*, 22(9/3), 42-49.

- Shu-ping, W., & Xiao-meng, W. (2017). Relationships between exchange rates, economic growth and FDI in China: An empirical study based on the TVP-VAR model. *Littera Scripta*, 10(1), 166-179.
- Sibanda, K., Ncwadi, R., Mlambo, C. (2013). Investigating the impacts of real exchange rates on economic growth: A case study of South Africa. *Mediterranean Journal of Social Sciences*, 4(13), 261-274.
- Svilokos, T., & Tolić, M.S. (2014). Does misaligned currency affect economic growth? Evidence from Croatia. *Croatian Economic Survey*, 16(2), 29-58.
- Tang, B. (2015). Real exchange rate and economic growth in China: A cointegrated VAR approach. *China Economic Review*, 34, 293-310.
- Tipoy, C.K., Breitenbach, M.C., & Zerihun, M.F. (2018). Exchange rate misalignment and economic growth: On the possible transmission channels for emerging economies. *Cogent Economics & Finance*, 6, 01-18.
- Ubah, U.P. (2015). Exchange rate volatility and economic growth in Nigeria. *Researchjournali's Journal of Economics*, 3(3), 01-15.
- Waheed, I. (2016). Real exchange rate misalignment and economic growth in Nigeria. *CBN Journal of Applied Statistics*, 7(1), 93-110. The Central Bank of Nigeria, Abuja.
- Wang, S., Ye, S., & Li, X. (2017). The impact of real effective exchange rate volatility on economic growth in the process of renminbi internationalization: An empirical study based on VAR Model. School of Economics and Management, Beijing Jiaotong University Beijing, China.
- Wong, H.T. (2013). Real exchange rate misalignment and economic growth in Malaysia. *Journal of Economic Studies*, 40(3), 298-313.