EXCHANGE RATE VOLATILITY AND ECONOMIC GROWTH IN NIGERIA

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BEING A PROJECT SUBMITTED TO THE DEPARTMENT OF ECONOMICS, FACULTY OF SOCIAL SCIENCES, UNIVERSITY OF BENIN, BENIN CITY, NIGERIA.
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CERTIFICATION

This is to certify that the project work was carried out by Judith Chinazaekpere CHINEDUM with matriculation number SSC1707986 in the Department of Economics, Faculty of Social Sciences, University of Benin, Benin City.

Prof. E.I. Izilein **(Project Supervisor)**	**Date**
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DEDICATION

This research undertaking is solely dedicated to the Almighty God, for He is the source from whence all the wisdom and understanding expended in this work are derived.

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ABSTRACT

This study examined exchange rate on economic growth of Nigeria from 1986 to 2020.Exchange rate is the rate at which one currency exchanges for another, it is the external value of a currency in respect to the external value of another currency. The objectives of the study is to empirically examine exchange rate and its volatility in the Nigerian economy. It will be shown in the study that exchange rate, inflation, interest rate has no significant impact on economic growth, thus making it a negative relationship. The significance of the study cannot be overemphasized as it is of great concern not only to policy makers but the economy at large. The main data used in this study is secondary; sourced from various issues of Central Bank of Nigeria Statistical Bulletin. The Ordinary Least Square (OLS) regression technique was used to analyze the data. Also in a view to afford difficulties while carrying out the regression analysis other methods such as Augumented Dickey Fuller test and ECM was employed, The result also revealed that exchange rate have no significant impacts on economic growth. The result also indicated that that interest rate and inflation rate have negative impact on economic growth respectively. We recommend that the government should properly manage exchange rate in Nigeria as its volatility has the potential to distort other factors (such as lending rate, labor force and price stability) that matter to the performance of the economy. Government should also encourage approved domestic investment to accelerate growth rather than relying on foreign direct investment. Interest rate should be

managed in such a way that it will encourage savings but not to the extent of discouraging investment. Government should also reduce inflation to boost economic growth in Nigeria.

CHAPTER ONE

INTRODUCTION

1.1 BACKGROUND OF THE STUDY

Since the adoption of financial liberalization policies, most developing countries have been exposed to sharp exchange rate fluctuations. This situation has attracted the attention of economists and previous research has been focused on the effects of exchange rate volatility on trade flows (Cho and Corriston 2002, Soleymani and Chua 2014, Karemera *et al.*2015, Wong 2017). Previous studies dealing with the effects of exchange rate volatility on economic growth have yielded mixed results. This is explained at least by two reasons.

Exchange rate is an important economic metric, as it reflects underlying strength and competitiveness with world economies (Asinya and Takon, 2014). Whether fixed or floating, exchange rate affects macroeconomic variables such as import, interest rate, balance of payment, inflation rate etc.

Chong and Tan, (2008) empirical analysis revealed that the exchange rate is responsible for changes in macroeconomic fundamentals for the developing economies. Mehdi et al (2014) states that the effect of exchange rate fluctuations on economic growth varies in different countries, asserting that one of the factors determining the way exchange rate volatility affect economic growth is development of each countries financial market revealing that new theories emphasizes the high correlation between growth and innovation.

Exchange rate volatility influence domestic prices through their effect on aggregate supply and demand.

First the effects of exchange rate volatility on the dynamics of growth are contradictory. On the one hand, exchange rate vol atility may be considered as a shock absorber and seems to be more appropriate for countries experiencing frequent real shocks; on the other hand, volatility may be associated with higher macroeconomics volatility in terms of international trade, investments and economic growth. Second, the relationship between exchange rate and economic growth also depends on other control variables such as financial development.

Although, various factors have been abducted to the poor economic performance of Nigeria, It is necessary to examine the exchange rate volatility on economic growth in Nigeria, and that is the main thrust of this study.

1.2 STATEMENT OF THE PROBLEM

The debate on exchange rate volatility has preoccupied economists and public sector managers for a long time. This transcended the collapse of the gold standard in 1930s to the emergence of the Bretton Wood System of adjustable peg from the 1940s, through the adoption of flexible exchange rate regime by developing economies in the 1970s and those undergoing structural reforms in the 1980s, as well as in the aftermath of the currency crises in emerging economies in the 1990s. Besides factors such as market opportunity, political risks and the legal environment, business entities take exchange rate into consideration in making investment decisions. The focus has always been on the

volatility of the exchange rate in foreign exchange market and its impact on business outcomes.

It has been established in literature that "getting the exchange rate right" or maintaining relative stability is critical for both internal and external balance and, hence growth in an economy. Failure to properly manage the exchange rate induces distortions in consumption and production patterns. Excessive volatility in exchange rate creates uncertainty and risks for economic agents with destabilizing effects on the macro economy. Private sector operators are concerned about exchange rate fluctuations because it impacts their portfolios, and may result in capital gains or losses. Policymakers also focus on the pervasive effects of exchange rate movements on the economy and macroeconomic policy objectives of price stability, economic growth, employment and external viability.

Exchange rate is a key price variable in an economy and performs dual role of maintaining international competitiveness, and serving as nominal anchor for domestic prices. It is therefore, defined as the price of one currency *vis-à-vis* another and is the number of units of a currency required to buy another currency. Since the collapse of the generalized fixed exchange rate regime and the adoption of the generalized fixed floating system by the industrialized countries in1973, most countries including Nigeria, have experimented with various types of exchange rate arrangements ranging from the peg system to weighted currency basket to managed floating and more recently to the monetary zone arrangements. In practice there is nothing like a "clean" or "pure" float

whereby the exchange rate is left entirely to the vagaries of the market forces. The predominant system is the "dirty" or "managed" float whereby the monetary authorities intervene periodically in the foreign exchange market to achieve certain strategic objectives.

In the view of the above problem, the following research questions are raised;

i. How has the prevailing exchange rate volatility affected economic growth in Nigeria?
ii. What is the relationship between interest rate and economic growth in Nigeria?
iii. What is the effect of Inflation on economic growth in Nigeria?

1.3 OBJECTIVES OF THE STUDY.

The main objective of the study is to empirically examined exchange rate and its volatility in the Nigerian economy. However, specific objectives are;

i. To ascertain the relationship of exchange rate volatility on the Nigerian economy.
ii. To examine the impact of interest rate on the Nigerian economy.
iii. To determine the impact of inflation on the Nigerian economy.

1.4 HYPOTHESES OF THE STUDY

Based on the above objectives, the hypotheses (Null) of this study are stated as follows:

Hypotheses 1

Ho: Exchange rate has no significant impact on economic growth in Nigeria.

Hypotheses 2

Ho: Interest rate has no significant impact on economic growth in Nigeria.

Hypotheses 3

Ho: Inflation rate does not have any significant impact on economic growth in Nigeria.

1.5 SIGNIFICANCE OF THE STUDY

The significance or the rationale for the study of exchange rate volatility and economic growth in Nigeria cannot be overemphasized. The impact of exchange rate on the Nigerian economy is of great concern to policy makers, thus the study would provide the government and other stakeholders (financial market participant) an edge in its decision making. Hence, significance or the rationale for the study of exchange rate would provide an in-depth theoretical and empirical framework for further study in the future.

1.6 SCOPE OF THE STUDY

This study seeks to theoretically and empirically analyse the effect of exchange rate volatility on economic growth within the period 1986 - 2020 in the context of a simple modified growth model using Nigeria as a case study. This study adopted time series secondary data sourced from Central Bank of Nigeria Statistical Bulletin, National Bureau of Statistics (NBS) and the World Development Indicators (WDI). The dependent variable for this research work is real Gross Domestic Product (RGDP), while the independent variables include exchange rate, exchange rate volatility, inflation, interest rate, and foreign direct investment.

1.7 LIMITATIONS OF THE STUDY

There is no research work that is devoid of limitations and drawbacks. This study is not an exception. In the course of carrying out this study, some challenges were encountered

in trying to access and get relevant documents and information. These limiting constraints include;

i. ***Time:*** Time plays a crucial role when sourcing for data, modelling and computation. Thus, limited time serves as a constraint to adequate research of the subject matter as the study was carried out alongside other academic responsibilities.
ii. ***Finance:*** The researcher was also constrained by his level of finance. Adequate finance is required in sourcing for materials, data, running regression, typing, and finally binding of the work.
iii. ***Data:*** As regards the availability of required and adequate data, data gotten from secondary sources are often inaccurate, thus constituting a limiting factor to the study. There is some elements of inaccuracy in the data because most data are often aggregated, averaged and massaged (i.e. data smoothening and massaging) and this tend to reduce the reliability of the data for econometric analysis and evaluation.
iv. ***Variables:*** The number of independent variables adopted for this research also constitutes a constraint on the part of the researcher. This is so because the researcher has to take account of the trade-off between 'reality and manageability' in the econometric model specification.

1.8 STRUCTURE OF THE STUDY

This research work will be subdivided into chapters to aid easy understanding and proper organization of the study. It will span through five chapters: chapter one depicts the introductory aspects of the research which in turn encompasses background to the study,

statement of the problem, research questions, objectives to the study, research hypotheses, scope of the study, significance of the study as well as the limitations of the study. Chapter two deals with the assessment and review of relevant literatures to the research work. It involves conceptual literature, theoretical review of literature and empirical review of literature. Chapter three offers the theoretical framework of the study, model specification as well as the methodology adopted for analyzing the data utilized in the course of the research work. Chapter four shows the presentation and analysis of results, which is decomposed into descriptive statistics, trend analysis, empirical results and analysis as well as policy implication of findings. Chapter five wraps up the research work by giving the summary of findings, recommendations and conclusion. Enclosed to this chapter are bibliography and appendices.

CHAPTER TWO

LITERATURE REVIEW

2.1 CONCEPTUAL CLARIFICATIONS

For the purpose of attaining the objectives of the study, it is essential to review some concepts related to the subject matter of the research work that would provide us with adequate conceptual clarification for assessing the pertinence and contributions of this research study to existing literature. This study tries to ascertain the empirical relationship that exists between exchange rate volatility and economic growth in Nigeria making use of descriptive and analytical frameworks.

2.1.1 Exchange Rate

Exchange rate is a significant macroeconomic variable in an economy. Its behavior determines to a large extent, the behavior of several macroeconomic variables in an economy. Hence, the determination of the relationship between exchange rate and economic growth has been a major preoccupation of both academics and policy makers for some decades now. It has been recognized in the literature that the depreciation of exchange rate tends to expand exports and encourage imports. Thus, exchange rate depreciation leads to income transfer from importing countries to exporting countries through a shift in terms of trade, and this affects the economic growth of both the importing and exporting nations. Fundamental to monetary policy in any economy is the goal of stabilizing the domestic and external value of the currency.

Exchange rate volatility in Nigeria has assumed a worrisome dimension where its threat to economic prosperity can no longer be ignored because itg creates uncertainty and risks

in the economy which in turn discourages investment (both foreign direct investment and foreign portfolio investment) translating into reduced economic growth of the country. Also, private sector operators are concerned about exchange rate fluctuations because it impacts on their portfolios and may result in capital gains or losses.

Exchange rate is simply defined as the rate at which one currency exchanges for another (Iyoha, 1996). In the view of West 1985, it is the external value of a currency expressed in terms of another currency or as a weighted average of the currencies to its main trading Partners. Agene (1991) shares these views by noting that an exchange rate between two countries indicates the value of one currency in terms of another. It can be expressed in one of two ways; as units of domestic currency per unit of foreign currency; or units of foreign currency per unit of domestic currency.

2.1.2 Exchange rate volatility

Exchange rate volatility refers to the swings or fluctuations in the exchange rate over a period of time or the deviations from a benchmark or equilibrium exchange rate. The later which also reflects the misalignment of the exchange rate could occur where there is multiplicity of markets parallel with the official markets. Empirically, volatility is measured in terms of "coefficient of variation" which is standard deviation divided by the mean of the series. Fluctuations and price volatility may be measured on any time scale from year-by-year to day-to-day. Volatility over any time interval tends to be higher when supply and demand is low. Price volatility tends to be higher for commodities, shares and exchange rates than for industrial products.

Depreciation and Appreciation: It connotes using the domestic currency per unit of foreign currency, when exchange rate increases (that is, the amount of domestic currency required to buy a foreign currency increases), the domestic currency is said to have depreciated while the foreign currency appreciates (Mordi, 2006).

2.1.3 Meaning of Economic Growth

The leading aim of every developed and developing nations of the world is economic growth and development. Economic growth is one of the general aims of the governments of every nation of the world which is usually depicted by the increase in the value of marketed goods and services produced overtime. It is mainstreaming measured as the percentage increase in the Gross Domestic Product (or Gross National Product) of a country over a period of time usually a year (IMF, 2012).

Professor Simon Kuznets (1971) in his Nobel Memorial lecture defined economic growth as a long-term increase in the capacity to supply increasingly diverse economic goods to its population. The increasing capacity is hinged on advancing technology and the institutional and ideological adjustments that it demands. Kuznets's view of economic growth was cited as having stimulated new insights into the world economic and social structure. He developed the concept of Gross National Product, the total sum of goods and services produced in a nation by both nationals and non-nationals, which is used to determine the rate of economic growth of a nation (Iyoha, 2004).

The term economic growth is often used interchangeably with the term economic development when analyzing economic performance and variations in economic

conditions in a country. Although, the two terms are used to describe the process of sustainable economic progress in less developed countries (LDCs), they are not the same strictly speaking (Iyoha, 2004). Professor Charles Kindleberger (1965) of the Massachusetts Institute of Technology, USA has suggested a useful way of differentiating both of the terms. According to Kindleberger, "economic growth means more output and economic development implies both more output and changes in the technical and institutional arrangements by which it is produced". Simply put, economic development goes beyond mere economic growth to include changes in the structure of outputs and in the allocation of inputs by subsectors and various sectors in the overall economy.

Although, it may seem as if the changes in the economy are sudden, there are certain characteristics economists use to forecast impending changes and modern economic growth. The primary characteristics of modern growth are increases in gross domestic product (GDP) and retail sales. The status of these indicators can help shape public policy and in a weak economic period, many of the policies will usually be aimed at increasing the flow and exchange of money. An indicator of growth of the economy is always measured mostly by a change in the gross domestic product. During a period of modern economic growth, the GDP is used to determine the total market value of everything produced and sold within a calendar year. To determine the change in GDP, the amount of goods produced is compared to consumer, government and investment spending (Kesha, 2013).

Simon Kuznets (1966) in his work ‘’Modern Economic Growth” stated six main characteristics of economic growth and they include:

- High rates of growth of per capita income
- High rates of growth of total factor productivity
- High rates of structural transformation of the economy
- Growth of trade, specifically import of raw materials and export of manufacturers.
- Limited spread of development to only a one-third of the world population.
- High rates of social and ideological transformation

According to Pettinger (2011), economic growth which is an increase in real GDP can be affected by several factors which can be split into two:

- Demand side factors
- Supply side factors

Demand side factors influences the growth of aggregate demand (AD). AD=C+I+G+X-M. Therefore, a rise in consumption, investment, government spending or exports can lead to higher aggregate demand and higher economic growth. Aggregate demand can be affected by interest rates, consumer confidence, asset prices, real wages, value of exchange rate and the banking sector.

Supply side factors also influences the growth of aggregate supply in the long-run (the production possibility frontier of the economy). If there is no increase in the long-run aggregate supply, then a rise in aggregate demand will just be inflationary. The long-run aggregate supply can be affected by the following factors;

- ***Levels of infrastructure*:** investment in roads, transport, power and communication can help firms reduce costs and expand production. Without necessary infrastructure it can be difficult for firms to be competitive in the international markets.
- ***Availability of resources***: resources such as natural resources, physical resources and even managerial know-how is indeed necessary for firms as this resources serve as the necessary inputs needed for production process.
- ***Human capital**:* human capital is the productivity of workers. This will be determined by the levels of education, training, motivation and health status. Increased labour productivity can assist firms take on more sophisticated production process and become more efficient.
- ***Development of technology*:** in the long-run, development of new technology is key factor in enabling improved productivity and higher economic growth.

Economic growth refers to an increase in the capacity of an economy to produce goods and services compared from one period of time to another. In the context of exchange rate volatility, economic growth can be measured in nominal terms, which include inflation, or in real terms, which are adjusted for inflation.

Jhingan (2003) defines economic growth as a quantitative sustained increase in the country's per capita output or income accompanied by expansion, capital and volume of trade. Todaro and Smith 2007 have defined economic growth as the steady process by which the productive capacity of an economy is increased overtime to bring about rising levels of national output and income.

2.1.4 Exchange Rate and Economic Growth

Exchange rate policy has been identified as one of the endogenous factors that can affect the economic performance of a nation (Jameela, 2010). The increase or decrease of real exchange rate indicates the strength or the weaknesses of the currency in relation to foreign currency, and it is a standard for illustrating the competitiveness of domestic industries in the world market. When there is deviation of this rate over a period of time from the benchmark or equilibrium, the exchange rate is said to be volatile. It also indicates that the misalignment of exchange rate has occurred where there is multiplicity of markets parallel with the official market. It is of a general belief that the appreciation of a currency expands imports and reduces exports while the depreciation of currency increases the cost of importation; thereby discourage import and encouraging export.

2.2 TYPES OF EXCHANGE RATE

Exchange rate can be viewed from the following angles;

a. **Nominal exchange rate**: It is the price of one currency in terms of another. It can be viewed as the price of currency in terms of units of local currency. Nominal exchange rates are established on currency financial markets called “forex markets” which are similar to stock exchange markets. Rates are usually established in continuous quotation, with newspaper reporting daily quotation. Central bank may also fix nominal exchange rate.

b. **Real exchange rate**: Real exchange rates are nominal exchange rates corrected by inflation measures. The real exchange rate as opposed to nominal exchange rate

attempts to measure the rate at which goods and services are exchanged between the domestic economy and the outside world. For instance if country A has inflation rate of 10%, country B has inflation rate of 5% and no changes in the nominal exchange rate took place then country A now has a currency whose real value is 10%-5%=5% higher than before. Higher prices mean an appreciation of the real exchange rate.

c. **Equilibrium exchange rate (EER)**: All exchange rate adjustment (ERA) is adopted to achieve certain macro or micro economic objectives. These include the achievement of balance of payment viability, the maintenance of internal balance and promotion of efficiency in resource allocation. In this premise, equilibrium exchange rate may be defined as that rate which promotes the achievement of external balance in a manner consistent with the other targets of economic policy (Olisadebe;1991).

In this sense, equilibrium exchange rate is synonymous with appropriate or realistic rate. This however should be distinguished from the nominal rate, which clears the foreign exchange markets at the auction session. This is because equilibrium in the foreign exchange market does not ensure that the goods and money markets are in the equilibrium. This equilibrium in the foreign exchange market could be sub-optimal in the sense that full employment of resources might not be guaranteed.

2.3 CAUSES OF VOLATILITY IN EXCHANGE RATE

There are different factors that affect or influence the demand and supply of foreign currency, which are responsible for the volatility in the exchange rate. Among these are:

i. **Terms of trade**: Any change in imports or exports will certainly cause a change in the rate of exchange. If imports exceed exports, the demand for foreign currency increases and then the rate of exchange moves in favor of the country. Thus, by all means a country should strive for efficient balance of payment, where export is greater than import.

ii. **Government debt**: These include granting of loans, payment of interest on foreign loans, repatriation of foreign capital, purchase and sale of foreign securities which influence demand for foreign funds and through its exchange rates.

iii. **Strong economic performance**: Foreign investors inevitably seek out stable countries with strong economic performance in which to invest their capital. A country with such positive attributes will draw investment funds away from other countries perceived to have more political and economic risk. Political turmoil, for example, can cause a loss of confidence in a currency and a movement of capital to the currencies of more stable countries.

iv. **Banking operations**: Banks also influence the exchange rate through their purchase and sales of bank draft, letter of credit, arbitrage, dealing in bills of exchange etc. This banking operations influence the demand and supply of foreign exchange which also affects the exchange rate (Jhingan 2009).

v. **Capital movements**: Short and long term capital movements also influence the exchange rate. Capital flows tend to appreciate the value of the currency capital importing country and depreciates the value of the currency of the capital exporting country. The exchange rate will move in favor of the capital importing country and against the capital exporting country.(Jhingan,2009)

2.4 EMPIRICAL REVIEW OF EXCHANGE RATE AND ECONOMIC GROWTH

Exchange rate is the price of one country's currency in relation to another country. It is the required amount of units of a currency that can buy another amount of units of another currency. Aliyu (2011) asserted that appreciation of exchange rates results in increased imports and reduced exports while depreciation would expand exports and reduce imports. Also, depreciation of exchange rate tends to cause a shift from foreign goods to domestic goods. Hence, it lead to diversion of income from importing countries to countries exporting through a shift in terms of trade, and it tends to have impact on the exporting and importing countries economic growth. In the same vein, it is agreed that the exchange rate help to connect the price systems of two different countries by making it possible for international trade and also effects on the volume of imports and exports, as well as country's balance of payments position. Rogoffs and Reinhartl (2004) also opined that developing countries are relatively better off in choice of flexible exchange rates regimes. Previous research on exchange rate impact and economic growth has reached contrasting results. For instance, empirical evidence has shown that the real

exchange rate variations can affect growth outcomes. Faster economic growth is significantly associated with exchange rate depreciation.

Asher (2012) examined the impact of exchange rate volatility on the Nigeria economic growth for period of 1980-2010. The result showed that real exchange rate has positive effect on the economic growth.

Different writers have given various opinions on exchange rate volatility and economic growth, of which we have: Obansa, Okoroafor, Aluko and Millicent (2013) also examined the relationship between exchange rate and economic growth in Nigeria from 1970-2010. The results indicate that exchange rate has strong impact on economic growth. They concluded that exchange rate liberalization was good to Nigeria economy as to provide economic growth.

2.5 PROBLEMS OF EXCHANGE RATE FLUCTUATIONS IN NIGERIA

Exchange rate management in Nigeria has been quite challenging owing to the myriads of problems. This explain why Usman (1993:15) said that the areas of failure in exchange rate policy have been accentuated by two considerations; one “micro” and the other “macro” The micro consideration has to do with the structure and institutional setting of the foreign exchange market itself. In spite the reforms in the foreign exchange market, the regulators of the foreign exchange market (CBN) have had to contend with some operators that were fast trying to outguess them and exploit the lope-holes in the markets arrangement to their personal advantage. How one recalls the alleged cases of multiple bids submitted by foreign exchange applicants and/or their banks, some shady deals

under the autonomous markets round tripping by operators accessing funds through official market and reselling them on the parallel market and other under the table sales, where bank officials collected perennial from buyers etc. All these added to the fact that the implication of some of the measures were not exhaustively considered, left the CBN in a situation where it was merely reacting to the situations apparently always a few step behind those that were busy trying to abuse and exploit the system to their advantage.

The second problem is that of government conduct of macroeconomic policy itself. There have been always inconsistency and lack of continuity of policy. Government intervention through the monetary and fiscal policies has influence the exchange rate a lot. Experience has shown that there was undue emphasis on achieving monetary restraint without a commensurate emphasis on fiscal restraints. For instance, in the first two years of SAP, 1986 and 1987, the government adopted a fairly enhanced and consistent approach to both monetary and fiscal policies. Usman (1993) says that from the beginning of 1988 government became obsessed with demonstrating short-term nature of SAP and began to remove the steps in fiscal restraint. This saw the federal governments' budget deficit rise from N12 billion in 1988 to N15 billion in 1991.

Furthermore, a critical requirement for a freely floating exchange rate regime is the absence of any form of economic rigidity. The Nigerian economy is characterized by structural rigidities and bottlenecks. Most of our exports and imports are characterized by inelasticity either on the demand or supply side of both. Essentially, what is required is a

realistic approach that is mindful of the strength and structural weakness that are inherent in the economy but still anchored on a deregulated framework.

In general it is imperative to let the exchange rate find its equilibrium level, as it is only when the equilibrium exchange rate prevails that there is viability of the balance of payments position. Moreover, a stable foreign exchange rate regime will lead to macroeconomic stability and encourage investment and growth, reduce capital flight and encourage capital inflows in the form of foreign private investment.

2.6 THEORETICAL LITERATURE

2.6.1 The Mint Parity Theory

This theory is associated with the working of the international gold standard. Under this system, the currency in use was made of gold or was convertible into gold at a fixed rate. The value of the currency unit was defined in terms of certain weight of gold, that is, so many grains of gold to the naira, the dollar, the pound etc. the central bank of the country was always ready to buy and sell gold at the specified price. The rate at which the standard money of the country was convertible into gold was called the 'mint price' of gold. If the official British price of gold was per ounce and the US dollar price of gold $36 per ounce, they were the mint prices of gold in the respective countries. The exchange rate between the dollar and the pound would be fixed at $ 36/€ = 6$. This rate was called the mint parity or mint per exchange because it was based on the mint price of gold. Thus under the gold standard, the normal or basic rate of exchange was equal to the ratio of their mint per values (R=$/€).

2.6.2 Purchasing Power Parity

This theory was developed by Gustav Cassel in 1920 to determine the exchange between countries on inconvertible paper currency. The PPP theory states that of exchange between inconvertible currencies is determined by the quality of the relative change in relative prices in the two countries. This means that exchange rate between two countries is determined by their relative price level.

In summary, the theory states that the exchange rate between two countries is determined at a point which expresses the quality between the respective purchasing powers of the two currencies. Thus, with very change in price level, the exchange rate also changes (Jhingan, 2009)

2.6.3 The Traditional Flow Model

The traditional flow model, views exchange rate as the product of the interaction between the demand for and supply of foreign exchange. In this model, the exchange rate is in equilibrium when supply equals demand for foreign exchange. The exchange rate adjusts to balance the demand for foreign exchange depends on the demand domestic residents have for domestic goods and assets. On the assumption that the foreign demands for domestic goods is determined essentially by domestic income, relative income plays a role in determined exchange rate under the flow model. Since assets demand can be said to demand on difference between domestic and foreign interest rates differential is other major determinants of the exchange rate in this frame work. Under the traditional flow model i.e. the balance of payments model, the exchange rate is assumed to equilibrate the

flow supply of and the flow demand for foreign currency. The B.O.P by deficits (surplus) in current account is offset by surplus in (deficits) in the capacity account. The major limitation of the traditional model or the portfolio balance model include the over-shooting of the exchange rate target and the fact that substitutability between money and financial asset may not be automatic, this led to the development of the monetary approach.

2.6.4 The Monetary Approach

It identifies- exchange rate as a function of relative shift in money stock. The Purchasing Power Parity (PPP) is also a major component of the monetary approach. The monetary approach is recent development in the theory exchange rate determination; it views the exchange rate as being the relative prices of two assets (national monies) is determined primarily by the relative supplies of and demand for those monies and that the equilibrium exchange rate is attained when the existing stocks of the two monies are willingly held. It therefore argues that a theory of exchange rate should be stated conveniently in terms of the supplies of and demands for these monies. This new theory of exchange rate determination can be presented in one or two terms: the monetary approach or the asset market approach of exchange rate determination. These are several versions of the monetary approach to exchange rate determination. The early flexible price model is based on the price monetary model as based on the assumptions of continued purchasing power parity (PPP) and the existence of stable money demand functions for the domestic and for price model except that it allows or accommodation of

short-term deviation from PPP in other words, the sticky price model accepts the fact that there may be deviations from PPP in the short-run both in the long-run, the deviations will tend to disappear.

The sticky-price monetary theory takes interest rate differentials as captured by exchange rate deviation. Price exchange is an automatic response to exchange rate changes. Inflation therefore depresses the exchange rate unlike the BOP model where the effect of y on exchange rate is positive. It is negative in the sticky-price monetary theory.

2.6.5 The Classical Theory of Economic Growth

The classical economist had explained growth process in terms of rates of technological progress and the population growth. In their opinion, technological progress (depending on capital accumulation) remains in lead for some time, but eventually falls when a fall in the profit rates prevent further accumulation of capital. It is at this stage that the economy falls into a stage of stagnation. The main components of the classical theory of growth and stagnation are the production function, technological progress, investment, determinants of profit, size of labour force and the wage system.

Smith, Ricardo and Malthus all postulated the identical production function, which can be written as;

Y= f (K, L, N, and S)…….. (i) Which means that output depends on the stock of capital, labour force, land and the level of technology. In the generalized classical growth model 'Land' is taken as the supply of known and economically useful resources and this seems

like the right thing to do as it is not the amount of cultivable land and its fertility that determines the national output but the total supply of know and usable natural resources.

Most of other classical economists except Adams Smith, seem to believe that the production function is linear and homogeneous, which implies that it has constant returns to scale meaning that on doubling the quantities of all the factors of production output would double. Adam Smith, on the other hand, believed in increasing returns to scale on account of improved division of labour.

Most classical economists believe that the main constraint to technological progress is capital accumulation, according to them, technological progress could not be assumed to be completely independent factor. In their opinion, technological progress is a capital absorbing and therefore, capital accumulation is a pre-requisite for a steady advance of technology. For this capital accumulation they stressed on savings and investment as a primary factor.

2.6.6 Neoclassical Theory of Economic Growth (Solow Swan Model)

The neoclassical growth theory was developed in the late 1950'sand 1960's of the twentieth century as a result of intensive research in the field of growth economics. The American economist Robert Solow, who won a noble prize in Economic and the British economist, J.E. Meade are the two well-known contributors to the neoclassical theory of growth. This neoclassic growth theory lays stress on capital accumulation and its related decision of savings as an important determinant of economic growth. Neoclassical growth model considered two factor production functions with capital and labour as

determinants of output. Besides, it added exogenously determined factor, technology, to the production function.

Thus neoclassical model uses the following production function:

$Y= AF (K, L)$…….. (i)

Where Y is gross domestic product (GDP), K is the stock of capital, L is the amount of unskilled labour and A is exogenously determined level of technology. Note that change in this exogenous variable, technology, will cause a shift in the production function.

There are two ways in which technology parameter A is incorporated in the production function. One popular way of incorporating the technology is labour augmenting and accordingly the production is written as

$Y = F (K, AL)$……. (ii)

Note that labour augmenting technological change implies that it increases productivity of labour. The second important way of incorporating the technology factor in the production function is to assume that technological progress augments all factors (both capital and labour in our production function) and not just augmenting labour. It is in this way that we have written the production function equation (i) above. To repeat, in this approach production function is written as:

$Y-AF (K, L)$

Considering in this way (a) represents total factor productivity (that is, productivity of both factor inputs). When we empirically estimate production function specified in this way, then contribution of (a) to the growth in total output is called Solow residual which

means that total factor productivity really measures the increase in output which is not accounted for by changes in factors, capital and labour. Unlike the fixed proportion production function of Harold – Domar model of economic growth, neoclassical growth model uses variable proportion production, that is, it considers unlimited possibilities of substitution between capital and labour in the production process. That is why it is called neoclassical growth model as the earlier neoclassical considered such a variable proportion production function. The second important departure made by neoclassical growth model is that it assumes that planned investment and saving are always equal because of immediate adjustments in price (including interest). With these assumptions, neoclassical growth theory focus its attention on supply side factors such as capital and technology for determining rate of economic growth of a country. Therefore, unlike Harold –Domar growth model, it does not consider aggregate demand for goods limiting economic growth. Therefore, it is called 'classical' along with 'neo' (Wikipedia, 2016).

2.6.7 Schumpetarian Theory of Economic Growth

Joseph Alois Schumpeter is best known for 'Creative Destruction'. This was a penetrating and unique insight about how economies grow. Schumpeter explained economic progress is not gradual and peaceful but rather disjointed and sometimes unpleasant. Whenever an entrepreneur disrupts an existing industry, businesses or even entire sectors can be temporarily thrown into loss. These cycles are tolerated, he explained, because it allows resources to be freed up for other more productive use (Investopedia, 2016).

This approach explains growth as a consequence of innovation and a process of creative destruction that captures the dual nature of technological progress: in terms of creation, entrepreneurs introduce new products or processes in the hope that they will enjoy temporary monopoly – like profits as they capture markets.

To these effects, they make old technologies or product obsolete. This can be seen as an annulment of previous technologies, which make them obsolete, and destroys the rents generated by previous innovations. (Wikipedia, 2015).

2.6.8 The Lewis Theory of Economic Growth

The Lewis two sector models is a sector of growth and development in high surplus labour from the traditional sector, the growth of which absorbs the surplus labour, promotes industrialization and stimulates sustained development.

According to the model, underdeveloped economy consists of a traditional overpopulated sector characterized by zero marginal labour productivity (a situation that permits Lewis to classify it as surplus labour) in the sense that it can be withdrawn from traditional agricultural sector without loss of output into the high productive urban industrial sector where the labour from the subsistence sector is gradually transferred. The primary focus of the model is on both the process of labour transfer and the growth of output and employment in the modern sector. Both labour transfer and modern sector employment are brought about by expansion in that sector (Todaro and smith, 2011).

2.6.9 New Endogenous Growth Model

The new endogenous growth model propounded that technological changes is endogenous to growth because it is responsible to the signal'' as price and profits in the economic system, the endogenous growth theorists introduced the concept of human capital as a factor for growth, these new growth theorist include Mankiw, Romar and well, Arrow, Villanueva Rebelos A k Model. The increasing returns theorist opposed the one classical growth theory that are subject to decreasing return and said that the investment in some new area, product, and power source or production technology proceeds through time that each new increment or investment is more productive than the previous increment, the source of these increasing return can be seen through cost and ideas. Investment in the early stages of development may create new skill and attitudes in the work force whose cost may be lower than the previous investment at the initial stage. Also each investor may find environment that are conducive or favourable to invest because of the infrastructure that has been created by those who came before.

2.7 IMPORTANCE OF EXCHANGE RATE STABILITY

The following have been adduced as the effect of exchange rate stability on economic growth of many developing nations from the research carried out by Roderick (1993), Ajakaiye (2002) and Afolabi (2006).

i. **Increase in foreign exchange earnings** – The foreign exchange reserve of a country is responsive to its exchange rate which has a multiplier effect on the economic growth of a country. When there is more export due to increase in value

of a country's currency, this would increase the foreign exchange reserve of the country at the Central Bank. There is a possibility of the increase in export enhancing economic growth of the country. However, in Nigeria, the foreign exchange reserve has not translated to enhanced economic growth due to low exports and more imports.

ii. **Improvement in Technology** – There is empirical evidence that most of the countries having high external reserves are countries with advanced technology. The increase in currency reserves would lead to advanced countries investing their capital in Nigeria.

iii. **Appreciation of National Currency** – Increase in foreign exchange according to Afolabi (2006) would strengthen the value of national currency in relation to the other currencies being traded in the foreign exchange market. This would also lead to increase in the confidence of investors to trade in the national currency. However, this has not worked out for Nigeria as the naira is being weakened day in day out due to high level of corruption and capital flight ravaging the economy.

iv. **Increase in the standard of living** – In economies like China, Japan, USA and Switzerland with favourable external reserves, there is usually the positive effect on the people living or carrying on business in such countries. This was manifested in the Nigerian economy in the 1960s before the discovery of oil which has resulted into higher National income but lower standard of living at present.

v. **Inflation** – Increase in external reserve was supposed to dampen the inflationary effect in the economy. Unfortunately, the reverse has been the case in Nigeria as more Nigerian naira is being spent on imported goods.

CHAPTER THREE

THEORETICAL FRAMEWORK AND MODEL SPECIFICATION

3.1 THEORETICAL FRAMEWORK

The theoretical framework is the structure that can hold or support a theory of a research. The theoretical framework introduces and describes the theory that explains why the research problem exists.

The theoretical framework of this study is based on the framework of the A-K growth models. The A-K models are the simplest version of endogenous models. The main assumption of this model is that production function does not include diminishing returns to capital. This means that with this strong assumption the model can lead to endogenous growth. In the 1980s it became progressively clearer than the standard neoclassical exogenous growth models were theoretically unsatisfactory as tools to explore long run growth, as these models predicted economies without technological change and thus they would coverage to a steady state, with zero per capital growth. A fundamental reason for this is the diminishing return of capital.

The key property of AK endogenous growth model is the absence of diminishing returns to capital. In lieu of the diminishing returns of capital implied by the usual parameterization of a Cobb-Douglas production function, the AK model production function is a special case of Cobb-Douglas function with constant returns to scale.

$Y_t = A_t K_t$

Where;

Y= the total production in an economy

A= the total factor productivity

K= capital

L= labour

a and 1-a are elasticity of outputs in respect to inputs.

For the special case in which, the production function becomes linear in capital and does not have the property of decreasing returns to scale in the capital stock which would have prevail when alpha takes any other value of the capital intensity between 0 and 1.

However, if alpha is equal to one, that is, the absence of diminishing returns to scale (which is the key property of the A-K model), the per capital production function can be written as:

Y= AK…….. (2)

From the above equation:

A= level of technology (a positive constant).

K= volume of capital (both human and physical capital)

Y= total production (output level).

Hence, output per capital is:

Y/K= AK/L…… (3).

The model simplicity assumes the average product of capital is equal to the marginal product of capital which is equivalent to A>0, and per capital output grows at the rate given by:

Yk= s-n+d

n= population growth rate

d= depreciation

s= savings rate

Again, the model assumes that there is depreciation of capital, so d=0

a, which is the level of technology affects the capital stock (K) and this effect is captured by the constant factor (K), in addition, changes in (a) are thought traditionally to capture technological changes alone, it could also result of changes in other variables like interest rate, exchange rate etc.

Therefore, it is through (a) that this study intends to capture the effect of other variables on output level (Y) which represents GDP used as proxy for economic growth.

3.2 MODEL SPECIFICATION

The empirical model of this study shall be based on the conclusion of the theoretical framework and empirical framework. In the effort to establish a link between exchange rate fluctuations and economic growth, special reference is made to the work done by Asher (2012) which is modified for the purpose of this research.

This relationship is expressed below in the functional form as follows:

RGDP= F (EXRT, EXRTVOL, RINR, INFL, FDI)

This further stated in an econometric form below;

$RGDP_t = \beta_0 + \beta_1 EXPT_t + \beta_2 EXRTVOL_t - \beta_3 RINR_t - \beta_4 INFL + \beta_5 FDI + Ut$

Where;

RGDP= real gross domestic product (proxy for economic growth)

EXRT= exchange rate

EXRTVOL= exchange rate volatility

RINR= real interest rate

INFL= inflation rate

INFR= inflation rate

FDI= Foreign direct investment

μ =stochastic term

β_0 = constant intercept

$\beta_1 - \beta_5$ = co-efficient of the associated variables

A-Priori Expectations

This is said to be a situation where certain basic principles are assumed to be true. The a-priori expectation provides the expected signs and significance of the values to be estimated in the light of the economic theory and empirical evidence.

Therefore,

$\beta_3, \beta_4 < 0$

This means that, exchange rate and foreign direct investment are expected to have positive relationship with real gross domestic product (RGDP), while interest rate and inflation rate are expected to have negative relationship with real gross domestic product (RGDP).

3.2 TECHNIQUES FOR DATA ANALYSIS

Data gathered for research purposes are meaningless if not analyzed. Data analysis refers to those techniques whereby the researcher extract from the data what was not apparent before and which would enable a summary description of the studies to be made. A multiple regression analysis with Ordinary Least Squares (OLS) econometric technique was adopted for this study. In a view of avoiding the difficulties that may spring up while carrying out regression analysis with clearly non-stationary series which thus leads to spurious results, this study, however adopted Augmented Dickey Fuller (ADF) test for unit root to check whether the data series has a unit root. The study also employed the use of Johansen co-integration test so as to ascertain the long run relationship between variables employed for this study. Furthermore, ECM is employed to correct any form of dis-equilibrium in the short run. However, the techniques adopted for this study are further elaborated below;

i. ***Unit Root Test***

This test is the first step and involves testing the stationarity of the variables, and then the order of integration of the individual series under consideration. Researchers have developed several procedures for the test of order of integration. The most popular among them is the Augmented Dickey-Fuller (ADF) test due to Dickey (1979) and Fuller (1981). Augmented Dickey-Fuller test relies on rejecting a null hypothesis of unit root (the series are non-stationary) in favour of the alternative hypotheses of no unit root (the series are stationary). The tests are conducted with or without a deterministic trend (t) for each of

the series. A stochastic process y(t) is known as a unit root if its first difference, y(t) – y(t-1) is non-stationary. Basically, a series is said to be integrated of order I(1), if it needs to be differenced once to become stationary. The same holds for an I(2) series which need to be differenced twice to become stationary. If I(0) then no further differencing is necessary.

ii. The Co-Integration Test

The second step is the testing of the presence of co-integration between the series of the same order of integration. The analysis of and testing for unit roots naturally lead to the theory of co-integration. The test deals with the methodology of modelling non-stationary time series variables. According to Maddala (1992) as cited in Iyoha (2004, p.86), "the theory of co-integration explains how to study the interrelationships between the long run trend in the variables that are differenced away in the Box-Jenkins method". The basic idea behind co-integration is that, if in the long run two or more variables move closely together, even though the series themselves are trended, the difference between them is constant. Simply put, variables are said to be co-integrated if there exist a long-run relationship among them. A lack of co-integration suggests that such variables have no long-run relationship: they can wander arbitrarily far away from each other (Dickey et.al., 1991). In this study, we employ the maximum-likelihood test procedure established by Johansen and Juselius (1990) and Johansen (1991). To determine the number of co-integration vectors, the Trace statistic can be used. The statistic test of null hypothesis is the number of distinct co-integrating vectors is less than or equal to q.

iii. ***The Error Correction Model***

Given that the existence of Co-integration is established amongst the series, then an Error Correction Mechanism (ECM) first adopted by Sargan (1964) and later popularized by Engel and Granger (1969) is carried out to correct for any dis-equilibrium in the short run. In this model, the dynamics of both short-run (changes) and long-run (levels) adjustment processes are modeled simultaneously, thereby providing information about both the short-run and long-run relationship.

3.3 SOURCE OF DATA

The secondary of data sourcing was used for this research. Annual data will be used for the study and the main sources of data shall come from Central bank of Nigeria (CBN), World Development Indicators (WDI), statistical bulletin, economic and financial review and annual reports.

CHAPTER FOUR

DATA ANALYSIS AND INTERPRETATION OF RESULTS

This chapter contains the analysis and representation of data. It shows the empirical analysis of the study which examines the impact of exchange rate volatility on economic growth in Nigeria from 1986-2020.

4.1 DESCRIPTIVE STATISTICS

Descriptive statistics is the process of using and analyzing descriptive statistics, which is a summary statistic that statistically describes or summarizes features from a collection of data. The table below shows the summary statistics for the variable of this study:

Table 4.1: Summary statistics for the variable

	RGDP	EXRT	INFL	RINR	FDI
Mean	39987.05	115.1782	19.51429	2.548000	451.7629
Median	33346.62	120.9702	12.55000	5.370000	229.8400
Maximum	72094.09	358.8108	72.84000	18.18000	2372.120
Minimum	17180.55	2.020575	5.390000	-31.45000	0.380000
Std. Dev.	19799.55	99.80060	17.82661	10.09658	544.2214
Skewness	0.461719	0.758338	1.703099	-1.192034	1.450137
Kurtosis	1.608729	2.851629	4.547639	5.072520	5.423776
Jarque-Bera	4.066376	3.386720	20.41283	14.55288	20.83416
Probability	0.130917	0.183901	0.000037	0.000692	0.000030
Observations	35	35	35	35	35

Source: Author's Computation

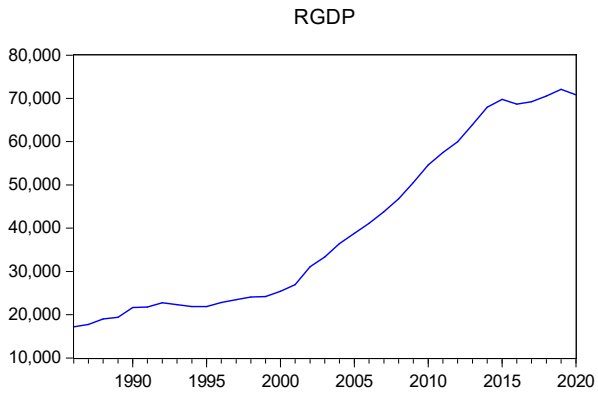
The table 4.1 indicates that the variables ie RGDP, EXRT, INFL, RINR, FDI have mean values 39987.05, 115.18, 19.51, 2.54, 451.76 respectively and their standard deviations are given respectively as follows: 19799.55, 99.80, 17.83, 10.10, 544.22. All the variables employed are shown to be positively skewed from skewness values obtained in the table above except for RINR and FDI. The table above also shows that mean values fall

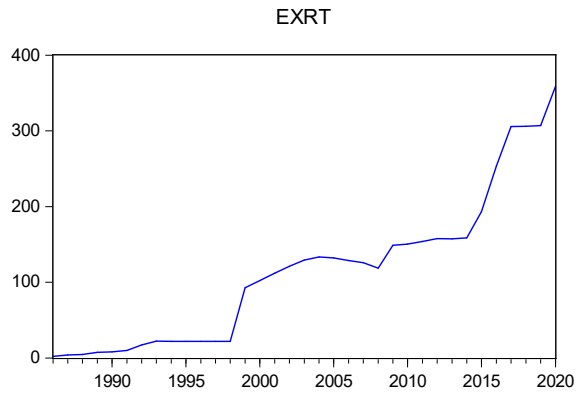
between the minimum and maximum values. Furthermore, for the kurtosis, the value often compared to is 3. From the table above, we see that the kurtosis values in the table are less than 3 except for INFL, RINR and FDI and this implies that the distribution of the variables are all platykurtic in nature except for INFL, RINR and FDI which are leptokurtic in nature.

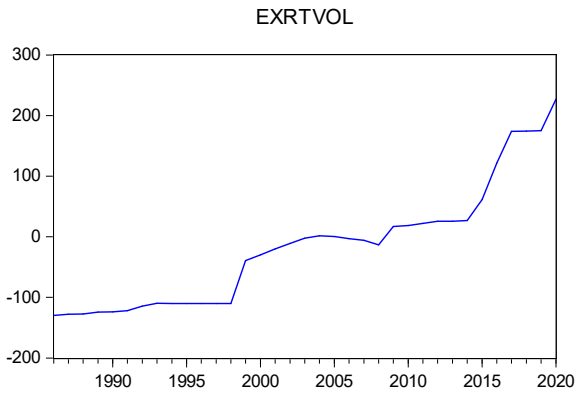
4.1.1 TREND ANALYSIS

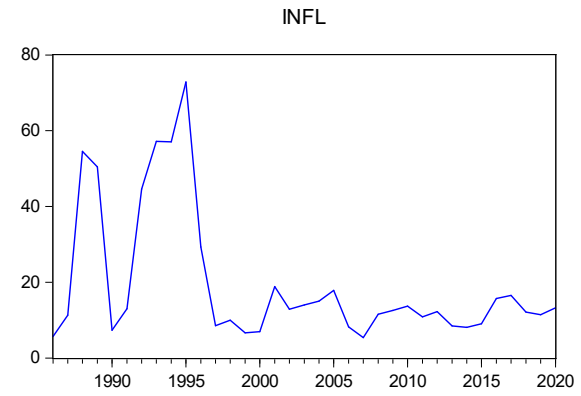
Trend analysis is a technique used in technical analysis that aids in anticipating future movement based on present trend data. Researchers can use trend analysis to get an idea of what has happened in the past and what will happen in the future. The diagrams below are trend behaviors of the variables captured in this study namely: GDP, EXRT, EXRT VOL, INFL, RINR, FDI.

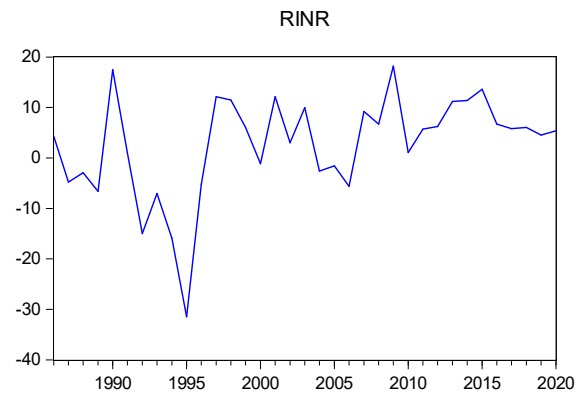
Multiple Trends

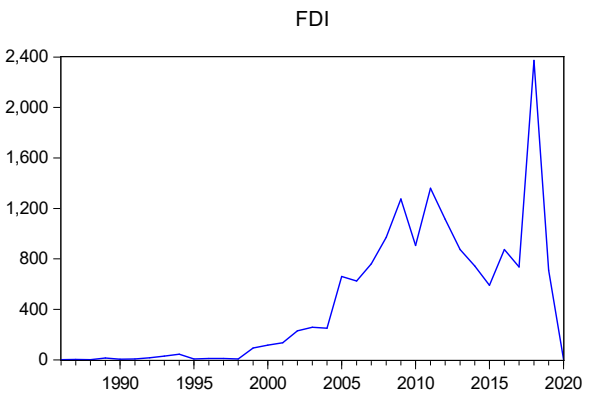




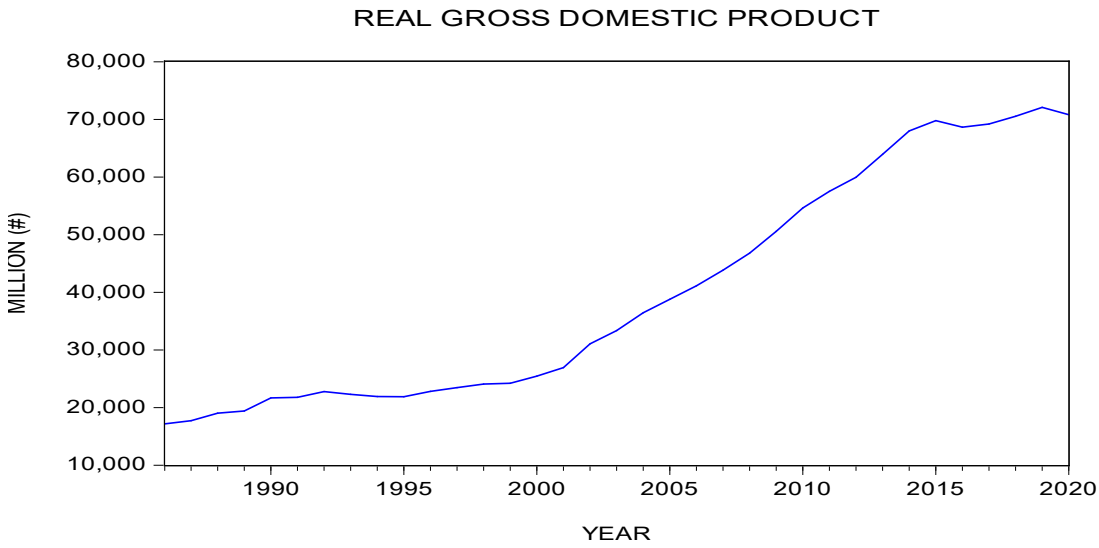




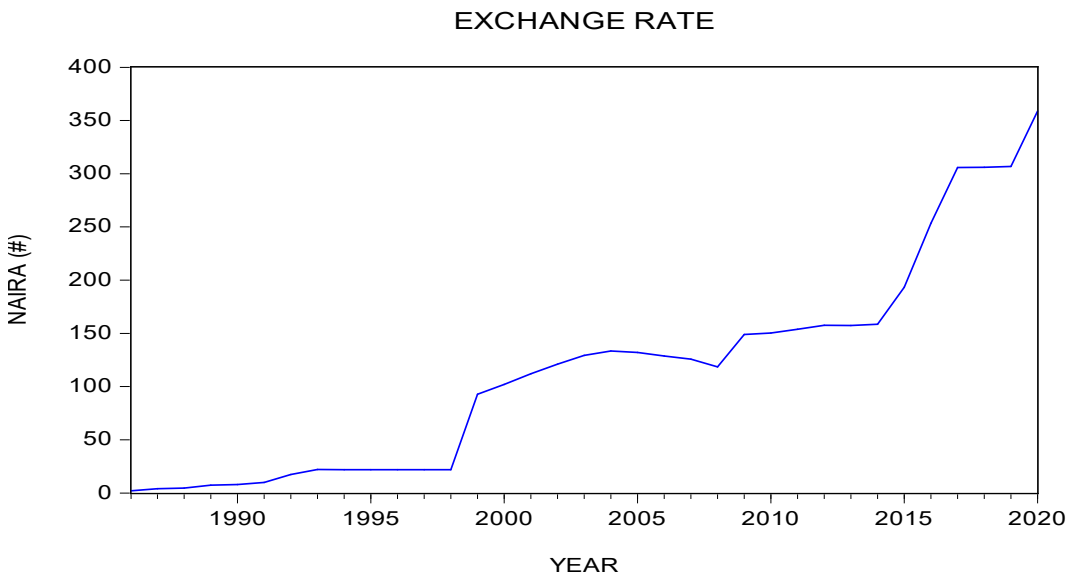




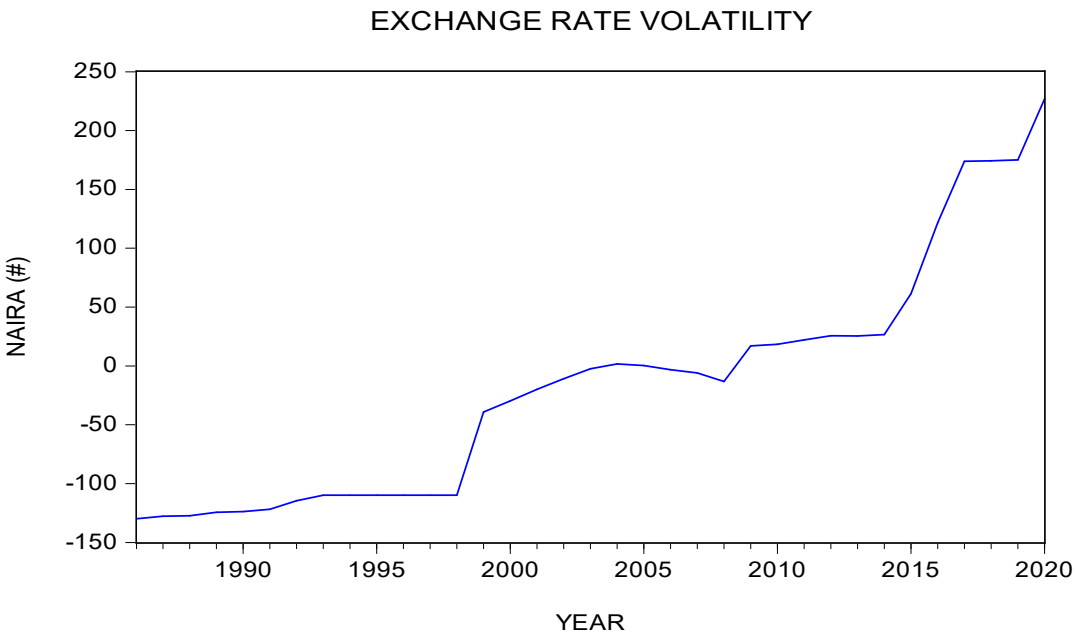
Singular Trends



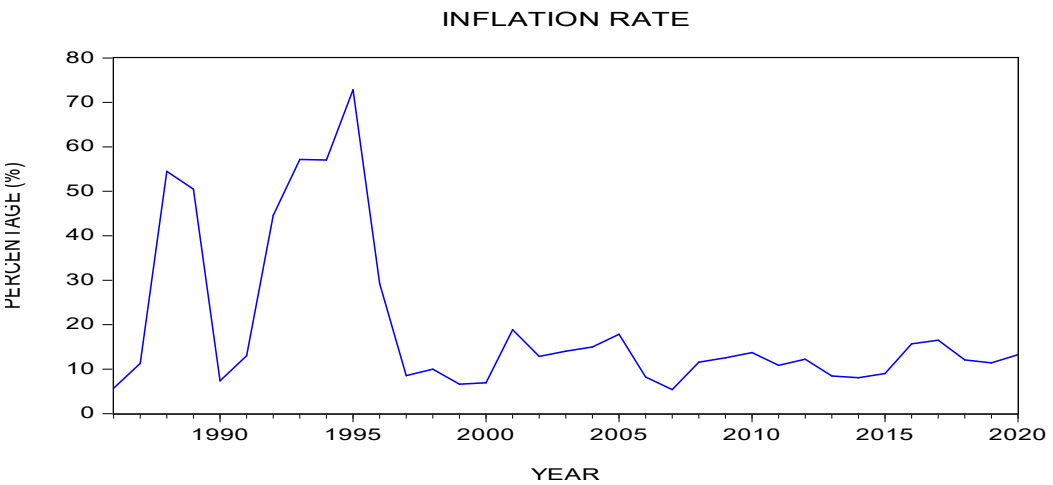
In the diagram above, GDP increased gradually from 1986-1990. From 1990, it increased in an increasing rate up to 2010.Fro 2010, GDP increased with a sharp increase and fell in 2020.



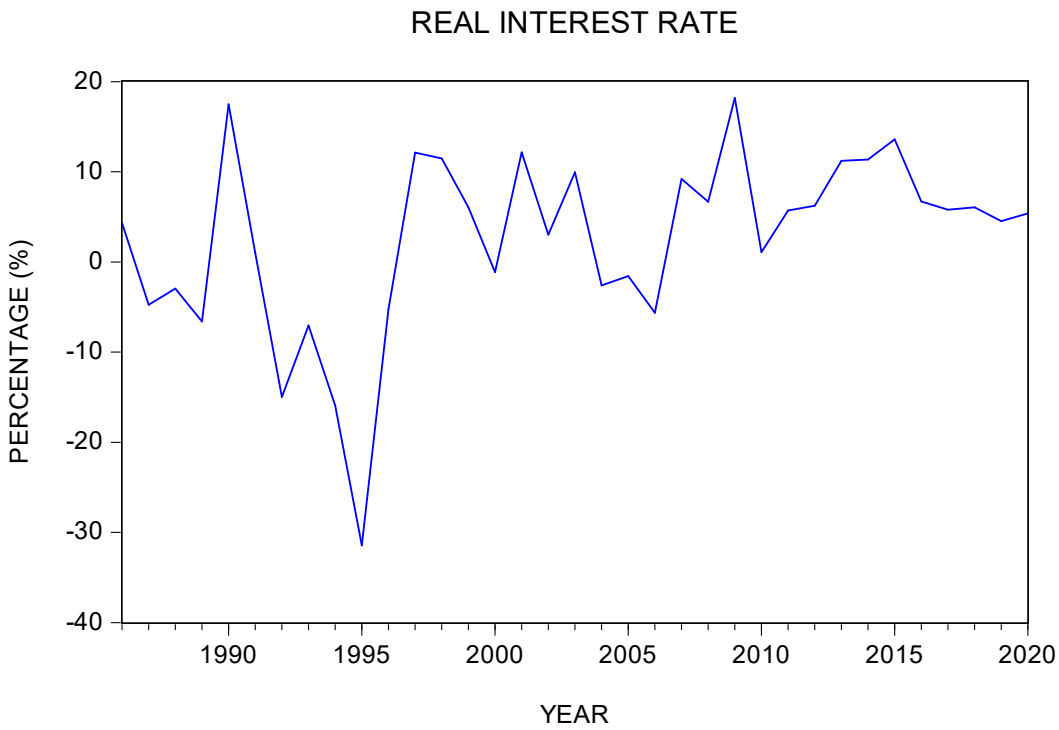
EXRT increased at a decreasing rate from 1986-1990.From 1991, it remained constant from 1994 even to 1998 and then after increased continually from 1998 even up to 2020.



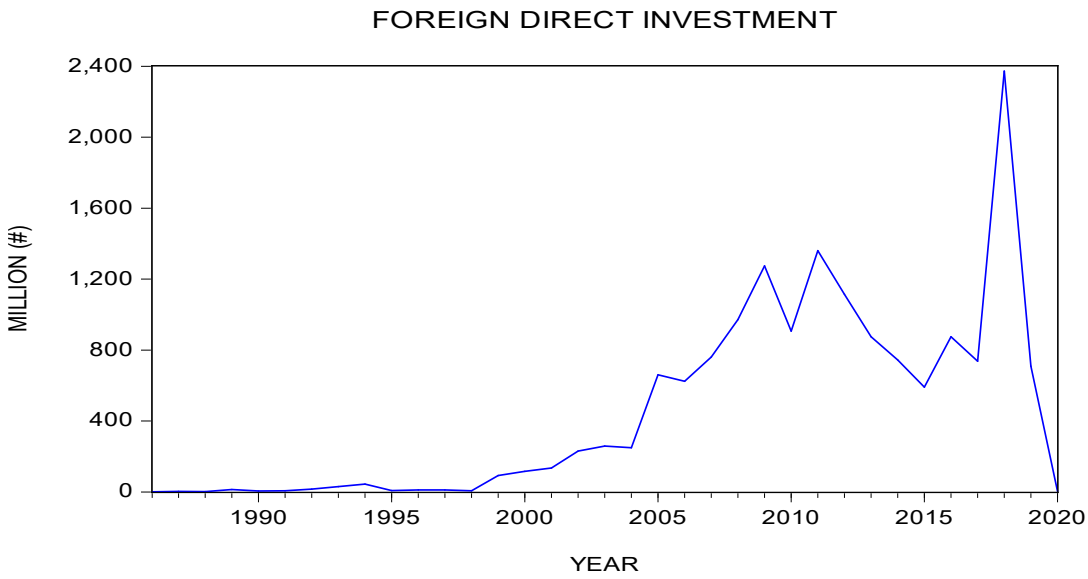
Exchange rate volatility increased at a decreasing rate from 1986-1993.From 1991, it remained constant from 1994 even to 1998 and then after increased continually from 1998 even up to 2020.



Inflation rate increased at an increasing rate from 1986-1988 and fell continuously even till 1990. Picked up from 1990 and continued to fluctuate steadily till 2020.



Real interest rate decreased from 1985 and fluctuated continually i.e., had continuous upward and downward movement until 2017 after which it has maintained a falling movement till 2020.



From 1986 FDI increased in an increasingly rate. From 1985-1986 FDI deceased in a decreasingly rate. From 1988- 1989 FDI increased in an increasingly rate. From 2002-2003 FDI increased very slowly. From 2004-2005 FDI increased in an increasingly rate. From 2005-2006 FDI increased at a very fast rate. From 2010-2012 FDI increased in an increasingly rate. From 2012-2014 FDI decreased in a high rate and picked up again 2015 to 2016 and fell drastically even to 2020.

4.1.2 Test for Stationarity

The stationarity of the time series variables is examined in this section. The statistical features of a time series (or, more accurately, the process that generates it) do not change with time, which is known as stationarity. Stationarity is significant since it is required by many valuable analytical tools, statistical tests, and models. The stationarity or non-stationarity of the variables in these studies, as well as the order of integration, are shown in the table below:

Table 4.2.: Augmented Dickey Fuller Approach Unit Root test

Variables	**ADF Statistics (level)**	**MacKinnon Critical Values at 5%**	**ADF Statistics (1st Difference)**	**MacKinnon Critical Values at 5%**	**Order of Integration**
RGDP	0.522801	2.963972	3.461761	2.954021	I(1)
EXRT	2.614102	2.951125	5.837674	2.954021	I(1)
INFL	2.540732	2.976263	6.638471	2.981038	I(1)
RINR	1.535297	2.951125	4.821887	2.960411	I(1)
FDI	1.074593	2.976263	3.943698	2.981038	I(1)

Source: Author's Computation

From the table 4.2 above, it can be seen that the variables of this study were all stationary at I (1) at 5 percent significant level.

4.1.3 Test for Co-integration

Cointegration tests detect situations in which two or more non-stationary time series are integrated in such a way that they cannot diverge from equilibrium over time. The tests are designed to determine how sensitive two variables are to the same average price over a given time.

The test results are given below as:

TABLE 4.3a: Johansen co-integration test (Trace Statistic)

Hypothesized		Trace	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.842635	133.5332	95.75366	0.0000
At most 1 *	0.601797	72.50993	69.81889	0.0300
At most 2	0.467704	42.12373	47.85613	0.1553
At most 3	0.392159	21.31540	29.79707	0.3383
At most 4	0.137614	4.886615	15.49471	0.8207
At most 5	2.68E-05	0.000885	3.841466	0.9770

Source: Author's Computation

In the table 4.3a, the trace test also indicates there is 2 co-integrating equations at 0.05 significant level and so there is a long run relationship among the variables captured by this study.

TABLE 4.3b: Johansen co-integration test (Maximum Eigenvalue)

Hypothesized		Max-Eigen	0.05	
No. of CE(s)	Eigenvalue	Statistic	Critical Value	Prob.**
None *	0.842635	61.02328	40.07757	0.0001
At most 1	0.601797	30.38620	33.87687	0.1234
At most 2	0.467704	20.80833	27.58434	0.2880
At most 3	0.392159	16.42878	21.13162	0.2008
At most 4	0.137614	4.885731	14.26460	0.7562
At most 5	2.68E-05	0.000885	3.841466	0.9770

Source: Author's Computation

In the table 4.3b, the max-eigen value test also indicates there is 1 co-integrating equation at 0.05 significant level and so there is a long run relationship among the variables captured by this study.

Model Estimates

The table below shows the Error Correction Model (ECM) regression results regressing RGDP on the independent variables EXRT, EXRTVOL, INFL, RINR, FDI.

Table 4.4: Parsimonious Error Correction model

Dependent Variable: RGDP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.55852	0.080329	131.4403	0.0000
D(EXRT(-1))	-1.252740	0.317196	-3.949421	0.0005
D(EXRTVOL(-1))	-0.016325	0.004907	3.326990	0.0026
D(INFL(-1))	0.002156	0.005393	0.399801	0.6926
D(RINR(-1))	0.008497	0.008055	1.054811	0.3012
D(FDI(-1))	0.000368	0.000170	2.164706	0.0426
ECM(-1)	-0.803516	0.396990	-2.024021	0.0015
R-squared	0.850782	Mean dependent var		10.51806
Adjusted R-squared	0.824039	S.D. dependent var		0.482882
S.E. of regression	0.397010	Akaike info criterion		1.176121
Sum squared resid	4.098042	Schwarz criterion		1.493562
Log likelihood	-12.40600	Hannan-Quinn criter.		1.282930
F-statistic	3.556666	Durbin-Watson stat		1.641468
Prob(F-statistic)	0.010488			

Source: Author's Computation

4.2 DISCUSSION AND FINDINGS

The parsimonious error correction model is shown in table 4.4 (ECM). It shows that each year, approximately 80% of the difference between the real and long run (equilibrium) value of real gross domestic product is reversed or removed. It's worth noting that the ECM's coefficient has a negative sign, as predicted, and is meaningful at 5% significant level with a probability value of 0.0015. As a result, we can now confidently assert that the variables under study are still co-integrated.

The table 4.4 above also indicates that level of exchange rate is negatively related to the real gross domestic product in the short run. This implies that one unit increase in exchange rate in Nigeria will result in 1.25 unit decrease in the level of real gross domestic product. The results above show that exchange rate is a statistically significant factor affecting the real gross domestic product in Nigeria at 5% level of significance.

The table 4.4 above also indicates that level of exchange ratevolatility is negatively related to the real gross domestic product in the short run. This implies that one unit increase in exchange rate volatility in Nigeria will result in 0.01 unit decrease in the level of real gross domestic product. The results above show that exchange rate volatility is a statistically significant factor affecting the real gross domestic product in Nigeria at 5% level of significance.

The table 4.4 above also indicates that level of inflation is positively related to the real gross domestic product in the short run. This implies that one unit increase in the levelof inflation in Nigeria will result in 0.002 unit increase in the level of real gross domestic

product. The results above show that inflation is a statistically insignificant factor affecting the real gross domestic product in Nigeria at 5% level of significance.

The table 4.4 above also indicates that level of interest rate is positively related to the real gross domestic product in the short run. This implies that one unit increase in the level ofinterest rate in Nigeria will result in 0.008 unit increase in the level of real gross domestic product. The results above show that interest rate is a statistically insignificant factor affecting the real gross domestic product in Nigeria at 5% level of significance.

The table 4.4 above also indicates that level of foreign direct investment is positively related to the real gross domestic product in the short run. This implies that one unit increase in the levelof foreign direct investment in Nigeria will result in 0.0004 unit increase in the level of real gross domestic product. The results above show that foreign direct investment is a statistically significant factor affecting the real gross domestic product in Nigeria at 5% level of significance.

The coefficient of determination (R^2) showed that, about 85% of the systematic variations in the explained variable are accounted for by the joint influence of all the explanatory variables employed in the study, while the remaining 15% is due to other factors captured by the error term. This further confirms that the model is correctly specified. The F-statistics indicate a rejection of the null hypothesis of joint insignificance (at 5% significance level). In other words, we are about 95% confident that the explanatory variables are simultaneously significant when addressing the various factors that influence economic growth in Nigeria. The Durbin Watson statistic 1.64 which is

approximately equals 2 indicating that autocorrelation is absent in the estimated model, this makes the estimated model reliable and fit for policy perspective.

Table 4.5: Long run model

Dependent variable: RGDP

Dependent Variable: RGDP				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.00929	0.206987	48.35719	0.0000
EXRT(-1)	-0.103818	0.044495	-2.333249	0.0270
EXRTVOL(-1)	-0.002519	0.000705	-3.574841	0.0013
INFL(-1)	0.001033	0.002703	0.382326	0.7051
RINR(-1)	0.005990	0.004653	1.287428	0.2085
FDI(-1)	0.000199	0.000007	2.675635	0.0123
R-squared	0.899018	Mean dependent var		10.49644
Adjusted R-squared	0.880986	S.D. dependent var		0.491934
S.E. of regression	0.169709	Akaike info criterion		-0.550672
Sum squared residual	0.806437	Schwarz criterion		-0.281314
Log likelihood	15.36143	Hannan-Quinn criter.		-0.458813
F-statistic	49.85552	Durbin-Watson stat		1.733604
Prob(F-statistic)	0.000000			

Source: Author's Computation

The table 4.5 above also indicates that level of exchange rate is negatively related to the real gross domestic product in the short run. This implies that one unit increase in exchange rate in Nigeria will result in 0.10 unit decrease in the level of real gross domestic product. The results above show that exchange rate is a statistically significant factor affecting the real gross domestic product in Nigeria at 5% level of significance.

The table 4.5 above also indicates that level of exchange ratevolatility is negatively related to the real gross domestic product in the short run. This implies that one unit increase in exchange rate volatility in Nigeria will result in 0.0002 unit decrease in the level of real gross domestic product. The results above show that exchange rate volatility is a statistically significant factor affecting the real gross domestic product in Nigeria at 5% level of significance.

The table 4.5 above also indicates that level of inflation is positively related to the real gross domestic product in the short run. This implies that one unit increase in the levelof inflation in Nigeria will result in 0.001 unit increase in the level of real gross domestic product. The results above show that inflation is a statistically insignificant factor affecting the real gross domestic product in Nigeria at 5% level of significance.

The table 4.5 above also indicates that level of interest rate is positively related to the real gross domestic product in the short run. This implies that one unit increase in the level of interest rate in Nigeria will result in 0.006 unit increase in the level of real gross domestic product. The results above show that interest rate is a statistically insignificant factor affecting the real gross domestic product in Nigeria at 5% level of significance.

The table 4.5 above also indicates that level of foreign direct investment is positively related to the real gross domestic product in the short run. This implies that one unit increase in the level of foreign direct investment in Nigeria will result in 0.0001 unit increase in the level of real gross domestic product. The results above show that foreign

direct investment is a statistically significant factor affecting the real gross domestic product in Nigeria at 5% level of significance.

The coefficient of determination (R^2) showed that, about 89% of the systematic variations in the explained variable are accounted for by the joint influence of all the explanatory variables employed in the study, while the remaining 11% is due to other factors captured by the error term. This further confirms that the model is correctly specified. The F-statistics indicate a rejection of the null hypothesis of joint insignificance (at 5% significance level). In other words, we are about 95% confident that the explanatory variables are simultaneously significant when addressing the various factors that influence economic growth in Nigeria. The Durbin Watson statistic 1.73 which is approximately equals 2 indicating that autocorrelation is absent in the estimated model, this makes the estimated model reliable and fit for policy perspective.

4.3 DIAGNOSTIC TESTS

Table 4.6: Test on the Error Term

TEST	**TYPE**	Prob(@ 5 Percent Sig. Level.	**CONCLUSION**
Serial correlation	Breusch-Godfrey Serial Correlation LM Test	0.3535	No serial correlation
Heteroskedasticity	Breusch-Pagan Serial Correlation LM Test	0.6219	Homoskedastic (equal spread)
Normality	-	0.6291	Normally distributed

Source: Author's compilation

The table 4.6 above indicates that the distribution of the model is there is absence of serial correlation and heteroscedasticity in the model.

4.4 POLICY IMPLICATIONS

In general, the study showed a negative relationship between exchange rate volatility and the economy. Most frequently, an unstable exchange rate regime reduces the export sector's external competitiveness by undermining the incentive structure. Given that the exchange rate volatility coefficients had negative right signs and were significant, it is likely that risk-averse exporters and importers would drastically scale back their operations, change the sources of their supply and demand, or alter their policies to reduce their exposure to the negative effects of exchange rate variability on the Nigerian investment climate. This could then change how output is distributed across other economic sectors. Additionally, trade policy interventions intended to stabilize trade flows probably produced ambiguous outcomes. This is in line with economic theory, which predicts that a depreciation of the local currency will make domestic export commodities relatively cheaper than those of other nations, increasing demand for Nigeria's exports. However, Nigeria mostly exports crude oil and has few alternative non-oil products to capitalize on the country's rising export demand. Additionally, Nigeria imports the majority of its consumer and production products, thus a devaluation or depreciation of the currency will not always result in an increase in exports of items that can replace imports. In the current situation, we will advise Nigeria to broaden its export base to include more non-oil commodities and process these products to raise their value-

added content, which will increase their import appeal in global markets. In contrast to theoretical predictions that a real depreciation of the naira exchange rate should increase total exports and decrease imports, the study found that the real exchange rate had a positive and significant impact on total imports. However, the actual depreciation of the naira has increased total imports. The real exchange rate's appreciation or depreciation would not, in all other circumstances, have a materially negative impact on Nigeria's total imports and exports because the country depends on imports for both its consumer and productive goods.

CHAPTER FIVE

SUMMARY, CONCLUSION AND RECOMMENDATION

5.1 SUMMARY OF FINDINGS

The study evaluates the impact of exchange rate volatility on economic growth in Nigeria. The study checks for unit root using Augmented Dickey-Fuller (ADF) to check if the variables are stationary or non-stationary. Also, to check that long run relationship exists, the study used the Johansen Co-integration test. This shows the existence of no long-run relationship exists among the variables employed in the study. An error correction model was determined to show the relationship between the dependent and independent variables. The Durbin-Watson test was carried out to check for autocorrelation. The parsimonious error correction model is showed that each year, approximately 80% of the difference between the real and long run (equilibrium) value of real gross domestic product is reversed or removed and the ECM's coefficient has a negative sign, as predicted, and is meaningful at 5% significant level with a probability value of 0.0015. As a result, we can now confidently assert that the variables under study are still co-integrated.The study found that the in the short run and long run, exchange rate and exchange rate volatility was shown to negatively and significantly related to the economy and interest rate was shown to be positively and insignificantly related to the level of economic growth while foreign direct investment was shown to affect economic growth positively and significantly in Nigeria. In the long run, the coefficient of determination about 89% of the systematic variations in the explained variable are accounted for by the

joint influence of all the explanatory variables employed in the study, while the remaining 11% is due to other factors captured by the error term. This further confirms that the model is correctly specified and that the F-statistics indicate a rejection of the null hypothesis of joint insignificance (at 5% significance level). In other words, we are about 95% confident that the explanatory variables are simultaneously significant when addressing the various factors that influence economic growth in Nigeria and the Durbin Watson statistic 1.73 which is approximately equals 2 indicating that autocorrelation is absent in the estimated model, this makes the estimated model reliable and fit for policy perspective. On the other hand, the short run model showed that the coefficient of determination showed that 85% of the systematic variations in the explained variable are accounted for by the joint influence of all the explanatory variables employed in the study, while the remaining 15% is due to other factors captured by the error term and this further confirms that the model is correctly specified while the F-statistics indicate a rejection of the null hypothesis of joint insignificance (at 5% significance level) meaning that we are about 95% confident that the explanatory variables are simultaneously significant when addressing the various factors that influence economic growth in Nigeria. The Durbin Watson statistic 1.64 which is approximately equals 2 indicating that autocorrelation is absent in the estimated model, this makes the estimated model reliable and fit for policy perspective.

5.2 CONCLUSION

In an era of ever-changing global economic environment, especially now when the current economic approach of most countries is geared towards minimum government and market based economic system, Nigerian cannot afford to be left out. It is strongly believed therefore, that if these policies or policy measures are taken seriously and implemented, the country's goal of attaining a stable exchange rate will become possible leading to quality standard of living, peace and unity and therefore encourage competition in domestic factors of production.

The study explored the relationship between the exchange rate volatility on economic growth in Nigeria. The data used covered a time frame of 1986 to 2020 period on annual basis. The various statistical and econometric measures as well as empirical results were quite revealing indicating that exchange rate volatility has a negative relationship with Nigerian economy. Following a detailed time series analysis, the study conclusively reveals exchange volatility generally affects negatively affects the country's economy. It is in this light that this makes the following recommendations below.

5.3 RECOMMENDATIONS

i. Given the aforementioned conclusion, policymakers in Nigeria should seriously consider exchange rate management. By depreciating the home currency, exports can be increased while imports are decreased. In order to lower the cost of domestic goods and services and ultimately boost net exports, governments weaken their currencies. The Nigerian government should support exports as well because they

boost employment, enhance incomes, and improve the quality of life for citizens. As a result, people are happier and more likely to support their national leaders. Exports also improve a country's central bank's foreign exchange reserves.

ii. In order to ensure that the country attracts more foreign investment, macroeconomic professionals who truly comprehend how an economy functions through foreign investment should be involved in policy-making. Nigerian corporations can buy new goods and technologies and advertise their current goods to new markets by obtaining a controlling interest in overseas assets. Governments can encourage FDI by promoting job development and economic expansion, which increases FDI appeal.

iii. Avoiding dumping, which is brought on by excessive importation of goods from outside, should be accomplished by the implementation of an appropriate protective exchange rate regime. Countries typically impose tariffs and other import fees to deter one another from dumping. Although the purpose of these import tariffs is to support domestic employment and industry protection, they also raise prices for domestic consumers. Nigeria is an import-dependent nation, with its exports of crude oil providing the majority of the funding for imports. Due to this, Nigeria has become the target of dumping of commodities from industrialized nations; interestingly, toxic waste has also been dumped, as shown in the infamous Koko incident of 1988. Due to its numerous detrimental effects, dumping has now been a topic of national discussion. The Nigerian steel industry is also suffering from the unfavorable impact of dumping; imports of cheap steel products are impeding local businesses' efforts to

expand. A functioning steel sector is a requirement for the national and industrial growth of a nation, as has frequently been shown elsewhere. Given Nigeria's abundant iron ore reserves, that was one of the justifications for President Shagari's administration beginning the Ajaokuta Steel Complex, Aladja Steel Complex (Company), rolling mills like Jos, Oshogbo, etc. Another option to stop dumping is for the government to give local producers of essential goods financial aid in order to, among other things, facilitate quality improvements. Nigerians might not want to purchase inferior goods, which leads to a demand for imported substitutes, especially when they are priced similarly to their inferior local counterparts. It's important to address cultural concerns, such as the belief that imported items are superior than local counterparts. To promote the purchase of locally produced items, the government should launch massive awareness and orientation initiatives through the Consumer Protection Council.

iv. Policies which will aid in developing the Nigerian economy should be adhered to, such policies will aim at the diversification of the economy making it more independent as it will lead to growth of domestic industries, businesses and investment. This will lead to appreciation of the Nigeria foreign exchange rate among other countries.

REFERENCES

Adekanye Femi (2010) The Elements of Banking in Nigeria, 4th edition, Fazburn Publishers, 2010. ISBN: 9789071736.

Akanji, O. O (2006). The achievement of convergence in foreign exchange market. Central Bank of Nigeria Bullion, 30(3), 10-15

Adetifa, Bayo S. (2005) Corporate Finance and Investment Strategy, Lagos: CIBN.

Afolabi L. (2005) Theory of Monetary Economics, Ibadan: University Press Ltd.

Ajakaiye D. (2002) Economic Development in Nigeria: A Review of Experience, CBN Bullion, Vol. 26 pp4664. CBN Annual Reports of Accounts (various Issues) 2000 – 2012.

Asinya and Takon (2014) Exchange rate Management and economic growth in Nigeria. Benin City, Nigeria: Goldmark press limited.

Adelowukan (2012) Impact of exchange rate fluctuations on selected macro-economic variables in Nigeria. *European scientific journal, 9(25)*

Azeez, B.A., Kolapo, F.T and Ajayi, L.B (2012) Effect of Exchange rate Volatility on Macroeconomic Performance in Nigeria. *Interdisciplinary Journal of Contemporary Research in Business*. 4(1), 149-155.

Arize, A. C., T. Osang, and D. J. Slottje. (2000) Exchange-Rate Volatility and Foreign Trade: Evidence from Thirteen LDCs. *Journal of Business and Economic Statistics* 18 (1): 10–17.

Asher O. J (2012) The Impact of Exchange rate Fluctuation on the Nigeria Economic Growth. Aghion, P., P. Bacchetta, R. Ranciere, and K. Rogoff. 2009. Exchange Rate Volatility and Productivity Growth: The Role of Financial Development. *Journal of Monetary Economics* 56 (4): 494–513.

Akpan, P.L (2008) Foreign exchange market and economic growth in an emerging petroleum based economy: Evidence from Nigeria (1970-2003). *African Economic and Business Review* 6(2), 46-58.

Aliyu, S.R.U. (2011) Impact of Oil Price Shock and exchange Rate Volatility on economic growth in Nigeria. Evidence from Nigeria. African Economic and Business Review, 6(2), 46-58.

Adebiyi, M.A & Dauda, R.O.S (2009) *Trade Liberalization policy and Industrialization Growth performance in Nigeria: An Error Correction Mechanism Technique, being a paper presented at the 45th annual conference of the Nigerian economic Society,* 24th to 26th August, Central Bankof Nigeria.

Barkoulas, J.T, Baum C. & Caglayan, M. (2002) Exchange Rate Effect on the Volume and Variability of Trade Flows, *Journal on International Money and Finance*, No.21 pp. 481-406.

Benson, U.O and Victor, E.O (2012) Real Exchange Rate and Macroeconomic Performance: Testing for the Balassa-Samuelson Hypothesis in Nigeria. *International Journal of Economics and Finance*: 4 (2), 127-134.

Busayo, O. (2013) Oil prices and exchange rate volatility in Nigeria. Department of economics and developmental studies, college of developmental social studies (covenant university, Ota).

Bosworth, B., S. Collins, and C. Yu-chin (1995) *Accounting for Differences in Economic Growth*. Unpublished manuscript. Brookings Institution, Washington, DC.

Chong and Tan (2005) Exchange rate volatility and microeconomics variables in Pakistan. Business management dynamics, 1(2), 11-22

Central Bank of Nigeria (2010) Central Bank of Nigeria annual report and statements of account.

David, Umeh & Ameh (2010) The Effect of Exchange Rate fluctuations on Nigeria Manufacturing Sector, *African Journal of Business Management* 4(14):2994-2998.

Dada and Oyeranti (2006) Exchange rate management and economic growth in Nigeria. *Central Bank of Nigeria journal of Applied Statistics,* (2), Article 2.

Edwards, S. and E. Levy-Yeyati (2003) Flexible Exchange Rates as Shock Absorbers, NBER working paper 9867.

Eze and Okpala (2014) Exchange rate policies management and economic growth in Nigeria. A doctoral thesis (University of Ibadan). Retrieved from http://www.google.com.

Eichengreen, B and Leblang, D. (2003) Exchange Rates and Cohesion: Historical Perspectives and Political-Economy Considerations, *Journal of Common Market Studies* Vol. 41, pp. 797 -822.

Eme, O.A and Johnson A.A (2012) Effect of Exchange Rate Movements on Economic Growth in Nigeria. *CBN Journal of Applied Statistics*. 2(2), 1-28.

Elizabeth Irekpitan Izilein, Ogochukwu Theresa Chukwuma and Olohitare P. Odjegba. An empirical analysis of determinants of exchange rate. Retrieved from www.globalacademicgroup.com/node/352

Ewa A (2011) and Asher O. J (2012) The Impact of Exchange Rate Fluctuation on the Nigeria Economic Growth (1980 – 2010). Unpublished B.Sc Thesis of Caritas University Emene, Enugu State, Nigeria.

Fouquin et al (2014) Exchange rate management and economic growth in Nigeria. Contemporary economic issues in Nigeria. Central Bank of Nigeria, Abuja.

Hausmann, R., L. Pritchett, and D. Rodrik (2005) Growth Accelerations. *Journal of Economic Growth* 10 (4): 303–29.

Hossain, A, (2002) Exchange Rate Responses to Inflation in Bangladesh, (Washington D.C., IMF Working Paper No. WP/02/ IMF. 1984 Exchange Rate Volatility and The World trade. Occasional Paper No. 28, IMF Research Department, Washington, D.C.

Jhingan M. L. (2004) Money, Banking, International Trade and Public Finance, New Delhi: Vrinda Publications Ltd.

Kandil (2004) Exchange rate management and economic growth in Nigeria. *A European Scientific Journal* 9(7)

Meldi et al (2014) Effect of exchange rate policies on economic growth. Retrieved from: /57/ explaining-theory-of-economic growth.

Mordi, M.C. (2006) Challenges of Exchange Rate Volatility in Economic Management of Nigeria, In the Dynamics of Exchange Rate in Nigeria, *CBN Bullion Vol*. 30 (3), July-September. Pp.17-25

Najeb, M. (2013) Neo-classical economic growth theory: An empirical approach for East journal of psychology, volume 11, no 3.

Najeb, M. (2014) A contribution of the theory of economic growth*: old and new journal of economics and international finance, 6(3), 47-61. DOI: 10.589/jEIF2013.05518.*

Nnweke, T. (2014) The impact of exchange rate volatility on balance of payment: elements, policies and Nigeria experience. Benin city, Nigeria: Gold mark press limited.

Obansa, S. A. J., Okoroafor, O. K. D., Aluko, O. O., and Millicent Eze (2013) Perceived Relationship between Exchange Rate, Interest Rate and Economic Growth in Nigeria: 19702010. American Journal of Humanities and Social Sciences: 1 (3), 116-124.

Okuns C. (2015) Impact of exchange rate fluctuations on Economic growth of Nigeria, department of economics and statistics (University of Benin).

Ogun, O. (2006) Real Exchange Rate Behaviour and Non-oil export Growth in Nigeria. *African Journal of Economic Polic*y, 11(1), June.

Obadan M. I. (2006) Overview of exchange rate management in Nigeria. Central Bank of Nigeria Bullion, 30(3), 1-9

Obadan M. I. (2012) Foreign exchange market and the balance of payment: Elements, policies and Nigeria experience, Benin City, Nigeria.

Obaseki P. J (2001) Issues in exchange rate policy Design and management In the Central Bank of Nigeria Economic and Financial Review.

Okoduwa A. P (2005) Global finance theory and practice. Benin City, Edo state. Ambik press

Rodric, D. (2006) *The Real Exchange Rate and Economic Growth,* Harvard University, Cambridge, September.

Rebelo, S. (1990) Long run policy Analysis and long run growth NBER WP, vol. 46, no.8, ppl478-1500.

Razaq, O. D. (2013) The impact of exchange rate volatility on the macroeconomic variables in Nigeria, A European scientific journal 9 (7).

Servén, L. (2003) Real-Exchange-Rate Uncertainty and Private Investment in LDCs. *Review of Economics and Statistics* 85: 212–18.

Smriti, C. (2005) Causes of fluctuations in exchange rate and international trade. Retrieved from www.yourarticlelibrary.com/international trade/7 main causes of fluctuations- in –exchange- rate-international –trade/26047/.

Tejvan, P. (2012) Exchange rate and economic growth. Retrieved from: www.economicshelp .org/blog/565/economics/exchange rate-rate.

Tejvan, P. (2007) Explaining theory of economic growth. Retrieved from: /57/explaining-theory –of-economic-growth.

Todaro, P. M. and Smith, S. C (2011) Economic development. Harlow, England: Pearson.

Ubok-Udom, E.U. (1999) Currency Depreciation and Domestic Output growth in Nigeria: 19711995, *The Nigerian Journal of Economics and Social studies*, 41(1), 31-44.

Usman, O.A and Adeare, A.T (2012) The effects of foreign exchange regimes on industrial growth in Nigeria. *Global Advanced Research Journal of Economics, Accounting and Finance*. 1(1), 1-8.

Wikipedia (2015) Economic growth. Retrieved from: //en.m.Wikipedia.Org/ wiki/economic-growth.

Wise Geek (2015) retrieved from: m.wisegeek.com/what-is-exchange rate-rate-volatility.

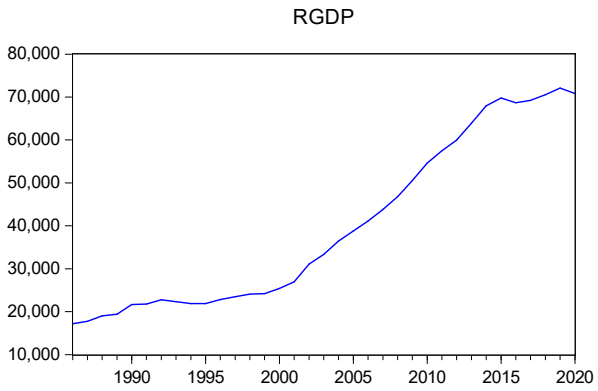
APPENDICES

1. **DESCRIPTIVE STATISTICS**

	RGDP	EXRT	INFL	RINR	FDI
Mean	39987.05	115.1782	19.51429	2.548000	451.7629
Median	33346.62	120.9702	12.55000	5.370000	229.8400
Maximum	72094.09	358.8108	72.84000	18.18000	2372.120
Minimum	17180.55	2.020575	5.390000	-31.45000	0.380000
Std. Dev.	19799.55	99.80060	17.82661	10.09658	544.2214
Skewness	0.461719	0.758338	1.703099	-1.192034	1.450137
Kurtosis	1.608729	2.851629	4.547639	5.072520	5.423776
Jarque-Bera	4.066376	3.386720	20.41283	14.55288	20.83416
Probability	0.130917	0.183901	0.000037	0.000692	0.000030
Sum	1399547.	4031.238	683.0000	89.18000	15811.70
Sum Sq. Dev.	1.33E+10	338645.4	10804.79	3465.991	10070017
Observations	35	35	35	35	35

2. **GENERAL**

GRAPH


RGDP
80,000
70,000
60,000
50,000
40,000
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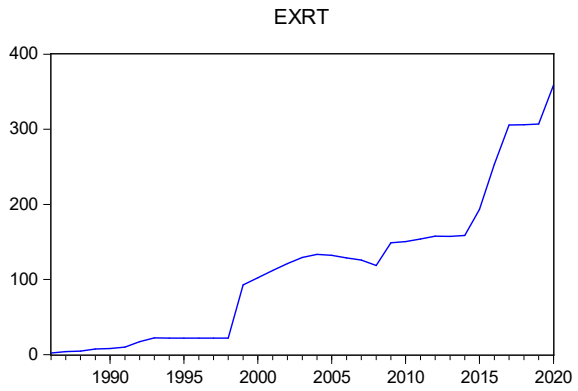
20,000
10,000
1990
1995
2000
2005
2010
2015
2020


EXRT
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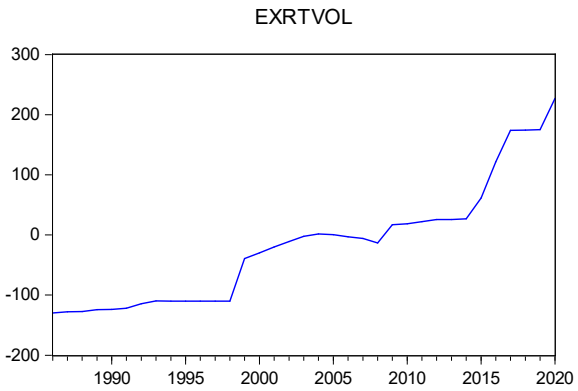
100
0
1990
1995
2000
2005
2010
2015
2020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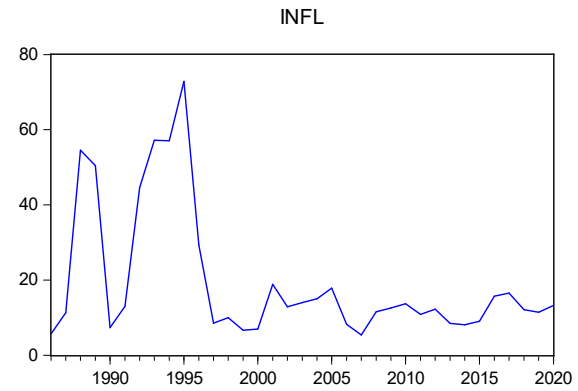
2000
2005
2010
2015
2020


INFL
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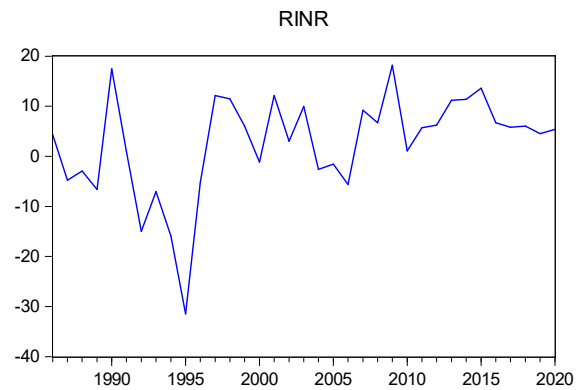
2000
2005
2010
2015
2020


RINR
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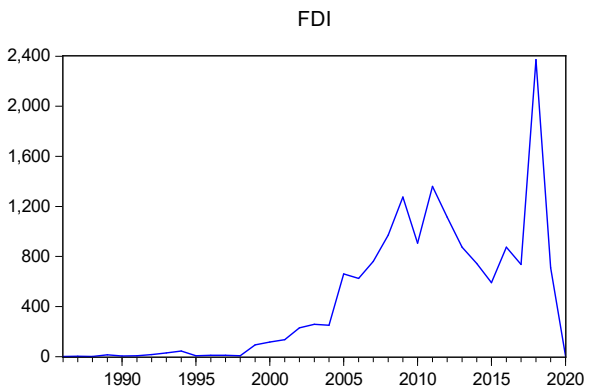
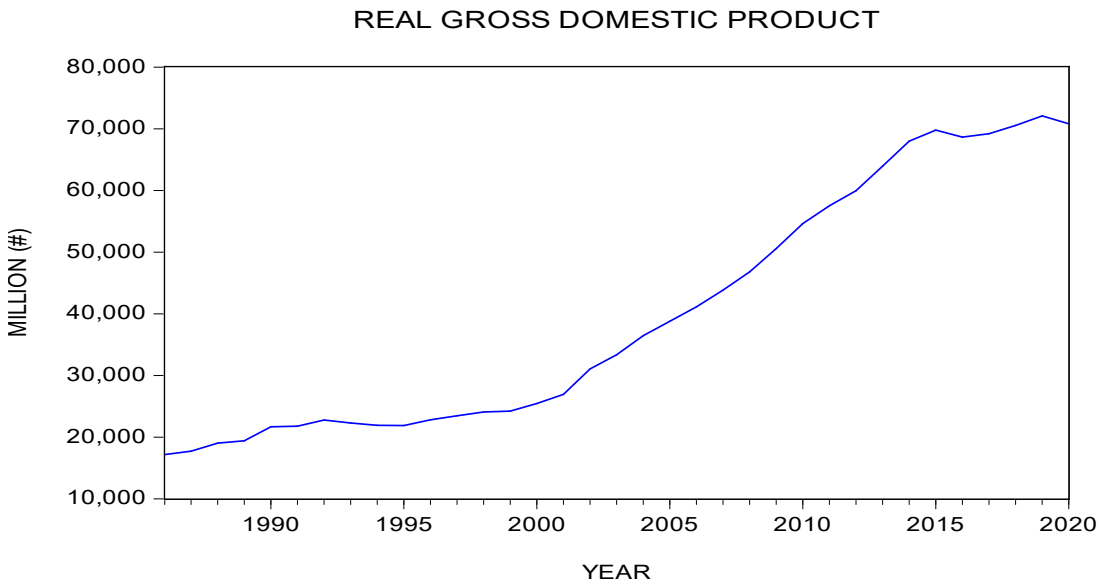
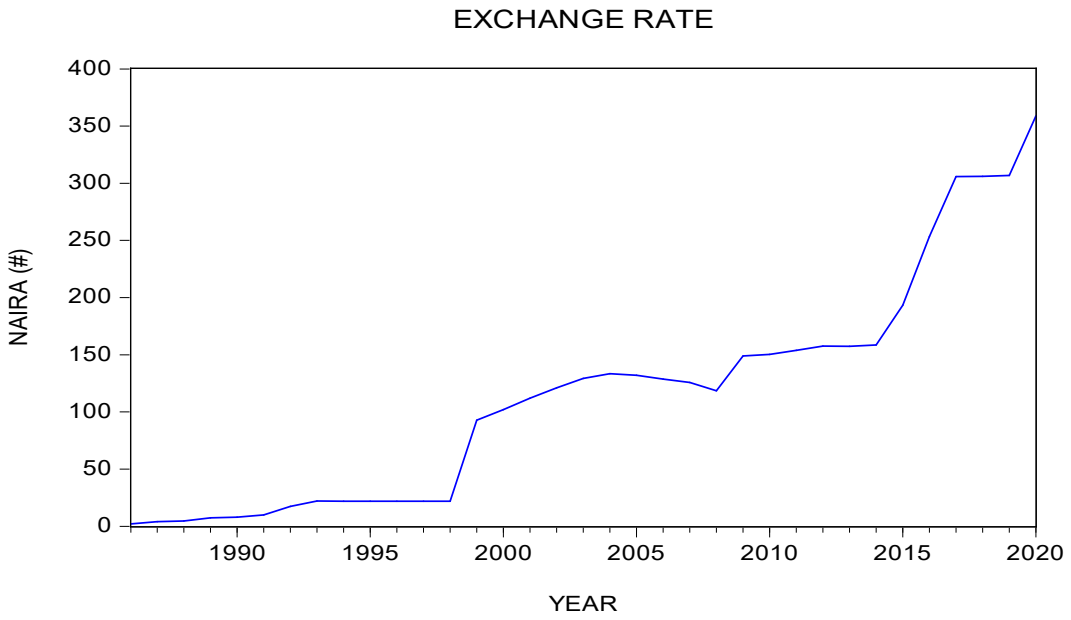
0
-10
-20
-30
-40
1990
1995
2000
2005
2010
2015
2020


FDI
2,400
2,000
1,600
1,200
800
400
0
1990
1995
2000
2005
2010
2015
2020

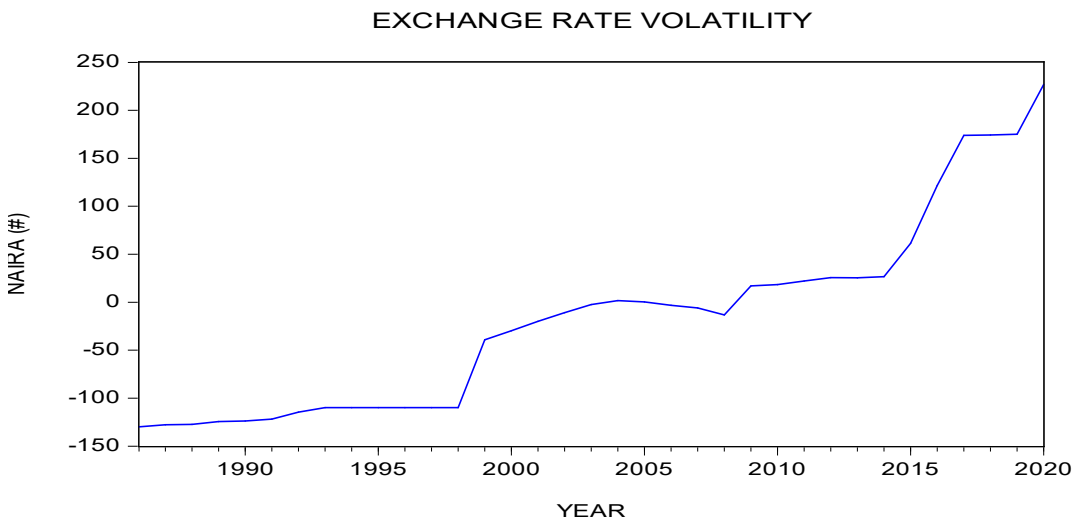
RGDP



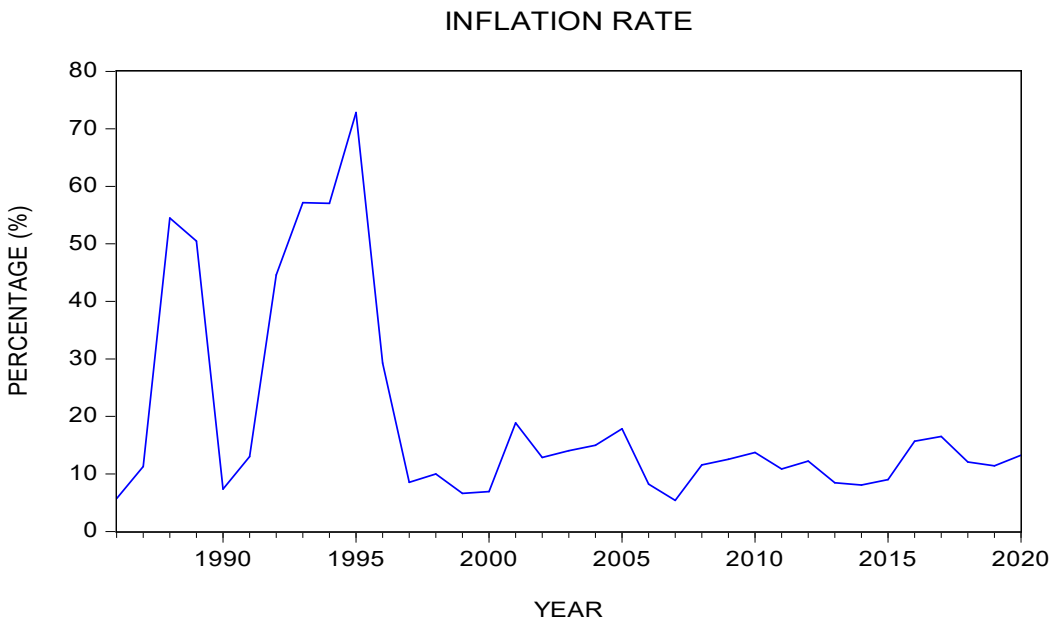
EXRT



EXRTVOL


EXCHANGE RATE VOLATILITY
NAIRA (#)
250
200
150
100
50
0
-50
-100
-150
1990
1995
2000
2005
2010
2015
2020
YEAR

2.4 INFL


INFLATION RATE
PERCENTAGE (%)
80
70
60
50
40
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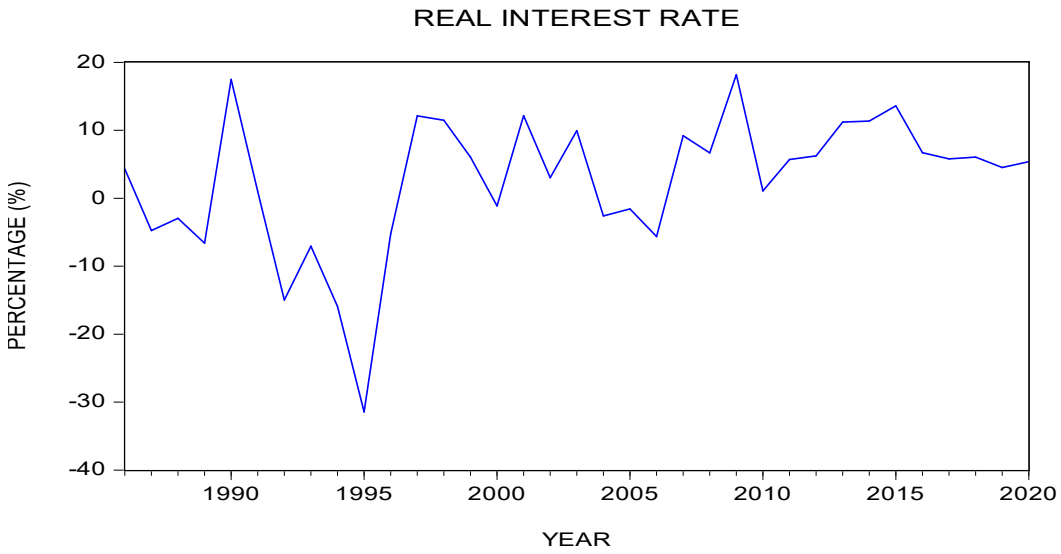
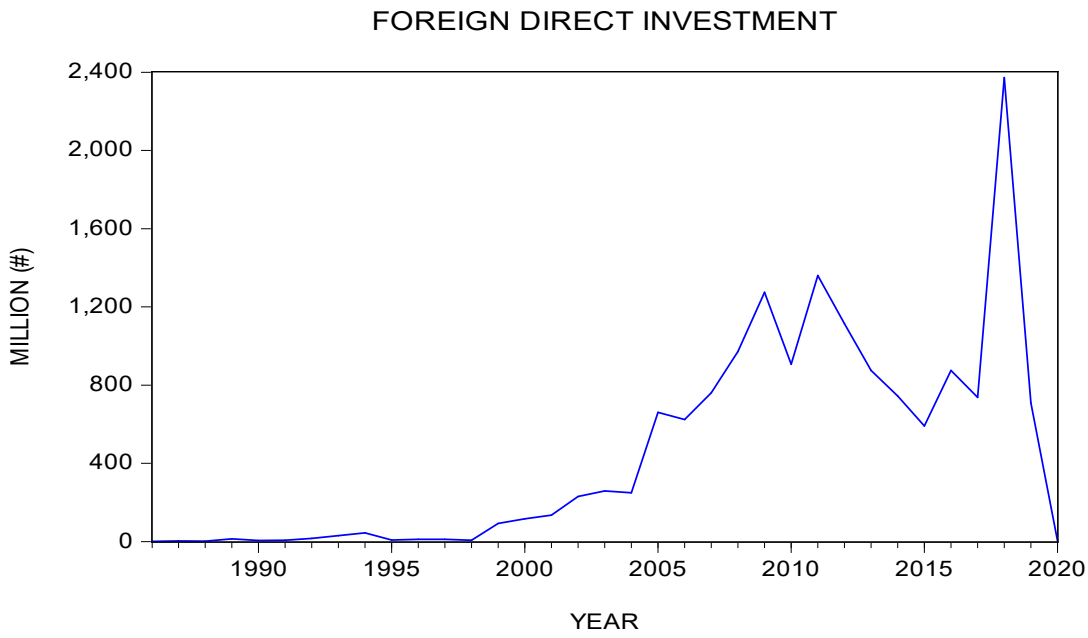
YEAR

2.5 RINR



2.6 FDI



UNIT ROOT TEST
AT LEVEL

RGDP

Null Hypothesis: RGDP has a unit root
Exogenous: Constant
Lag Length: 4 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-0.522801	0.8731
Test critical values:	1% level	-3.670170	
	5% level	-2.963972	
	10% level	-2.621007	

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RGDP)
Method: Least Squares
Date: 12/03/22 Time: 12:28
Sample (adjusted): 1991 2020
Included observations: 30 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RGDP(-1)	-0.006875	0.013150	-0.522801	0.6059
D(RGDP(-1))	0.530360	0.190975	2.777116	0.0105
D(RGDP(-2))	0.267535	0.193492	1.382668	0.1795
D(RGDP(-3))	-0.329589	0.188630	-1.747279	0.0934
D(RGDP(-4))	0.248567	0.193027	1.287731	0.2101
C	0.080501	0.136399	0.590190	0.5606

R-squared	0.420875	Mean dependent var	0.039449
Adjusted R-squared	0.300224	S.D. dependent var	0.037277
S.E. of regression	0.031183	Akaike info criterion	-3.921016
Sum squared resid	0.023337	Schwarz criterion	-3.640777
Log likelihood	64.81524	Hannan-Quinn criter.	-3.831365
F-statistic	3.488367	Durbin-Watson stat	1.556682
Prob(F-statistic)	0.016436		

EXRT

Null Hypothesis: EXRT has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.614102	0.1000
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXRT)
Method: Least Squares
Date: 12/03/22 Time: 12:29
Sample (adjusted): 1987 2020
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
EXRT(-1)	-0.084681	0.032394	-2.614102	0.0135
C	0.494405	0.138448	3.571042	0.0011

R-squared	0.175970	Mean dependent var	0.152336
Adjusted R-squared	0.150219	S.D. dependent var	0.286032
S.E. of regression	0.263674	Akaike info criterion	0.228818
Sum squared resid	2.224771	Schwarz criterion	0.318604
Log likelihood	-1.889901	Hannan-Quinn criter.	0.259437
F-statistic	6.833530	Durbin-Watson stat	2.074490
Prob(F-statistic)	0.013525		

INFL

Null Hypothesis: INFL has a unit root
Exogenous: Constant
Lag Length: 7 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-2.540732	0.2313
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INFL)
Method: Least Squares
Date: 12/03/22 Time: 12:29
Sample (adjusted): 1994 2020
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
INFL(-1)	-0.472352	0.104026	-4.540732	0.0003
D(INFL(-1))	-0.038149	0.141906	-0.268830	0.7911
D(INFL(-2))	0.223198	0.134292	1.662033	0.1138
D(INFL(-3))	0.216166	0.118952	1.817263	0.0859
D(INFL(-4))	-0.053728	0.107647	-0.499115	0.6237
D(INFL(-5))	-0.262423	0.107266	-2.446462	0.0249
D(INFL(-6))	0.167946	0.087558	1.918113	0.0711
D(INFL(-7))	0.194393	0.094595	2.055014	0.0547
C	6.195824	2.315603	2.675685	0.0154

R-squared	0.797672	Mean dependent var	-1.626667
Adjusted R-squared	0.707748	S.D. dependent var	10.64281
S.E. of regression	5.753539	Akaike info criterion	6.598709
Sum squared resid	595.8579	Schwarz criterion	7.030655
Log likelihood	-80.08257	Hannan-Quinn criter.	6.727149
F-statistic	8.870539	Durbin-Watson stat	1.978993
Prob(F-statistic)	0.000069		

RINR

Null Hypothesis: RINR has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.535297	0.5129
Test critical values:	1% level	-3.639407	
	5% level	-2.951125	
	10% level	-2.614300	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RINR)
Method: Least Squares
Date: 12/03/22 Time: 12:30
Sample (adjusted): 1987 2020
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
RINR(-1)	-0.562466	0.159100	-3.535297	0.0013
C	1.417655	1.651701	0.858300	0.3971

R-squared	0.280872	Mean dependent var	0.031176
Adjusted R-squared	0.258399	S.D. dependent var	10.86387
S.E. of regression	9.355561	Akaike info criterion	7.366841
Sum squared resid	2800.849	Schwarz criterion	7.456627
Log likelihood	-123.2363	Hannan-Quinn criter.	7.397461
F-statistic	12.49832	Durbin-Watson stat	1.944098
Prob(F-statistic)	0.001266		

FDI

Null Hypothesis: FDI has a unit root
Exogenous: Constant
Lag Length: 7 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-1.074593	0.8941
Test critical values:	1% level	-3.699871	
	5% level	-2.976263	
	10% level	-2.627420	

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FDI)
Method: Least Squares
Date: 12/03/22 Time: 12:31
Sample (adjusted): 1994 2020
Included observations: 27 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
FDI(-1)	-0.601273	0.147566	-4.074593	0.0007
D(FDI(-1))	0.767874	0.307160	2.499916	0.0223
D(FDI(-2))	1.501047	0.442351	3.393341	0.0032
D(FDI(-3))	-0.486279	0.343778	-1.414514	0.1743
D(FDI(-4))	-1.411107	0.390768	-3.611114	0.0020
D(FDI(-5))	-0.373339	0.351906	-1.060906	0.3028
D(FDI(-6))	2.085382	0.532826	3.913816	0.0010
D(FDI(-7))	3.563445	0.548974	6.491103	0.0000
C	92.51525	84.92962	1.089317	0.2904

			-
R-squared	0.796386	Mean dependent var	1.014074
Adjusted R-squared	0.705891	S.D. dependent var	514.5244
S.E. of regression	279.0359	Akaike info criterion	14.36176
Sum squared resid	1401498.	Schwarz criterion	14.79370
Log likelihood	-184.8838	Hannan-Quinn criter.	14.49020
F-statistic	8.800327	Durbin-Watson stat	1.843089
Prob(F-statistic)	0.000072		

UNIT ROOT TEST
AT FIST DIFFERENCE

RGDP

Null Hypothesis: D(RGDP) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.461761	0.0157
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RGDP,2)
Method: Least Squares
Date: 12/03/22 Time: 12:32
Sample (adjusted): 1988 2020
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RGDP(-1))	-0.596363	0.172272	-3.461761	0.0016
C	0.024415	0.009737	2.507551	0.0176

R-squared	0.278798	Mean dependent var	-0.001503
Adjusted R-squared	0.255533	S.D. dependent var	0.041443
S.E. of regression	0.035758	Akaike info criterion	-3.765401
Sum squared resid	0.039637	Schwarz criterion	-3.674704
Log likelihood	64.12912	Hannan-Quinn criter.	-3.734884
F-statistic	11.98379	Durbin-Watson stat	2.188594
Prob(F-statistic)	0.001587		

EXTR

Null Hypothesis: D(EXRT) has a unit root
Exogenous: Constant
Lag Length: 0 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-5.837674	0.0000
Test critical values:	1% level	-3.646342	
	5% level	-2.954021	
	10% level	-2.615817	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(EXRT,2)
Method: Least Squares
Date: 12/03/22 Time: 12:33
Sample (adjusted): 1988 2020
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(EXRT(-1))	-0.989491	0.169501	-5.837674	0.0000
C	0.134522	0.054920	2.449405	0.0202

| | | | -
|
|---|---|---|---|
| R-squared | 0.523652 | Mean dependent var | 0.016096 |
| Adjusted R-squared | 0.508286 | S.D. dependent var | 0.397178 |
| S.E. of regression | 0.278511 | Akaike info criterion | 0.339970 |
| Sum squared resid | 2.404612 | Schwarz criterion | 0.430668 |
| Log likelihood | -3.609510 | Hannan-Quinn criter. | 0.370487 |
| F-statistic | 34.07844 | Durbin-Watson stat | 1.990711 |
| Prob(F-statistic) | 0.000002 | | |

INFL

Null Hypothesis: D(INFL) has a unit root
Exogenous: Constant
Lag Length: 7 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-6.638471	0.0084
Test critical values:	1% level	-3.711457	
	5% level	-2.981038	
	10% level	-2.629906	

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(INFL,2)
Method: Least Squares
Date: 12/03/22 Time: 12:33
Sample (adjusted): 1995 2020
Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(INFL(-1))	-1.602376	0.607313	-2.638471	0.0172
D(INFL(-1),2)	0.599257	0.493823	1.213507	0.2415
D(INFL(-2),2)	0.755878	0.415363	1.819801	0.0864
D(INFL(-3),2)	0.642014	0.346401	1.853386	0.0813
D(INFL(-4),2)	0.327207	0.297421	1.100146	0.2866
D(INFL(-5),2)	-0.009333	0.222913	-0.041867	0.9671
D(INFL(-6),2)	0.159466	0.140273	1.136821	0.2714
D(INFL(-7),2)	0.246354	0.107835	2.284541	0.0355
C	-1.541558	1.589872	-0.969612	0.3458

R-squared	0.853341	Mean dependent var	0.076538
Adjusted R-squared	0.784324	S.D. dependent var	15.28752
S.E. of regression	7.099663	Akaike info criterion	7.025396
Sum squared resid	856.8885	Schwarz criterion	7.460891
Log likelihood	-82.33015	Hannan-Quinn criter.	7.150803
F-statistic	12.36435	Durbin-Watson stat	2.026246
Prob(F-statistic)	0.000010		

RINR

Null Hypothesis: D(RINR) has a unit root
Exogenous: Constant
Lag Length: 2 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-4.821887	0.0005
Test critical values:	1% level	-3.661661	
	5% level	-2.960411	
	10% level	-2.619160	

*MacKinnon (1996) one-sided p-values.

Augmented Dickey-Fuller Test Equation
Dependent Variable: D(RINR,2)
Method: Least Squares
Date: 12/03/22 Time: 12:34
Sample (adjusted): 1990 2020
Included observations: 31 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(RINR(-1))	-1.916082	0.397372	-4.821887	0.0000
D(RINR(-1),2)	0.552623	0.300523	1.838868	0.0770
D(RINR(-2),2)	0.270628	0.182313	1.484416	0.1493
C	0.585587	1.938676	0.302055	0.7649

R-squared	0.672570	Mean dependent var	0.145161
Adjusted R-squared	0.636189	S.D. dependent var	17.87487
S.E. of regression	10.78154	Akaike info criterion	7.713462
Sum squared resid	3138.523	Schwarz criterion	7.898493
Log likelihood	-115.5587	Hannan-Quinn criter.	7.773777
F-statistic	18.48680	Durbin-Watson stat	1.823221
Prob(F-statistic)	0.000001		

FDI

Null Hypothesis: D(FDI) has a unit root
Exogenous: Constant
Lag Length: 7 (Automatic - based on SIC, maxlag=8)

		t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic		-3.943698	0.0075
Test critical values:	1% level	-3.711457	
	5% level	-2.981038	
	10% level	-2.629906	

*MacKinnon (1996) one-sided p-values.
Augmented Dickey-Fuller Test Equation
Dependent Variable: D(FDI,2)
Method: Least Squares
Date: 12/03/22 Time: 12:34
Sample (adjusted): 1995 2020
Included observations: 26 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(FDI(-1))	-1.516007	1.606453	-0.943698	0.3585
D(FDI(-1),2)	0.903379	1.540334	0.586482	0.5653
D(FDI(-2),2)	1.158875	1.314241	0.881783	0.3902
D(FDI(-3),2)	-0.348214	1.147695	-0.303403	0.7653
D(FDI(-4),2)	-1.324631	1.267975	-1.044682	0.3108
D(FDI(-5),2)	-0.971108	1.381736	-0.702818	0.4917
D(FDI(-6),2)	0.683712	1.253124	0.545606	0.5924
D(FDI(-7),2)	2.251349	0.772793	2.913263	0.0097
C	28.83329	96.94904	0.297407	0.7698

R-squared	0.896739	Mean dependent var	-27.71538
Adjusted R-squared	0.848146	S.D. dependent var	833.3427
S.E. of regression	324.7410	Akaike info criterion	14.67136
Sum squared resid	1792764.	Schwarz criterion	15.10685
Log likelihood	-181.7276	Hannan-Quinn criter.	14.79676
F-statistic	18.45394	Durbin-Watson stat	2.219695
Prob(F-statistic)	0.000001		

CO-INTERGRATION

Date: 12/03/22 Time: 12:26
Sample (adjusted): 1988 2020
Included observations: 33 after adjustments
Trend assumption: Linear deterministic trend
Series: RGDP EXRT EXRTVOL INFL RINR FDI
Lags interval (in first differences): 1 to 1

Unrestricted Cointegration Rank Test (Trace)

Hypothesized No. of CE(s)	Eigenvalue	Trace Statistic	0.05 Critical Value	Prob.**
None *	0.842635	133.5332	95.75366	0.0000
At most 1 *	0.601797	72.50993	69.81889	0.0300
At most 2	0.467704	42.12373	47.85613	0.1553
At most 3	0.392159	21.31540	29.79707	0.3383
At most 4	0.137614	4.886615	15.49471	0.8207
At most 5	2.68E-05	0.000885	3.841466	0.9770

Trace test indicates 2 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values

Unrestricted Cointegration Rank Test (Maximum Eigenvalue)

Hypothesized No. of CE(s)	Eigenvalue	Max-Eigen Statistic	0.05 Critical Value	Prob.**
None *	0.842635	61.02328	40.07757	0.0001
At most 1	0.601797	30.38620	33.87687	0.1234
At most 2	0.467704	20.80833	27.58434	0.2880
At most 3	0.392159	16.42878	21.13162	0.2008
At most 4	0.137614	4.885731	14.26460	0.7562
At most 5	2.68E-05	0.000885	3.841466	0.9770

Max-eigenvalue test indicates 1 cointegrating eqn(s) at the 0.05 level
* denotes rejection of the hypothesis at the 0.05 level
**MacKinnon-Haug-Michelis (1999) p-values
Unrestricted Cointegrating Coefficients (normalized by b'*S11*b=I):

RGDP	EXRT	EXRTVOL	INFL	RINR	FDI
-1.661459	-0.420629	-0.001567	-0.069548	0.031743	0.000468

-0.380209	1.051489	-0.001513	0.116019	0.255651	-0.001125
-6.386429	0.486330	0.005256	-0.009288	0.011232	0.004761
5.008482	0.152663	0.003068	-0.030775	-0.037861	-0.003488
2.769662	-1.619011	0.010957	0.029028	0.045206	-1.42E-05
1.561393	0.393152	-0.032983	-0.017237	-0.031787	0.003080

Unrestricted Adjustment Coefficients (alpha):

D(RGDP)	0.001932	0.003997	0.007059	9.56E-05	-0.011382	3.45E-05
D(EXRT)	0.160491	0.052988	-0.053505	-0.043170	0.036758	0.000588
D(EXRTVOL)	6.403462	5.205034	-1.848967	4.198217	2.975929	0.047782
D(INFL)	9.519773	-2.114128	0.870698	3.148056	1.237448	-0.044596
D(RINR)	-4.412274	-3.567177	-0.733242	0.605669	-0.909679	0.034266
D(FDI)	37.20123	-68.88512	-215.9203	-47.10984	-76.04163	-0.352842

1 Cointegrating Equation(s): Log likelihood -517.3634

Normalized cointegrating coefficients (standard error in parentheses)

RGDP	EXRT	EXRTVOL	INFL	RINR	FDI
1.000000	0.253169	0.000943	0.041860	-0.019105	-0.000282
	(0.10240)	(0.00183)	(0.00744)	(0.01372)	(0.00024)

Adjustment coefficients (standard error in parentheses)

D(RGDP)	-0.003211
	(0.01112)
D(EXRT)	-0.266649
	(0.06894)
D(EXRTVOL)	-10.63909
	(5.30057)
D(INFL)	-15.81671
	(3.88311)
D(RINR)	7.330810
	(2.90974)
D(FDI)	-61.80830
	(132.978)

2 Cointegrating Equation(s): Log likelihood -502.1703

Normalized cointegrating coefficients (standard error in parentheses)

RGDP	EXRT	EXRTVOL	INFL	RINR	FDI
1.000000	0.000000	0.001198	0.012758	-0.073894	-9.78E-06
		(0.00187)	(0.00808)	(0.01511)	(0.00027)
0.000000	1.000000	-0.001006	0.114951	0.216413	-0.001074
		(0.00447)	(0.01934)	(0.03617)	(0.00066)

Adjustment coefficients (standard error in parentheses)

D(RGDP)	-0.004730	0.003390
	(0.01132)	(0.00752)
D(EXRT)	-0.286796	-0.011791
	(0.06838)	(0.04544)
D(EXRTVOL)	-12.61809	2.779551
	(5.13996)	(3.41527)
D(INFL)	-15.01290	-6.227277
	(3.91776)	(2.60317)
D(RINR)	8.687081	-1.894914
	(2.72605)	(1.81134)
D(FDI)	-35.61759	-88.07985
	(134.379)	(89.2887)

3 Cointegrating Equation(s):	Log likelihood	-491.7661

Normalized cointegrating coefficients (standard error in parentheses)

RGDP	EXRT	EXRTVOL	INFL	RINR	FDI
1.000000	0.000000	0.000000	0.011302	-0.023290	-0.000477
			(0.00382)	(0.00733)	(7.7E-05)
0.000000	1.000000	0.000000	0.116174	0.173910	-0.000682
			(0.01617)	(0.03100)	(0.00033)
0.000000	0.000000	1.000000	1.215855	-42.25770	0.389811
			(4.48897)	(8.60584)	(0.09053)

Adjustment coefficients (standard error in parentheses)

D(RGDP)	-0.049810	0.006822	2.80E-05
	(0.04291)	(0.00800)	(3.7E-05)
D(EXRT)	0.054911	-0.037812	-0.000613
	(0.25558)	(0.04766)	(0.00022)
D(EXRTVOL)	-0.809789	1.880342	-0.027623
	(19.7831)	(3.68881)	(0.01703)

D(INFL)	-20.57355	-5.803831	-0.007139
	(15.1500)	(2.82490)	(0.01304)
D(RINR)	13.36988	-2.251512	0.008455
	(10.5275)	(1.96298)	(0.00906)
D(FDI)	1343.342	-193.0884	-1.088836
	(436.017)	(81.3008)	(0.37526)

4 Cointegrating Equation(s):	Log likelihood	-483.5517

Normalized cointegrating coefficients (standard error in parentheses)

RGDP	EXRT	EXRTVOL	INFL	RINR	FDI
1.000000	0.000000	0.000000	0.000000	-0.004404	-0.000704
				(0.00461)	(7.5E-05)
0.000000	1.000000	0.000000	0.000000	0.368044	-0.003022
				(0.05951)	(0.00096)
0.000000	0.000000	1.000000	0.000000	-40.22592	0.365317
				(5.21274)	(0.08425)
0.000000	0.000000	0.000000	1.000000	-1.671071	0.020145
				(0.46302)	(0.00748)

Adjustment coefficients (standard error in parentheses)

D(RGDP)	-0.049331	0.006837	2.83E-05	0.000261
	(0.05384)	(0.00806)	(4.2E-05)	(0.00090)
D(EXRT)	-0.161306	-0.044403	-0.000745	-0.003189
	(0.31257)	(0.04681)	(0.00024)	(0.00524)
D(EXRTVOL)	20.21691	2.521253	-0.014743	0.046507
	(23.8241)	(3.56773)	(0.01857)	(0.39941)
D(INFL)	-4.806565	-5.323240	0.002520	-1.012328
	(18.2767)	(2.73699)	(0.01424)	(0.30641)
D(RINR)	16.40336	-2.159049	0.010313	-0.118824
	(13.1700)	(1.97226)	(0.01026)	(0.22080)
D(FDI)	1107.393	-200.2803	-1.233373	-7.123891
	(541.438)	(81.0821)	(0.42198)	(9.07721)

5 Cointegrating Equation(s):	Log likelihood	-481.1088

Normalized cointegrating coefficients (standard error in parentheses)

RGDP	EXRT	EXRTVOL	INFL	RINR	FDI
1.000000	0.000000	0.000000	0.000000	0.000000	-0.000733
					(7.0E-05)
0.000000	1.000000	0.000000	0.000000	0.000000	-0.000592
					(0.00051)
0.000000	0.000000	1.000000	0.000000	0.000000	0.099713
					(0.06511)
0.000000	0.000000	0.000000	1.000000	0.000000	0.009112
					(0.00476)
0.000000	0.000000	0.000000	0.000000	1.000000	-0.006603
					(0.00203)

Adjustment coefficients (standard error in parentheses)

D(RGDP)	-0.080854	0.025264	-9.64E-05	-6.96E-05	0.000644
	(0.05316)	(0.01241)	(7.7E-05)	(0.00086)	(0.00161)
D(EXRT)	-0.059499	-0.103914	-0.000342	-0.002122	0.021336
	(0.32321)	(0.07543)	(0.00047)	(0.00525)	(0.00978)
D(EXRTVOL)	28.45922	-2.296810	0.017865	0.132893	1.488750
	(24.5726)	(5.73459)	(0.03575)	(0.39917)	(0.74339)
D(INFL)	-1.379254	-7.326682	0.016078	-0.976407	-0.291761
	(19.1471)	(4.46843)	(0.02786)	(0.31104)	(0.57926)
D(RINR)	13.88386	-0.686268	0.000346	-0.145231	-1.124301
	(13.7937)	(3.21908)	(0.02007)	(0.22407)	(0.41730)
D(FDI)	896.7836	-77.16806	-2.066567	-9.331240	-20.50882
	(555.131)	(129.553)	(0.80770)	(9.01784)	(16.7944)

6. MODEL ESTIMATION

LONG RUN

Dependent Variable: RGDP
Method: Least Squares
Date: 12/03/22 Time: 12:39
Sample (adjusted): 1987 2020
Included observations: 34 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.00929	0.206987	48.35719	0.0000
EXRT(-1)	-0.103818	0.044495	-2.333249	0.0270
EXRTVOL(-1)	-0.002519	0.000705	-3.574841	0.0013
INFL(-1)	0.001033	0.002703	0.382326	0.7051
RINR(-1)	0.005990	0.004653	1.287428	0.2085
FDI(-1)	0.000199	0.000007	2.675635	0.0123

R-squared	0.899018	Mean dependent var	10.49644
Adjusted R-squared	0.880986	S.D. dependent var	0.491934
S.E. of regression	0.169709	Akaike info criterion	-0.550672
Sum squared resid	0.806437	Schwarz criterion	-0.281314
Log likelihood	15.36143	Hannan-Quinn criter.	-0.458813
F-statistic	49.85552	Durbin-Watson stat	1.733604
Prob(F-statistic)	0.000000		

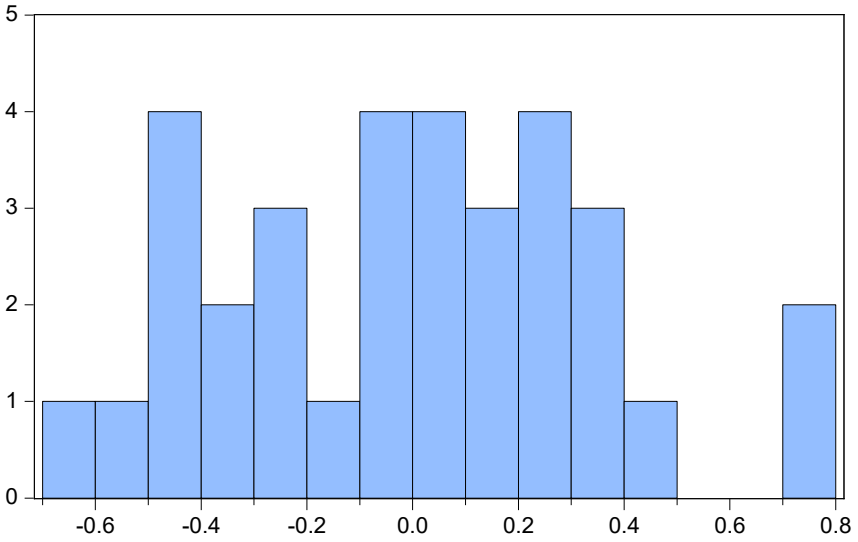
SHORT RUN
Dependent Variable: RGDP

Method: Least Squares
Date: 12/03/22 Time: 12:44
Sample (adjusted): 1988 2020
Included observations: 33 after adjustments

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	10.55852	0.080329	131.4403	0.0000
D(EXRT(-1))	-1.252740	0.317196	-3.949421	0.0005
D(EXRTVOL(-1))	-0.016325	0.004907	3.326990	0.0026
D(INFL(-1))	0.002156	0.005393	0.399801	0.6926
D(RINR(-1))	0.008497	0.008055	1.054811	0.3012
D(FDI(-1))	0.000368	0.000170	2.164706	0.0426
ECM(-1)	-0.803516	0.396990	-2.024021	0.0015

R-squared	0.850782	Mean dependent var	10.51806
Adjusted R-squared	0.824039	S.D. dependent var	0.482882
S.E. of regression	0.397010	Akaike info criterion	1.176121
Sum squared resid	4.098042	Schwarz criterion	1.493562
Log likelihood	-12.40600	Hannan-Quinn criter.	1.282930
F-statistic	3.556666	Durbin-Watson stat	1.641468
Prob(F-statistic)	0.010488		

DIAGNOSTIC TESTS



Series: Residuals	
Sample 1988 2020	
Observations 33	
Mean	1.24e-15
Median	0.024223
Maximum	0.788548
Minimum	-0.600624
Std. Dev.	0.357860
Skewness	0.224473
Kurtosis	2.494038
Jarque-Bera	0.629131
Probability	0.730106

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	20.37121	Prob. F(2,24)	0.3535
Obs*R-squared	20.76691	Prob. Chi-Square(2)	0.7368

Test Equation:
Dependent Variable: RESID
Method: Least Squares
Date: 12/03/22 Time: 12:51
Sample: 1988 2020
Included observations: 33
Presample missing value lagged residuals set to zero.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.011918	0.051900	-0.229634	0.8203
D(EXRT(-1))	0.552163	0.220904	2.499557	0.0197
D(EXRTVOL(-1))	-0.004080	0.003260	-1.251594	0.2228
D(INFL(-1))	-0.004394	0.003568	-1.231620	0.2300
D(RINR(-1))	0.001825	0.005179	0.352442	0.7276
D(FDI(-1))	0.000113	0.000116	0.974220	0.3397
ECM(-1)	-0.634490	0.359069	-1.767040	0.0899
RESID(-1)	0.742331	0.185942	3.992280	0.0005
RESID(-2)	0.444971	0.233393	1.906533	0.0686

R-squared	0.629300	Mean dependent var	1.24E-15
Adjusted R-squared	0.505734	S.D. dependent var	0.357860
S.E. of regression	0.251590	Akaike info criterion	0.304970
Sum squared resid	1.519143	Schwarz criterion	0.713109
Log likelihood	3.967989	Hannan-Quinn criter.	0.442297
F-statistic	5.092804	Durbin-Watson stat	1.405667
Prob(F-statistic)	0.000876		

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.740519	Prob. F(6,26)	0.6219
Obs*R-squared	4.816285	Prob. Chi-Square(6)	0.5676
Scaled explained SS	2.233379	Prob. Chi-Square(6)	0.8970

Test Equation:
Dependent Variable: RESID^2
Method: Least Squares
Date: 12/03/22 Time: 12:52
Sample: 1988 2020
Included observations: 33

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	0.150978	0.031976	4.721546	0.0001
D(EXRT(-1))	-0.111495	0.126265	-0.883026	0.3853
D(EXRTVOL(-1))	-0.001052	0.001953	-0.538807	0.5946
D(INFL(-1))	-0.000568	0.002147	-0.264344	0.7936
D(RINR(-1))	-0.000448	0.003206	-0.139661	0.8900
D(FDI(-1))	-2.28E-05	6.78E-05	-0.336614	0.7391
ECM(-1)	-0.194605	0.197834	-0.983677	0.3343

R-squared	0.145948	Mean dependent var	0.124183
Adjusted R-squared	-0.051141	S.D. dependent var	0.154143
S.E. of regression	0.158036	Akaike info criterion	-0.666158
Sum squared resid	0.649359	Schwarz criterion	-0.348717
Log likelihood	17.99161	Hannan-Quinn criter.	-0.559349
F-statistic	0.740519	Durbin-Watson stat	0.836888
Prob(F-statistic)	0.621950		

SOURCE OF DATA

Year	RGDP	EXRT	FDI	INFL	RINR
1986	17180.55	2.020575	0.38	5.72	4.31
1987	17730.34	4.017941667	2.45	11.29	-4.77
1988	19030.69	4.536733333	1.72	54.51	-2.96
1989	19395.96	7.391558333	13.9	50.47	-6.61
1990	21680.2	8.037808333	4.74	7.36	17.47
1991	21757.9	9.909491667	7.04	13.01	0.99
1992	22756.55	17.298425	15.57	44.59	-14.99
1993	22302.24	22.05105833	29.77	57.17	-7.05
1994	21897.47	21.8861	43.77	57.03	-15.92
1995	21881.6	21.8861	7.44	72.84	-31.45
1996	22799.69	21.8861	10.94	29.27	-5.26
1997	23469.34	21.8861	10.94	8.53	12.13
1998	24075.15	21.8861	6.57	10	11.48
1999	24215.78	92.69335	92.69	6.62	6.05
2000	25430.42	102.1052083	116.4	6.93	-1.14
2001	26935.32	111.943325	134.33	18.87	12.14
2002	31064.27	120.9701667	229.84	12.88	3.02
2003	33346.62	129.3565333	258.71	14.03	9.94
2004	36431.37	133.5004	249.65	15	-2.6
2005	38777.01	132.147	660.74	17.86	-1.59
2006	41126.68	128.6516	623.96	8.23	-5.63
2007	43837.39	125.8331	760.03	5.39	9.19
2008	46802.76	118.5669167	971.06	11.58	6.68
2009	50564.26	148.8801742	1274.41	12.55	18.18
2010	54612.26	150.298025	906.3	13.72	1.07
2011	57511.04	153.8616083	1360.14	10.84	5.69
2012	59943.79	157.4994282	1113.52	12.22	6.22
2013	63942.85	157.3112183	874.65	8.48	11.2
2014	67977.5	158.5526449	743.61	8.06	11.36
2015	69780.69	193.2791667	591.43	9.01	13.6
2016	68652.43	253.4922519	874.55	15.68	6.69
2017	69205.69	305.7901092	736.95	16.52	5.79
2018	70536.35	306.0801619	2372.12	12.09	6.06
2019	72094.09	306.9205538	708.99	11.4	4.52
2020	70800.54	358.8107973	2.39	13.25	5.37

SOURCE: I. World Development Indicators (2021)
II. Central Bulletin Of Nigeria (2021)