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Monetary Conditions, Oil Revenue and Economic Growth in Nigeria



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Abstract

This study investigated the relationship between macroeconomic conditions, oil revenue, and economic growth in Nigeria within the period 1981-2017. To determine this, annual time series data from the World Development Indicator (WDI) and Central Bank of Nigeria Statistical Bulletin was collected for the dependent variable - Gross Domestic Product (the proxy for economic growth) and the independent variables: Labour force participation of productive working age (POP), Interest rate (INTR), Exchange rate (EXCH), Inflation rate (INF) and Oil revenue growth rate (OILR). Taking all variables in natural logarithm, the Ordinary Least Squares (OLS) method, Augmented Dickey Fuller (ADF) unit-root test and the Auto-Regressive Distributive Lag (ARDL) were employed for the empirical analysis. The result showed that a long-run relationship exist among oil revenue growth rate, exchange rate, interest rate, inflation rate and GDP growth rate. Furthermore, the results showed that there is a direct significant relationship between economic growth rate and all other rate-based variables - interest rate, exchange rate, inflation rate and oil revenue growth rate, while labour force participation of productive working age (POP) had a direct and insignificant impact on GDP.

The short-run estimate showed that in the event of a shock or perturbation, the system would restore itself to equilibrium at an adjustment speed of approximately 53.2%. It was recommended that revenue generated from the oil sector should be divested into real sectors such as agriculture and textiles that are known for large scale employment of labour. This would help to increase the production of previously imported goods, promote consumption of "made in Nigerian goods" and help to maintain a stable exchange rate in the country.

Keywords: Macroeconomic conditions, Economic Growth, Oil Revenue, Monetary Policy

Introduction

Monetary conditions are often used to evaluate the monetary policy stance of central banks. Monetary conditions represent the collective effect of interest, inflation and the exchange rates on the economy. These are the key variables through which monetary policy stimulate economic activity. In a period of economic lull, monetary conditions are set in such a way as to support economic growth. Conversely, monetary conditions suppress growth when economic activity tends to the direct opposite; this is referred to as contractionary monetary policy. The Neutral monetary policy, also referred to as the "natural" or "equilibrium" rate, is the monetary conditions that neither stimulates nor restrains economic growth. Neutral monetary policy is efficacious and appropriate if the economy is at full employment with low inflation and steady sustainable growth.

Monetary authorities manipulate exchange, interest rates and preserve the value of local currency to avoid market signal failure. This is germane considering their effects on the achievement of macroeconomic objectives. Like most other central banks, CBN is concerned with ensuring the stability of the tripartite macro prices. However, a seeming trade-off exists among these macroeconomic conditions as enunciated in the Impossible Trinity Theorem. The disequilibria in monetary conditions in Nigeria are not difficult to validate. This is reflected in mass underemployment, external trade imbalance and deficiency in productive investment at prevailing monetary conditions.

Interest rate (otherwise referred to as Monetary policy rate) in Nigeria has been pegged at 14 percent up to June, 2018 and among the highest in the world (Worldwide interest rates, 2018). Banks factors in the necessary adjustment for inflationary

expectation and associated cost of doing the banking business, including overhead cost, insurance and energy cost (self-generation of power). In addition, odious collateral security and short *repayment periods are enshrined in loan contract to reduce bank exposure to credit risk*. Interest rates are also kept high to ensure attractive yields and encourage both local and foreign investors to invest in the FGN bonds. These have devastating impact on real sector financing and job creation since no business can achieve incremental productivity and improved employment generation capacity with high interest and exchange rates.

Equally worrisome, is the non-stationary fluctuations in the price of goods and services. Inflation in Nigeria exhibits a volatile trend. The highest inflation rate recorded in Nigeria was 76.8 per cent in 1994 and the least value of inflation recorded was 0.2 per cent in 1999. Over the years, government have been advocating for single digit inflation, but only 1987, 1990, 1999, 2006 and 2007 were found to be one digit in Nigeria i.e. less than 10 per cent. For the remaining years, inflation was found to be more than one digit. Nonetheless, estimates from the National Bureau of statistics showed that inflationary trends are pointing in affirmative and right direction. Inflation rate plummeted from 14.33 in February to 13.34 in March, 2018. Food inflation declined from 17.59 %y/y in February to 16.02 %y/y in March, 2018. Core inflation also reduced from 11.7%y/y in February to 11.2%y/y in March, 2018. Commodity prices act as a link between the real and financial sectors, and plays fundamental role in economic dynamics. Inflation is capable of enshrining uncertainties in both the inter-temporal and intra-temporal allocation of resources.

Exchange rate management remains a big challenge to the Nigerian economy. From 1981 to 1986, the naira witnessed gradual depreciation such that the foreign exchange rate plummeted from \$0.828: N 1.00 in 1981 to \$1.121: N 1.00 in 1985. Notwithstanding the introduction of the Second tier foreign exchange market in September 1986 to address this anomaly, the currency still witnessed a downward spiral from N 1.5:\$1 at inception of the Market to N 3:\$1 at end-December 1988. By 1993, the average official exchange rate stood at N 137.07:\$1.0. Historically, the Nigerian Naira reached an all-time high of 365 in August of 2017 (Trading Economics, 2018). The exchange rate depreciated by about 98.0 per cent. Foreign exchange management has been constrained by continuous excess demand relative to supply occasioned by high ostentatious import bills and oil wealth illusion with the consequent low foreign exchange value of the naira, and the attendant high inflation in the economy. The country has contacted the "Dutch disease" with the achievement of macroeconomic and financial development intrinsically dependent

on the performance of the oil sector which is subject to vagaries in the international market.

Despite the emphasis on economic diversification by the Nigerian government, crude oil remains the dominant exported product in Nigeria (Nigerian Economic Summit Group, 2018). In addition, oil is mostly exported as a crude product, thereby bypassing opportunities for domestic refinement and the creation of value-added industries as well as employment opportunities for Nigerians (CIA, 2008). The Nigerian economy relies consistently on oil and gas revenues providing about 90.0 per cent of foreign exchange earnings, 80.0 per cent of government revenues with low levels of national savings averaging about 15.0 per cent of GDP. Taxes on oil represent a meager 5.0 per cent of GDP, compared with global threshold of 20.0 per cent. Investment as evident from FGN's recurrent budget is 107.0 per cent of its revenues and the capital budget is only nominally at 30.0 percent of total budget which is entirely borrowed. Yakub (2008) opine that "the problems with Nigerian economy have been traced to failure of successive governments to use oil revenue and excess crude oil income effectively in the development of other sectors of the economy". Hence, it is not an embellishment that the main challenges currently embattling the Nigerian economy are congenial solutions to the gyrating exchange rate, interest rate disequilibria and inflationary pressure amidst her supposed oil wealth. Therefore, the monetary authority is constantly challenged on policy measures to address the dynamic malaises confronting the Nigerian economy.

Empirical evidence on the relationship between monetary condition, oil revenue and economic growth in Nigeria focused on the nexus between each variable in the monetary conditions, oil revenue and economic growth, very few elucidated the combined influence of inflation, exchange rate, interest rate, and oil export earning on economic growth. This, however, is not sufficient enough to explicate the complexity and multi-dimensional nature of economic growth in Nigeria. Hence, this study builds upon the identified knowledge gap to examine the long and short-run effects of oil revenue, interest rate, exchange rate and inflation on economic growth in Nigeria using the ARDL model framework.

2.0 Conceptual Issues and Literature Review

To gain better understanding of what some economic concepts are; it is pertinent to clarify some key variables:

2.1 Interest rate: Interest can be defined as the return or yield on equity or opportunity cost of deferring current consumption into the future (Uchendu, 1993

cited in Acha & Acha, 2011). This definition clearly shows that interest is a concept which can mean different things depending on the perspective it is viewed. Interest rate can therefore be seen as a nebulous concept, a position affirmed by the availability of different types of rates. Some of which are: savings rate, discount rate, lending rate and treasury bill rate (Acha&Acha, 2011). According to Keynes, interest is the reward for not hoarding, but for parting with liquidity for a specific period of time. Keynes' definition of interest rate focuses more on the lending rate. Adebisi (2002) defined interest rate as the return or yield on equity or opportunity cost of deferring current consumption into the future. Some examples of interest rate include the saving, lending, and discount rate. Professor Lerner, in Jhingan (2003), defined interest as the price which equates the supply of 'Credit' or savings plus the net increase in the amount of money in a period, as the demand for credit or investment plus net 'hoarding' in a period. According to Soludo (2008), there are conflicting and competing views about what constitutes an appropriate interest rate depending on whose perspective-savers or lenders/borrowers. Borrowers prefer plummeting interest rates, while savers prefer a high interest rate regime. High interest rate generally exacerbates the attractiveness of postponing consumption and investment. This leads to weaker domestic demand, slower economic growth and high unemployment. In contrast, if interest rates are low, it is generally better to realise one's consumption and investment plans immediately. The result is upward trend in economic growth and upward pressure on inflation.

2.2 Exchange rate: Exchange rate is the price of a domestic currency in terms of another currency (international) (Olufayo & Fagite, 2014). Exchange rate represents the relative price for the exchange of domestic and foreign goods and services in international trade. It is one of the most important variables in international trade. Exchange rate is the rate at which a currency is exchanged for another currency. It is referred to as the ratio at which a unit of currency of one country is expressed in terms of another currency. Exchange rate between the Naira and the Dollar refers to the number of naira required to buy one dollar. Naira required to buy a Dollar. The rates are generally determined by the foreign exchange market. The foreign exchange market is a market where currencies of different countries are sold and bought. It is a market where the prices of local and foreign currencies are determined. As enunciated by Jhingan (2004), the national currencies of all countries are the stock in trade of the foreign exchange market, and as such, it is the largest market to be found around the world which functions in every country. Consequently, exchange rate levels and movements have far-reaching implications for international capital flow

competitiveness and business confidence. Exchange rate plays a crucial role in a small open economy. Exchange rate bears on trade by determining the relationship between international and domestic prices. A rise in Naira raises the price of Nigerian goods on the international market, while a fall in Naira lowers these prices. The fluctuation of exchange rates makes the exports/imports costlier or cheaper and also the unstable tendency of this variable attaches a level of uncertainty or risk to trade (Olufayo&Fagite, 2014).

2.3 Inflation rate: Inflation is the bane of the contemporary economy. It is one of the key tenacious threats that can undermine or even destroy decades of economic growth if not curbed. It is feared by central bankers globally and forces the execution of unconventional monetary policies. Because of its complexity and multi-dimensional nature, there is no universally accepted definition of the term inflation, nor is there a common agreement on what constitutes acceptable levels of inflation. That notwithstanding, there is a consensus among economists that inflation is a continuous rise in the general prices of goods and services. According to Samuelson (1976), "inflation is a general rising price for bread cars, haircut, rising wages, rent." Inflation refers to the persistent and sustained rise in the general level of prices of goods and services in an economy. Manifesting visibly during inflation period is the decline in the value of money. Igbatayo & Agbada (2012) defined it as the continuous and sustained rise in general price level of goods and services in a nation's economy. It also refers to a situation where the volume of money chasing the available goods and services in an economy is too much, consequently resulting in a persistent rise in general price level. In the aforementioned definition of inflation, there are two key emerging terminologies that are pertinent. Firstly, inflation is aggregate or general. This implies rise in prices that constitutes inflation must be encompassing and cover the entire basket of goods in the economy as distinct from an isolated rise in the prices of a single commodity or groups of commodities. The implication here is that changes in the individual prices or any combination of the prices cannot be considered as the occurrence of inflation. Monetary authorities should be concerned with the common price pressures acting across all items (i.e., core inflation). However, a situation may arise such that a change in an individual price could cause the other prices to rise. An example is petroleum product prices in Nigeria which in itself cannot signal inflation unless the price adjustment in the basket is such that the aggregate price level is induced to rise. Second, the rise in the aggregate level of prices must be continuous for inflation to be said to have occurred. The aggregate price level must show a tendency of a sustained and continuous rise over different time periods. This must

be separated from a situation of a one-off rise in the price level.

The effects of high inflation on the economy are generally considered to be predominantly harmful that is why the achievement of price stability has always been one of the fundamental objectives of macroeconomic policy in both developed and less developed countries (Orubu, 2009). Operationally, this can be viewed as the maintenance of a low and stable rate of aggregate price as defined by commonly accepted measures such as the consumer price index. Inflationary spiral increases the uncertainty about future relative prices and about the price level, causing a fixing and inertia inflation and depreciation expectations in the decision-making of economic entities. Premised on the volatility of prices, investors focus on short-term financial investments (speculative activities) and hedging against inflation instead of on longer-term investment projects in the real economy which remains a *sin-qua non* for development. Inflation also creates tax distortions, misallocates income, and causes implicit tax burden on savers, who are unable to maintain the marginal propensity to save.

2.5 Oil Export Revenue: Oil revenue refers to the income earned from the sale of crude oil. In the word of Hirschman (2015), "it is the total amount of income derived from the sale of crude oil in an economy." The oil revenue generated according to Hirschman (1958), is expected to contribute to the growth of other sectors and the entire economy. Based on this standpoint, oil export earnings can be described as the streams of income receivable to an economy for trading its oil product in the international market. In Nigeria, oil revenue is the major source of the economy upon which budgets and other fiscal policies are majorly estimated. Nigeria is Sub Saharan Africa's largest economy and relies heavily on oil as its main source of foreign exchange earnings and government revenues (CIA, 2018). Oil accounts for well over half of annual government revenues and, since 1974, between 21 and 48 percent of GDP (Ross, 2003). In 2008, oil revenues accounted for 20 percent of GDP, 95 percent of foreign exchange earnings, and 80 percent of government revenues (CIA 2008).

2.6 Economic growth: The term economic growth can be viewed from two different perspectives. Some view it as the total increase in the level of individuals' income within the country. Farah (2008) defined it as a potential growth in the income of each individual that forms the working group in a country as a result of their level and type of education. Economic Growth is defined as the growing capacity of the economy to satisfy the wants of goods and services of economic agents. Economic growth is achievable through improved productivity, with reduced contributions of

production inputs (technology, land, energy, labor, capital, etc.) for a given amount of production. Reduced costs raise demand for goods and services. Economic growth is also the outcome of human capital development and innovation. Also, Kathleen (2012) defined it as increase in the bargaining power of individuals to demand more goods and services produced within the economy over time. Coechy (2011) posited that economic growth is conventionally measured by the level of education and commensurate employment opportunity provided. Coechy (2011) views it as the percentage rate of increase in real income of individual over a period of time. Others view economic growth from the gross domestic product (GDP) or real GDP perspective. Of more importance is the growth of the ratio of GDP to population (GDP per capita), which is also called per capita income. An increase in per capita income can be referred to as intensive growth. Some view economic growth as an area of study which is different from development economics. The former is primarily the study of how countries can advance their economies. The latter is the study of the economic aspects of the development process in low-income countries. Erinoso (2010) posited that economic growth typically refers to the growth of potential output, that is, production at full employment.

2.7 Empirical Literature

Although the relationship between oil revenue and economic growth seems to be well established by limited literature, the direction of causality has remained largely unresolved.

Abdul and Marwan (2013) investigated the effect of interest rate, inflation rate, and GDP on real economic growth in Jordan over the period 2000-2010. Unit root test (Augmented Dickey-Fuller test) was exploited to check the integration order of the variables. A cointegration analysis with four variables (economic growth, interest rate, GDP, and inflation level) was employed. The study adopted Johansen test. Findings indicated that both trace test and max eigen value static showed that the four equations have significant existent 1% or 5%. It means that all variables have long-term equilibrium relationship. Finally, regression used to test GDP, interest rate, and inflation rate together indicated that current GDP and one lag GDP influenced growth rate.

Anthony, Uzomba and Olatunji (2009) examined the impact of interest and exchange rates on the Nigerian economy from 1975-2008. Data for the variables were collected from the CBN Statistical Bulletin. The study employed the ordinary least square (OLS) technique in the analysis but due to the fact that data were not stationary, a unit root test was employed; it further resorted to co-integration analysis which established the existence of a long run

relationship between the variables in the models. Their findings showed that an increase in interest rate retards investment and subsequently economic growth; while the lag one of exchange rate showed the expected positive sign, implying that depreciation in exchange rate retarded growth from 1975 to 2008. Thus, interest and exchange rates exerted negative impact on the Nigerian economy during the review period.

Anyingana (2010) investigated the effect of interest rate fluctuation on the economic growth of Nigeria. Two research hypotheses were formulated to investigate the relationship between interest rate and economic growth and the difference in economic growth before and after interest rate deregulation regime in Nigeria. Ex-post facto research design was adopted for the study. The Data for the study were obtained from the Central Bank of Nigeria Statistical Bulletin 2010. Data collected were analyzed and tested using the ordinary least square multiple regression analytical technique. The result of the findings revealed that: there existed an inverse relationship between interest rate and economic growth in Nigeria, meaning that increase in interest rate will decrease GDP of the country, thus retarding growth of the real economy.

Acha and Acha (2010) examined the implications of interest rate for savings and investment in Nigeria. It used data obtained from the Central Bank of Nigeria (CBN). Data were analyzed, using Pearson's Correlation Coefficient and regression. Evidence showed interest rate as a poor determinant of savings and investment, indicating that bank loans are mostly not used for productive purposes. Obamuyi and Olorunfemi (2011), examined the implications of financial reform and interest rate behavior on the economic growth in Nigeria. The result revealed that financial reform and interest rates have significant impact on economic growth in Nigeria. It also, implied that the interest rate behavior is important for economic growth.

Nweze and Edame (2016) examined the relationship between oil revenue and economic growth in Nigeria between 1981 and 2014. Secondary data on gross domestic product (GDP) was used as a proxy for economic growth; oil revenue (OREV), and government expenditure (GEXP) which represented the explanatory variables were sourced mainly from CBN publications. The cointegration result indicated that there is long-run relationship among the variables with three cointegrating equation(s). The result of the error correction mechanism (ECM) test indicated that all the variables except lag of government expenditure exerted significant impact on economic growth in Nigeria.

Aregbeyen and Kolawole (2015) examined the

relationships among oil revenue, government spending, and economic growth in Nigeria. They employed Ordinary Least Square (OLS), cointegration, Vector Error Correction Model (VECM), and Granger causality. The findings from the analysis revealed that oil revenue Granger caused both the total government spending and growth, while there was no-causality between government spending and growth in the country. Dominic (2014) carried out a study on the impact of Foreign Direct Investment (FDI) and Oil export on Economic growth in Nigeria from 1970 through 2011. The Augmented Dickey Fuller (ADF) unit root test was adopted to determine the stationary properties of the data, while the order of integration of the data was tested using the Johansen Cointegration test. The result showed that 87 per cent of total changes in economic growth were explained by the explanatory variables.

Akinlo (2012) assessed the importance of oil in the development of the Nigerian economy in a multivariate VAR model over the period 1960-2009. Empirical evidence showed that oil could cause other non-oil sectors to grow. However, oil had adverse effect on the manufacturing sector. Findings revealed bi-directional causality between oil and manufacturing, oil and building and construction, manufacturing and building, and construction, manufacturing and trade and services, and agriculture and building and construction. It also confirmed unidirectional causality from manufacturing to agriculture, and trade and services to oil. However, the study found no causality between agriculture and oil, likewise between trade and services and building and construction.

Adedokun (2012) examined the effect of oil export revenue on economic growth in Nigeria between the period 1975 and 2009. Empirical analysis from the study suggested that oil export revenue had a positively significant effect on growth both in the short-term and long-term in the country. The study further revealed that the primary determinant of foreign exchange earnings in Nigeria was changes in the world crude oil prices. Oladipo and Fabayo (2012) investigated global recession and the oil sector, based on its effects on economic growth in Nigeria. Analysis from the study revealed a negatively significant relationship between GDP and oil produced (domestic consumption and export) in the country. The result also showed the existence of a decline in the oil sector due to global recession.

Onyemaechi (2012) examined the implications of the various petroleum policies on the Nigerian economy using descriptive method. The result revealed some noticeable improvements in the gross domestic product (GDP), foreign direct investment, and employment levels. Oladipo and Fabayo (2012)

investigated global recession and the oil sector, based on its effects on economic growth in Nigeria, using the Ordinary Least Square (OLS). Findings of the study revealed that there was a negative relationship between GDP and oil produced (domestic consumption and export), which is significant at 5% level of significance ($p < 0.05$). The result also showed that there exists decline in the oil sector due to the global recession despite all measures deployed by Government to curb its effects.

Aminu and Anono (2012) investigated the impact of inflation on economic growth and development in Nigeria from 1970-2010 through the application of Augmented Dickey-Fuller technique in testing the unit root property of the series and Granger causality test of causation between GDP and inflation. The findings revealed that inflation possessed a positive impact on economic growth through encouraging productivity and output level and on evolution of total factor productivity. Similarly, it was also noted that GDP granger causes inflation and not inflation granger causing GDP.

Employing cointegration and Granger-causality test analysis, Omeke and Ugwuanyi (2010) tested the relationship between money, inflation and output. The findings revealed no existence of a cointegrating vector in the series used. Money supply was seen to Granger cause both output and inflation. The result suggested that monetary stability can contribute towards price stability in the Nigerian economy since the variation in price level is mainly caused by money supply and it also concluded that inflation in Nigeria is to a large extent, a monetary phenomenon. They found empirical support in context of the money-price-output hypothesis for Nigerian economy. Money supply appears to have a strong causal effect on the real output as well as prices.

Marbuah (2010) investigated the relationship between inflation and economic growth to ascertain whether a significant threshold effect existed in the case of Ghana over the period 1955-2009. The study found evidence of significant threshold effect of inflation on economic growth with and without structural breaks. Specifically, the evidence showed both a minimum and maximum inflation threshold levels of 6 per cent and per cent respectively. Moreover, the study found that adjusting for structural break in the model increased the effect of inflation on growth at a robust threshold level of 10 per cent by a factor of 1.8 or approximately 81 per cent. He concluded by recommending to continue pursuing the inflation targeting framework by keeping inflation targets below 10 percent for beyond 10 percent threshold, inflation can be detrimental to Ghana's growth prospects.

Williams and Adedeji (2004) examined price dynamics in the Dominican Republic by exploring the joint effects of distortions in money and traded-goods markets on inflation, holding other potential influences constant. The study captured the remarkable macroeconomic stability and growth for period 1991 to 2002. Using a parsimonious and empirically stable error-correction model, the paper found that the major determinants of inflation were changes in monetary aggregates, real output, foreign inflation, and the exchange rate. However, there was an incomplete pass-through of depreciation from the exchange rate to inflation. They established a long-run relationship in the money and traded-goods markets, observing that inflation was influenced only by disequilibrium in the money market.

Mallik and Chowdhury (2001) found two results: First, the relationship between inflation and economic growth is positive and statistically significant for Bangladesh, Pakistan, India and Sri Lanka. Second, the sensitivity of growth to changes in inflation rates was smaller than that of inflation to changes in growth rates. The policy implication of these results was the fact that, although moderate inflation promotes economic growth, faster economic growth absorbs into inflation by overheating the economy.

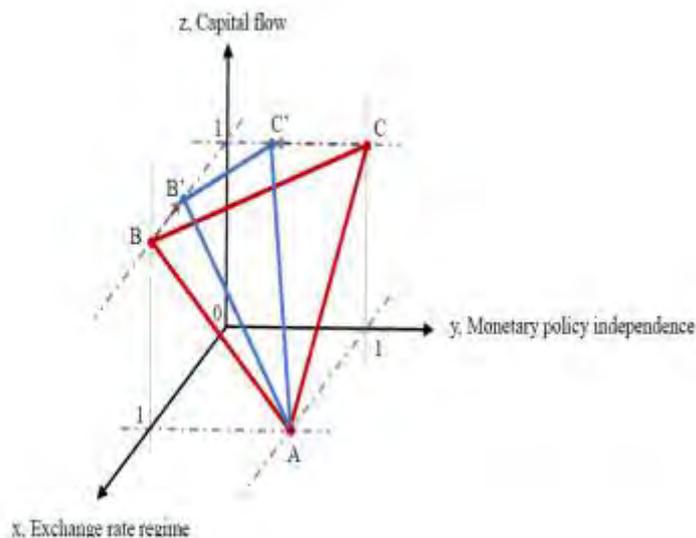
A survey of related literature revealed divergent viewpoints on the relationships that exist between oil export earning, exchange rate, interest rate, inflation and economic growth in Nigeria. While majority of the studies focused on the nexus between each variable in the monetary conditions and economic growth, very few elucidated the combined influence of inflation, exchange rate, interest rate, and oil export earning on economic growth. This, however, is not sufficient enough to explicate the complexity and multi-dimensional nature of economic growth in Nigeria. Hence, this study builds upon the identified knowledge gap to examine the long and short-run effects of oil revenue, interest rate, exchange rate and inflation on economic growth in Nigeria using the ARDL model framework.

3.0 Theoretical Framework: This study applied the scalene impossible trinity initiated by SUN Guofeng and LI Wenzhe (2017), which is an extension of the mundell-flemming models to examine nonlinearities in the monetary conditions. Impossible Trinity (also known as Unholy trinity, Inconsistent Trinity or Trilemma), is an important analytical framework of policy choice in a small open economy. The unholy trinity is conterminous to a policy choice conundrum which constitutes a persistently multifaceted and startling problem confronting monetary authorities the world over. The powerful theoretical insight for this preposition is premised on the mundell-flemming

models. Robert Mundell, the intellectual magnacarter of economics, and Marcus Fleming, a former IMF economist, provided locus classicus on the incompatibility of macro prices. The mundell-flemming model conjured that the central bank is constrained in achieving the key tripartite monetary objectives. At optimal performance level, it can jointly achieve only two of the three objectives of lowering interest rates, stable exchange rate and capital flows. Increased propensity of achieving one of the policy requires an opportunity cost of plummeting the degree of achieving one (or both) of the other policies. The classical "Impossible Trinity", emphasized equi importance of monetary conditions, and is an equilateral triangle. In reality, however, LDCs (Nigeria inclusive) continually depend on capital inflow especially oil revenue, debts and foreign aids which injected excessive liquidity, without improving the productive capacity and providing requisite impetus for supporting the real economy. Instead, LDCs have developed the appetite for ostentatious imported commodities due to wealth illusion. Consequently, capital flow became substantial and its direction susceptible to acute changes with concomitant economic shock and perturbation. This poses significant risks and uncertainties, which could rapidly alter macroeconomic conditions and even hamper a more robust and sustained trajectory for the economy. For example, Rey (2015) highlighted that a global financial cycle in capital flows, asset prices and credit growth, which is not aligned with a country's idiosyncratic macroeconomic conditions, can severely limit the independence and effectiveness of emerging markets' monetary policies. Recent evidence confirms that macroeconomic fundamentals do not provide full insulation, for example, to sudden spikes in risk aversion and large capital flows reversals, including episodes of "sudden stops" (Eichengreen and Gupta, 2016). This development increase the relative importance of capital flow to exchange rate regime and monetary policy independence in the monetary policy landscape, challenging earlier held belief on the equality of monetary conditions.

The underlining case should be "Scalene Impossible Trinity" which means that capital flow renders exchange rate completely unable to adjust money supply and demand both in domestic market and abroad. In this case, scalene triangle collapses into a line segment on the plane of monetary policy independence and capital flow.

Figure 1. "Impossible Trinity" (Scalene Triangle)

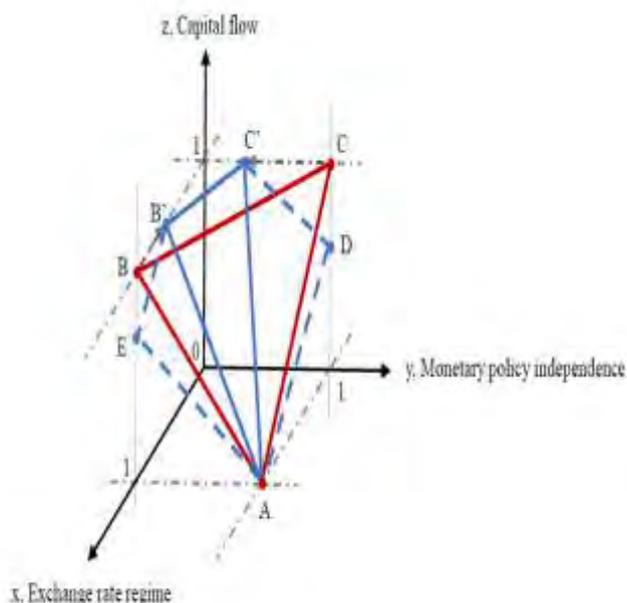


Sources: SUN Guofeng and LI Wenzhe (2017)

"Impossible Trinity" introduces Cartesian coordinate system for a three-dimensional space, consisting of an ordered triplet of lines (the axes) that go through a common point (the origin), and are pair-wise perpendicular; an orientation for each axis; and a single unit of length for all three axes as shown in Figure 1. In the three-dimensional Cartesian coordinate system of Figure 2, axes x, y, z represents exchange rate regime, monetary policy independence, and capital flow, respectively. $x=0$ connotes freely floating exchange rate regime, while $x=1$ represents fixed exchange rate regime and $y=0$ implies a completely dependent monetary policy, in which case monetary policy decisions are made fully in accordance with international coordination, $y=1$ means independent monetary policy, in which case there is no international monetary policy coordination. International monetary policy coordination in this context doesn't specifically refer to active or passive coordination, and is only an objective illustration of monetary policy dependence. The coordination mainly takes the form of interest rate policy coordination. $z=0$ means full capital control, $z=1$ means free capital flow. Choices 1, 2, 3 correspond to vertices A, B, C. ΔABC is the traditional equilateral form of "Impossible Trinity". $\Delta AB'C'$ in Figure 1 is the scalene form of "Impossible Trinity". Compared with the equilateral form ΔABC , vertex A, the combination of full capital control, fixed exchange rate, and independent monetary policy, doesn't changed. This is because capital flow is more germane than the other two, if there is full capital control; the elevated importance of capital flow becomes ineffective. Vertex B, the combination of free capital flow, fixed exchange rate, dependent monetary policy, moves to B'. If capital flows freely, even if monetary policy becomes completely dependent, i.e. interest rate follows other central banks, fixed exchange rate couldn't be guaranteed.

This is premised on the fact that central bank ability to maintain fixed exchange rate is not unlimited, depending on foreign exchange reserve balance, and issuance ability of domestic currency. As well, vertex C, the combination of free capital flow, floating exchange rate, and independent monetary policy, moves to C". This is because if capital flows freely, floating exchange rate is unable to guarantee independent monetary policy. The movement of points B and C both shows the importance elevation of capital flow in "Impossible Trinity", which results in equilateral triangle ABC transforming into scalene triangle AB'C'. Note that BB' doesn't necessarily equal to CC'. "Dilemma" is the extreme case of axis x collapse, in which case points B' and C' in Figure 2 merge into point (0, 0, 1), and point A maps into point (0, 1, 0) on plane (x=0). Among the three of capital flow, exchange rate regime, and monetary policy independence, capital flow is more important. "Scalene Impossible Trinity" refers to the triangle whose three vertices are free capital flow (B" and C") and full capital control (A). If monetary authority chooses full capital control, then fixed exchange rate and independent monetary policy could be achieved at the same time. If it chooses free capital flow, it could only achieve relatively stable exchange rate and relatively independent monetary policy. Further analysis shows that after importance of capital flow is elevated, policy choice set of the monetary authority becomes the pentagon ADC"B"E, which is the intersection of plane AB"C" and cube (0≤x≤1,0≤y≤1,0≤z≤1), as shown in Figure 2. Monetary authority will make the optimal choice within this pentagon.

Figure 2 "Impossible Trinity" (Pentagon)



Sources: SUN Guofeng and LI Wenzhe (2017)

3.1 Research Methodology

The *ex-post facto* research design was adopted for the study. The study relied on quantitative data obtained from the World Development Indicators (WDI) and Central Bank of Nigeria Statistical Bulletins. The econometric methods used in this study are time series analysis using Ordinary Least Squares (OLS) method, Augmented Dickey Fuller (ADF) unit-root test, the Auto-Regressive Distributive Lag (ARDL) to cointegration approach developed by Pesaran and Shin (1999) and later extended by Pesaran, Shin & Smith(2001). The econometric views package (E-views version 7) was used to analyse data. The model for the study was adapted from the work of Abdul and Marwan (2013) who investigated the effect of interest rate, inflation rate, and GDP on real economic growth in Jordan. The modification that was done to the model of Abdul and Marwan was the inclusion of oil revenue growth rate, exchange rate and labour force participation rate of the productive working age. Following this modifications, the equation is specified functionally as follows:

$$GDPR = f(\text{POP}, \text{INTR}, \text{EXCH}, \text{INF}, \text{OILR}) \quad [1]$$

The algebraic equation given below:

$$GDPR = \alpha_0 + \alpha_1 \text{POP}_t + \alpha_2 \text{INTR}_t + \alpha_3 \text{EXCH}_t + \alpha_4 \text{INF}_t + \alpha_5 \text{OILR}_t + U_t$$

$$\alpha_1 > 0, \quad \alpha_2 < 0, \quad \alpha_3 > 0, \quad \alpha_4 > 0, \quad \alpha_5 > 0$$

Where:

- GDPR = Gross domestic product growth rate per annum
- POP = Labour force participation rate of the productive working age
- INTR = Interest rate
- EXCH = Exchange rate
- INF = Inflation rate
- OILR = Oil revenue growth rate
- α_0 = Constant of the model
- $\alpha_1, \alpha_2, \alpha_3, \alpha_4$ and α_5 are all slopes of the estimates
- U_t = Disturbance term
- t = time (yearly trend)

Prior to estimation, the data was subjected to vigorous test to establish their adequacy as regards stationarity. The need to determine whether time series are stationary overtime underscores the importance of unit root test. For the Auto-Regressive Distributive Lag (ARDL) to cointegration framework or ARDL bound testing approach to be employed, each series involved in the estimation of the model must be integrated at I(0), I(1) or a combination of both (Pesaran & Shin, 1999; Pesaran, Shin & Smith, 2001). Basically, the ARDL or the bounds test approach involves two steps. The first step in the ARDL framework was to investigate the relationship among the included variables as follows:

$$\begin{aligned} \Delta GDPR = & \delta_0 + \beta_1 GDPR_{t-1} + \beta_2 POP_{t-1} + \beta_3 INTR_{t-1} + \beta_4 EXCH_{t-1} + \beta_5 INF_{t-1} \\ & + \beta_6 OILR_{t-1} + \sum_{i=0}^a \sigma_1 \Delta GDPR_{t-1} + \sum_{i=0}^b \varphi_1 \Delta POP_{t-1} + \sum_{i=0}^c \tau_1 \Delta INTR_{t-1} \\ & + \sum_{i=0}^d \omega_1 \Delta EXCH_{t-1} + \sum_{i=0}^e \vartheta_1 \Delta INF_{t-1} + \sum_{i=0}^f \gamma_1 \Delta OILR_{t-1} \end{aligned} \quad [2]$$

where, δ_0 is the drift component, Δ is first-difference operator while a, b, c, d, e and f are the optimal lag lengths for each incorporated series. Note that there is no reason that the lag-length terms are equivalent to each other. The second part of the equation with $\sigma_1 \varphi_1 \tau_1 \omega_1 \vartheta_1$ and γ_1 represents the short-run dynamic multipliers of the model whereas the parameters represent the long-run multipliers. Note that the terms with summation signs are used to model the short-run dynamic structure. Appropriate lag length is selected based on the Akaike Information Criterion (AIC) before the selected model is estimated using the ordinary least squares (OLS) method. For annual data, Pesaran and Shin (1999) recommended choosing a maximum of 2 lags from which the lag length that minimizes the criteria is selected. The second stage involves the estimation of the following conditional ARDL long-run model:

$$\Delta GDPR = \delta_0 + \beta_1 GDPR_{t-1} + \beta_2 POP_{t-1} + \beta_3 INTR_{t-1} + \beta_4 EXCH_{t-1} + \beta_5 INF_{t-1} + \beta_6 OILR_{t-1} \quad [3]$$

All the variables in equation [3] are as previously defined. Estimation of equations [3] involves the selection of the optimal lag orders of the ARDL (a, b, c, d, e and f). Finally, short-run dynamic parameters of the model associated with the long-run estimates can be obtained by estimating the following error correction model given as:

$$\begin{aligned} \Delta GDPR = & \delta_0 + \sum_{i=0}^a \sigma_1 \Delta GDPR_{t-1} + \sum_{i=0}^b \varphi_1 \Delta POP_{t-1} + \sum_{i=0}^c \tau_1 \Delta INTR_{t-1} \\ & + \sum_{i=0}^d \omega_1 \Delta EXCH_{t-1} + \sum_{i=0}^e \vartheta_1 \Delta INF_{t-1} + \sum_{i=0}^f \gamma_1 \Delta OILR_{t-1} \end{aligned} \quad [4]$$

Where ECT in equation [4] is the error correction term (representing the residual of the co-integrating equation) and η represents its coefficient which measures the speed of adjustment. The error correction coefficient shows how quickly the variables converge to equilibrium (i.e., speed of adjustment back to long-run equilibrium after a short-run disturbance) and should be statistically significant and negatively signed.

4.0 Results

The results from the analysis are presented below

Table 1: Result of Unit Root Test

Series	ADF statistics	Critical values		Order of Integration
		1%	5%	
GDPR	-5.874	-3.585	-2.928	I(0)
POP	-3.172	-3.611	-2.939	I(1)
INTR	-6.801	-3.589	-2.929	I(1)
EXCH	-5.384	-3.589	-2.929	I(1)
INF	-3.788	-3.585	-2.928	I(0)
OILR	-5.626	-3.593	-2.931	I(1)

Source: Regression result from (E-view version 7)

To test for the stationary of the series, the unit root test using Augmented Dickey Fuller (ADF) was conducted. Results from Table 1 showed that the GDPR and INF were stationary or integrated at level i.e I(0) while POP, INTR, EXCH and OILR were stationary or integrated in their first differencing i.e I(1). This implies that the hypothesis of non-stationarity was rejected. The stationarity of the series at level and first differencing; justified that we can confidently apply the ARDL framework to our model

Table 3: Bounds Test Results for Cointegration Relationship

Critical Bounds Value of the F-statistic						
K=5	1% level		5% level		10% level	
	I(0)	I(1)	I(0)	I(1)	I(0)	I(1)
Bound limits	3.516	4.781	2.649	3.805	2.262	3.367
Calculated F-statistics = 5.039						

Critical Bounds value from Pesaran *et al.* (2001:300), Table CI, Case II: Unrestricted intercept and no trend while **K** is the number of regressors.

The ARDL bounds test for the presence of long-run relationships in equation 3 are reported in Table 3. The lag structure was selected based on the sequential modified likelihood ratio (LR) test statistic, Final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ). The bounds F-test for cointegration test yields evidence of a long-run relationship between economic growth rate and the predictors. The computed F-statistic (F_c) = 5.039 is greater than the upper bound of the 1%, 5% and 10% critical values resulting in the rejection of the null hypothesis. This evidence rules out the possibility of estimated relationship being spurious.

Table 4: Estimated Long-run ARDL Model

Dependent Variable: D(GDPPERCAP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	117.704	100.650	1.169	0.249
GDPR(-1)	1.037*	0.139	7.421	0.000
POP(-1)	3.311	1.787	1.853	0.072
INTR(-1)	0.209	0.502	-0.418	0.679
EXCH(-1)	0.100*	0.031	3.184	0.003
INF(-1)	0.098	0.072	1.363	0.181
OILR(-1)	6.211*	2.686	2.313	0.026
Diagnostic Test Results				
R-squared	0.619	Breusch-Godfrey Serial Correlation LM Test^a		
Adjusted R-squared	0.559	F-statistic = 0.095		Prob. F(1,30) = 0.759
F-statistic	10.306	Obs*R-squared = 0.139		Prob. Chi -Square(1) = 0.709
Prob(F-statistic)	0.000	Wald F-Statistic = 5.039		
Durbin-Watson stat	2.131	Prob(Wald F-statistic) = 0.001		

Note:*Coefficient is significant at 0.05 level ($p < 0.05$)

Source: Regression result (E-view version 7)

Table 4 displays the estimated long-run relationship economic growth, oil revenue and monetary conditions. The model was iterated at same lag lengths and the optimal lag of one was determined using the Final prediction error (FPE), Akaike information criterion (AIC), Schwarz information criterion (SC) and Hannan-Quinn information criterion (HQ). The long-run estimated model revealed that GDPR, EXCH and OILR had direct and significant impact on economic growth rate. The impact of labour force participation of productive working age (POP) and inflation rate (INF) was direct but insignificant while interest rate (INTR) had indirect and insignificant impact on the dependent variable.

The r-squared (R^2) of 0.619 showed that the overall goodness of fit of the model is good. The value indicates that the model explained about 61.9 per cent variations in the dependent variable, while the residue of 38.1% variation is attributed to error or other factors which are not captured in the model that have prominent impact on the dependent variable (economic growth). The F-statistic of 10.306 was jointly significant ($p < 0.05$). Therefore, the overall parameter estimates for the model are jointly significant. The Durbin Watson (D.W) statistic of the model is 2.131. Since the value was approximately

equal to 2. This explains that there is no presence of serial auto-correlation between or among the independent variables following the rule of thumb ($1.8 \geq DW \leq 2.2$).

The diagnostic test result indicated that the residual generated from the long-run estimates used as error correction term (ECT) in the short-run model estimates presented in Table 4 is normally distributed and not serially correlated. The Breusch-Godfrey Serial Correlation LM Test was used to verify the hypothesis that no serial correlation exist between the short run and long run period. The test validated the null hypothesis of no serial correlation; hence, its rejection requires low probability, that is, the probability value exceeds 0.05 ($p > 0.05$). This indicates that the estimated long-run model is structurally stable and provides reliable estimates for policy simulation.

Table 5: Estimated Short-Run ARDL Model

Dependent Variable: D (GDPPERCAP)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-0.098	1.136	-0.086	0.932
D(GDPR(-1))	0.101*	0.032	3.136	0.001
D(POP(-1))	3.694	7.912	0.467	0.643
D(INTR(-1))	-0.191	0.615	-0.309	0.758
D(EXCH(-1))	0.071	0.091	0.785	0.438
D(INF(-1))	0.100	0.074	1.354	0.184
D(OILR(-1))	-2.384	4.289	-0.556	0.582
ECT(-1)	-0.532	0.161	-3.299	0.001
R-squared	0.616	Mean dependent var		-0.263
Adjusted R-squared	0.542	S.D. dependent var		9.636
F-statistic	8.256	Durbin-Watson stat		2.181
Prob(F-statistic)	0.000			

Note:*Coefficient is significant at 0.05 level ($p < 0.05$)

Source: Regression result (E-view version 7)

Result of the short run estimates is shown in Table 5. The error correction term (ECT) that explains the speed of adjustment from any distortion in the short-run to its long run equilibrium stood at -0.532. The term or coefficient is correctly signed and statistically significant at 0.05 level of significance ($p < 0.05$). This shows that if there is disequilibrium, the system will restore itself to equilibrium with a speed of adjustment of approximately 53.2%. This implies that 53.2% of any disequilibrium is restored in the first year. The short-run estimated model revealed that only one-lagged value of GDPR had direct and significant impacts on the dependent variable while the impact of the other variables (POP, INTR, EXCH, INF and OILR) were insignificant impact on economic growth in the short-run.

The long-run estimate revealed that GDPR, EXCH and OILR had direct and significant impact on economic growth rate while the impact of labour force participation of productive working age (POP) and inflation rate (INFR) was direct but insignificant. This implies that increase in one year lagged value of GDP growth rate, exchange rate and oil revenue growth rate promotes GDP growth rate in the current year. The direct and insignificant impact of labour force participation of productive working age (POP) on GDP growth rate is worrisome because it is expected that labour as a major factor of production should be the major drivers of economic activities in

the real sector of the economy. However, the result showed that the impact was direct but insignificant. This may be due to the wide spread of youth unemployment resulting in a large chunk of economic waste among the productive working age population. Consequently, policy makers and implementers need to realize that to promote economic growth and attain the vision 2020:20 objective of making Nigeria becoming one of the top 20 nation economies with a minimum GDP per capita of about US\$4000, efforts towards creating jobs for the youth and increasing oil revenue growth is highly expedient.

5.0 Conclusion

It is concluded that a long-run relationship exist among oil revenue growth rate, exchange rate, interest rate, inflation rate and GDP growth rate. Furthermore, the results showed that there is a direct significant relationship between economic growth rate and all other rate based variables - interest rate, exchange rate, inflation rate and oil revenue growth rate, while labour force participation of productive working age (POP) had a direct and insignificant impact on GDP. However, in the event of a shock or perturbation, the system would restore itself to equilibrium at an adjustment speed of approximately 53.2 per cent.

5.1 Recommendations

Based on findings, the following recommendations were made for policy implementation:

1. Revenue generated from the oil sector should be divested into the real sectors of the economy such as agriculture and textiles that are known for large scale employment of labour. This would help to increase the production of previously imported goods, promote consumption of "made in Nigerian good" and help to maintain a stable exchange rate in the country.
2. The Federal Government should intensify efforts towards increasing labour participation of the working population by creating an enabling business ethos that promote startups in the real sectors of the economy. Furthermore, strategic measures must be adopted to reap the dividends of the youthful bulge that currently puts the country in a knife edge situation.
3. In pursuance of sustainable growth rate, the convergence of the monetary and fiscal policies is germane. This remains a precursor to guaranteeing shared prosperity and eliminating the sprout of poverty that ravages the country.
4. Policy Choice on macro prices should be subjected and amenable to empirical verifications before implementation. Empirical investigation/ simulations on permissible optimal threshold of macro prices with special emphasis on the peculiarity of the Nigerian economy needs to be undertaken. Nonetheless, to promote productivity in the real sector, the cost of borrowing should be reduced to encourage investment demand.

References

- Abdul, R. A., and Marwan, A. J. (2013). *Fundamentals of corporate finance*. [Third Edition], New York, Irwin/McGraw Hill .CBN Statistical Bulletin, 2006. 17 Dec., Retrieved from : http://www.cenbank.org/out/publications/_statbulletin/rd/2008/stabull-2006.PDF.
- Acha I.A. and Acha, C.K. (2010). Interest rate policy in Nigeria and its attendant distortion. ArnwldoManri(ed) *Saving and Development Quarterly Review*. 12(1), 19–30.
- Acha I.A. and Acha C.K. (2011). Interest rates in Nigeria: An analytical perspective. *Research Journal of Finance and Accounting*, 2(3): 71-81.
- Adebiyi, M.A. (2002). The role of real interest rates and savings in Nigeria. *First Bank of Nigeria Plc, Quarterly review*, March, 2002.
- Adedokun, J. (2012). *Is Africa Democratising?* Lagos: Maithouse Press Limited.
- Akinlo, A. E (2012). How important is oil in Nigeria's economic growth? *Journal of Sustainable Development*, 5(4).12-24.
- Aminu, U. and A.Z. Anono (2012). An empirical Analysis of the relationship between unemployment and inflation in Nigeria from 1977-2009. *Business Journal, Economics and Review*, 1(12), 42-61.
- Anthony, I.I., Uzomba, P.C and Olatunji L.M (2009). An analysis of interest and exchange rates effect on the Nigerian Economy 1975–2008. *Asian Economic and Financial Review*. 2(6), 648-657.
- Anyingana, D. (2010). *Securitization and the bank lending channel*, Working Paper, European Central Bank, Frankfurt.
- Aregbeyen, O. and Kolawole, B.O. (2015). Oil revenue, public spending and economic growth relationships in Nigeria. *Journal of Sustainable Development*, 3(8), 113-123.
- Budina, H. and Wijnbergen, C. D. (2008). *Managing oil revenue volatility in Nigeria: The role of fiscal policy*. 425-459.
- CIA (2008): CIA World Factbook: Nigeria. www.cia.gov/library/publications/the-world-factbook/print/ni.html. Last accessed 5 November 2008.
- CIA (2018) CIA World Fact Book Nigeria [Economy - overview](http://www.cia.gov/library/publications/resources/the-world-factbook/geos/ni.html): Available at <https://www.cia.gov/library/publications/resources/the-world-factbook/geos/ni.html> retrieved on the 24th June, 2018

- Coechy, R. Y. (2011). Towards enhanced human capital development in developing countries for the 21st century. *International Journal of Current Research*, 2(3), 114-217.
- Eichengreen, Barry, and Poonam Gupta (2016). Managing sudden stops. Policy Research Working Paper, No. 7639. Washington, D. C.: World Bank.
- Erinosa, S. R. (2010). The mechanics of economic development. *Journal of Monetary Economics*, 83(3), 66-90.
- Hirschman, A.O. (1958). *The strategy of economic development*. New Haven: Yale University Press.
- Igbatayo, S. and Agbada, A.O. (2012). Inflation, Savings and Output in Nigeria: A Var Approach. *Journal of Emerging Trends in Economics and Management Sciences (JETEMS)* 3(5), 447-453.
- Jhingan, M. L. (2003). *Macroeconomic Theory*. Dehi: Vrinda Publication (P) Ltd.
- Jhingan M. L. (2004): *Money, Banking, International Trade and Public Finance*, New Delhi: Vrinda Publications Ltd.
- Mallik G., and Chowdhury A. (2001), Inflation and Economic Growth: Evidence from Four South Asian Countries, *Asia-Pacific Development Journal*, 8(1), 123-135.
- Marbuah, G. (2010). The inflation-growth nexus: testing for optimal inflation for Ghana, *Journal of Monetary and Economic Integration*, 11(2), 71-72.
- The Nigerian Economic Summit Group (2018). State of the Economy H-1 2018 publication of Nigerian Economic Summit www.nesgroup.org
- Nweze P. N. and Edame C. E. (2016). An Empirical Investigation of Oil Revenue and Economic
- Obamuyi, T.M. (2011). The Control of Monetary and Banking System. *Journal of Economic and International Finance*. 1 (2), 011-065.
- Ogbonna, G. N. and Ebimobowei, A. (2012). Impact of Tax Reforms and Economic Growth of Nigeria: A Time Series Analysis. *Current Research Journal of Social Sciences*, 4(1): 62-68.
- Oladipo, S. O., and Fabayo, J. O. (2012). Global Recession, Oil Sector and Economic Growth in Nigeria. *Asian Transactions on Basic and Applied Sciences*, 1(6), 29-41.
- Olufayo, M. B. and Fagite B. A. (2014). Exchange rate volatility and sectoral export of Nigeria: case of oil and non-oil sectors. *Journal of Economics and Sustainable Development*. 5(10), 66- 75.
- Omeke, P.C. and Ugwunyi, C.U. (2010) Money, price and output: A causality test for Nigeria. *American Journal of Scientific Research*, 8, 78-87.
- Onyemaechi, J. O (2012) Economic implications of petroleum policies in Nigeria: An Overview. *American International Journal of Contemporary*, 2, 60-71.
- Orubu, C. O. (2009). *Inflation in Nigeria: Concept, Measurement and Control*. CBN Bullion), 19-30.
- Pesaran, H. M., and Shin, Y. (1999). Autoregressive distributed lag modelling approach to cointegration analysis. In: S. Storm (ed.), *Econometrics and Economic Theory in the 20th Century: The Ragnar Frisch Centennial Symposium*. Cambridge: Cambridge University Press.
- Pesaran, M. H. Shin, Y. and Smith, R.J. (2001). Bounds Testing Approaches to the Analysis of Level Relationships. *Journal of Applied Economics*. 16, 289-326.
- Rey, H elene (2015). Dilemma not trilemma: The global financial cycle and the monetary policy independence. NBER Working Paper, No. 21162. Massachusetts: National Bureau for Economic Research. May.
- ML Ross (2003): Nigeria's Oil Sector and the Poor. Paper prepared for the UK Department of International Development "Nigeria: Drivers of Change" program. May.
- Samuelson, P. A. (1976). *Economics* (10th ed.). Japan, McGraw-Hill.
- Soludo, C. C. (2008). *Achieving interest rate and exchange rate stability in Nigeria options and relevance*. Research Department, CBN, Abuja.
- SUN Guofeng and LI Wenzhe (2017), Monetary Policy, Exchange Rate and Capital Flow— From "Equilateral Triangle" to "Scalene Triangle" The People's Bank of China Working Paper Series No.2017/3 March 30, 2017

Trading Economics (2018). Nigerian naira 1960-2018 retrieved on the 7th july ,2018 at <https://tradingeconomics.com/nigeria/currency>

Uchendu, O. A. (1993). Interest rate policy, savings and investment in Nigeria. *CBN Economic and Financial Review*, 31(1), 34-35.

Williams, O. and Adedeji, O. S. (2004). Inflation dynamics in the Dominican Republic. IMF working paper, WP/04/29, Western Hemisphere Department: Washington DC. February.

Worldwide interest rates. (2018.). Retrieved April 19, 2018, from <http://www.cbrates.com/>