An Empirical Evidence of the Link Between Natural Resource Dependence and Economic Growth in Nigeria

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ABSTRACT

The study investigates the link between natural resource dependence and economic growth in Nigeria, employing the Autoregressive Distributed Lag framework on data from 1981 to 2017. The ARDL result indicated that the coefficients of natural resource dependence was positive but was not statistically significant at the 5% level of significant in the short run but was statistically significant in the long run. This finding negates the Structuralist consensus that natural resource dependent impact negatively on economic growth. Oil price was found positive and statistically significant. This means that oil price is an important growth determinant in Nigeria. Exchange rate and foreign direct investment were both positive and statistically significant while physical capital and domestic investment though positive but was not statistically significant. The study recommends deliberate effort at diversifying the economy from dependence on single natural resource to stall transmission of oil price shocks into the domestic economy; maintain stable exchange rate; and provide enabling business environment towards attraction of more inflows of FDI into Nigeria.

Keywords: Natural Resource Dependence, Oil Price, Economic Growth, Autoregressive Distributed Lag

1.0 INTRODUCTION

In Nigeria, the debate has been centred on the relationship between natural resource dependence, particularly crude oil and its impact on economic growth. Nigeria been one of the resource rich countries, it has recently experienced stunted growth despite the abundance of crude oil. It is unlikely difficult to think that being rich with abundance of raw materials can be hurting to an economy rather than a blessing. However, Ayadi (2005) argues that the major challenges facing most economies globally which are solely dependent on crude oil, is the problem of fluctuation in oil prices and lack of export diversification.

Nigeria economy is basically an open economy with international transactions constituting an important proportion of her aggregate economic activities. Over the years, the degree of openness of the economy has grown considerably. Before Nigeria gains her political independence in 1960, agriculture was the dominant sector in the economy, which provides both cash crops and food crops to the economy and accounted for the largest part of the foreign exchange of the country. But, the discovery of crude oil production in commercial quantities changed the structure of the Nigerian economy. This led to the neglect of agricultural product, making the economy to depend heavily on production of crude oil. In 2000, oil and gas export accounted for more than 98% of export and about 83% of federal Government Revenue. Nigeria's proven oil reserves are estimated to 35billion barrels, Natural gas reserves are 1000 trillion fti (2,800kmi) and its crude oil production was around 2.2million barrels (350,000mi) per day (Odularu, 2008).

In Nigeria, the goal of achieving inclusive growth and development has become a very daunting task. A country that is richly endowed in natural and human resources was ranked among countries that are development failures and with poor development outcomes. The incidence of unemployment in Nigeria has been deep and widespread, cutting across all facets of age groups, educational strata and geographical entities. A large number of well-trained and skilled people are not participating in the growth process. The unemployment rate increased significantly from 13.1 percent in 2001 to 19.7 percent in 2009 and consistently to 26.8 percent in 2015 (Central Bank of Nigeria Statistical Bulletin, 2017). These are very intolerable figures.

As Nigeria's growth is driven by primary commodities with low employment intensity, the country continues to suffer from high unemployment, especially youth unemployment estimated at over 60 percent. It is generally agreed that the slowdown in 2015 and descent of the Nigerian economy into recession in 2016 were both caused by two inter-related factors. These are the fall in world oil prices and reduction of Nigeria's oil production. The first of these represents an external shock, while the second is an internal one. The effect of the oil price slide between 2014 and 2015 was

worsened by the resurgence of militant's attacks on oil pipelines and related facilities in the Niger Delta (Oyejide, 2017). As a result, Nigeria's oil production which averaged 2.14 million barrels per day (mbpd) in 2015 fell to an average of 1.83 mbpd in 2016 and this lead to a drastic fall in the value of oil exportation from N14,222 billion in 2014 to N9,909 billion in 2015. The effects of the fall in world oil prices and reduction in Nigeria's oil exportation transmitted to the fall in GDP growth rate. The GDP growth rate fell from 6.31% in 2014 to 2.65% in 2015. The decline in crude oil production and fall in prices at the global markets leads to the recent economic crisis experienced in Nigeria in 2016 characterized by: drastic fall in government revenue, negative GDP growth rate in three consecutive quarters, high inflation rate and fall in the value of exchange rate. In the same, Nigeria's external debt rose from $28.94 billion dollars in 2015 to $31.5 billion dollars in 2016 and $40.24 billion dollars in 2017 (World Development Indicators, 2018).

Expectedly, natural resources endowed countries are supposed to increase wealth and purchasing power, raise an economy's investment and growth rates as well. Many oil-rich countries have aimed to use their vast oil revenues to finance diversified investments and a "big push" in industrial development. But the observation that countries with abundant natural resources seem to grow more slowly than those with scarce resources has been put forward by a number of researchers, including Gelb (1988), Auty (2001), Ranis (1991), and Lal and Myint (1996).The negative association between resource abundance and growth in recent decades certainly poses a conceptual puzzle. Sachs and Warner (1995, 1997) apparently gave a clear econometric expression of the relationship.

There is a general consensus among Structuralists that natural resource dependence is characteristic of developing countries where most of their export earnings come from the production of raw materials, most especially crude oil. Its impact is highlighted by Rodrick (2006) who believes it can impact on economic growth negatively. This is because it hinders diversification, particularly towards the manufacturing sector, thus making it vulnerable to savings and fluctuations in the world oil price. Structuralists have established a correlation between GDP growth and Natural resource price fluctuations. It is for this reason Blattman, Hwang and Williamson (2007) stated that fluctuations in price cause countries who are engaged in the production of raw materials to experience a decline in economic growth. In turn, this instability in price results in a subsequent fall in government revenue which affects budget financing and infrastructural development. Eichengreen (1996) further echoes that fluctuations in oil prices cause trade imbalances among countries dependent on raw materials leading to a decline in economic growth. Fluctuating oil prices can create export instability for countries that are dependent on raw materials, which leads to lower economic growth in the long term.

Continued work has focused on trying to explain why this apparently negative relationship between growth and natural resource endowment should exist. Therefore, this study shall empirically verify this observation on Nigeria to further extend the literature. It is against this background that this study seeks to investigate the link between natural resource dependence and economic growth in Nigeria employing the newly developed autoregressive distributed lag (ARDL) approach to cointegration.

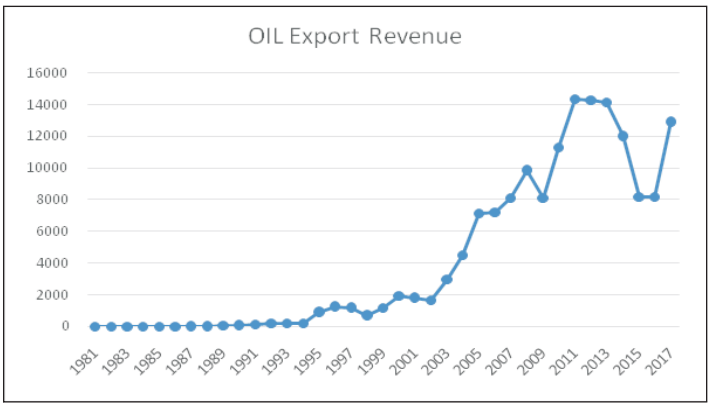
The objective of this study is to empirically examine the link between natural resource dependence and Nigeria economic growth. The paper is subdivided into five (5) sections. Following the introduction, literature review is considered in section 2, while methodology is in section 3. Results and Discussion is in section 4 and conclusion is in section 5.

2.1 Stylized Fact on Oil Export Revenue and Economic Growth in Nigeria

The extractive sector in the Nigerian economy is large and extensive, with oil playing a dominant role. With nearly 37.2 billion barrels in reserves and 2.13% of global production, Nigeria has the world's tenth largest proven reserves (3.1% of global reserves), and is among the top 10 oil producers. Since the discovery and production of oil Nigeria in 1958, the subsector has continued to play a major and dominant role in the Nigerian economy (Anthony, 2012).

In 1981, total trade was valued at ₦23.9 billion with oil trade accounting for 45% of total trade with a value of ₦10.8 billion and non-oil trade accounting for 55% with a value of ₦13.1 billion. Between 1982 and 1984, total trade dipped. It increased temporarily in 1985, exhibiting a tremendous increase from ₦14.9 billion in 1986 to ₦48.2 billion in 1987 and peaked at ₦26.2 trillion in 2011 with minor fluctuations as from 2008/2009. For the period 1981 to 2015, total trade (oil and non-oil trade) averaged ₦6.31 trillion billion, non-oil trade averaged ₦2.03 trillion and oil trade averaged ₦4.28 trillion accounting for about 67% of total trade. In general, the share of oil trade in total trade has increased significantly from 45% in 1981 to 56% in 1984, peaked in 2005 at 79% with a continuous but slight decline to 61% in 2015. The negative trend is attributable to series of unfavourable domestic and global economic conditions (CBN Statistical Bulletin, 2017).

Fig. 1: Nigeria's Oil Export Revenue

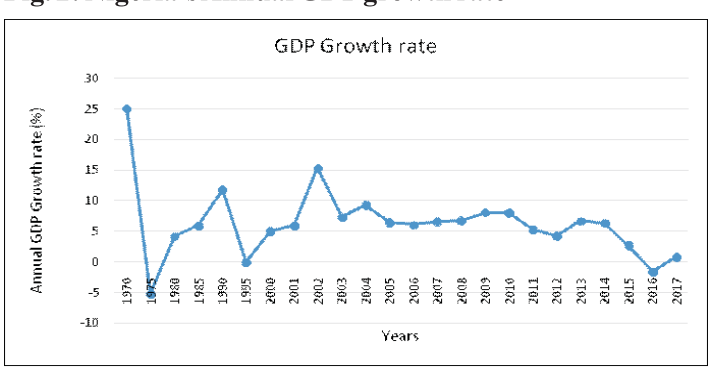


Source: Graphed by authors using data from Central Bank of Nigeria (CBN) Statistical Bulletin 2017

An additional assessment of Nigeria's foreign trade reveals that oil exports largely accounts for the expansion and magnitude of fluctuations of total trade. Oil exports were valued at ₦10.7 billion in 1981 with a significant increase to about ₦12 trillion in 2015. It peaked at ₦14.3 trillion in 2012.Oil exports accounted for 46% of total trade in 1981, 71% of total trade in 1990 and 72% of total trade in 2015. Indeed, non-oil sector has dominated imports while the oil sector has dominated exports (CBN Statistical Bulletin, 2017).

Nigeria's real GDP growth performance was quite robust over the 2010 – 2014 periods when the GDP growth rate varied between 4.21% and 7.80%, with an average of 5.81%. This growth rate fell to 2.79% in 2015; a decline of 52% from 2010 – 2014 average growth rates. A more comprehensive picture of the economic slowdown and the economy's descent into recession between 2014 and 2016 is presented in figure 2. This shows that while GDP growth rate declined sharply between 2014 and 2015, it remained positive until 2016 and 2017 (CBN Statistical Bulletin, 2017)

Fig. 2: Nigeria's Annual GDP growth rate



Source: Graphed by authors using data from World Development Indicators, 2018

2.2 Stylized Fact on World Oil Prices and Nigeria's Exchange rate

The frequent fluctuations in the world price of oil has been noted as one of the major challenges confronting global economy in general and Nigeria economy in particular (Ayadi, 2005). The effect of oil price volatility to the global economy is consequent upon its pivotal role to industrial production as a fundamental input resource. Nigerian economy like several other economies is vulnerable to oil price volatility. The vulnerability of the Nigerian economy to oil price shock has been explained by two key structural composition of the economy. First, the economy depends largely on crude oil proceeds which constitute about 90 percent of export earnings, 65 percent of public generated revenue and about 20 percent of the gross domestic product (Aliyu, 2010). Secondly, Nigeria's economy is excessively open, making the economy vulnerable to internationally transmitted shocks (Iyoha, 2003).

Since the discovery of oil in commercial quantities in the 70s, Nigeria government has experienced seven major oil price shocks. They are shocks for 1970 – 1974; 1978 – 1980;1985 -1986; 2003 – 2006; 2008 – 2009; 2010 – 2013; and 2014 - 2015. Most of these oil price shocks were positive in the sense that the price of oil per barrel increased and enhanced foreign exchange earnings. The oil price shock of 1970 – 1974; 1978 – 1980; 2003 – 2006;and 2010 - 2013 saw higher prices oil per barrel, but that of 1985 -1986, 2008 – 2009 and 2014 - 2016 saw the prices per barrel of oil plummeting.

Table 1: Average Crude Oil Price Shock Periods

Period	Shocks
1970 – 1974	**$1.21 - $11**
1978 – 1980	**$12.79 - $35.52**
1985 – 1986	**$27.01 - $13.53**
2003 – 2006	**$28.1 – $61**
2008 -2009	**$94.1 - $60.86**
2010 -2013	**$77.38 - $105.87**
2014 – 2016	**$96.29 - $40.69**

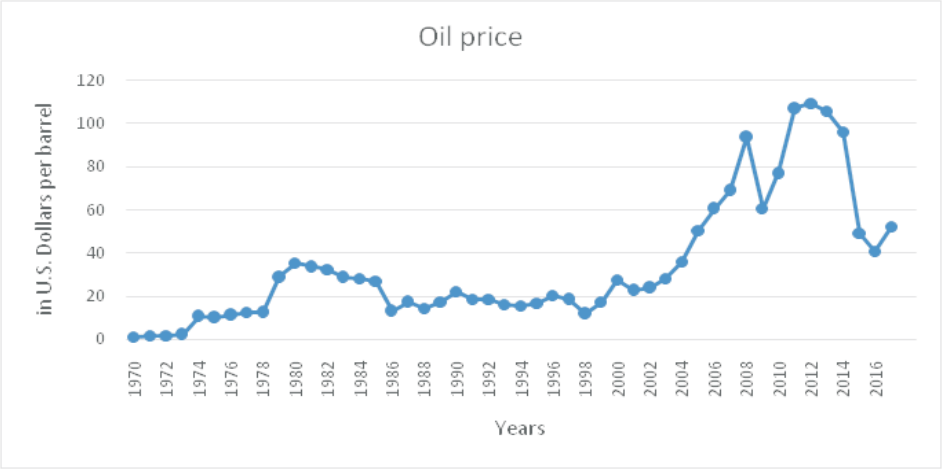
Source: Authors but underlying data from OPEC Annual Statistical Bulletin, 2018

The Nigerian economy is constantly exposed to oil price shocks since oil contributes over90% of the total revenue. The dependency of the country on crude oil revenue is amplified by the usual budgetary estimate based on forecast from the expected crude

oil prices. Shortfall on oil revenue occasioned by fluctuations in international oil prices had often led to deficit in the country's budget. Such deficits are usually financed by either external or internal borrowings or through downward adjustments in sectoral budgetary allocation. However, one may look at it, shortfalls from oil receipts have negative impact on the country's economic growth.

The significant effect of oil price shocks is explained by the "Dutch Disease" syndrome, a relationship that explains the decline in manufacturing sector despite increase in the exploitation of natural resources (Auty, 2001). Oil price shocks have become a very important impediment to the development of growing economies. The dependence on natural resources (oil) revenues makes the national economy vulnerable to market prices. The oil dependence and the volatility of oil prices in international markets lead to significant problems in fiscal planning, reduction in quality of public spending, and lead to financial disaster when oil prices collapse. When oil prices fall, however, fiscal budgets go into deficit, countries start taking loans leveraged against their reserves, and march unimpeded into debt (Otaha, 2012). Revenue generated when prices are high tends to cause "Dutch-Diseases", high oil revenue raises exchange rates, promotes an adverse balance of payments when prices fall, reduce the incentive to risk investment in non-oil sectors like agriculture and manufacturing.

Fig. 3: Average Annual Crude Oil Price (in U.S. dollars per barrel)



Source: Authors but underlying data from OPEC Annual Statistical Bulletin, 2018

Maintaining relative exchange rate stability is important for both internal and external balance and consequently growth in the economy. Exchange rate is the most important price variable in an economy and performs the twin role of maintaining international competitiveness and serving as nominal anchor to domestic price (Mordi 2006).

Swings or fluctuations in the exchange rates over a period of time or deviations from an equilibrium exchange rate is referred to exchange rate volatility. Where there is multiplicity of markets parallel with the official market there could be deviations from the equilibrium exchange rate (Obadan, 2006). Volatility over any time period interval tends to increase when supply, demand or both are likely to respond to large random shocks and when the elasticity of both supply and demand is low, price volatility tends to be low (Obadan 2006).

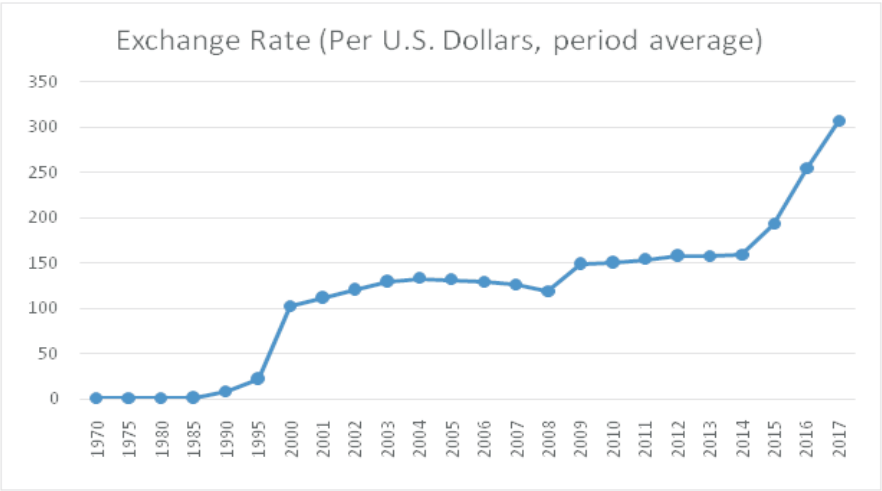
The exchange rate is subjected to variations when it is not fixed, thus floating exchange rate tends to be more volatile. Economic essentials affect the level of volatility and the extent to which exchange rate stability is maintained. Favourable economic circumstances and outcome which in turn would appreciate the currency and maintain stability is caused by strong fundamentals (Mordi 2006).

Sequel to the introduction of floating exchange rate system in mid-1986, Nigerian naira depreciated against the major intervention currency, the United States dollar. The average exchange rate over the period 1970-1985 was ₦0.67/US$. The rate depreciated to an average of ₦9.91, ₦17.30 and ₦22.05 to a dollar in 1991, 1992 and 1993, respectively. The exchange rate further depreciated to an average of ₦134.04/US$ in 2003 before marginal appreciation of the Naira from mid-2004 to late 2008, following series of monetary policy measures introduced by the monetary authorities, amidst weakness in US Dollar and positive effects of sustained high oil prices, reaching a record high of $147.27per barrel in July 2008. Other possible reasons for mild appreciation during the period may include the 2004 banking sector consolidation, strengthening of the Dutch Auction Market and narrower premium gap between the DAS, bureau de change and inter-bank rates.

In recent times, Naira exchange rate viz-a-viz the US Dollar has experienced wide fluctuations, especially from the 2009 with seemingly undeniable effects on the nation's domestic macroeconomic balance. Several studies, including Yinusa and Akinlo (2008) and Mordi (2006), have shown that the naira exchange rate was highly volatile during the period under study.

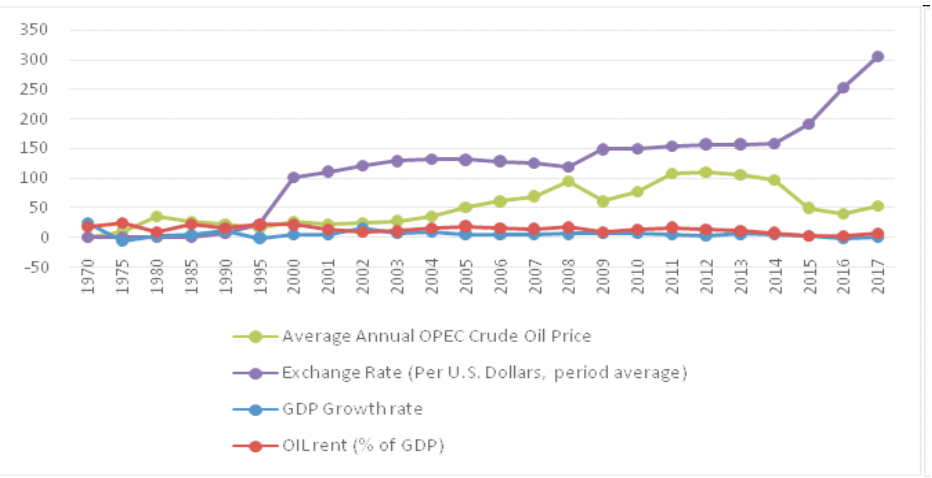
The consequences of substantial fluctuation of exchange rate can lead to shortage in output and extensive economic hardship. There is reasonably strong evidence that the alignment of exchange rate has a substantial influence on the rate of growth of per capita output in low income countries (Isard 2007).

Fig. 4: Nigeria's Exchange Rate (Per U.S. Dollars, period average)



Source: Authors but underlying data from the CBN Statistical Bulletin 2017

Fig.5: The interrelationship between GDP growth rate, Oil rent (% of GDP), Exchange rate and Average Crude oil price



Source: Authors but underlying data from the CBN Statistical Bulletin 2017 and World Development Indicator 2018.

2.3 Empirical Literature

The relationship between natural resource dependence and economic growth has received a plethora of theoretical and empirical research over the past decades. This study shall review past studies both in developed countries and developing countries.
Sachs and Warner (1995, 1997) study the effect of natural resource abundance on economic growth by using a cross country data sample from 1971 to 1989. According to their analysis, economies with significant natural resource export tended to have lower growth rate, even after controlling for the important variables that triggers economic growth such as trade policy, initial per capita income, investment rate, government efficiency and other variables. The negative relationship still holds. Therefore, they provide an easy theoretical model of endogenous growth to help and observe the relationship.

Lederman and Maloney (2003) study empirical trade structure and economic growth relationship. The study focused on export concentration, natural resource endowment and intra industry trade. Therefore, they tested for the robustness of the relationship among proxies, estimation methods and by using controlled variables. Hence, they constructed a cross sectional and a panel extending from 1975-1999. The study implies that natural resource abundance positively affect growth meanwhile export concentration impedes growth, despite physical and accumulation of human capital is being controlled.

Jiménez-Rodríguez and Sánchez (2005) provide evidence on the impact of oil prices on economic activities of the core countries. They used a linear and a non-linear model to carry out a multivariate VAR analysis. Three approaches were employed including asymmetric, scaled and net specification. In the first section: they tested for the significance of the oil prices variables. In second section: he compared the various specifications then examines the effect of oil price shock on GDP. Thereby presenting an impulse and accumulative response function. A non-linear effect of oil prices was found on real GDP. To be specific, GDP growth is found to be significantly affected by an increase in oil prices than a decline in oil price. Meanwhile oil price increase seems to have a negative impact on the oil importing countries economic activities except for Japan. Nevertheless, the impact of oil prices on the GDP growth varies among two oil exporting countries i.e. Norway benefited from the shock while UK was negatively affected.

Shahzad, Imran, and Shahnawaz (2009) their study empirically explores the contribution of natural resources to economic growth for Pakistan for the period of 1975-2006 using Ordinary Least Square technique. Their results showed that there is adverse nexus between exports related natural resources as ratio of GDP and

economic growth. Their findings also indicate that inadequate attention has been paid to human resource development in Pakistan throughout our sample period.

Olomola (2007) studied the impact of oil rent on the economy of the oil exporting African nations. He tested his claim by using panel data for 47 oil exporting countries from 1970-2000. He also included 13 non-oil exporting countries. The finding shows that there was an evidence of resource curse in the oil exporting countries. In addition, oil exporting African countries are significantly affected including their exchange rates. Dutch disease syndrome could not illustrate the resource curse in these regions which includes Africa. Conclusively oil rents failed to promote growth.

Mehrara, Maki, and Tavakolian (2010) applied the threshold error correction framework to investigate the nonlinear connection between crude oil revenues and real output growth of the Iranian economy (between 1959 and 2007). The study showed that the response of economic growth to crude oil revenue growth in low regimes of oil revenues is greater than in high regimes of oil revenues. Azaiki and Shagari (2007) used a sample of 95 developing countries such as Indonesia, Venezuela, Malaysia, Ivory Coast and Nigeria, and reported that countries with high ratio of natural resource exports to GDP appears to have shown slower economic growth than countries with low ratio of natural resource export to GDP.

Ogbonna (2011) examined the nexus among oil revenue shock, non-oil export and industrial output in Nigeria for the period 1970 to 2010. The study employed a VAR framework and co-integration technique to examine the long run relationship, while the Vector Error Correction Model (VECM) was used to analyse the short-run behaviour of the variables. The Johansen co-integration estimate showed that a long run behaviour exists among oil revenue shock, non-oil export, policy/regime shift and industrial output in Nigeria. The VECM estimate showed that the speed at which industrial output converges towards long-run equilibrium after experiencing shock from crude oil revenue was very slow. The long run estimate showed that crude oil revenue shock and policy/regime shift had negative impact on industrial output and non-oil export. The impulse response function and variance decomposition analysis suggested that the major drivers of industrial development in Nigeria are non-oil export, regime shift and crude oil revenue. The study recommended the diversification of the economy from crude oil export and ensuring a stable government that will endure long enough to sustain industrial and other economic policies.

Ewubare and Kakain(2017) examined the impact of natural resource abundance on economic growth in Nigeria. Using econometrics method of OLS, their result shows that, the coefficient of petroleum (PR) is positively signed but statistically not

significant at 5% level of significance. The coefficient of Natural Gas (NG) is positively signed but statistically not significant at 5%. The coefficient of coal (CL) is positively signed and statistically significant at 5% level. The coefficient of limestone (LS) is positively signed but statistically not significant at 5% level. Based on their results, they recommended that Nigerian government must as a matter of urgency, look beyond crude oil and natural gas but look inward in harnessing the huge natural resources in the country to engender growth and development of the economy. Also, there should be a stabilization in spending of natural resource proceed to ensure stable and moderate economic growth.

Chidi, Olusegun, Adeogun and IIori (2017) in their study overview of the performance of oil and gas sector in Nigeria (1981-2014), using Ordinary Least Square technique, the results show that investment and oil export has a positive relationship with output level of gross domestic product (GDP). The study recommends that appropriate policies to address the issue of oil dependence in Nigeria should focus on diversification and industrialization to promote economic growth. Also, government should increase its expenditure on rural roads and electricity as this will accelerate the productive sectors as well as raise the standard of living of poor citizens.

Abbas (2018) study the effect of abundance of natural resources on economic growth. The study was investigated on 22 advanced countries and 61 underdeveloped and developing countries within the time period between 1996 and 2010. For both countries, the researcher first used group effects' meaningfulness test to recognize the nature of data (pooled or panel) and Brush-Pagan and Haussmann tests to recognize the difference between fixed and random effects, and then the research model was estimated using fixed effects method. The study found that natural resources abundance, institutions, and interactions between institutions, and natural resources did not have a meaningful effect on average yearly growth rate of GDP.

Most of the literature reviewed focuses on cross sectional studies like: Sachs and Warner (1995, 1997); Lederman and Maloney (2003); Olomola (2007); Azaiki and Shagari (2007); Abbas (2018). While few studies are country specific like: Ogbonna (2011); Chidi, et al. (2017) Ewubare and Kakain (2017); Mehrara et al. (2010). These country specific studies use Ordinary Lease Square techniques and Vector Error Correction Mechanism techniques but our study employs newly developed Autoregressive Distributed Lag (ARDL) approach to Cointegration. A study on Nigeria is good and relevant given Nigeria as a key player in the ECOWAS sub-region.

2.4 Theoretical Perspectives on Resource Abundance and Growth

This section provides a succinct summary of the theoretical literature on the nature of the relationship between resource abundance and development. The purpose is to first

present a theoretical account of the malign and benign perspectives on the issue of resource abundance and economic progress. Then, the various channels through which oil may impact growth and development follow each perspective. However, the literature here should not be seen as a complete survey.

2.4.1 The Benign Perspective: Natural Resource Abundance Beneficial to Growth

The conventional wisdom before the late 80s was that natural resources had positive effect on development (Rosser, 2006). This view was shared by many development theorists and neoliberal economists until the resurgence of new view in the 80s that claimed that natural resource abundant was not a blessing to the developing countries. The basic argument of the benign perspective is that natural resource endowments would assist the developing countries to transit from the stage of underdevelopment to that of industrial 'take-off', as obtained in such countries as Britain, the United States and Australia.

Essentially, the various channels through which abundance of natural resources like oil sector could contribute to the economies of the oil producers have been identified in the literature. One, the huge revenues from oil enables the governments of the oil producing countries to spend and invest massively without recourse to taxation. Revenues from oil, if properly utilized, could serve as a "big push" for development. This channel is especially important for developing countries where paucity of capital often constitutes a major hindrance to growth and development. Moreover, the huge foreign exchange earnings from oil exports, apart from being used for importing raw material, intermediate and capital goods for production in the non oil sectors could equally assist in boosting the foreign reserves of the oil exporting countries. The accumulation of foreign reserves can be seen as collateral which the oil producing economies can use in attracting foreign investment (Dooley et al., 2003). Moreover, such holding can be seen as a costly self-insurance strategy to smoothen vulnerability impacts of domestic and foreign shocks and to intervene in the foreign exchange market.

Oil sector can also contribute to development in the oil rich economies through provision of intermediate inputs to the rest of the economy. These intermediate inputs include crude oil, gas and liquid feed stocks, as well as oil and gas into the refining, petrochemical and electricity and energy intensive industries respectively (Al-Moneef, 2006). This channel is critical to growth and development in the developing countries. For instance, many outputs of the petrochemical industries are crucial to the development of the manufacturing industries. Likewise, provision of electricity and other basic utilities at favourable prices is of considerable importance in the process of growing and nurturing the service and manufacturing sub sectors.

Growth and development in the oil rich economies could be enhanced through the market contribution from oil. The market contribution relates to the demand by oil sector for various inputs of goods and services provided by local sources. Generally, as a result of oil production, refining and distribution, there is tendency for oil sector-related services to spring up. These oil sector-related services will not only provide opportunity for employment but also serve as sources of earnings for the operators.

Asides from the market contribution, the foreign investment (FDI) effect is very important. Oil activity often leads to inflow of foreign resources such as FDI and portfolio investment. Indeed, the bulk of FDI into majority of the countries that export oil is concentrated in the oil sector. The various channels through which FDI impacts growth and development in the recipient countries have been extensively discussed in the literature. Specifically, FDI inflows to developing countries not only help in increasing their stock of capital but may also assist in boosting labour productivity and incomes in the host country. Consequently, the levels of output, employment creation, and potential tax revenues are enhanced in the host countries (Ramirez, 2006).

Empirically, few studies have been have provided results in support of the benign perspective on the impact of natural resources on economic growth and development. Some of these studies not only reported that resource abundance had positive impact on growth and development but also found that resource dependence had no adverse impact on growth.

2.4.2 The Malign Perspective: Natural Resource Abundance Not a Blessing

Sequel to the poor performance of most oil–rich countries in the 80s, the idea that natural resource abundance was a blessing to development was jettisoned by scholars. Critics argued that natural resource abundance is harmful to growth. Extensive literature exists on the various channels through which natural resources, especially oil, harms growth. The major transmission mechanisms include Dutch disease, volatility argument and inefficiency in resource allocation argument.

The Dutch disease simply says that an exogenous unexpected increase in foreign exchange revenues from natural resources, arising from increase prices or output, will precipitate a real exchange rate appreciation and thus a drop in output and employment in the non-resource traded good sector, often manufacturing. The volatility argument is anchored on the fact that revenues from natural resources especially oil are very volatile, as they are driven by sharp and significant fluctuations in prices over relatively short periods of time. Consequently, in the face of fluctuating revenues, governments in the oil rich countries often find it extremely difficult to pursue a prudent fiscal policy. In addition, there is the general apprehension that windfall revenues arising from unanticipated high export prices would be used for

consumption rather than being invested or at best invested on wasteful projects. Moreover, emphasis is placed on the political economy considerations in explaining the nature of the relationship between natural resource abundance and economic growth. This view contends that large windfalls from the resource tend to generate and promote rent-seeking activities that involve corruption, voracity and civil conflict (Tornell & Lane, 1999). Several empirical studies have confirmed the natural resource curse hypothesis.

Some other reasons why resource-rich countries might suffer resource curse are reduced returns to human investments, precipitated by natural resource exploitation (Gylfason, 2001) and poor economic management that leads to inefficient resource allocation (Rosser, 2006).

All in all, while there are strong theoretical grounds to suspect a broad correspondence between natural resource abundance especially oil and low growth, the nature of the linkage is neither direct nor simple. Empirical literature has not provided conclusive answer to whether abundant natural resource is a curse or blessing.

Even among studies that claimed the curse of natural resources actually exist, there is no agreement on what exactly drives the curse of the natural resources and on how it exactly plays out. This explains why further research should be focused on the causal link between natural resource abundance and growth in the resource rich economies.

3.0 METHODOLOGY

3.1 Model Specification

In line with extant literature, we utilize the following variables – GDP growth rate as the dependent variable and the explanatory variables are natural resource dependence which is proxy by oil rent as a percentage of GDP according to literature (Auty, 2001) and oil price which determines the total oil rent received (Anthony, 2012). Other control variables are based on their linkage with economic growth following findings in extant literature and they include physical capital and domestic investment (measured by gross fixed capital formation as a percentage of GDP); exchange rate; and foreign direct investment as a percentage of GDP.
A simple model is used to capture the relationship

$$GDPGR = f(NRD, OILP, PCAP, EXCHR, FDI) \quad \ldots \quad (1)$$

Where: GDPGR is Gross Domestic Product Growth Rate, NRD is Natural Resource Dependence, OILP is Oil Price, PCAP is Physical Capital and Domestic Investment, EXCHR is Exchange Rate, and FDI is Foreign Direct Investment.

We specify an estimable form of equation (1) as follows:

$$GDPGR_t = \beta_O + \beta_1 NRD_t + \beta_2 OILP_t + \beta_3 PCAP_t + \beta_4 EXCHR_t + \beta_5 FDI_t \quad \ldots (2)$$

The ARDL approach to cointegration involves estimating the unrestricted error correction model version of the model for GDP growth rate and Natural Resource Dependence. The ARDL representation of equation (2) is specified below:

$$\Delta GDPGR_t = \alpha_o + \sum_{i=1}^{k} \varphi_i \Delta GDPGR_{t-1} + \sum_{i=0}^{k} \gamma_i \Delta NRD_{t-1} + \sum_{i=0}^{k} \delta_i \Delta OILP_{t-1} + \sum_{i=0}^{k} \theta_i \Delta PCAP_{t-1} +$$
$$\sum_{i=0}^{k} \eta_i \Delta EXCHR_{t-1} + \sum_{i=0}^{k} \alpha_i \Delta FDI + \beta_1 GDPGR_{t-1} + \beta_2 NRD_{t-1} + \beta_3 OILP_{t-1} + \beta_4 PCAP_{t-1} + \quad \ldots (3)$$
$$\beta_5 EXCHR_{t-1} + \beta_6 FDI_{t-1} + \mu_i$$

The null hypothesis that there is no cointegration is defined as: H_0: $\alpha_1 = \alpha_2 = \alpha_3 = \alpha_4 = \alpha_5 = \alpha_6 = 0$ is tested against its alternative, H_1: $\alpha_1 \neq 0$, $\alpha_2 \neq 0$, $\alpha_3 \neq 0$, $\alpha_4 \neq 0$, $\alpha_5 \neq 0$, $\alpha_6 \neq 0$ by computing F-statistic. Once the cointegrating relationship is established, the short run dynamics is also analyzed.

The error correction equation of the ARDL model is specified in equation (4) below:

$$\Delta GDPGR_t = \alpha_o + \sum_{i=1}^{k} \varphi_i \Delta GDPGR_{t-1} + \sum_{i=0}^{k} \gamma_i \Delta NRD_{t-1} + \sum_{i=0}^{k} \delta_i \Delta OILP_{t-1} + \sum_{i=0}^{k} \theta_i \Delta PCAP_{t-1} +$$
$$\sum_{i=0}^{k} \eta_i \Delta EXCHR_{t-1} + \sum_{i=0}^{k} \lambda_i \Delta FDI_{t-1} \Omega ECM_{t-1} + \mu_i \quad \ldots (4)$$

Where ECM is the error correction term which is the residual obtained from the long run estimation and Ω is the speed of adjustment parameter.

Natural Resource Dependence, Oil price, Physical Capital, Exchange rate and Foreign Direct Investment are likely to have positive relationship with GDP growth rate, so the values of the coefficients γ, δ, θ, η, *and* λ are expected to be positive, $\gamma > 0$, $\delta > 0$, $\theta > 0$, $\eta > 0$, and $\lambda > 0$.

The error correction equation is used to find the adjustment speed to the equilibrium in the third stage. Lag length was determined using the Akaike information criterion (AIC) and Schwarz information criterion (SIC). The lower the value of AIC and SIC, the better the model.

Table 2: Definition of Variables and Sources of Data used in Regression Analysis

Variable	Definition and Construction	Apriori Expectation	Sources of Data
Annual GDP Growth Rate	Annual Gross Domestic Product Growth Rate		World Development Indicators, 2018
Natural Resource Dependent	OIL rent (% of GDP)	(+)	World Development Indicators, 2018
Oil price	Average Annual OPEC Crude Oil Price (in U.S. Dollar per Barrel)	(+)	OPEC Annual Statistical Bulletin, 2018
Physical Capi tal and Domestic Investment	Gross fixed capital formation (% of GDP)	(+)	World Development Indicators, 2018
Exchange Rate	Official Exchange Rate (Per U.S Dollar, Average Period)	(+)	World Development Indicators, 2018
Foreign direct investment	Foreign dir ect investment, net inflows (% of GDP)	(+)	World Development Indicators, 2018

3.2 Estimation Technique

This study employs the bounds testing Autoregressive Distributed Lag (ARDL) method proposed by Pesaran, Shin and Smith (2001) to examine the long run and short run relationship between trade and unemployment. ARDL is employed for certain advantages. First, it can be applied irrespective of whether the underlying variables are I(1), I(0) or a combination of both. Secondly, unlike the Engle and Granger and Johansen multivariate cointegration approach, it is not sensitive to the values of nuisance parameters in finite sample thereby making its small sample properties superior. Thirdly, the error correction model (ECM) can be derived from ARDL through a simple linear transformation, which integrates short run adjustments with long run equilibrium without losing long run information. Also, the ARDL approach is known for providing unbiased long run estimates even when some of the variables are endogenous (Adom, Bekoe, Akoena, 2012; Pahlavani, Wilson and Worthington, 2005).

Prior to the ARDL estimation, we carry out unit root test on all the variables employing the Augmented Dickey Fuller (ADF) test to account for the stationarity of the variables and establish the order of integration.

4. RESULTS AND DISCUSSION

4.1 Unit Root Test

Tests of unit root/stationarity for the variables of this study are carried out using the Augmented Dickey-Fuller (ADF) unit root tests. The results are presented in table 3.

Table 3: Results of unit root/stationarity tests

Variable	ADF Test Statistic (at level)	Decision and Order of integration
GDPGR	-4.045485	SL — I(0)
NRD	-1.992825	NSL
OILP	-1.312831	NSL
PCAP	-3.187069	SL—I(0)
EXCHR	2.248978	NSL
FDI	-3.354841	SL—I(0)
	Critical values	
	5%: -2.9451125	
Variable	**ADF Test Statistic (at first difference)**	**Order of integration**
NRD	-7.252494	I(1)
OILP	-5.263003	I(1)
EXCHR	-3.297372	I(1)
	Critical values	
	5%: -2.951125	

Notes: Thecritical values in column 2and 3are MacKinnon critical values for the rejection of null hypothesis of unit root (non-stationarity). SL stands stationary at level while NSL stands for non-stationary level.
Source: Authors' computation

Table 3 presents the results of the unit root tests performed for the variables in their levels and in their first differences. At levels, GDPGR, PCAP, and FDI were found to be stationary at 5% level of significance while NRD, OILP, and EXCHR were not stationary at level according to the ADF tests. At first differences, NRD, OILP, and EXCHR were found to be stationary at 5% level of significance. Thus, the variables satisfy the unit root property in their first differences. The conclusion is that the order of integration is mixed.

4.2 Bounds Cointegration Test Results

Pesaran and Shin (1998) explains that the residual-based cointegration are inefficient and can lead to contradictory results, especially when there are mixed order of integration for variables under consideration.

Table 4: Bound F-test for Cointegration

	F-Statistics: 6.037218 P-value: 0.0118	
Critical Values (Narayan, 2005)	**Lower Bound Value**	**Upper Bound Value**
1%	4.068	5.250
5%	2.962	3.910
10%	2.496	3.346

Critical values are obtained from Narayan. (2015), Table CI (V): Unrestricted Intercept and Unrestricted Trend.
Source: Authors' Computation

The result of the Bounds Cointegration test is presented in Table 4. This result emanates from the estimation of equation 2 to examine the existence of long run relationships among the variables. The maximum lag length chosen was 3 based on Akaike Information Criterion (AIC). The calculated F-Statistic is 6.037218, and this value is higher than the upper bound at 5% level of significance. This indicates the existence of cointegration. Hence, the alternative hypothesis of cointegration is accepted. In view of the fact that the variables are cointegrated, the dynamic (short run) relationship between them can be represented with an error correction model.

4.3 Estimated Dynamic Short run Coefficients

Table 5: Error Correction Representation for the Selected ARDL Model Dependent Variable: D(GDPGR)

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-1.850937	1.081252	-1.711847	0.1107
D(GDPGR(-1))	0.467472	0.365778	1.278023	0.2236
D(GDPGR(-2))	0.912255	0.378216	2.411992	0.0314*
D(GDPGR(-3))	0.832245	0.288930	2.880439	0.0129*
D(NRD(-1))	0.123549	0.196521	0.628685	0.5404
D(NRD(-2))	-0.106443	0.190827	-0.557798	0.5865
D(NRD(-3))	0.000426	0.179878	0.002366	0.9981
D(OILP(-1))	0.083799	0.068536	1.222692	0.2432
D(OILP(-2))	0.139742	0.070929	1.970159	0.0705**
D(OILP(-3))	0.196824	0.085150	2.311513	0.0378*
D(PCAP(-1))	0.035640	0.206265	0.172786	0.8655
D(PCAP(-2))	0.263723	0.217297	1.213654	0.2465
D(PCAP(-3))	0.193976	0.213419	0.908898	0.3799
D(EXCHR(-1))	0.128764	0.054730	2.352702	0.0350*
D(EXCHR(-2))	0.001927	0.057254	0.033658	0.9737
D(EXCHR(-3))	0.129620	0.057757	2.244220	0.0429*
D(FDI(-1))	2.544561	0.996975	2.552282	0.0241*
D(FDI(-2))	2.194372	1.010436	2.171708	0.0490*
D(FDI(-3))	1.979274	0.741551	2.669102	0.0193*
ECM(-1)	-1.500125	0.419117	-3.579253	0.0034*
R-squared	0.76	**Adjusted R-squared**	0.42	
F-statistic	2.235	**F-stat Prob.**	0.071085	
Durbin-Watson statistic	1.95			

*Values: * and ** indicates significance at the 5% level and 10% respectively.*
Sources: Authors' computation

Error correction representation is shown in Table 5 above which captures the short-run dynamics of relationship between the dependent variable and the independent variables. The error correction (ECM) term is negatively sign and statistically significant at 5%. The overall fit is moderately high with R-Squared of approximately 0.76 and adjusted R-Squared of 0.42. This means that the about 76% of the systematic variations in GDP growth rate are explained by the explanatory variables. The adjusted R-Squared shows that about 42% of the variations in GDP growth rate are attributed to the explanatory variables. The F-statistics of 2.235 is significant at the 10% level, validating the hypothesis of a linear relationship between GDP growth rate and its explanatory variables. The Durbin-Watson statistic of 1.95 shows that there is no serial correlation in the model, implying that the model can be used for structural and policy analysis.

Table 5 shows the results of short-run coefficients under ARDL method. In Table 5, the coefficients of natural resource dependence for lag one and lag three was positive, while lag two was negative. The coefficients for natural resource dependence were not statistically significant at 5% level of significance for all the lags. The result suggests that a 10% rise in natural resource dependence in one year lag would lead to an increase GDP Growth rate by 1.24%, suggesting that Nigeria is highly dependent on proceeds from crude oil sales. The huge revenues from oil, of course, was suppose to create an opportunity for large expenditure and investment in certain productive venture but this huge proceeds from oil have not significantly impacted the economy.
The coefficients for oil price for all the lags were positive. However, the coefficients of oil price for two year lag and three year lag was statistically significant at 10% and 5% level of significance respectively. But the coefficient for one year lag was not statistically significant. The result suggests that a 10% rise in oil price in two year lag and three year lag would lead to an increase GDP Growth rate by 1.39% and 1.96% respectively. This findings shows that oil price is an important growth determinant in Nigeria. The fall in prices at the global markets leads to the recent economic crisis experienced in Nigeria in 2016 characterized by: drastic fall in government revenue, negative GDP growth rate in three consecutive quarters, high inflation rate and fall in the value of exchange rate. The coefficient for physical capital and domestic investment for all lags were positive, but they were not statistically significant at 5% level of significance. A 10% rise in physical capital and domestic investment for one year lag, two year lag and three year lag will lead to a 0.3%, 2.6% and 1.9% increase in GDP growth rate respectively.

The coefficients of the exchange rate variable for all lags were positive, however, the coefficient of exchange rate for one year lag and three year lag are statistically significant at 5% level of significance while two year lag was not statistically significant at 5% level of significance. The positive signs for one year lag and three

year lag agree with the theoretical proposition that a depreciation of the local currency should enhance the country's exports. The empirical result specifically indicates that a10% depreciation in the exchange rate causes the GDP growth rate to rise by 1.29% and 1.29% for one year lag and three year lag respectively.

The coefficients of foreign direct investment for all lags were found to be positive, and were statistically significant at 5% level of significance. This implies that foreign direct investment is positively related to economic growth and they do significantly impact economic growth. A 10% increase in foreign direct investment in one year lag, two year lag and three year lag leads to 25.4%, 21.9% and 19.8% increase in GDP growth rate respectively. This suggest that foreign direct investment promotes growth by increasing the capital stock, easing foreign exchange constraint to development, and encouraging the transfer of advanced technology and know-how from developed countries to host countries, thus increasing productivity. The higher the level of foreign direct investment is, the more rapid will be the rate of economic growth since investment increases the capital stock and boosts aggregate demand.

4.4 Diagnostic Test Statistics

The model is generally robust as shown by the F-statistic, which is statistically significant at the 10% level. The Durbin-Watson statistic of 1.95 suggests that the model does not suffer from first-order autocorrelation, while the null hypothesis of no autocorrelation was accepted using the Breusch-Godfrey serial correlation LM test **(Table 6)**. The residuals are normally distributed given that the Jarque-Bera statistic was not significant **(Figure 6)**. Moreover, the Ramsey RESET test indicates that the null hypothesis of no misspecification error cannot be rejected at 5% level of significance, indicating that the assumption of a linear equation is appropriate **(see Table 7)**. Results of the diagnostic tests aptly show that the model is correctly specified, and thus findings of the model have huge policy implications.

Table 6: Breusch-Godfrey Serial Correlation LM Test

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.108179	Prob. F(2,11)	0.8984
Obs*R-squared	0.636552	Prob. Chi-Square(2)	0.7274

Source: Authors' estimation

Figure 6: Normality

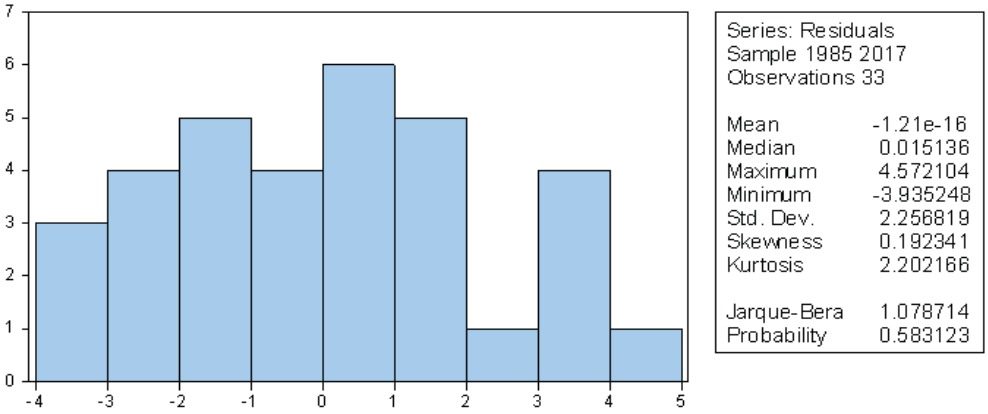


Table 7. Ramsey RESET Test

Ramsey RESET Test
Equation: UNTITLED
Specification: D(GDPGR) C D(GDPGR(-1)) D(GDPGR(-2)) D(GDPGR(-3)) D(NRD(-1)) D(NRD(-2)) D(NRD(-3)) D(OILP(-1)) D(OILP(-2)) D(OILP(-3)) D(PCAP(-1)) D(PCAP(-2)) D(PCAP(-3)) D(EXCHR(-1)) D(EXCHR(-2)) D(EXCHR(-3)) D(FDI(-1)) D(FDI(-2)) D(FDI(-3)) ECM(-1)
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.484090	12	0.6370
F-statistic	0.234343	(1, 12)	0.6370
Likelihood ratio	0.638232	1	0.4244

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	3.121872	1	3.121872
Restricted SSR	162.9834	13	12.53718
Unrestricted SSR	159.8615	12	13.32179
Unrestricted SSR	159.8615	12	13.32179

LR test summary:

	Value	df
Restricted LogL	-73.17779	13
Unrestricted LogL	-72.85868	12

Source: Authors' estimation

4.4.1 Structural Stability Testing of Model

The structural stability of the model was tested using plots of the cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of residuals (CUSUMsq). The plots are shown in Figures 2A and 2B. Basically, the existence of parameter instability is established if the CUSUM and CUSUMSq of residuals go outside the bands represented by the two critical (dotted) lines. From results, the plot of both CUSUM and CUSUMSQ lie within the critical bounds at the 5% significance level, indicating that the model is structurally stable and hence useful for policy formulation.

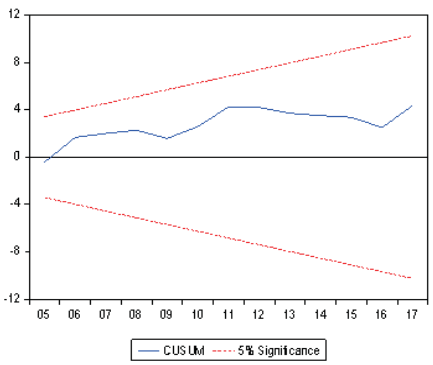


Figure 7A: Plot of CUSUM

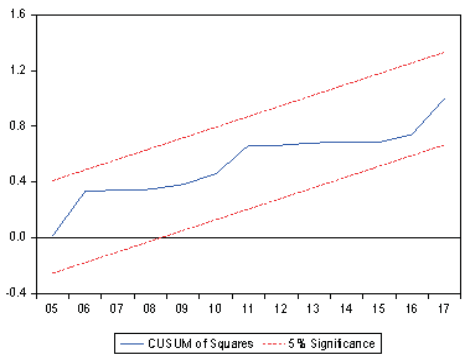


Figure 7B: Plot of CUSUMsq

4.5 Model Estimation Results (Long-run)

Table 8: Estimated Long-run Coefficients for selected ARDL Model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	19.98739	4.521263	4.420754	0.0001*
NRD	0.321236	0.143266	2.242243	0.0322*
OILP	-0.037527	0.026431	-1.419796	0.1656
PCAP	-0.347543	0.062360	-5.573211	0.0000*
EXCHR	-0.036460	0.015137	-2.408635	0.0221*
FDI	-1.868457	0.660267	-2.829852	0.0081*

*Values; * and ** indicates significance at the 5% and 10% level respectively.*
Sources: Authors' computation

Table 4 shows the results of long-run coefficients under ARDL method. In Table 8, the coefficient for natural resource dependence (NRD) is positive and statistically significant at 5% level of significance. The estimated coefficient for NRD implies that for every 10% increase in NRD, there is 3.2% increase in GDP growth rate. The

coefficient for oil price (OILP) is found to be negative and not statistically significant at the 5% level of significance. The estimated coefficient implies that a 10% increase in oil price will result into 0.37% decrease in GDP growth rate.

The coefficient for physical capital and domestic investment (PCAP) was found to be negative and statistically significant at 5% level of significance. This implies that a 10% increase in PCAP will lead to a fall in GDP growth rate by 3.47%. Also, there is an inverse and a significant relationship between exchange rate and GDP growth rate in long-run. A 10% percent rise in exchange rate leads to 0.36% decrease in GDP growth rate.

In the long run also, the coefficient for foreign direct investment was found to be negative and statistically significant at 5% level of significance. A 10% increase in FDI will lead to 18.7% decrease in GDP growth rate. This implies that in the long run, foreign direct investment is negatively related to GDP growth rate in Nigeria.

5. CONCLUSION AND RECOMMENDATIONS

This study examined the link between natural resource dependence and economic growth in Nigeria within the context of Autoregressive Distributed Lag (ARDL) framework. Applying annual time series data from 1981 to 2017, the coefficient of natural resource dependence was positive both in the short run and in the long run, although the coefficient of natural resource dependence was not statistically significant in the short run but it was found significant in the long run. The positive sign for the coefficient of natural resource dependence in Nigeria negates the Structuralists general consensus that natural resource dependent impact negatively on economic growth and agrees with Lederman and Maloney (2003) that natural resource dependence positively impact economic growth.

The coefficient of oil price was positive and statistically significant at the 5% test levels. This result confirms the all-pervading effects of uncertainty brought about by vagaries in oil price. The direct relationship between economic growth and oil price, gives credence to the fact that Nigeria is highly dependent on oil. This outcome makes economic fortunes of the country to remain vulnerable to oil price dynamics at the international oil market. This finding agrees with the study of Blattman, Hwang and Williamson (2007) which stated that fluctuations in price cause countries who are engaged in the production of raw materials to experience a decline in economic growth. Our finding also agree with Eichengreen (1996) which stated that fluctuations in oil prices cause trade imbalances among countries dependent on raw materials leading to a decline in economic growth. The coefficient of exchange rate was positive and significant. This means that exchange rate is an important economic growth determinants and that government should adopt appropriate monetary and fiscal

policies that will not only ensure a realistic and stable exchange rate but will also serve to foster economic growth in Nigeria.

Accordingly, this study recommends that for sustained economic growth and development in Nigeria, there is need for deliberate efforts at diversifying the economy from oil dependence to stall transmission of oil price shocks into the domestic economy. Maintaining stable exchange rate and providing enabling business environment towards attraction of more inflows of FDI into Nigeria.

Appendix one

Years	Annual GDP Growth rate	OIL rent (% of GDP)	Average Annual OPEC Crude Oil Price (in U.S. Dollar per Barrel)	Gross fixed capital formation (% of GDP)	Official Exchange rate (Per U.S. Dollar, period average)	Foreign direct investment, net inflows (% of GDP)
1981	-13.1279	3.242157	34	89.38613	0.617708	0.329732
1982	-6.80339	1.511362	32.38	85.9414	0.673461	0.301613
1983	-10.9241	4.079126	29.04	75.75651	0.72441	0.375338
1984	-1.11562	8.9474	28.2	58.95629	0.766527	0.257422
1985	5.913027	9.574905	27.01	46.39545	0.893774	0.658453
1986	0.060945	4.307286	13.53	54.94827	1.754523	0.352544
1987	3.200125	9.566539	17.73	50.04989	4.016037	1.15907
1988	7.334025	8.105868	14.24	43.75477	4.536967	0.762696
1989	1.919381	20.08558	17.31	52.48744	7.364735	4.282088
1990	11.77689	21.85745	22.26	53.12219	8.038285	1.087951
1991	0.358353	13.84653	18.62	48.40018	9.909492	1.450318
1992	4.631193	17.10261	18.44	43.77439	17.29843	1.876018
1993	-2.03512	26.43017	16.33	44.47636	22.0654	4.84779
1994	-1.81492	16.76268	15.53	42.06784	21.996	5.790847
1995	-0.07266	15.16929	16.86	37.20593	21.89526	2.449413
1996	4.195924	17.63876	20.29	36.58167	21.88443	3.119792
1997	2.937099	13.89168	18.86	38.42226	21.88605	2.826858
1998	2.581254	5.164365	12.28	40.5534	21.886	1.925363
1999	0.584127	9.894751	17.44	38.278	92.3381	1.692559
2000	5.015935	20.92307	27.6	34.04928	101.6973	1.641739
2001	5.917685	12.94978	23.12	30.03794	111.2313	1.608284
2002	15.32916	9.187276	24.36	26.76866	120.5782	1.964727
2003	7.347195	10.37936	28.1	28.3709	129.2224	1.911463
2004	9.250558	15.40887	36.05	26.06325	132.888	1.374086
2005	6.438517	18.60758	50.59	24.96612	131.2743	2.82883
2006	6.059428	16.17745	61	26.1665	128.6517	2.056024
2007	6.59113	14.44399	69.4	20.18004	125.8081	2.189934
2008	6.764473	16.86751	94.1	18.85977	118.546	2.431643
2009	8.036925	9.185302	60.86	21.11545	148.9017	2.930908
2010	8.005656	12.8276	77.38	16.81501	150.298	1.658475
2011	5.307924	16.4	107.46	15.67631	153.8616	2.154611
2012	4.230061	13.91947	109.45	14.21112	157.4994	1.53903
2013	6.671335	10.62301	105.87	14.16873	157.3112	1.08024
2014	6.309719	8.053641	96.29	15.08353	158.5526	0.818201
2015	2.652693	2.994155	49.49	14.82718	192.4403	0.634336
2016	-1.61687	2.803152	40.69	14.72496	253.492	1.098507
2017	0.805887	6.122234	52.51	14.71562	305.7901	0.930745

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