



저작자표시-비영리-변경금지 2.0 대한민국

이용자는 아래의 조건을 따르는 경우에 한하여 자유롭게

- 이 저작물을 복제, 배포, 전송, 전시, 공연 및 방송할 수 있습니다.

다음과 같은 조건을 따라야 합니다:



저작자표시. 귀하는 원저작자를 표시하여야 합니다.



비영리. 귀하는 이 저작물을 영리 목적으로 이용할 수 없습니다.



변경금지. 귀하는 이 저작물을 개작, 변형 또는 가공할 수 없습니다.

- 귀하는, 이 저작물의 재이용이나 배포의 경우, 이 저작물에 적용된 이용허락조건을 명확하게 나타내어야 합니다.
- 저작권자로부터 별도의 허가를 받으면 이러한 조건들은 적용되지 않습니다.

저작권법에 따른 이용자의 권리는 위의 내용에 의하여 영향을 받지 않습니다.

이것은 [이용허락규약\(Legal Code\)](#)을 이해하기 쉽게 요약한 것입니다.

[Disclaimer](#)

Master's Thesis in Engineering

**Contribution of Nigeria Oil Resource to
Economic Growth: Assessing the Evidence
of Resource Curse in Nigeria**

February 2021

**Graduate School of Seoul National University
Technology Management, Economics, and Policy Program**

Matthew Ofuonyebuzor

Contribution of Nigeria oil resource to economic growth: Assessing the evidence of resource curse in Nigeria

지도교수 허은녕

이 논문을 공학석사학위 논문으로 제출함
2021 년 2 월

서울대학교 대학원
협동과정 기술경영경제정책 전공
Matthew Ofuonyebuzor

메튜의 공학석사학위 논문을 인준함
2021 년 2 월

위원장 김연배 (인)
부위원장 허은녕 (인)
위원 이응기 (인)

Contribution of Nigeria Oil Resource to Economic Growth: Assessing the Evidence of Resource Curse in Nigeria

Matthew Ofuonyebuzor

Technology Management, Economics, and Policy Program

College of Engineering, Seoul National University

Abstract

This research investigates the contribution of Nigeria oil resources to economic growth and as well as assessing the evidence of resource curse in Nigeria. For empirical analyses, data ranging from 1984 to 2017 for gross domestic product, oil rent, oil revenue, gross capital formation, total factor productivity, control of corruption amongst others were used. Following literature review, three econometric models were chosen to investigate the evidence of resource curse and the contribution of oil resource to economic growth in Nigeria. After testing for stationarity and cointegration, the short-run and long-run models were estimated using Autoregressive Distributed Lag (ARDL) model.

The first empirical model which shows the nature of association between economic growth and oil rent have a positive relationship in the short-run, which implies that oil resource contributes to economic growth in the short-run. However, the relationship was found to be negative in the long-run, which means that in the long-run, an increase in resource rent leads to decline in economic growth. In the meanwhile, oil revenue remains positive both in the short run and long run, implying that it is not just the oil resources that

lead to resource curse, but over dependence on the resources, since oil rent is expressed as share of oil export in percentage of GDP. This therefore confirms the evidence of resource curse in Nigeria for the period under study. Again, the second model estimated for the relationship between total factor productivity and oil revenue shows a negative relationship. Therefore, as oil revenue increase, productivity decreases which eventually cause a decline in the economic growth, which is also an evidence of resource curse.

The third model was estimated to ascertain the nature of relationship between institutional quality, in which control of corruption serves as a proxy, and oil revenue. The result shows that oil revenue has a negative coefficient both in the short run and long run, which is known as political resource curse, while the coefficient of oil rent in both short run and long run are insignificant. Therefore, as oil revenue increases, it induces for rent-seeking behavior among public leaders which tends to cause the quality of institution to and deteriorate. This implies that higher oil revenue can induce corruption in Nigeria which creates inefficiencies and distortions in economic activities.

The results from the three models show the evidence of resource curse in Nigeria. Having validated the existence of resource curse in Nigeria with understanding of some of the transmission channels, several recommendations can be made to escape the trap of resource abundance in an oil-rich country like Nigeria, including introducing an efficient resource management mechanism, initiating a set of policies that can diversify the economy away from oil revenue, and introducing a special stabilization fund.

Keywords: Economic growth, resource curse, oil rent, Nigeria, quality of institution, and corruption.

Matthew Ofuonyebuzor

Student I.D: 2019-29405

Table of content

Contents

Abstract	i
Table of content	iii
List of Tables	v
List of Figures	vi
Chapter One: Introduction	1
1.1: Background to the Study.....	1
1.2: Statement of the Problem.....	4
1.3.1: Aim and Objectives of the Study.....	5
1.3.2: Research Questions.....	5
1.3.3: Significance of the Research	5
1.3.4: Scope of the Study	6
Chapter Two: Literature Review.....	7
2.1: Literatures on Resource Curse	7
2.2: Overview of Nigeria Oil Production	16
Chapter Three: Theoretical Framework	19
3.1 Data and Methodology	22
3.1.1 Description of Variables	22
3.1.2 Graph of Variables	25
3.1.3 Unit Root Test	29
3.1.4 Testing for Cointegration	30
3.1.5: Bound Cointegration Test	31
3.2: Post Estimation Test.....	31
Chapter Four: Result and Discussion.....	33
4.1: Unit Root Test Result.....	33
4.2: The Impact of Oil Rent on Economic Growth	34
4.2.1: Bound Test Result	34
4.2.2: Interpretation of Result of the Impact of Oil Rent on GDP Per Capita	36
4.2.3: Post Diagnostic Test for model of GDP and Oil Rent	37
4.3: The Impact of Oil Revenue on total factor productivity (TFP)	42

4.3.1: Bound Test	42
4.3.2: The Interpretation of the model of the impact of oil revenue on total factor productivity	44
4.3.3: Post Diagnostic Test for the model of the impact of oil revenue on total factor productivity	45
4.4: The Impact of Oil Revenue on Quality of Institution (QI)	48
4.4.1: Bounds Cointegration Test.....	48
4.4.2: Interpretation of the model of impact oil revenue on institutional quality	49
4.4.3: Post Diagnostic Test for the model of the Institutional Quality and Oil Revenue	49
Chapter Five: Summary, Conclusion and Policy Recommendation.....	53
5.1 Summary	53
5.2 Conclusion	54
5.3 Recommendation and Policy implication	55
5.3.1: Contribution to knowledge	55
5.3.2: Limitation and suggestion for further study	56
References.....	57
Appendices.....	61
Appendix 1: Unit Root Test Results.....	61
Appendix 2: Bound Cointegration Test	94
Appendix 3: Short-run and long-run model.....	96
국문 요약.....	102

List of Tables

Table 3.1: Descriptive Statistics.....	24
Table 4.1: Table of unit test result	33
Table 4.2.1: Bound test result for model of oil rent and GDP	35
Table 4.2.2: Short-run model of the impact of oil rent on GDP per capita.....	35
Table 4.2.3: The long-run result of the Impact of Oil Rent GDP per capita.....	36
Table 4.2.1: Table of Ramsey RESET for GDP and oil rent model	38
Table 4.2.2: Table of serial correlation for model of GDP and oil rent	39
Table 4.2.3: Heteroskedasticity Test. Breusch-Pagan-Godfrey: GDP and oil rent	39
Table 4.3.1: Table of bound test for the model of oil resource and TFP	42
Table 4.3.2: Table of short-run model of impact of oil revenue on TFP	43
Table 4.3.3: Long run model of impact of oil revenue on TFP.....	44
Table 4.3.4: Table of Ramsey RESET for TFP and oil revenue model.....	45
Alternative Hypothesis H_1 : There is serial correlation.....	45
Table 4.3.5: Table of serial correlation test for TFP and oil revenue model.....	45
Table 4.3.6: Table of Heteroskedasticity Test. Breusch-Pagan-Godfrey for TFP and oil revenue model.....	46
Table 4.4.1: Table of bound test for model of oil revenue and QI.....	48
Table 4.4.2: Short run model of impact of oil revenue and QI	48
Table 4.4.3: Long run model of impact of oil revenue on quality of institution	49
Table 4.4.4: Table of Ramsey RESET for QI and oil revenue model.....	50
Table 4.4.5: Table of serial correlation test for QI and oil revenue model	50
Table 4.4.2.3: Table of Heteroskedasticity Test. Breusch-Pagan-Godfrey for QI and oil revenue model.....	51

List of Figures

Figure 3.1: Graph of per capita GDP (in US Dollar) from 1984 - 2017	25
Figure 3.2: Graph of gross capital formation (US Dollar) from 1984 - 2017	26
Figure 3.3: Graph oil rent (in % of GDP) from 1984 - 2017	26
Figure 3.4: Graph of oil revenue (in billion naira) from 1984 - 2017	27
Figure 3.5: Graph of corruption from 1984 - 2017	27
Figure 3.6: Graph quality of institution from 1984 - 2017	28
Figure 3.7: Graph education expenditure (in billion naira) from 1984 - 2017.....	28
Figure 3.8: Graph exchange rate from (naira to US dollar) 1984 – 2017	29
Figure 4.2.2: CUSUM Chart for GDP and oil rent model	41
Figure 4.2.3: CUSUM of Square Chart for GDP and oil rent model.....	41
Figure 4.3.1: Normality test for the model of TFP and oil revenue	46
Figure 4.3.2: CUSUM Chart for TFP and oil revenue model	47
Figure 4.3.3: CUSUM of Square Chart for TFP and oil revenue model.....	47
Figure 4.4.1: Normality test for the model of QI and oil revenue.....	51
Figure 4.4.2: CUSUM Chart for model of QI and oil revenue	52
Figure 4.4.3: CUSUM of Square Chart for model of QI and oil revenue	52

Chapter One: Introduction

1.1: Background to the Study

Some basic economic theories in history by renowned economists in the like of Adam Smith and others suggested that the wealth of any nation would be positively associated with the natural resource abundance of the country. This therefore means that nation with more natural resources such like petroleum and solid minerals would experience more growth in economy and with improved and better living standard for the populace when compared to country which are poor in natural resource. A supportive reason for this is that abundance of natural resources would spur trade openness and increase the export earnings of the resource-abundant country as well trigger economic growth. Ironically, the reverse has been the case based on current happenings where resource-poor countries achieve good economic growth while countries rich in natural resources have slow and stunted growth in their economy despite the accumulation of abundant resources. For instance, countries of the Asian Tigers like Hong Kong, Japan, South Korea, Singapore and Taiwan which have little or no natural resources achieved good and robust economic growth and sustained development. But many developing nations for instance, in Africa such as Nigeria, Angola, Ghana, etc., and also some Middle East countries which have a lot of natural resources still wallow in poverty and poor economy, the huge natural resources notwithstanding.

The above scenarios tend to negate the classical basic economic theories that natural resource correlates positively with economic growth and development. This has triggered debates in many literatures if the abundance of natural resource is a blessing or a curse. Many expected that availability of natural resource should be a blessing for developing countries to grow their economy, but on the contrary, natural resource abundance slowed or impeded economic growth in most developing countries. This paradoxical phenomenon whereby a country rich in terms of abundance of natural resources (like petroleum and solid minerals) but have slow or poor growth of economy is referred to as resources curse. The name resource curse was coined by Richard Auty in 1993 and was used to explain how some countries that have a lot of natural resources could not use the wealth of the nation to improve the economies and better the living standard of

the people (Aljarallah & Angus, 2020). A similar experience was also termed the Dutch Disease when huge natural gas discovery was made in Groningen, Netherland in 1959 which initially increased their export earnings because of the profit from gas export, but slowed down the export of non-gas produce and eventually caused a decline in economic growth. Many economists have posited that having a lot of natural resource was supposed a blessing and not a curse, but the dependence on resource abundance is what result in a curse. Aljarallah & Angus, (2020) stated in a very recent article that resource abundance on its own is not harmful but cause distortions that hamper growth through some transmission mechanisms, which then cause a crowding-out effect on other growth enhancing sectors. The transmission channels could be appreciation of exchange rate, abandonment of the manufacturing sector, poor quality of institutions and governance, and low human capital development. It is actually these channels of transmission that are categorized into the economic, the social and the political drivers of resource curse.

At this point, it is necessary to define what natural resources are. It has been defined as naturally occurring assets that can serve as raw materials and useful for economic production and for the benefit of the people. Such resources include fertile land, water, forest, petroleum and other solid minerals. It has been stated in many literatures that abundance of natural resources or over dependence on natural resources initiate influence on variables and triggers some mechanism which slow or impede economic growth (Cramon, 2002). In more recent time, it has become a topic of interest for most researchers and economic growth theorists to identify these variables and how they influence economic growth.

The Dutch Disease is an economic concept mainly used to describe the inverse relationship between the economic development of a particular sector (such as natural resource – crude oil, natural gas) and a decline in other sectors such as manufacturing, agriculture, tourism etc. This normally result in the overall decline in growth and development. The Dutch Disease, which is also a type of resource curse is used in describing a situation where countries that have so much natural resources such as petroleum could not use the resource wealth to develop and boost the entire economy of the nation, therefore resulting in overall low or slow economic growth. Natural resources on its own are not meant to impede economic development but due to poor management and governance, they cause distortions which eventually impede economic growth through

its various transmission channels that course a crowding-out effect. The transmission channels include real exchange rate appreciation, the manufacturing sector abandonment, poor government institution, government mismanagement and low level of human capital. The fact that natural resources are depletable and non- renewable causes a major threat to resource-rich nations which economies is dependent on the resources. In a nutshell, main impacts of Dutch Diseases are Currency appreciation, Loss of international competitiveness, Growth in real wages, Increases import of normal and luxury goods, Indirect deindustrialization, Income inequality, unemployment etc.

Considering the above illustration on natural resource abundance and resource curse, some major transmission channels of natural resource curse that can distilled out are: the dutch disease and foreign capital; rent-seeking and social capital; education and human capital; saving, investment and physical capital. These channels basically define the main transmission mechanisms of resource curse (Cramon, 2002). The main symptom of the Dutch disease is currency over valuation. The attraction of foreign capital to a resource rich nation cause the appreciation of domestic currency. This triggers inflation and cause the price of other manufactured goods to be very high to the extent that they become globally uncompetitive. The natural resource capital therefore crowds out the non-natural capital and eventually suppress the manufacturing companies out of existence. This leads to loss of jobs and bring hardship upon the people with an overall harmful effect on the economy. Again, knowing fully well that the natural resource sector is characterized by booms and busts, also create a serious problem of price fluctuation and hence trigger exchange rate volatility. This unstable exchange rate have an unfavorable effects on export trades, create uncertainty and discourage foreign direct investment, which eventually reduce total export and crowd out foreign capital (Cramon, 2002).

The second channel of resource curse transmission is the rent seeking behavior, especially in countries that don't have well defined property right. This rent-seeking behavior by producers cause resources to be diverted from socially gainful economic activities. Also, the grabbers tendency and struggles by political leaders to have undue control over resource rent could create tension and conflicts with its concomitant effects on the people. Another adverse effect of rent-seeking behavior among political leaders is that it could weaken democracy and the rule of law. Rent-seeking behavior cause economic distortion and inefficiency when political elites give undue favor to certain investors at the

expense of the public warfare. Natural resource abundance create a false sense of economic security, especially during windfall, which could lead to loss of goals and focus, as well as cause economic mismanagement (Cramon, 2002).

The third transmission channel is the education and human capital. Abundance natural resource tends to lower the incentives and motivation to build up human capital by both private and public, possibly due to non-wage income, low tax, social spending, dividends and all sorts of free money. The natural resource capital may overwhelm the government and could cause government to pay less attention to education, cause a decrease in number of schools' enrollment. The underestimation of education therefore lead to erosion of human capital, lack of adequate knowledge and skills which in the long run affect productivity and economic growth (Cramon, 2002). Though, to some extent, this depends on the natural resources type that is available and also the type of political structure of the country. The fourth channel for transmission of natural resource curse is saving, investment, and physical capital. When output from natural capital rises, the demand for money fall. This leads to a low interest rate and eventually reduce the stimulus to save and invest to fall. If the government agencies and institution of the country is weak, this could create serious economic problems as investment in the country decline. A very worrisome part of natural resource capital is that unproductive investment may not be a concern to the government and individuals.

1.2: Statement of the Problem

Nigeria being one of the African countries with abundance of crude oil and natural gas resources, has been so much dependent on the huge deposit of the natural resource wealth. The petroleum resources have been the main source of Nigeria revenue and foreign exchange. Over 90% of Nigeria revenue comes from oil, and as such the country tended towards mono-economy which has adversely affected the overall performance of the economy. This means that the huge revenue realized from the petroleum sector was not used to develop the non-petroleum sector. Many literatures exist on the impact of crude oil on Nigeria economy and some at variance on the contribution of oil to Nigeria economy growth both in the short- and the long-run. Also, most literatures on resource curse about Nigeria, to the best of my knowledge didn't apply the transmission mechanism in assessing the evidence of resource curse in Nigeria. Only few literatures could be assessed on this

from the Middle East region. Again, other studies done on resource curse for Nigeria was done in combination with other countries as panel study, and for that reason could not capture the case of Nigeria peculiarity. This research therefore, adds to the ever growing body of knowledge by applying the transmission channels for resource curse and also for the case of Nigeria in order to capture the country's specific nature.

1.3.1: Aim and Objectives of the Study

The aim of this study is to estimate the contribution of crude oil resources to Nigeria economic growth and as well assesses the evidence of resource curse in Nigeria. The research objectives are as stated as follows:

- i. Estimate the impact of crude oil production on the Nigeria economic growth, in the short- and long-run.
- ii. Assess the evidence of natural resource curse in Nigeria.
- iii. Ascertain the significant channels of transmission of resource curse for the case of Nigeria.
- iv. Make appropriate policy recommendation towards ensuring contribution of natural resource to economic growth.

1.3.2: Research Questions

In addressing the issue of resource curse in Nigeria, this research is focused on answering the following questions:

- i. Do oil resource contribute to economic growth both in the short- and long-run in Nigeria?
- ii. Do oil resource enhance total factor productivity in the short- and long-run in Nigeria?
- iii. Is there evidence of resource curse in Nigeria?

1.3.3: Significance of the Research

Though considering the reality of the Nigeria economic situation in the midst of abundance of crude oil and natural gas, one would easily suspect a case of the resource curse. Even as this is glaring and obvious, it is important to understand how this natural

resource causes distortions that impede or slow down economic growth. This can be well understood by the estimation of the different transmission channels through which these distortions are caused. Again, the governance structure and institutional quality of different countries differ, hence it is necessary to study the Nigeria case of resource curse with its peculiarity. Appropriate understanding of the transmission channels is crucial to making appropriate policy recommendations that can lead to turning natural resource into a blessing and not a curse.

1.3.4: Scope of the Study

This research considers the contribution of oil resource to the Nigeria economic growth as well validating the evidence of resource curse. The data used for this study ranges from a period of 1984 to 2017. The transmission mechanisms considered in the study is limited to availability of data.

Chapter Two: Literature Review

2.1: Literatures on Resource Curse

A lot of studies have been done to investigate the kind of relationship between natural resources and economic growth; and why and how resource-rich countries could experience poor economic growth and performance amidst plenty of natural resource. Considering the complexities of different countries in terms of political, economic and social structures, various reasons have been attributed to the resource curse experienced in many countries. Even in some cases, the nature and cause of the resource curse are with no firm conclusion. Previous studies done on resource curse are reviewed as followed: Aljarallah & Angus, (2020) investigated Kuwait's dilemma of natural resource abundance with data ranging from 1984 to 2014. The study investigates the effects of natural resource rent on gross domestic product per capita (GDP), productivity, institutional quality, and human capital in the short run and long run. Using the autoregressive distributed (ARDL) lag model, the result shows that economic growth increases with resource rent in the short run only, and also shows that resource rent decreases productivity, human capital and institutional quality in short run as well as long run. It finally concluded that for Kuwait, over dependence of natural has been a disadvantage in the long run.

Also, on the effect of oil revenue and the quality of institution on economic growth by D Oluseun Olayungbo & Adediran, (2017) using ARDL approach shows that institutional quality (measured by corruption index) and oil revenue promote economic growth in the short run, while they retard economic growth in the long run. The result support resource curse hypothesis for Nigeria, and their finding suggests that strong anti-corruption policies should be in place to ensure oil revenue contribute optimally to economic growth. In another study by D.O. Olayungbo & Olayemi, (2018) to examine the relationship between non-oil revenue and economic growth in an oil producing country like Nigeria, using the vector autoregressive model and error correction model, the result shows that government spending have a negative impact on economic growth both in the short run and long run, while non-oil revenue has a positive effect on economic growth. From the analysis, it was recommended that Nigeria should diversify its economy by using the oil revenue to boost the non-oil revenue. In a similar study, Kromtit et al., (2017) examine

the contribution of non-oil exports to economic growth of Nigeria using the ARDL model, and with GDP as the dependent variable while non-oil export and exchange rate serve as the independent variables. ARDL approach was used on data ranging from 1985 to 2015, and the result reveals a positive association between economic growth (proxied by GDP) and non-oil export. The result also shows an insignificant negative relationship between economic growth and exchange rate. The result agrees with that obtained by D.O. Olayungbo & Olayemi, (2018) and also recommended that government should promote legislature that will enhance the non-oil sector such as agriculture, manufacturing, solid minerals etc., in order to increase its export base and hence reduce reliance on crude oil. These results also corroborate that obtained by Ifeacho & Olufemi, (2014), meaning that a significant economic growth can be experienced in the overall economy if the export volume of the non-oil produce can be increased through appropriate policy. Riti & Gubak, (2016) in their research on growth of non-oil sector as key to diversification, using the ARDL and vector error correction model (VECM) shows that agriculture and telecommunication positively and significantly contribute to economic growth, meaning that expansion in this sector would increase diversification of the economy from oil. But on the contrary, manufacturing showed a negative relationship with economic growth which was attributed to the un-explorative nature and neglect of the manufacturing sector (Riti & Gubak, 2016).

Many researchers have advanced that natural resource would be a blessing if the revenue from the natural resources such as oil and gas could be judiciously utilized in developing the non-natural resource sector and would improve the overall growth of the economy and help to avoid the Dutch disease symptom. A Johansen Co-integration approach was used to examine if oil revenue has improved the non-oil export in Nigeria in a study by Ifeakachukwu and John (2013), a long run co-integration shows a significant positive relationship between the non-oil export and oil revenue. This shows that the oil sector impeded the development of the non-oil sector which could imply resource curse in Nigeria. Therefore, it is needful for strategic effort towards ensuring that revenue derived from oil be used in enhancing the non-oil sector and hence escape the Dutch disease. It has been stated that neglecting the non-oil sector will pose a great danger and socioeconomic problem for the country. Such problems include: increasing unemployment rate; social unrest; macroeconomic volatility; increasing debt profile; and poor economic growth as

suggested in graphical and explorative analyses (Kida & Salami, 2019). It was therefore recommended that government should initiate policy that would encourage agriculture and manufacturing, as this is key to diversification from oil.

To further investigate the Dutch disease effect on Organization of Petroleum Exporting Countries (OPEC), a panel co-integration technique was used to examine the relationship between oil export, non-oil export and economic growth among the OPEC members. The result obtained from the panel data analysis shows a positive relationship between economic growth and oil export, and as well as a positive relation between oil export and non-oil export; and import and oil export. It is expected to have varied relationship depending on the country's national economic structure (Huseyin Karameliki et al 2017). A country-wise analysis showed variant results, with some positive relationships while others are negative. Understanding the evolution of resource curse has shown that in all probability, natural resource dependence affects economic growth negatively (Abubakr et al., 2017). Most literatures on resource curse have confirmed its existence, with no much focus on the mechanism of the transmission of the resource curse. The major mechanism of resource curse as highlighted by Abubakr et al. (2017), include the Dutch disease; volatility in the commodity price; economic mismanagement; rent seeking; and corruption and institutional quality. The term Dutch disease originated back to 1977 when a decline of the Dutch manufacturing activities was experienced upon a huge discovery of natural gas resource in the Netherland.

Most economists consider the Dutch disease as a very pronounced channel for the resource curse. It occurs as a result of increase in domestic income and the demand for goods when natural resource boom had already occurred. This therefore, leads to inflation and real exchange rate appreciation. The end result is that the price of non-resource commodity also increases even more than the global market price, and could affect manufacturing sector and other sectors. Another channel of resource curse is due to price volatility of the commodity which is common among natural resource commodity, this hamper effective planning and reduce economic growth. Again, it has been argued that resource abundance may induce over-confidence in government, especially during windfall. This could lead to lack of interest and development of other sectors. Many economists have argued that rent seeking is a channel of resource curse common among political elites who try to attract more benefits of the natural resource to themselves. During

windfall, the political elites widen the gap and inequalities between them and the low-income earners. The role played by corruption and institutional quality has been divergent from the view of many researchers (Abubakr et al., 2017). While some said that corruption and institutional quality have no role to play in resource curse, other said that a strong and effective institution is important in avoiding the resource curse.

Another area of manifestation of the resource curse is its effect on human capital accumulation. In a recent study on the effect of natural resource on human capital accumulation, analysis on panel data from China shows that natural resource dependence, negatively affects human capital accumulation (Sun et al., 2018). It has been seen that the crowding-out effect of human capital by natural resource occurs when people are attracted into the production sector of natural resource with zealously of quick riches which impede human capital development. This also could result in under development of the education sector (Shao & Yang, 2014).

Many studies on the resource curse have pointed to the fact that poor economic growth is as result of the neglect of the non-resource sector such as manufacturing, agriculture, tourism, etc. This leads to non-diversification of the economy, and subsequently impede the overall economic development. Diversification here, can be referred to as the growth per capita of the non-natural resource sector. The growth per capita of the different sectors enables a clearer comparison of the different contributions to economic growth by the various sectors of the economy. From this, inferences could be drawn on which sector(s) that need to be improved upon in order to have a more diversified economy. This is more sustainable for resource rich country because the impact of threat associated with price volatility and resource depletion could be reduced or avoided (Lashitew et al., 2020). In a recent research by The World Bank, it was pointed out that using the nature of association between the aggregate economic output and resource abundance could yield a spurious conclusion, since a negative relationship could be from the poor performance of the natural resource sector itself. It was recommended that in order to make appropriate policy recommendation towards avoiding resource curse, it is necessary to have an in-depth understanding of the drivers of diversification in natural resource-rich countries (Lashitew et al., 2020). The imperativeness of resource diversification should be considered by resource-rich countries since a diversified economy create more job opportunities compared to employment opportunities provided by natural

resources which have lower job opportunities. Diversification also makes the economy to be very resilient to shock caused by natural resource price volatility and resource depletion.

Nigeria is a resource-rich country, especially in oil and gas. Therefore, it is natural for one to expect a buoyant economy which would really reflect on the citizens, but unfortunately, the reverse is the case. This is also true for most oil-rich countries in Africa and Middle East where the abundance of oil and natural gas did not improve the standard of living of the people. The nature of oil-led development practiced by these countries came with some adverse consequences such as high poverty rate, poor health care, social unrest, civil conflict, environmental degradation, poor governance and corruption (Karl, 2007). It was stated that the problem of resource curse in oil-rich countries wasn't caused by the oil per se, but the structures and manner of incentives that over reliant on oil creates. According to (Karl (2007), various suggestions had been put forwards towards mitigating the problem of resource curse which is also code named "the paradox of plenty". These recommendations include transparency in management of oil revenues by oil companies and the exporting government, setting up a stabilization fund to cushion the effect of price shock, efficiency in government institutions etc. (Karl, 2007). He concluded that unless appropriate reforms are implemented, oil dependence will continue to pose a curse and not a blessing.

Over many decades, government had made attempt to diversify the country's export base away from oil in order to reduce the shock associated with oil price volatility. Achieving this has not been possible as the government lacks the political will to implement the necessary policies aimed towards diversification. In a study of the nature of relationship that exists between trade and sectoral export diversification in Nigeria by Nwosa & Fasina, (2020), the result shows that Nigeria export is majorly oil as the relationship between trade policy and oil export is very significant. Other sectors such as agriculture, manufacturing, mining, etc. of the economy show insignificant relationship between them and trade policy. This indicates how undiversified the Nigeria economy is. Some studies on resource diversification has shown that many resource-dependent countries found it difficult to detach themselves from resource dependency. Because of this strong affinity to the natural resources, the economics of these countries become vulnerable to problem of price volatility. Research by World Bank on diversification economies of natural resource-rich countries has shown that such diversification do not always result in competitiveness of

non-natural resources (Lashitew et al., 2020). Also, in a study of the effect of oil export and non-oil export on the Syria economic growth, it was found that both sectors contribute to economic growth, but with oil export responding more to shock. Therefore, to reduce the impact of this shock, diversification of the economy was recommended (Mohsen, 2015).

Resource curse has been found to be very common among resource-rich developing countries, despite this awareness, escaping this “trap” has never been easy for most developing countries. It has been pointed out that some key factors underpin the potential for escaping the natural resource curse. These factors include: governance quality, institutional quality, transparency and control of corruption (Adams et al., 2019). This therefore means that if there are effectiveness and efficiency in governance and prudent management of natural resources revenue, the menace of resource curse can be averted. In a study on the role of country’s institution in escaping resource curse in the case of Ghana, the study argued that country’s resource abundance is a huge economic advantage over countries with limited natural resource. It further stated that depending on how natural resources are extracted, managed and reported, the discovery of natural resources could either be a blessing or a curse (Adams et al., 2019; Dauvin & Guerreiro, 2017), which is in agreement with many studies on resource curse. Dauvin & Guerreiro (2017), are of the view that resource curse only exists in developing countries and it depends on the nature of studies and the measures of natural resources. The study suggested the needs for institutional reforms and development of regulations necessary for efficient and sustainable extraction of natural resource. Dauvin & Guerreiro (2017), suggested that the nature of interaction between the quality of institution and natural resources is important for growth and development. In a nutshell, the expected economic growth through natural resources can be achieved by strategic introduction of anti-corruption policy that promotes transparency, accountability and good management of natural resource revenue (Adams et al., 2019).

It was pointed out in a study that broke resource curse into three main scales such as macro, meso and micro, that the impact of natural resource extraction might be disproportionate on the people depending on their locations (Gilberthorpe & Papyrakis, 2015). Evidence from macro resource curse hinted that the people get less income on the average over time, which therefore affect their standard of living. Considering the resource curse at both macro and micro levels mean that that people living in the immediate

community where resource extraction is taking suffer more harm (that is micro resource curse) in addition to the impact resulting from macro resource curse. Such adverse impact on the host community of resource extraction are erosion, land, air and water pollution, acid rain and general environmental degradation (Gilberthorpe & Papyrakis, 2015). At the meso level, regions where natural resources are located appears to be more prone to civil war, conflict, crime and tension. This is particularly the case when the region is of multi-ethnic and multi-religious. It is therefore obvious that in as much there is resource curse across the country, the indigenous community suffers more than the urban elites (Gilberthorpe & Papyrakis, 2015). Having a holistic analysis of the resource curse across the macro, meso and micro levels would enable appropriate policy formulation that could reduce the impact of resource curse borne more by the indigenous community where natural resource is extracted.

The complexity of resource curse has shown that it also has effect on human capital accumulation and development. Research by Sun et al., (2018), shows that as investment in education increases, human capital accumulation increases significantly and thus reduce the adverse effect of natural resource dependence on human capital accumulation. Investment in education is expected to boost knowledge and skills acquisitions, which will in turn enhance productivity and economic growth through efficient management of natural resources. Although this may not be the case in many countries due to multi-dimensional mechanism of transmission of the natural resource curse.

An intriguing example that the Dutch disease or resource curse can be escaped is the case of Norway. Prior to the discovery of oil in Norway in 1970, Norway was lagging behind its neighboring countries like Denmark and Sweden in terms economic growth per capita. With the discovery and extraction of oil, Norway had been able to catch up with these countries after decades of oil production. This is contrary to the resource curse hypothesis which implied that extraction of natural resource would lead to contraction of economic growth in the long run (Larsen, 2006). It therefore means that with appropriate policy, natural resource would be a blessing and not a curse. The major policies applied in order to escape the Dutch disease include: Factor Movement Policy; Spending Effect Policy; Spill-over loss Policy; Education, Research and Development Policy; and Labor Market policy (Larsen, 2006). Factor Movement Policy which apply a central wage information system to inhibit general increase in wages, get the income controlled in order

to reduce the effect of oil sector on non-oil traded goods sector. The Spending Effect Policy was put in place in order to instill fiscal discipline and protect the economy from excessive demand and currency appreciation, as this may cause manufactured goods to be less competitive abroad. Spill-over loss Policy help to encourage domestic expertise in oil production and reduce the use of foreign expertise. Increase investment in oil research as well as get the export diversified. Education, Research and Development Policy that put emphasis on education, research and development which will help in building capacity and enhance productivity. Labor Market policy which enable the coordination and maintenance of centralized wage negotiation. The self-interest of the employers and employees would be avoided during negotiation in order to protect the aggregate economy. Industrial Policy that would help build and accumulate the requisite knowledge and skills and get the export base diversified. In the process, increase technological progress and human capital accumulation. In all, having efficient political system is all important in order to avoid distortion.

Another success story that natural resource can be a blessing is the case of an African country called Botswana. This country was able to achieve rapid economic growth upon discovery of diamond through good policy implementation. How Botswana did it was like a puzzle to the world considering the poor economic performance of many of its fellow African countries with huge natural resources. This success has been attributed to efficient institution, which was called the institution of private property (Daron Acemoglu, Simon Johnson, n.d.). The institution safeguards the property right of the investors and ensure political stability. The efficient management system put in place hindered political elites from revenue mismanagement (Daron Acemoglu, Simon Johnson, n.d.). To further deepen the argument that institutions play a significant role in determining whether natural resources would be a curse or a blessing, (Mehlum et al., 2006) claimed that the quality of institution is what determine if natural resources would be a blessing or a curse. They concluded that countries with abundant natural resources could be either growth winners or growth losers, stating that the reason for the divergent outcomes is as a result of the differences in institutional quality of the various countries. It was concluded that with grabber-friendly institution, more natural resources will result in a decrease in aggregate income, while with producer-friendly institution, more natural resources will result in an increase in aggregate income, and thus improving the standard of living. While countries

with producer-friendly institution escaped the resource curse, countries with grabber-friendly institution could not escape the resource curse (Mehlum et al., 2006). The resource curse situation could be worse when the institution become weakened. Though many can argue that the role of institutions remains neutral, since the variables for institution slowly change and validating the measure of institutional quality could be ambiguous, the fact remains that the role of institution is key in determining the contribution of natural resource to economic growth.

According to Muhammad (2016), the resource curse in Nigeria is caused more by corruption than the Dutch disease. It was stated here that the Dutch disease manifested in the long run in the agricultural sector as agriculture export as a share of GDP respond both to real exchange rate and oil revenue (Muhammad, 2016). Though some have argued that agricultural sector is neutral to natural resource revenue and that oil would impart more on manufacturing than agriculture which is the traditional tradable sector of the economy. The fact that the manufacturing sector in Nigeria and other developing countries are not fully developed compared to advanced countries that are highly industrialized and technologically inclined also makes it difficult for the developing countries to compete favorably. This could also exaggerate the impact of resource curse in the developing countries. For this reason, it becomes imperative to consider the peculiarity of individual country when making explanation of resource curse.

Detail understanding of the resource curse shows that the channels of transmission might vary for different countries. Though countries may share some similarities in transmission channels, the intrinsic peculiarity of the individual country cannot not be overemphasized. As a result of this, the solution to averting resource curse may not be the same, though there could be a more common solution for some countries. To address the problem of resource curse in a eight developing countries, Auty (1991), suggested that the revenue realized from natural resources during windfall should be reinvested into resource-based industrialization. The resource-based industrialization concept will enable the processing of the crude natural resource into a refined product, finished or semi-finished products. This value addition to the natural resource will create job opportunities and eventually increase economic growth. A foreseeable that may arise in the future with resource-based industrialization is price distortion (Auty, 1991), but this could be solved with appropriate policy implementation and setting up prices that are cost reflective.

Buttressing on the important of institution to economic growth, Robinson (2010), argued that major determinant of countries differences in economic growth and prosperity is the differences in economic institution. It was added that the promotion of democracy and accountability, check and balances and good institution would lead to economic growth and development (Robinson, 2010).

2.2: Overview of Nigeria Oil Production

Nigeria has been known to be the largest oil producer in Africa, and revenue from crude oil has been the mainstay of the economy. Crude oil was first discovered in Nigeria in the year 1956 in a place called Oloibiri in the then River state (But now Bayelsa State) of the Niger Delta region, while actual commercial production started in 1958. Few years later, refineries were built to locally refine the crude oil, but with low capacity utilization of these refineries, the domestic needs of the country for petroleum products could not be met, therefore importation from abroad set in for the country to meet its domestic requirement for refined products. Nigeria proven crude oil reserve as at the end of 2019 stood at 36.89 billion barrels of oil and condensate, and 203.45 trillion cubic feet of gas, which was a decrease of 2.16% for oil and condensate and decrease of 1.27% for gas when compared to 2018 value (NNPC 2019 ASB, 2019). The average daily production between the 2017 and 2019 ranges between 1.3 to 2.1 million barrels depending on OPEC (Organization of Petroleum Exportin Countries) crude production allocation (Barkindo, 2019; OPEC, 2018). Out of the total volume of the crude oil produced, only very little fraction is used domestically since the country owned refineries operate at a very poor capacity utilization. This reduces the contribution of crude oil to GDP and leaving the country to be heavily dependent on imported petroleum products. Since the nation is very dependent on oil as a source of revenue, the Nigeria economy is vulnerable to oil price volatility. For this reason it is very important to enact policy that promote value-addition to the crude for both domestic consumption and for export, and also encourage the diversification of the energy mix (Energy Commision of Nigeria, 2003).

In attempt to diversify the Nigeria economy away from oil, the federal government of Nigeria has made a lot of non-oil sector reform policy. One of such policies includes the Structural Adjustment Programme (SAP), which was a short-term reform initiated in 1986 and aimed at solving the economic problem of the country. The introduction of this policy

came with some gains at that time, which include increase in agricultural exports, increased government revenue, better external payment arrangement and reversal of the downward trend of the economy (D.O. Olayungbo & Olayemi, 2018), though the programme was said not be as effective as it was in other countries where it was introduced. The economic downturn experienced prior to the introduction of SAP was partly due to the sudden collapse of the world oil prices and the decrease of petroleum output as a result of OPEC cut of production. The introduction of SAP by the then military President Ibrahim Babangida was to reduce government involvement in economic activities and ensure the creation of conducive environment for business to thrive (Anyanwu, 1992).

Another policy reform introduced to boost the economy was the National Economic Empowerment and Development Strategy (NEEDS) which was a medium term plan from 2003 to 2007 and meant to move the economy in the desired direction by developing the different sectors of the economy like agriculture, manufacturing, etc. as well as put infrastructure and social services in place (D.O. Olayungbo & Olayemi, 2018). Similar reform called Local Economic Empowerment and Development Strategy (LEEDS) was also introduced at the state and local level in order to complement the role of NEEDS. (D.O. Olayungbo & Olayemi, 2018). The major targets of the NEEDS were the empowerment of the people and to improve social delivery; engendering economic growth especially in the non-oil sector; enhance efficiency and effectiveness in governance. In article on the examination impact of National Economic Empowerment Strategy on targeting poverty reduction by Ugoani (2017), it was discovered that NEEDS couldn't make the desired positive and significant impact on the reduction of poverty as poverty level rose from 55% in 2004 to 62 in 2011 despite the initiation and implementation in 2003. It was therefore recommended that there was a need for better and realizable development framework.

Additional reform attempt made in 2010 was the Vision 20:20 which was to run from the year 2010 to 2020 on medium term plan basis while adopting the strategy of the medium-term fiscal framework (MTFF) and medium-term expenditure framework (MTEF). This plan policy was expected to take advantage of the country's resource endowment to create a sustainable development path for the country's economy (Nigeria Vision 20:20, 2009).

With the failures of the previous policies, the federal government in 2017 introduced another policy reform named Economic Recovery and Growth Plan (ERGP) 2017 – 2020. The vision of the ERGP is to achieve a sustained and inclusive growth. The policy is aimed at increasing the productivity of the country as well as having sustainable diversification of the economy. On a broader scale, the reforms was geared towards restoring growth, enhancing human capacity and building a very globally competitive economy (Ministry of Budget & National Planning, 2017). Adekunle & Alokpa (2020), stated that though the ERGP show positive sign for growth, yet has not been able achieve its stated objectives three years into the implementation due to the dwindling crude oil price. Their study strongly recommend that the ERGP should be backed by law to make it more effective, otherwise it would be a mere stated objectives (Adekunle & Alokpa, 2020).

Chapter Three: Theoretical Framework

The theoretical framework adopted in this research is drawn from the Solow growth model which analyses the dynamics of economic growth and considers the economic output in relation to the production factors and technological changes. The model majorly emphasized on variables which are: output (Y), capital (K), Labor (L), Knowledge (A) (or sometimes called the effectiveness of labor). The economy at any time has the combination of these variables or factors to yield the output, (Romer, 2019). This model has been used in many literatures and was initially stated as shown below:

$$Y(t) = A(t) * F[K(t), L(t)] \quad (1)$$

Y(t) is the aggregate output, K(t) is the capital, L(t) is the labor force and A(t) is the level of technology.

It is important to know that A can enter the equation multiplicatively with L or K. if A enters in the form $Y=F(AK,L)$ it is called capital-augmenting, when A enters in the form $Y=F(K,AL)$, it is called labor-augmenting while if it enters in the form of $Y=AF(K,L)$, it is called Hicks-neutral technological process, which assume that change only affects technological progress and does not have effect on the balance of labor (Aljarallah & Angus, 2020; Romer, 2019).

Equation 1 above is expressed in the form of Cobb-Douglas production function as:

$$Y_t = AK_t^\alpha L_t^\beta \quad (2)$$

Where α and β are the shares of capital and labor in the total output respectively.

To put equation (2) into per capita form, we divide both sides by labor L_t .

$$Y_t / L_t = AK_t^\alpha L_t^\beta / L_t \quad (3)$$

$$Y_t / L_t = A \left(K_t^\alpha / L_t^\alpha \right) L_t^\alpha \left(L_t^\beta / L_t^\beta \right) L_t^\beta / L_t \quad (4)$$

Then, $Y_t/L_t=y_t$ which is output per capita, $K_t^\alpha/L_t^\alpha = k_t^\alpha$ which is the physical capital stock per worker.

We therefore have:

$$y_t = Ak_t^\alpha L_t^\beta \quad (5)$$

Since α and β are ratios which sum is 1, the equation above turns to:

$$y_t = Ak_t^\alpha$$

Taking the natural logarithm of both sides, we have:

$$\ln(y_t) = \ln(Ak_t^\alpha)$$

$$\ln(y_t) = \ln(A) + \ln(k_t^\alpha)$$

$$\ln(y_t) = \ln(A) + \alpha \ln(k_t) \quad (6)$$

Rearranging:

$$\ln(A) = \ln(y_t) - \alpha \ln(k_t) \quad (7)$$

“A” represents the Solow residual which is also called total factor productivity (TFP), and it is that component that explains the unexplained part of the output. “A” can be economic or noneconomic variable which explain the output. Drawing from previous literature, TFP can be a function of oil rent, institutional quality, corruption, (Aljarallah & Angus, 2020) etc.

$$\ln(A) = TFP$$

TFP=f(oilrent, oilrevp, corrupt, QI, edu, etc.)

Where oilrent represent oil rent, oilrevp represent oil revenue, corrupt is corruption and QI represent quality of institution. Edu represent educational expenses.

Considering all the equations above, we can have the following equations for estimation of the models to depict the transmission channels of resource curse.

$$\ln PGDP_t = \beta_0 + \beta_1 \ln GCF_t + \beta_2 Oilrent_t + \beta_3 Oilrevp_t + \beta_4 Corrupt_t + \beta_5 Edu_t \quad (8)$$

$$TFP_t = \beta_0 + \beta_1 Oilrent_t + \beta_2 Oilrevp_t + \beta_3 Edu_t + \beta_4 Exchrates_t \quad (9)$$

$$QI_t = \beta_0 + \beta_1 Oilrent_t + \beta_2 Oilrevp_t + \beta_3 Edu_t + \beta_4 PGDP_t \quad (10)$$

Equations (8) to (10) above are converted to econometric equations as shown below:

$$\ln PGDP_t = \beta_0 + \beta_1 \ln GCF_t + \beta_2 Oilrent_t + \beta_3 Oilrevp_t + \beta_4 Corrupt_t + \beta_5 Edu_t + \mu_t \quad (11)$$

$$TFP_t = \beta_0 + \beta_1 Oilrent_t + \beta_2 Oilrevp_t + \beta_3 Edu_t + \beta_4 Exchrates_t + \mu_t \quad (12)$$

$$QI_t = \beta_0 + \beta_1 Oilrent_t + \beta_2 Oilrevp_t + \beta_3 Edu_t + \beta_4 PGDP_t + \mu_t \quad (13)$$

Where β_0 is an intercept while $\beta_1, \beta_2, \beta_3$ and β_4 are constants slope coefficients of the independent variables which are the parameters to be estimated, and μ_t represents error or disturbance term.

The empirical model specified for this research is the Autoregressive Distributed Lag (ARDL) model. The ARDL is more appropriate for estimation in which the variables are of the orders $I(0)$ and $I(1)$, which is the case of this study. This specification was originally expressed by (Shin & Smith, 2001) as shown below

$$\begin{aligned} \Delta \ln PGDP_t = & \beta_0 + \sum_{i=1}^t \alpha_i \Delta \ln PGDP_{t-i} + \sum_{i=1}^t \beta_1 \Delta \ln GCF_{t-i} + \sum_{i=1}^t \beta_2 \Delta Oilrent_{t-i} + \sum_{i=1}^t \beta_3 \Delta Oilrevp_{t-i} + \sum_{i=1}^t \beta_4 \Delta Corrupt_{t-i} + \sum_{i=1}^t \beta_5 \Delta Educ_{t-i} + \\ & \lambda_1 \ln GDP_{t-1} + \lambda_2 \ln GCF_{t-1} + \lambda_3 Oilrent_{t-1} + \lambda_4 Oilrevpt_{t-1} + \lambda_5 Corrupt_{t-1} + \lambda_6 Educ_{t-1} + \mu_t \end{aligned} \quad (14)$$

$$\begin{aligned} \Delta TFP_t = & \beta_0 + \sum_{i=1}^t \beta_1 \Delta Oilrent_{t-i} + \sum_{i=1}^t \beta_2 \Delta Oilrevp_{t-i} + \sum_{i=1}^t \beta_3 \Delta Edu_{t-i} + \sum_{i=1}^t \beta_4 \Delta Exchrates_{t-i} \\ & + \lambda_1 TFP_{t-1} + \lambda_2 Oilrent_{t-1} + \lambda_3 Oilrevp_{t-1} + \lambda_4 Edu_{t-1} + \lambda_5 Exchrates_{t-1} + \mu_t \end{aligned} \quad (15)$$

$$\begin{aligned} \Delta QI_t = & \beta_0 + \sum_{i=1}^t \beta_1 \Delta Oilrent_{t-i} + \sum_{i=1}^t \beta_2 \Delta Oilrevp_{t-i} + \sum_{i=1}^t \beta_3 \Delta Edu_{t-i} + \sum_{i=1}^t \beta_4 \Delta PGDP_{t-i} \\ & + \lambda_1 QI_{t-1} + \lambda_2 Oilrent_{t-1} + \lambda_3 Oilrevp_{t-1} + \lambda_4 Edu_{t-1} + \lambda_5 PGDP_{t-1} + \mu_t \end{aligned} \quad (16)$$

Equations (14) to (16) above show both the short-run and the long-run components of the three models estimated in this research. The parameter, β_0 is the intercept and drift component while the parameters $\beta_1, \beta_2, \beta_3$, and β_4 are the coefficients used for short-run estimation, while the parameters $\lambda_1, \lambda_2, \lambda_3$, and λ_4 are the coefficients used for the long-run estimation. When $\lambda_1, \lambda_2, \lambda_3$, and λ_4 are equal to zero, it means there is no cointegration and hence no long run relationship. But if on the other hand that $\lambda_1, \lambda_2, \lambda_3$, and λ_4 are not equal to zero, it means there is cointegration and hence there is long run relationship.

3.1 Data and Methodology

3.1.1 Description of Variables

The variables used for this study are described below:

1. GDP Per Capita (PGDP): Gross Domestic product Per capita is the metric that breaks down a country economic output per person. It is derived by the dividing the GDP of a country by its mid-year population. The per capita GDP is more appropriate for assessing the well-being and standard of living of a country. It is the dependent variable used in this study to proxy economic growth and development. The PGDP data ranging from 1984 to 2017 were obtained from the World Development Indicator (WDI) of the World Bank ([https://data.worldbank.org/indicator/NY.GDP.PCAP.KN?locations=NG&view=chart, n.d.\)](https://data.worldbank.org/indicator/NY.GDP.PCAP.KN?locations=NG&view=chart, n.d.)). The GDP used here in this research is measured in US dollar at constant US dollar 2010.
2. Gross Capital Formation (GCF): This can be considered to as expenditures on fixed assets of the economy and addition to net variation in the measure of inventories. Here, fixed assets are considered to include important and critical infrastructure such as roads, plant & machinery, hospitals, buildings industries, inventory goods, etc. The gross capital formation is used here as one of the independent variables.
3. Oil Revenue (OilRev) and Oil Rent (Orent): The oil revenue is defined as the income (measured in billions of naira) received from the sales of crude oil. The data ranging from 1984 to 2017 was obtained from the World Bank and the Central Bank of Nigeria (CBN) and it is an important variable in the models since Nigeria economy is highly dependent on revenue from oil. It is important to note that for decades, over 90% of foreign exchange earnings is from crude oil, and several attempt through policies to diversify the economy have not yielded the desired result. Another variable close to the oil revenue used in this study is the oil rent which is measured as share of oil export in percentage of GDD. Oil rent which is a proceed of crude oil production. It is given in the form of percentage of oil export in GDP of the country. Being expressed as a

percentage share of oil export in GDP, the oil rent is more appropriate for estimating the level dependence of a country on oil resources.

4. Total Factor Productivity (TFP): The total factor productivity can be defined as the part of the output that is not explained by the input for production. The total factor productivity has been recognized as an important factor in the process of economic growth. Data selected ranges from 1984 to 2017 and its source is the Penn World Table (PWT) v9 (www.ggdg.net/pet). This variable is also expressed in the Nigeria local currency. It gives an indication of how efficiently and intensely the factors of production are being utilized.
5. Education Expenditure (Edu): The amount spent on education is considered important here since it is expected that adequate funding of academic institution will enhance human capital development. The amount is also expressed in local currency of billion naira. The data was obtained from the Central Bank of Nigeria (CBN) and it ranges from 1984 to 2017. If the amount spent on education increase, the acquisition of knowledge and skills could increase, which would eventually lead to high productivity and economic growth. This data was chosen to replace the number of school enrollment which would have been more appropriate data, since adequate data on school enrollment is unavailable for this research.
6. Quality of Institution (QI): Several literatures have considered effective and efficient quality as a necessity for profitable management of natural resource wealth. The data used for this purpose was obtained from International Country Risk Guide (ICRG) which was provided as control for corruption. The control of corruption was ranked 0 to 6, with country ranking 0 as most corrupt while the less corrupt country is ranked level 6. It is expected that countries which are ranked high in the control of corruption should have more efficient institution while countries with low ranking will have less efficient institution. Therefore, it would be adequate to use control of corruption as appropriate variable for quality of institution. Using the same analogy, the variable for corruption is obtained by taking the reciprocal of control for corruption as this will make interpretation of the model easier. Higher value of corruption implies that

government officials and agencies are likely to be involved in corrupt practices. According International Country Risk Guide (ICRG), corruption stands as a great threat to business and foreign investment, it creates distortion in economic activities and cause inefficiency (Aljarallah & Angus, 2020). Corruption cause public officials and political elites to use public positions for personal interest and gain.

Descriptive Statistics

The table 3.1 below shows the descriptive statistics of the variables used in their level forms:

Table 3.1: Descriptive Statistics

	PGDP	PGCF	OILREVP	OILRENT	EDUC	CORRUPT	EXCHRAT E	QI	TFP
Mean	1756.887	224.3807	15923.71	12.82451	110.2913	0.662255	89.89925	1.602941	0.737200
Median	1513.631	192.2683	11293.85	13.41045	50.78364	0.666667	106.4643	1.500000	0.713596
Maximum	2563.900	419.4257	54537.43	26.43288	403.9571	1.000000	305.7901	2.000000	1.186036
Minimum	1324.297	105.9212	94.52769	2.812282	0.198904	0.500000	0.766527	1.000000	0.399621
Std. Dev.	446.2846	102.3370	16686.07	5.594939	136.8471	0.177397	79.84605	0.367022	0.278095
Skewness	0.648593	0.739810	0.752856	0.172531	1.065819	0.970075	0.621267	-0.332781	0.159972
Kurtosis	1.805365	1.995841	2.263966	2.641916	2.599650	2.747720	2.843102	1.931976	1.319801
Jarque-Bera	4.405609	4.529946	3.979292	0.350331	6.664227	5.422754	2.222054	2.243502	4.144363
Probability	0.110493	0.103833	0.136744	0.839318	0.035718	0.066445	0.329221	0.325709	0.125911
Sum	59734.17	7628.943	541406.1	436.0333	3749.905	22.51667	3056.575	54.50000	25.06480
Sum Sq. Dev.	6572609.	345604.2	9.19E+09	1033.010	617995.5	1.038505	210387.9	4.445261	2.552116
Observation s	34	34	34	34	34	34	34	34	34

From the table, the mean and the median of OILRENT, TFP, CORRUPT and QI are very close, which shows some measure of symmetry among these variables, while other variables such PGDP, PGCF, OILREVP, EDU and EXCHRATE are not symmetric. From the values of the standard deviation, it can be seen that GDP per capita (PGDP) and gross capital formation per capita (PGCF) with a standard deviation of 446.28 and 102.33 respectively are the most volatile variables while corruption is the least volatile with a standard deviation of 0.97. The values of the skewness show that the distribution has a long right tail since they all, (except institutional quality (QI)) have positive values. For the Kurtosis, all the values are less than 3 therefore, the distributions are therefore flat (platykurtic) relative to normal. Though oil revenue and gross capital formation are closer to normal from the value of the Kurtosis, considering the probability of the of Jarque-Bera shows that only oil rent and exchange rate appear to be closer to normal distribution.

3.1.2 Graph of Variables

The graphs of the variables used in this research are obtained as shown in order to fully understand the behavior and trend of the variables.

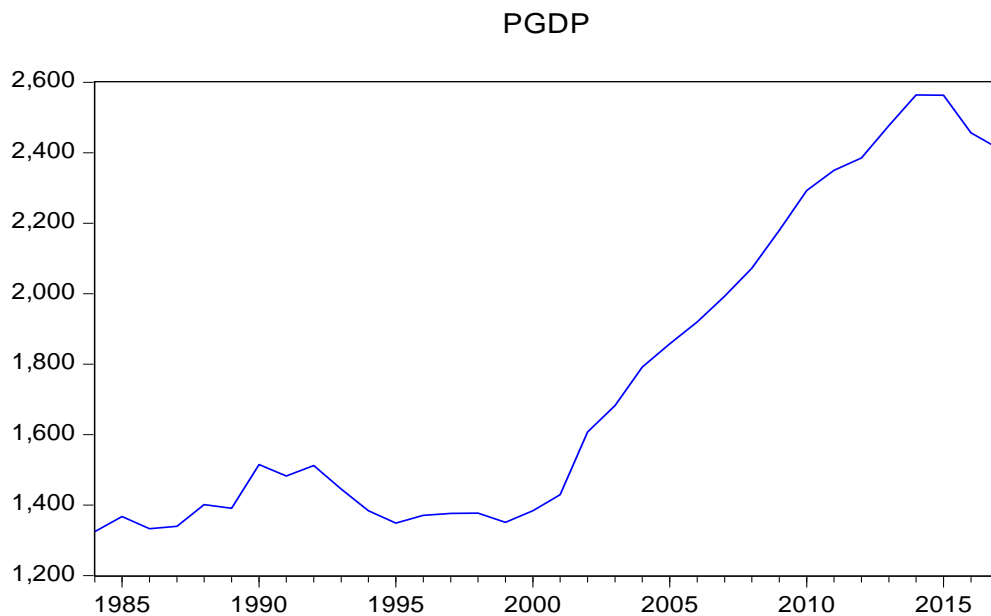


Figure 3.1: Graph of per capita GDP (in US Dollar) from 1984 - 2017

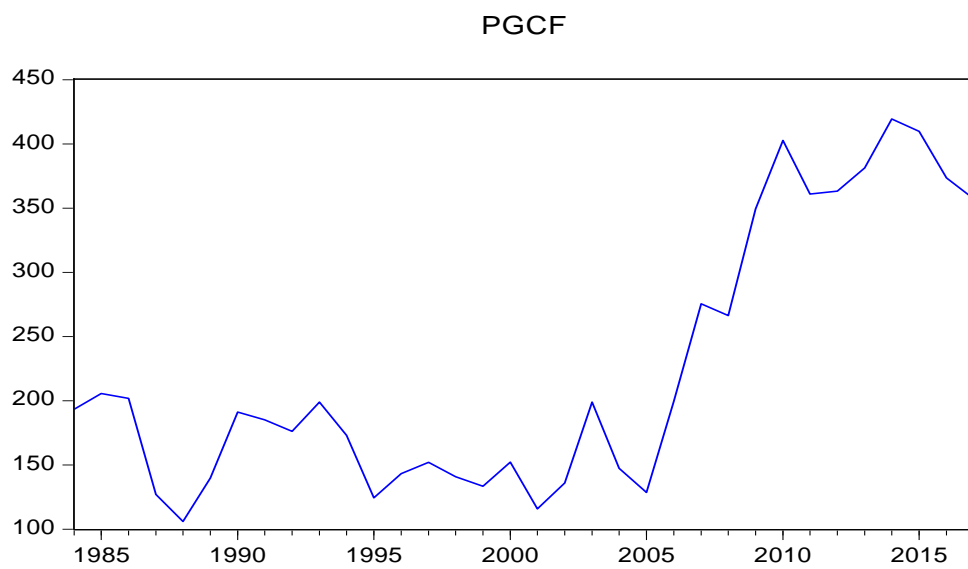


Figure 3.2: Graph of gross capital formation (US Dollar) from 1984 - 2017

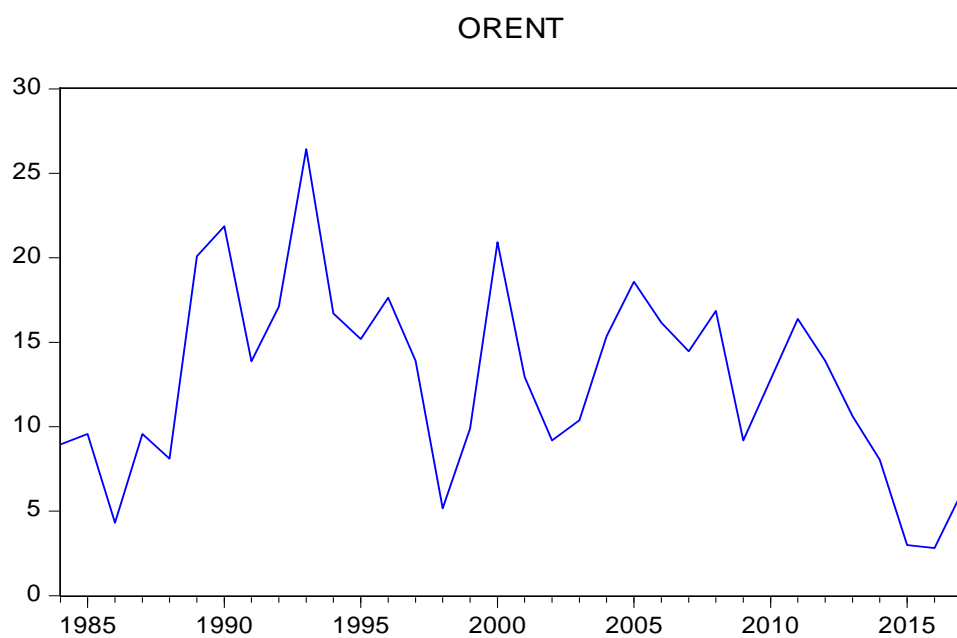


Figure 3.3: Graph oil rent (in % of GDP) from 1984 - 2017

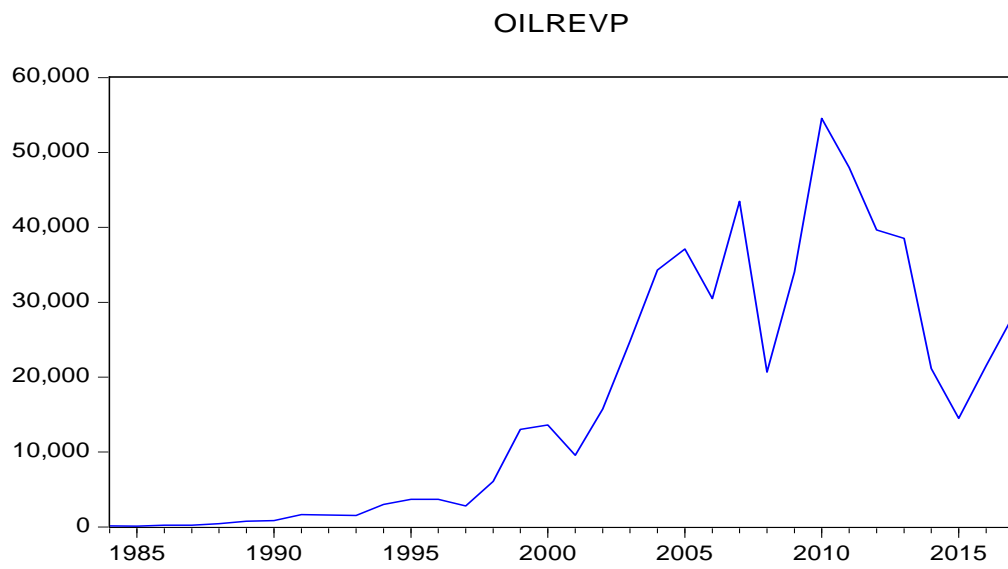


Figure 3.4: Graph of oil revenue (in billion naira) from 1984 - 2017

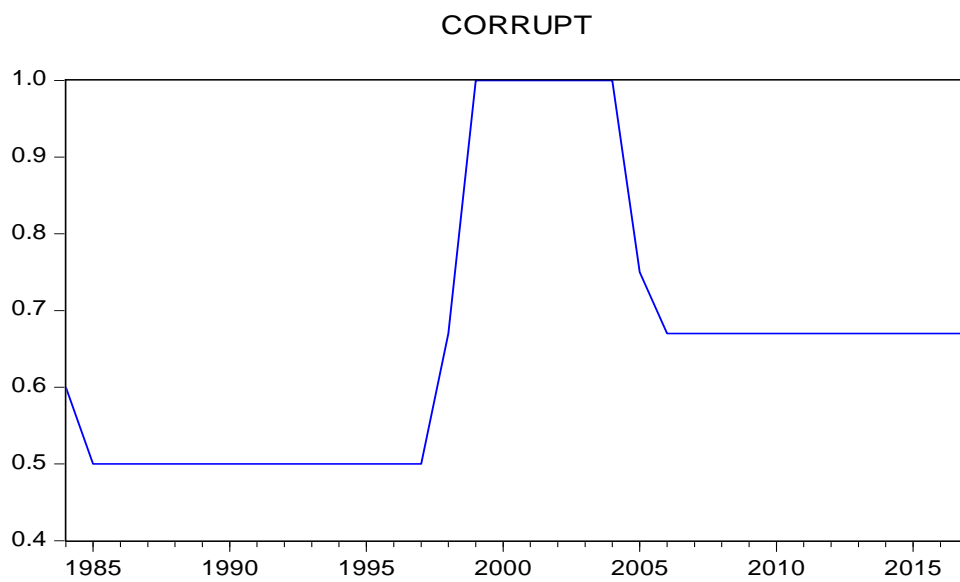


Figure 3.5: Graph of corruption from 1984 - 2017

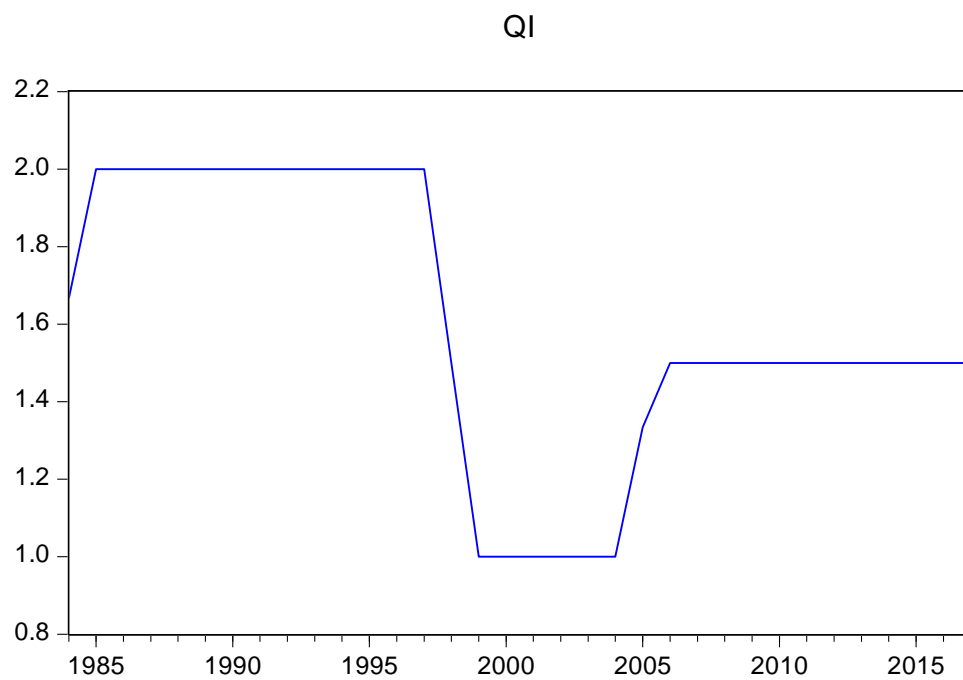


Figure 3.6: Graph quality of institution from 1984 - 2017

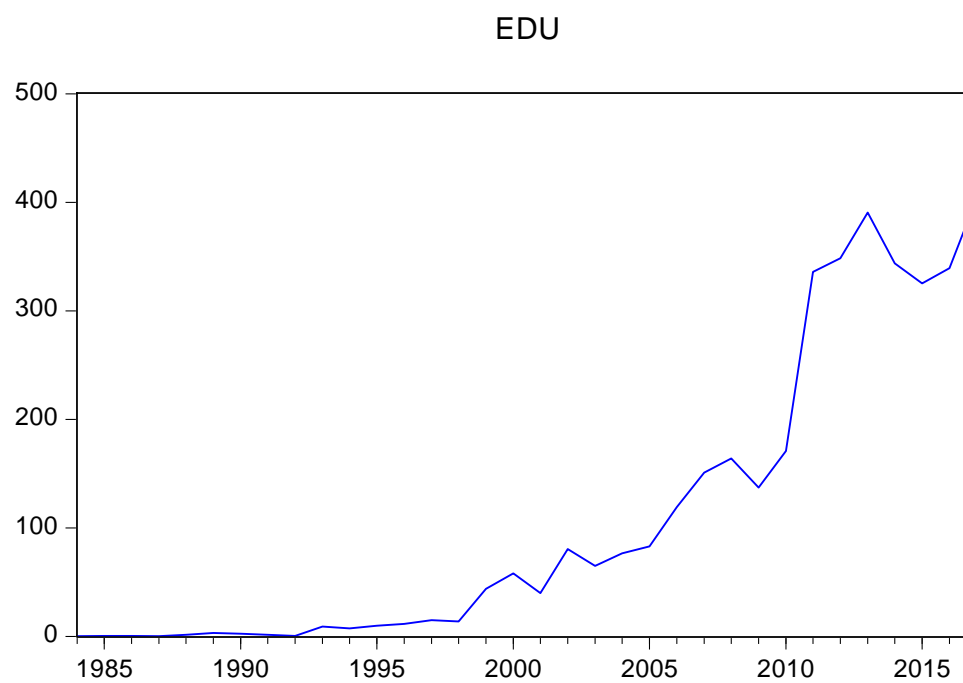


Figure 3.7: Graph education expenditure (in billion naira) from 1984 - 2017

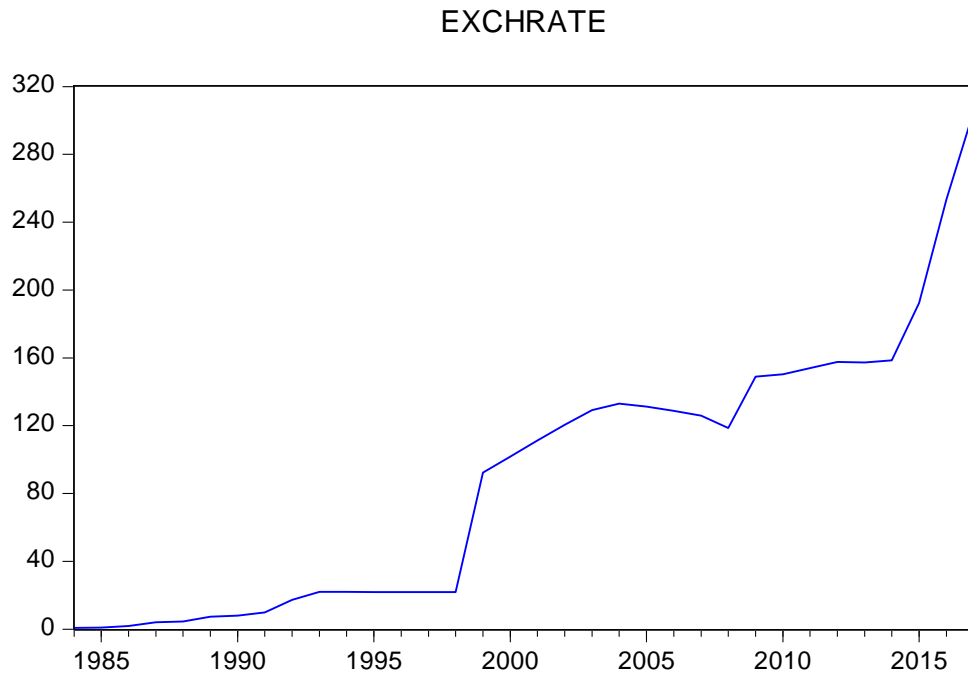


Figure 3.8: Graph exchange rate from (naira to US dollar) 1984 – 2017

3.1.3 Unit Root Test

In order to evaluate the behavior of the series over time, that is whether the series is trending upward or downward, it is important to carry out a unit root test. The unit root test is used to evaluate the stability and predictability of the time series data. Several tests are available in literatures for testing for unit roots, and they include: Augmented Dickey Fuller (ADF), Phillips-Perron (PP), Dickey Fuller GLS (DFGLS), Kwiatkowski-Phillips-Schmidt-Shin (KPSS), Ng-Perron, Elliott-Rothernberg-Stock Point-optimal. If the series has a unit root, it means the series is unstable and unpredictable, and for that reason it cannot be used to make valid prediction and forecasting. In this research, the Augmented Dickey Fuller (ADF) test and Phillips-Perron (PP), are used to determine whether the series have a unit root or not. With the result of the unit root test, one can also determine how the series behave when there is a shock. If a series has a unit root, the impact of shock may be permanent while the impact may be temporary if the series has no unit root. The null hypothesis is that the series has a unit root, which can be rejected or not at a particular critical value of the desired level of significance (usually at 5%). The unit root is tested on

the variables in the form in which they appear on the estimation model. The variables are tested at level first, if not stationary at level, then we test at first difference until the variable become stationary (that is no unit root). The unit roots are tested at different form of equations to include constant; trend and constant; and none. Testing the unit root requires the selection of the appropriate lag, which is selected using the Akaike Info Criteria (AIC). For economic analysis, only variables stationary at level and first difference are considered in econometrics as no meaningful economic deduction can be made from variable stationary at second difference. Depending on the order of integration after performing the unit root test, the model is tested for the existence of cointegration.

3.1.4 Testing for Cointegration

The result of the unit root is very relevant for the model to be estimated. Depending at what stage stationarity is attained by the variables, the following three cases can be obtained after testing for unit root:

Case 1: Series in the model are all stationary at levels: When all the series are stationary at level, cointegration test is not needed since any shock to the model in the short-run, quickly adjust to the long-run. It therefore means that only the long-run model should be estimated. In long run model, the model is static and none of the variables are lagged nor differenced. Thus when the variables are stationary at level (that is of order of integration $I(0)$) short-run estimation are not necessary.

Case 2: Series in the model are all stationary at first difference: All the series here are at the same order of cointegration $I(1)$ and are non-stationary. The variables in this case are unpredictable and there is need to test for cointegration in order to ascertain the relevance of the model. If there is cointegration, it means there is a relationship among the series in the model, and the model can be combined linearly. This shows that if there is shock in the short-run, it quickly adjusts and converge to the long-run. So, when there is cointegration, both short-run and long-run are estimated. But if there is no cointegration, only the short-run model is estimated, there is no long-run relationship. In literature, two main tests are applied when all series are $I(1)$ order of cointegration. They are Engle-Granger and Johansen cointegration.

Case 3: Series are of different order of cointegration. When the series are of different order of cointegration (that is $I(0)$ and $I(1)$), the appropriate test to do is bound cointegration test. If there is no cointegration from the bound test, there is no long-run relationship between the series, and hence only the short-run model is estimated. But if there is cointegration, it means there is long-run relationship, and therefore, both the short-run and long-run models are estimated.

3.1.5: Bound Cointegration Test

The bound test is considered when the series are of different order of cointegration. Three options are available for the decision criteria and they are:

- i. If the calculated F-Statistics is greater than the Critical Value Bound for the upper bound $I(1)$, it is therefore concluded that there is cointegration, and hence a long-run relationship exist. When there is cointegration, both the short-run and long-run models are estimated.
- ii. If the calculated F-Statistics is lower than the Critical Value Bound for the lower bound $I(0)$, it is therefore concluded that there is no cointegration, and hence no long-run relationship exist. When there is no cointegration, only the short-run model is estimated.
- iii. An inclusive test results when the F-Statistics falls between the upper bound value $I(1)$ and lower bound value $I(0)$.

It is important to note that the Autoregressive distributed lag (ARDL) model is the underlying model to apply when estimating series that are of different order of cointegration.

3.2: Post Estimation Test

When a model is estimated, it is necessary to conduct a post estimation test on the model in order to ensure the validity of the models and the interpretations drawn from them. Most relevant post estimation tests in literature are linearity test (that is the Ramsey RESET test), Serial Correlation test, Heteroscedasticity and CUSUM Stability test (Gujarati, n.d.; Jeffery M. Woodridge, n.d.).

- i. **Linearity:** This a specification test to ensure that the model is correctly specified. It helps to test for linear relationship between the dependent variable and the independent variables in the model. The null hypothesis is that the model under study is linear or appropriately specified. When this assumption is violated, the implication is that the model is not correctly specified. Ignoring the violation could give rise to inconsistent or biased model. The diagnostic test often use for testing linearity is Ramsey RESET Test (Regression Equation Specification Error Test).
- ii. **Serial Correlation (or Autocorrelation):** The assumption of the non-autocorrelation implies that the disturbance terms of the variables are not correlated. Once this assumption is violated, it therefore means there is the presence of serial correlation or autocorrelation. Though in the presence of serial correlation the estimator is still unbiased and consistent, yet the model is no longer efficient. The serial correlation used in this research is the Breusch-Godfrey LM test, which is commonly used in literatures. The null hypothesis is there no serial correlation while the alternative hypothesis is that there is serial correlation.
- iii. **Heteroscedasticity:** The assumption of homoscedasticity model means that each disturbance term has constant finite variance. The violation of this assumption implies that the model has heteroscedasticity. Ignoring the presence of heteroscedasticity when it is there makes the statistical inference from the f-statistics and t-statistics invalid, though the parameter estimates are still unbiased and consistent. In literatures, the presence heteroscedasticity can be detected by Breusch-Pagan test, Harvey-Godfrey test, the white test, Glesjer test, etc. In this research, the Breusch-Pagan test is adopted and it is popular in many literatures. The null hypothesis is that there is no presence of heteroscedasticity while the alternative state that there is presence of heteroscedasticity.
- iv. **Stability Test (CUSUM Test):** The CUSUM (cumulative sum control) test for stability of the model is used to enables us to determine the appropriateness and stability of the model. This helps to show if the model is suitable for appropriate decision making. Once the CUSUM plot of the model is within the desired level of the critical bound, it implies the model do not suffer from any form structural instability under the period covered by the study. The CUSUM and CUSUM square test were used in this research.

Chapter Four: Result and Discussion

4.1: Unit Root Test Result

The test for unit root was done in order to determine the stationarity of the series and also to be able to ascertain their order of cointegration. The result of the unit root is as shown in the table 4.1 below:

Table 4.1: Table of unit test result

LEVEL						
Variable	Augmented Dickey Fuller (ADF)			Phillip-Perron		
	Constant	Constant & trend	None	Constant	Constant & trend	None
PGDP	-1.278	-2.081	1.250	-0.012	-1.582	2.088
LnPGDP	-1.214	-2.138	0.928	-0.172	-1.603	2.079
LnPGCF	-1.051	-1.799	0.969	-1.065	-2.374	0.530
ORENT	-3.059**	-3.268*	-1.160	-3.059**	-3.138	-0.911
CORRUPT	-2.129	-2.047	-0.199	-1.625	-1.711	-0.303
QI	-2.155	-2.066	-0.667	-1.457	-1.850	-0.470
EDU	0.728	-1.499	1.810	1.801	-1.039	2.525
EXCHRATE	1.103	-1.470	2.105	1.602	-0.339	3.095
TFP	-0.802	-3.332*	1.066	-0.546	-2.048	1.803
OILREVP	-1.538	-2.199	-0.785	-1.439	-2.234	-0.647
FIRST DIFFERENCE						
PGDP	-1.830	-1.746	-1.618*	-3.279**	-3.199	-2.938***
LnPGDP	-2.294	-2.015	-1.709*	-3.742***	-3.806**	-3.278***
LnPGCF	-3.112**	-2.821	-2.947***	-5.127***	-5.251***	-5.196***
CORRUPT	-3.918***	-3.893**	-3.969***	-3.914***	-3.850**	-3.967***
QI	-3.595***	-3.554*	-3.634***	-3.966***	-3.892**	-4.017***
EDU	-4.916***	-5.247***	-4.441***	-4.844***	-9.828***	-4.390***
EXCHRATE	-3.209**	-3.624**	-2.601**	-3.209**	-3.620**	-2.515**
TFP	-4.524***	-4.449***	-4.384***	-6.309***	-6.103***	-4.296***
OILREVP	-6.132***	-6.071***	-6.191***	-6.132***	-6.071***	-6.191***

Note ***, **, * implies significance at 1%, 5% and 10% level respectively

The result in Table 4.1 above can simply be summarized and presented as below

Table 4.2: Summarized table of unit root test result

	Augmented Dickey Fuller ADF			Phillip-Perron		
	Level	First Difference	I(d)	Level	First Difference	I(d)
PGDP	-2.081	-1.618*	I(1)	-1.582	-2.938***	I(1)
LnPGDP	-2.138	-1.709*	I(1)	-1.603	-3.742***	I(1)
LnPGCF	-1.799	-2.947***	I(1)	-2.374	-5.251***	I(1)
ORENT	-3.059**	-	I(0)	-3.059**	-	I(0)
CORRUPT	-2.129	-3.969***	I(1)	-1.711	-3.96***	I(1)
QI	-2.155	-3.634***	I(1)	-1.850	-4.017***	I(1)
EDU	-1.499	-5.247***	I(1)	-1.039	-9.829***	I(1)
EXCHRATE	-1.470	-3.624**	I(1)	-0.339	-3.620**	I(1)
TFP	-3.332*	-4.524***	I(1)	-2.048	-6.309***	I(1)
OILREVP	-2.199	-6.191***	I(1)	-2.234	-6.191***	I(1)

From the result of the unit root test shown in Table 4.2, it can be seen that the series are combination of I(0) and I(1) order of cointegration. Therefore, to determine if there is short-run or long-run relationship, the bound cointegration tests are conducted on the three models for this study.

4.2: The Impact of Oil Rent on Economic Growth

4.2.1: Bound Test Result

The result of the bound test for the first model which is the relationship between economic growth and oil rent is shown below:

Null Hypothesis H_0 : there is no long-run relationship

Alternative Hypothesis H_1 : there is long-run relationship

Table 4.2.1: Bound test result for model of oil rent and GDP

Test Statistics	Value	Significance	I(0)	I(1)
F-Statistics	5.20	10%	2.41	3.52
K	5	5%	2.91	4.19
		1%	4.13	5.76

From table 4.2.1 above, the value (5.20) of the F-statistics is greater than the upper bound I(1) value (4.19) at 5% significant level. Therefore, the null hypothesis of no long-run relationship is rejected. This means there is cointegration and thus, both the short-run and long-run model is estimated.

The result of the short-run model is shown in the table 4.2.2 below.

$$\ln PGDP_t = \beta_0 + \beta_1 \ln GCF_t + \beta_2 Oilrent_t + \beta_3 Oilrevp_t + \beta_4 Corrupt_t + \beta_5 Edu_t + \mu_t$$

Table 4.2.2: Short-run model of the impact of oil rent on GDP per capita

Variables	Coefficients	t-stat	p-values
Oil Rent	-0.0021*	-2.106	0.0537
Oil Rent (-1)	0.0020**	2.173	0.0474
Oil Revenue	2.09E-06**	2.269	0.0396
Corruption	-0.1723**	-2.704	0.0172
Corruption (-1)	-0.2151**	-2.946	0.0106
Education Expenses	7.71E-05	0.661	0.5191
Education Expenses (-1)	-0.0003**	-2.437	0.0288
Education Expenses (-2)	0.0003**	2.367	0.0329
Gross Capital Formation	0.2031***	7.298	0.0000
Gross Capital Formation (-1)	0.0147	0.745	0.4684
Gross Capital Formation (-2)	0.1113***	4.323	0.0007
CointEq (-1)	-0.5840***	-7.214	0.0000

Table 4.2.3: The long-run result of the Impact of Oil Rent GDP per capita

Variables	Coefficients	t-stat	p-values
Oil Rent	-0.0106**	-2.319	0.0360
Oil Revenue	3.59E-06**	2.565	0.0224
Corruption	0.1050	1.214	0.2446
Education	0.0005*	1.825	0.0894
Gross Capital Formation	0.1872**	2.259	0.0404
Constant	6.4288***	14.133	0.0000

4.2.2: Interpretation of Result of the Impact of Oil Rent on GDP Per Capita

The result of the short-run model shows that oil revenue has a positive coefficient which is significant at 5%, but the contribution to economic growth is infinitesimal. Oil rent has a negative coefficient at level but marginally significant at 10%. It shows as oil rent increases by 1%, it leads to 0.2% decrease in per capita GDP, this indicates the existence of resource curse. But it is discovered that at first lag, the coefficient is positive and significant at 5% which shows 0.2% decline in per capita GDP as oil rent increase by 1%. The negative coefficient of oil rent implied that dependence on oil resource is what actually lead to resource curse since oil rent is expressed as share of GDP. From the coefficients of both oil revenue and oil rent, it can be inferred that the overall contribution to economic growth of oil resource in the short run is very minimal. Since a unit increase in oil revenue leads to less than a proportionate increase in economic growth, the relationship between oil revenue and GDP is therefore an inelastic one. This result is similar to that obtained in literature for some developing countries like Kuwait, Angola, etc.

The relationship between corruption and economic growth is negative in the short-run and it is also significant at 5% both at level and first lag. Corruption causes deterioration of government institutions, introduce inefficiencies and economic distortions, which eventually impede economic growth. The result shows that a unit increase in the level of

corruption leads to a decrease in economic growth. For the education expenses, which is one of the control variables used in the research, the result shows that the coefficient of education expenses at level is insignificant, but at first lag the coefficient is negative and significant at 5%. At second lag, the coefficient is positive and significant at 5%, this shows that the expenses on education which is more of social expenses do not immediately translate to economic growth. The gross capital formation has a positive coefficient which is significant at 1% both at level and second lag. From the result, 1% increase in gross capital formation lead to an increase in economic growth by 0.2% and 0.1% respectively at level and second lag in the short run. This is expected because physical capital and infrastructural development enhance economic growth and development.

The error correction term is negative with a value of 0.584, this means that the speed of adjustment from short-run equilibrium to long run is 58%.

In the long-run, the result shows that oil rent has negative coefficient which is significant at 5% level. The value of the coefficient indicates that 1% increase in oil rent lead to 1% decrease, which shows an evidence of resource curse in Nigeria. This occurs when there is over-dependence on natural resources by a natural resource-rich country. The coefficient of oil revenue being positive though quite infinitesimal shows that is not having natural resources that result in resource curse but the over-dependence of oil resource as measured by oil rent is what lead to resource curse. The coefficient of education expenses is positive and significant only at 10% in the long run. The result shows that one billion naira increase in education expenses leads to 0.05% increase in per capita GDP. For gross capital formation, the coefficient is positive and significant at 5%, it shows that an increase in gross capital formation by 1% will lead to 0.19% increase in per capita GDP in the long run.

4.2.3: Post Diagnostic Test for model of GDP and Oil Rent

To ensure the reliability and validity of the interpretations drawn from the model, it is necessary to check that the assumptions of the main diagnostic are not violated. It is therefore necessary to run a diagnostic test in order to ascertain the reliability of the model. The main diagnostic tests conducted are heteroscedasticity, autocorrelation, Ramsey

RESET, normality test and stability test. The results of the various tests are provided as shown below:

Linearity test:

The test mostly use for linearity is the Ramsey RESET (Regression Equation Specification Error Test). It is used to check if the model is appropriately specified. In Eviews, if the p-value of the F-statistics and t-statistics is greater than 5%, we do not reject the null hypothesis, which implies that there is no specification error, otherwise we reject the null hypothesis. The result of the Ramsey RESET is as shown in Table 4.2.1 below.

Null Hypothesis H_0 : The model is correctly specified

Alternative Hypothesis H_1 : The model is not correctly specified.

Table 4.2.1: Table of Ramsey RESET for GDP and oil rent model

	Value	Probability
t-statistics	0.1454	0.8873
F-statistics	0.0211	0.8873

From Table 4.2.1 above, the probability of F-statistics is 0.89 which is more than 5% (0.05), therefore we do not reject the null hypothesis, which implies that the model is correctly specified.

Serial Correlation test:

Serial correlation test is used to check if the disturbance terms of the independent variables are correlated. The presence of serial correlation (or autocorrelation) renders the inference drawn from the model invalid.

The result for the Serial Correlation test using the Breusch-Godfrey LM test is as shown below:

Null Hypothesis H_0 : There is no serial correlation

Alternative Hypothesis H_1 : There is serial correlation

Table 4.2.2: Table of serial correlation for model of GDP and oil rent

	Value	Probability
F-statistics	3.9801	0.0578
Obs*R-squared	14.0805	0.0009

Since the probability value (0.058) of F-statistics is greater than 5% (0.05), we do not reject the null hypothesis, therefore the model of the impact of oil rent on GDP do not have Serial Correlation problem.

Heteroscedasticity test:

Heteroscedasticity exists in a model when the residuals of the independent variables are not constant. The null hypothesis of no heteroscedasticity is not rejected when the P-value is greater than 5%. The heteroscedasticity result is shown below.

Null Hypothesis H_0 : There is no heteroscedasticity

Alternative Hypothesis H_1 : There is heteroscedasticity

Table 4.2.3: Heteroskedasticity Test. Breusch-Pagan-Godfrey: GDP and oil rent

F-Statistics	0.7534	Probability	0.7133
Obs*R-squared	16.5643	Prob Chi-square	0.5532
Scaled explained SS	2.0764	Prob Chi-square	1.0000

The probability value (0.71) of F-statistics is greater than 5%, so we do not reject the null hypothesis. Therefore, there is no heteroscedasticity problem for the model of the oil rent on GDP.

Normality test:

The assumption for normality is that the disturbance terms are normally distributed, it then means the disturbance terms are identically and independently distributed with zero mean and common variance. The violation of this assumption implies that the disturbance term is not normally distributed. One of the prominent tests for normality is the Jarque Bera test and the null hypothesis is that the disturbance term is normally distributed while the

alternative hypothesis is that the disturbance term is not normally distributed. If the probability of the Jarque Bera is greater than the chosen level of significance, it shows the disturbance terms is normally distributed, otherwise it not normally distributed. Figure 4.2.1 below shows that the normality assumption is not violated since the probability value of the Jarque Bera is greater than 10%, which is usually the standard significant level.

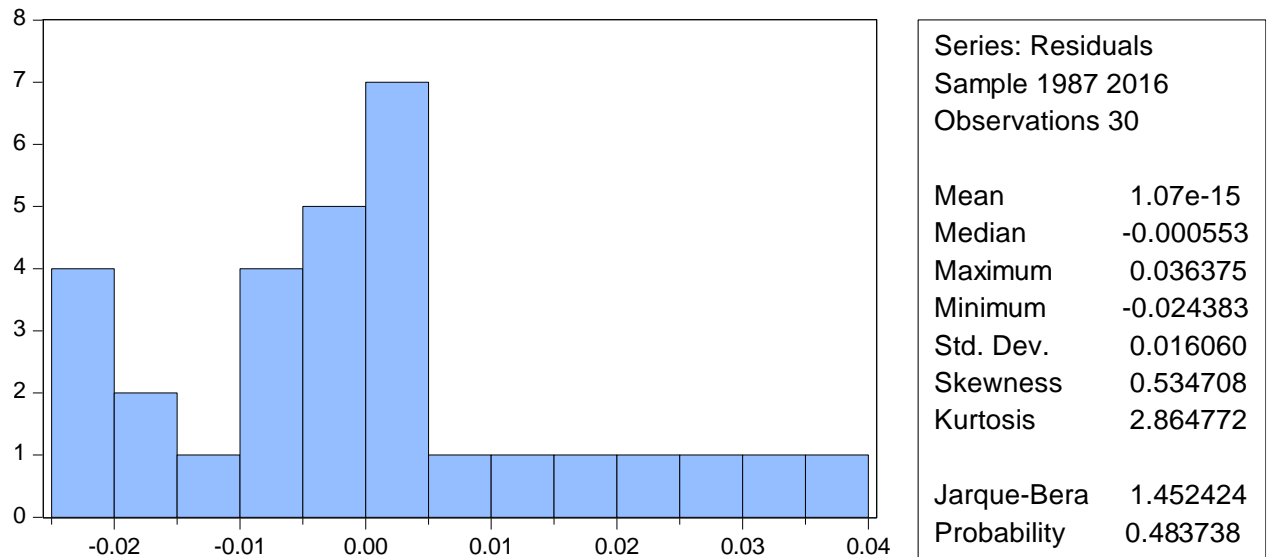


Figure 4.2.1: Normality test for model of oil rent and GDP

Stability Test:

The cumulative sum control chart (CUSUM) and CUSUM of squares test were conducted to determine the stability of the model and hence the validity of the model estimation. For the period of study, the model of impact of oil rent on GDP do not suffer instability as shown figure 4.2.2 below:

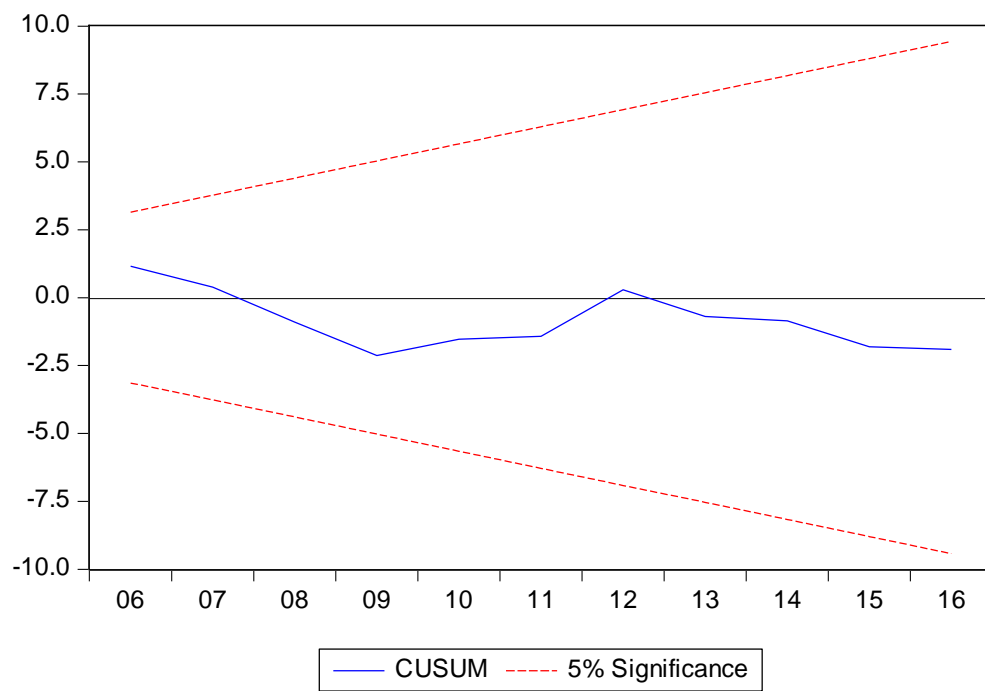


Figure 4.2.2: CUSUM Chart for GDP and oil rent model

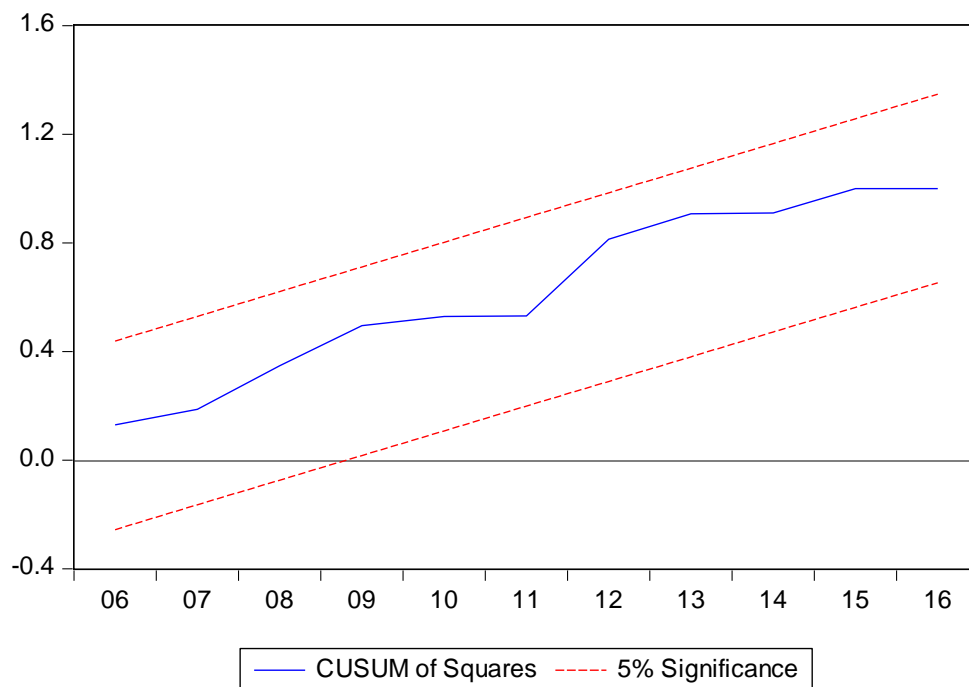


Figure 4.2.3: CUSUM of Square Chart for GDP and oil rent model

4.3: The Impact of Oil Revenue on total factor productivity (TFP)

4.3.1: Bound Test

The result for the bound cointegration for the second model is as shown below:

Null Hypothesis H_0 : there is no long-run relationship

Alternative Hypothesis H_1 : there is long-run relationship

Table 4.3.1: Table of bound test for the model of oil resource and TFP

Test Statistics	Value	Significance	I(0)	I(1)
F-Statistics	8.943	10%	2.525	3.56
K	4	5%	3.058	4.223
		1%	4.28	5.84

Since the value of the F-Statistic (8.943) is greater than the upper bound I(1) value at 5% significance level, we reject the null hypothesis. This means there is cointegration among the variables and hence, long run relationship exists among them. Therefore, both the short run and long run models are estimated. Table 4.3.2 and Table 4.3.3 below respectively show the short run and long run relationship between oil revenue and total factor productivity (TFP)

$$TFP_t = \beta_0 + \beta_1 Oilrent_t + \beta_2 Oilrevp_t + \beta_3 Edu_t + \beta_4 Exchrates_t + \mu_t$$

Table 4.3.2: Table of short-run model of impact of oil revenue on TFP

Variable	Coefficient	t-Statistics	p-value
Oil rent	-0.0031*	-2.138	0.065
Oil rent (-1)	0.0044**	2.795	0.0234
Oil rent (-2)	-0.00804	-0.516	0.6205
Oil Revenue	-1.98E-06	-1.687	0.1300
Oil Revenue (-1)	-1.12E-05***	-6.603	0.0002
Oil Revenue (-2)	-3.44E-06*	-2.275	0.0525
Education Exp	-8.83E-07	-0.004	0.9967
Education Exp (-1)	0.0015***	6.2454	0.0002
Exchange rate	0.0009*	2.035	0.076
Exchange rate (-1)	0.0004	0.891	0.3991
Exchange rate (-2)	0.0047***	8.883	0.0000
Exchange rate (-3)	0.0031***	4.838	0.0013
CointEq(-1)	-0.5571***	-9.338	0.0000

Table 4.3.3: Long run model of impact of oil revenue on TFP

Variables	coefficient	t-stat	p-value
Oil Rent	-0.0080	-1.399	0.1994
Oil Revenue	1.64E-05*	1.907	0.0930
Education Expenses	-0.0017**	-3.137	0.0139
Exchange Rate	0.0012	0.698	0.5050
Constant	0.5448	5.808	0.0004

4.3.2: The Interpretation of the model of the impact of oil revenue on total factor productivity

The coefficient of oil rent is negative at level which means dependence on oil rent could decrease total factor productivity, but at first lag, the coefficient became positive while it is insignificant at second lag, in the long run, oil rent is negative but not significant. The changes caused by oil rent on total factor productivity in the short run is less than 0.5%, it can also be inferred that oil rent as a percentage share of GDP do not have a major effect on total factor productivity when compared to its impact on GDP. For oil revenue, the coefficients are negative but only significant at first lag and second lag and at significant level of 1% and 10% respectively. This mean that an increase in oil revenue by 1 Billion Naira will lead to a decrease in productivity by 11,200 Naira in the first lag and similar increase in oil revenue by one billion naira will lead to a decrease in total factor productivity by 3,440 naira. The decrease in productivity eventually lead to a decrease in economic growth. The short run validates the evidence of resource curse in Nigeria. In the long run, oil revenue is positive but marginally significant at 10%.

The coefficient of education expenditure was not significant at level, though negative. At first lag, the coefficient became positive and significant at 1% showing that good funding of educational institution will increase total factor productivity. The coefficient of education expenses becomes negative and significant at 5% on the long run, it means that the expenses incurred on education was not properly designed to increase total factor productivity. Exchange rate is added in this model to enhance the performance of the model. The coefficient here are positive and significant.

4.3.3: Post Diagnostic Test for the model of the impact of oil revenue on total factor productivity

Again, to ensure the interpretation of the model above is valid, post estimation test is conducted on the model.

Linearity test:

The result of the Ramsey RESET for the model of the impact of oil revenue on total productivity is shown in Table 4.3.4 below

Null Hypothesis H_0 : The model is correctly specified

Alternative Hypothesis H_1 : The model is not correctly specified.

Table 4.3.4: Table of Ramsey RESET for TFP and oil revenue model

	Value	Probability
t-statistics	0.812	0.4433
F-statistics	0.660	0.4433

Since the probability value (0.44) of F-statistics is greater than 5% (0.05), we do not reject the null hypothesis. This mean the model is correctly specified.

Serial Correlation test:

Table 4.3.5 below shows the result of the serial correlation test of the model of impact of oil revenue on TFP

Null Hypothesis H_0 : There is no serial correlation

Alternative Hypothesis H_1 : There is serial correlation

Table 4.3.5: Table of serial correlation test for TFP and oil revenue model

	Value	Probability
F-statistics	3.054	0.1304
Obs*R-squared	18.758	0.0003

Again, the F-Statistic is greater than 5%, we do not reject the null hypothesis

Therefore, the model does not have serial correlation

Heteroscedasticity test:

Null Hypothesis H_0 : There is no heteroscedasticity

Alternative Hypothesis H_1 : There is heteroscedasticity

Table 4.3.6: Table of Heteroskedasticity Test. Breusch-Pagan-Godfrey for TFP and oil revenue model

F-Statistics	0.9799	Probability	0.5474
Obs*R-squared	20.594	Prob Chi-square	0.4214
Scaled explained SS	1.149	Prob Chi-square	1.0000

The p-value of the F-statistics is greater 5%, we therefore do not reject the null hypothesis, and the model is said to be homoscedastic.

Normality Test: The probability value (0.46) of the Jarque-Bera is greater than 10%, the error term of the model is therefore normally distributed as shown in the figure below.

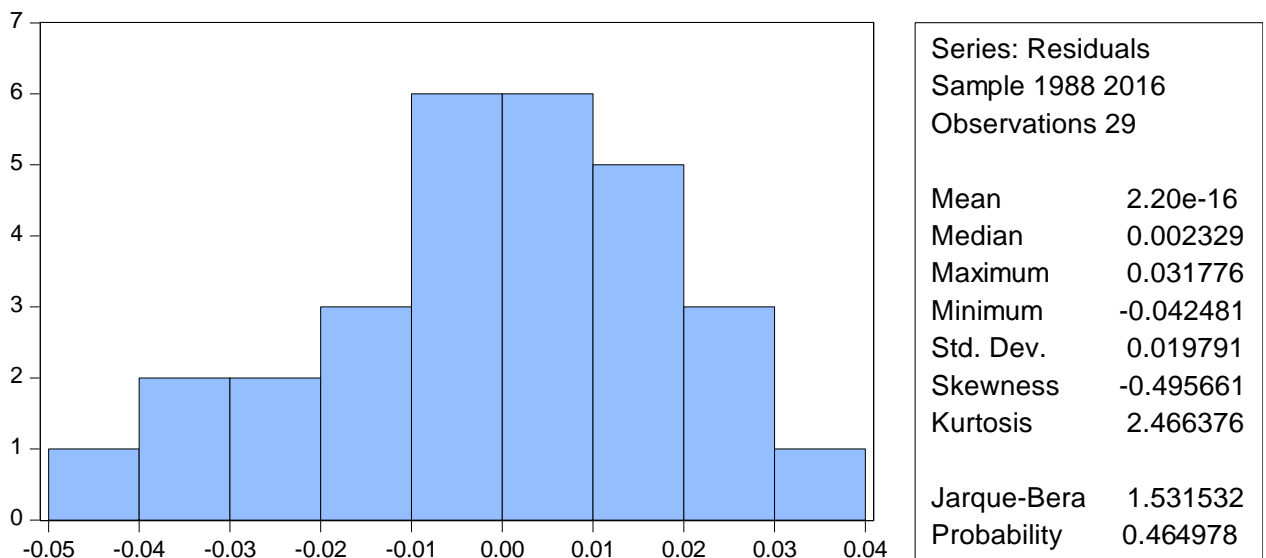


Figure 4.3.1: Normality test for the model of TFP and oil revenue

Stability Test:

The CUSUM plots show that the model of TFP and oil revenue is stable of the period of study.

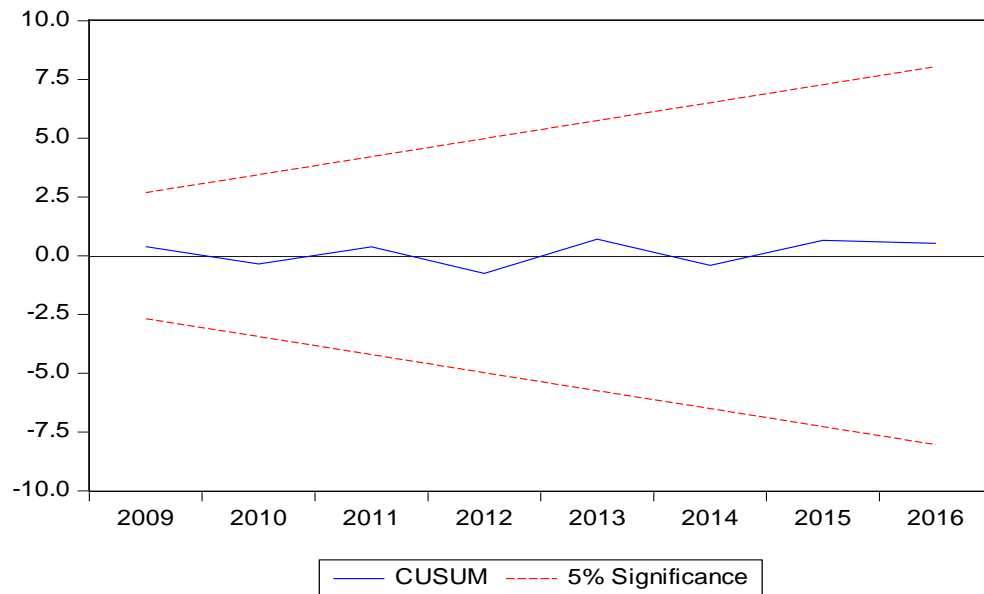


Figure 4.3.2: CUSUM Chart for TFP and oil revenue model

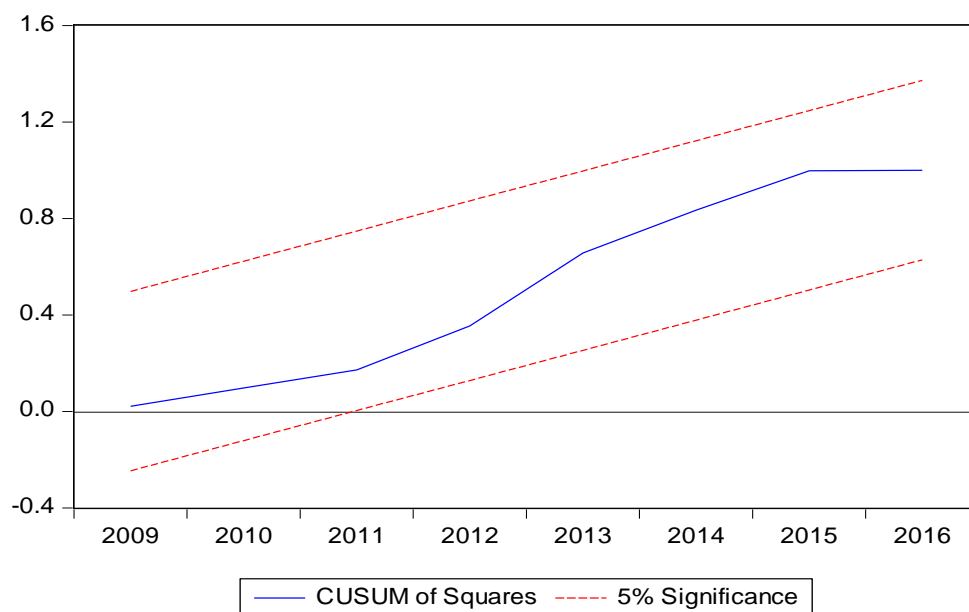


Figure 4.3.3: CUSUM of Square Chart for TFP and oil revenue model

4.4: The Impact of Oil Revenue on Quality of Institution (QI)

4.4.1: Bounds Cointegration Test

Null Hypothesis H_0 : there is no long-run relationship

Alternative Hypothesis H_1 : there is long-run relationship

Table 4.4.1: Table of bound test for model of oil revenue and QI

Test Statistics	Value	Significance	I(0)	I(1)
F-Statistics	7.354	10%	2.525	5.56
K	4	5%	3.058	4.223
		1%	4.248	5.84

The result shows that the value of the F-Statistic (7.354) is greater than the upper bound I(1) at 5% significance level, thus we reject the null hypothesis. This means there is cointegration among the variables and hence short run and long run relationship exists among them. Therefore, both the short run and long run models are estimated. Table 4.4.2 below show both the short run and the long run relationship between oil revenue and quality of institution (QI).

$$QI_t = \beta_0 + \beta_1 Oilrent_t + \beta_2 Oilrevp_t + \beta_3 Edu_t + \beta_4 PGDP_t + \mu_t$$

Table 4.4.2: Short run model of impact of oil revenue and QI

Variables	Coefficients	t-stat	p-values
Oil rent	0.0085	1.620	0.1262
Oil revenue	3.05E-06	0.893	0.3861
Oil revenue (-1)	1.25E-06	0.395	0.6986
Oil revenue (-2)	-1.44E-05***	-3.219	0.0057
Oil revenue (-3)	-1.38E-05***	-3.192	0.0061
Oil Revenue (-4)	-1.39E-05***	-3.012	0.0088
Education Expenses	-0.0035***	-4.225	0.0007
Per capita GDP	0.0018***	3.451	0.0036
Constant	-3.582	-5.186	0.0001

Table 4.4.3: Long run model of impact of oil revenue on quality of institution

Variables	Coefficients	t-Stat	p-value
Oil Rent	0.027	1.498	0.1548
Oil Revenue	-0.00012***	-4.178	0.0008
Education Expenses	-0.0112***	-4.131	0.0009
Per capita GDP	0.0091	4.752	0.0003
Constant	-11.3384	-4.225	0.0007

4.4.2: Interpretation of the model of impact oil revenue on institutional quality

The coefficient of oil rent is positive and insignificant both in the short and long run, while oil revenue has a negative and significant coefficient in the second, third and fourth lag of the short run. Also, in the long run, the coefficient of oil revenue is negative and is significant at 1% level. This means an increase in oil revenue will induce rent-seeking behavior and corruption among political leaders. This causes distortions in economic activities and deterioration in government efficiency. This effect is known as political resource curse. In this model education expenditure has a negative coefficient both in the short run and long run, and therefore it can be said that the amount spend on education has not improved on the quality of institution within the period of study.

4.4.3: Post Diagnostic Test for the model of the Institutional Quality and Oil Revenue

As with other models, the following post estimation is done to ensure that the model is valid.

Linearity Test

The result of the Ramsey RESET for the model of the impact of oil revenue on total productivity is shown in Table 4.4.4 below.

Null Hypothesis H_0 : The model is correctly specified

Alternative Hypothesis H_1 : The model is not correctly specified.

Table 4.4.4: Table of Ramsey RESET for QI and oil revenue model

	Value	Probability
t-statistics	0.456	0.6555
F-statistics	3.438	0.6555

The probability of the F-Statistic is greater 5%, we therefore do not reject the null hypothesis, therefore the model is well specified in the functional form.

Serial Correlation test:

Null Hypothesis H_0 : There is no serial correlation

Alternative Hypothesis H_1 : There is serial correlation

Table 4.4.5: Table of serial correlation test for QI and oil revenue model

	Value	Probability
F-statistics	0.6728	0.5272
Obs*R-squared	3.838607	0.2566

Here, the F-Statistic is greater than 5%, therefore we do not reject the null hypothesis of no serial correlation.

Heteroscedasticity test:

Null Hypothesis H_0 : There is no heteroscedasticity

Alternative Hypothesis H_1 : There is heteroscedasticity

Table 4.4.2.3: Table of Heteroskedasticity Test. Breusch-Pagan-Godfrey for QI and oil revenue model

F-Statistics	2.4307	Probability	0.1306
Obs*R-squared	2.3952	Prob Chi-square	0.1217

The result indicates that there is no heteroscedasticity since the probability value of F-Statistics is greater than 5%, we do not reject the null hypothesis.

Normality Test: Since the probability value (0.89) of the Jarque-Bera is greater 10%, the error term in the model is said to be normally distributed.

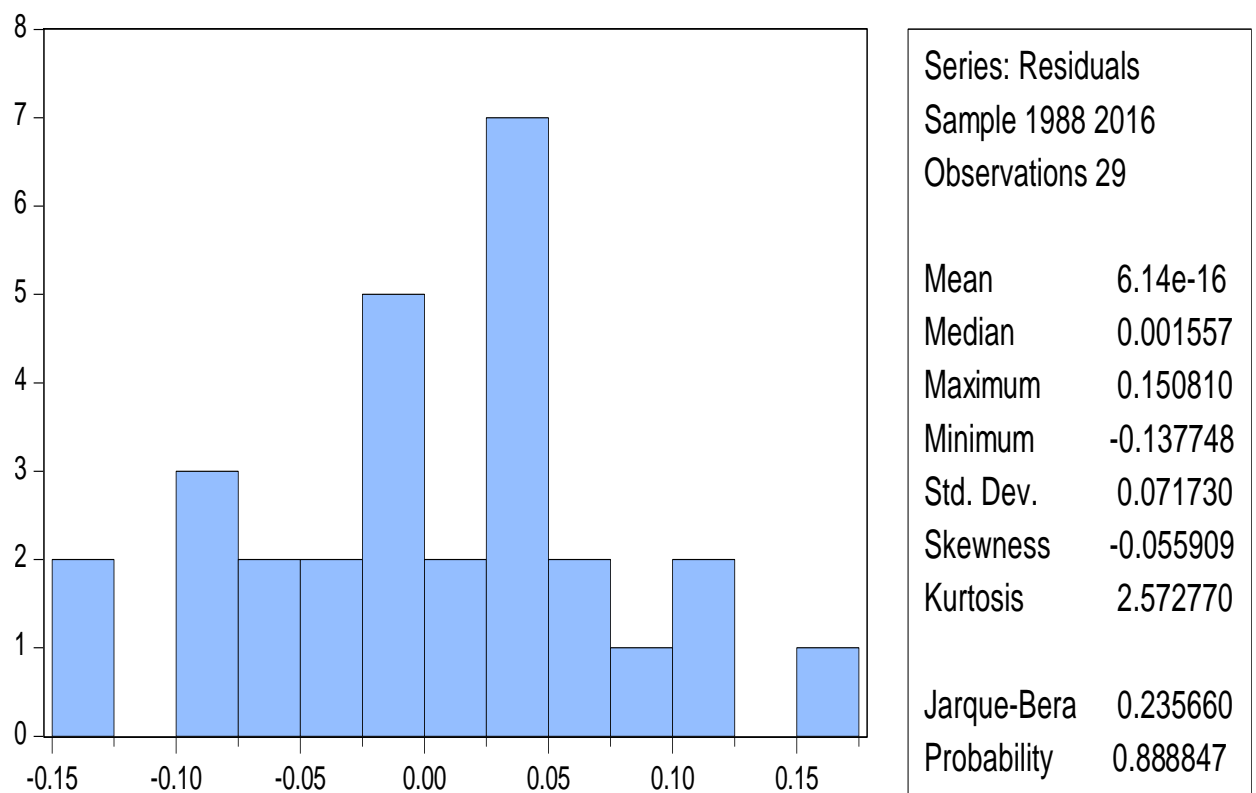


Figure 4.4.1: Normality test for the model of QI and oil revenue

Stability Test:

The CUSUM plots show that the model of Institutional Quality (QI) and oil revenue is stable for the period of study. This is as shown in the chart below:

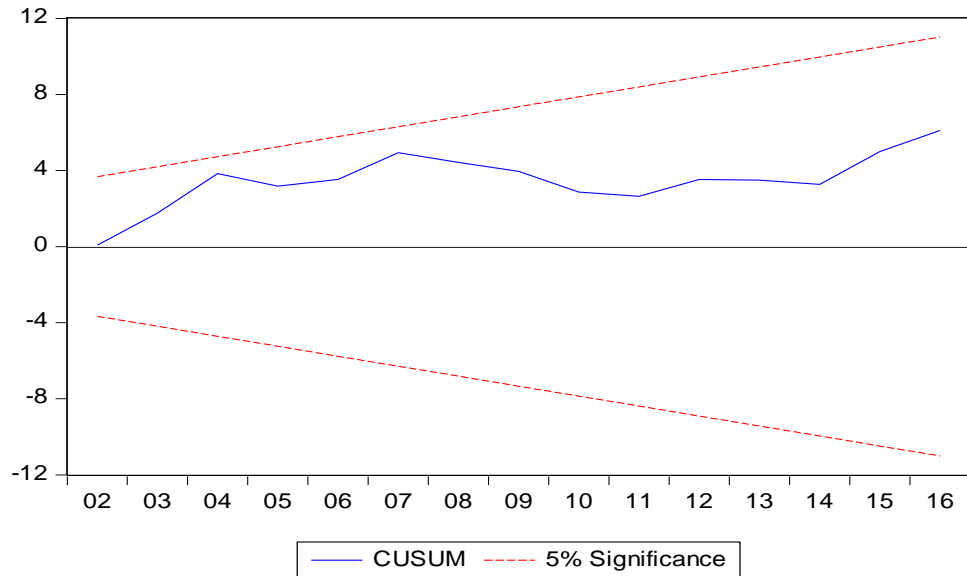


Figure 4.4.2: CUSUM Chart for model of QI and oil revenue

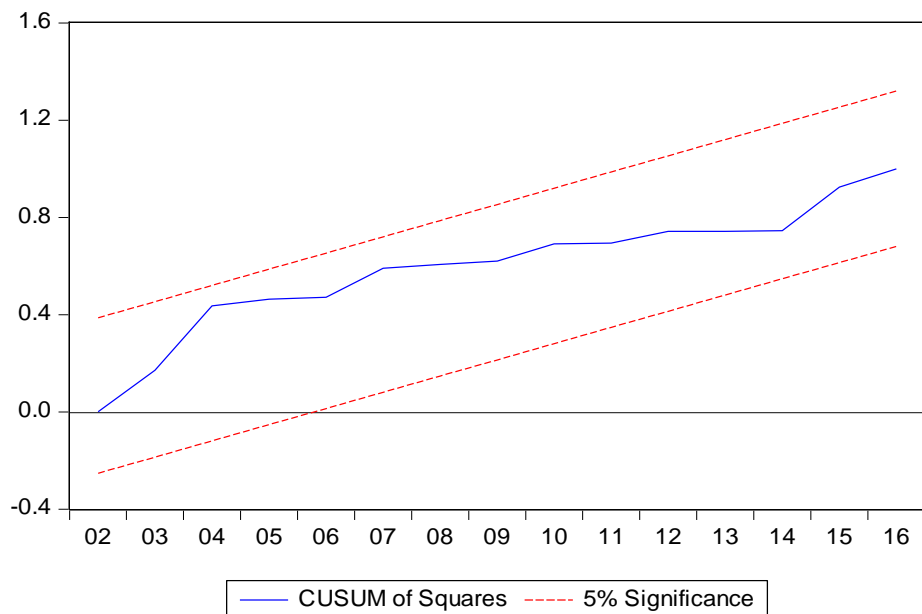


Figure 4.4.3: CUSUM of Square Chart for model of QI and oil revenue

Chapter Five: Summary, Conclusion and Policy Recommendation

5.1 Summary

This research is centered on the investigation of how much oil resources have contributed to the Nigeria economic growth as well as finding the evidence of resource curse in Nigeria. Contrary to classical economic theories, that natural resource-rich nations would have more robust economic growth and development than resource-poor countries, it has been discovered that many resource-rich nations have slow or stunted economic growth and development compared to some resource-poor countries, a paradoxical phenomenon known as resource curse. It therefore means that having abundant natural resources does not just translate into economic wealth for the nation, but it depends on the management structure of the resource revenue.

In literatures, it has been identified that resource curse occurred through some factors and transmission channels that cause distortions to economic activities which therefore slow down economic growth. Some of the transmission channels of resource curse in literatures include the Dutch disease and foreign capital; rent-seeking and social capital; education and human capital; saving, investment and physical capital. To reflect some of these channels, the variables used in the study are gross domestic product (GDP), total factor productivity (TFP), oil rent, oil revenue, education expenditure, control of corruption and exchange rate. With the time series data ranging from 1984 to 2017, three models were estimated. First is the model estimating the nature of relationship that exist between economic growth and oil rent; the second model estimates the relationship between total factor productivity and oil revenue while the third model estimates the kind of relationship that exist between institutional quality and oil revenue. The approach applied in this research is the Autoregressive Distributed Lag (ARDL) model, which is the most appropriate model when estimating series of variables that attain stationarity at level and at first difference, as we have in this research.

The result obtained indicates that there is a positive relationship between economic growth (GDP) and oil rent only at level and negative at first lag in the short-run. In the long run, oil rent has a negative coefficient while oil revenue has a positive coefficient both in

the short-run and long-run. This simply implies that it is over dependence on oil (since oil rent is presented as percentage share of oil export in GDP) is what lead to resource curse and not just the availability of oil revenue. The coefficient of corruption is negative in the short-run, which means that as the corruption level rises in the country it causes the economic growth to decrease.

The second model estimates the kind of relationship that exist between total factor productivity and oil revenue, the coefficient of oil revenue is negative and very significant in the short-run, which simply implies that oil revenue does not increase productivity but rather decrease it. This eventually lead to decrease in development and growth of the economy, which again confirm the evidence of resource curse in Nigeria. Though the coefficient in the long-run, of oil revenue become positive, it is only marginally significant. The third model was estimated to investigate how quality of institution and oil revenue correlate. From the result obtained, the coefficient of oil revenue is negative both in the short-run and long-run, implying that as oil revenue increases, the institutional quality diminishes and deteriorate in efficiency and effectiveness. Since control of corruption was used as a proxy for quality of institution, it can also be inferred that oil revenue induces rent-seeking behavior and corruption among leaders of institutions. This type of resource curse is called political resource curse.

5.2 Conclusion

Having abundant natural resources should have been a huge source of blessing and not a curse, but the over dependent on natural resource by any country makes natural resources a curse. This is because the accumulation of huge amount of natural resource which leads to much confidence on the part of the people and government could cause a deterioration of other sectors through negligence, and hence slow down economic growth.

It has been discovered that resource curse manifest through different mechanisms or channels, which include the Dutch disease, price volatility, rent seeking, economic mismanagement, corruption and institutional quality. The focal point of this study how oil resource impact on economic growth, total factor productivity and institutional quality using data ranging from 1984 to 2017, and the result shows the evidence of resource curse in Nigeria. The outcomes of the study clearly show the evidence of political resource curse in Nigeria, hence the need to have a more accountable institution that is void of corruption

and more effective and efficient in oil resource management. Since resource curse has channels through which it is transmitted, it takes appropriate understanding and formulation of effective policy recommendation to avoid the resource curse.

5.3 Recommendation and Policy implication

The over-reliance on crude oil was what turned it to a curse in Nigeria instead of blessing. Therefore, in order to correct these anomalies, the government has to put in place appropriate policies that will encourage diversification from oil. Other factors that affect manufacturing and agricultural sector, such as inflation and foreign exchange appreciation due to inflow of foreign currency which is being attracted by natural resource should be prudently managed to avoid too much currency in circulation.

Stabilization fund should be set aside to receive money more than necessary for the economy to be stable for all sectors. The excess natural capital realized during windfall should also be channeled to the stabilization fund to reduce the amount of money in circulation and avoid unnecessary spending by the government. The money realized from the oil resource should be used to boost the non-oil sector.

Above all, it is crucial for government and individuals of any resource-rich country to understand the reality of resource curse and its transmission channel as this will foster the desire for proper management of the resource that is usually threatened by resource price volatility and non-renewability. Finally, efficient resource revenue management strategy should be in place as well as strong anti-corruption institution. This will reduce leakages of resource revenue.

5.3.1: Contribution to knowledge

This research attempts to investigate how much oil resources have contributed to Nigeria economic growth and as well as check if the Nigeria oil resource caused a resource curse. Many researches have been done on natural resources and its relationship to economic growth by simply estimating a single model without putting into consideration various channels of transmission of the resource curse. In literature, a major transmission being often considered is the Dutch disease, but this research contributes to growing body of academic knowledge by considering more channels of transmissions such as rent-

seeking which induces corruption and cause inefficiency and deterioration of government institution. It is also anticipated that abundance of oil resource would indirectly initiate a positive influence on the economy by enhancing total factor productivity which would eventually increase economic growth. This study therefore investigates how oil revenue indirectly relate with economic growth through total productivity in Nigeria. To the best of my knowledge, using the relationship between oil resources and total factor productivity to check the evidence of resource curse or Dutch disease has not been done for Nigeria case. In addition, having a combination of GDP, oil rent and oil revenue in a model enable the understanding of the distinction between having an abundant oil resources and over-dependence on the resources.

5.3.2: Limitation and suggestion for further study

Many channels and mechanisms of transmission of resource curse have been identified in literatures. Considering the complexity of some of these channels, it could be difficult to get an appropriate data necessary to consider all the channels through which resource curse are transmitted. In this study, we could not include data on human capital development index, number of school enrollment, saving, investment and physical capital due to lack of data at the time of study. Instead, education expenditure was used in the place of human capital development while gross capital formation was used instead of physical capital.

In addition to the limitation above, the measurement of institutional quality and corruption could be a subject of debate sometimes, but the measured data on control of corruption by the relevant international organization have been used so far in many literatures. Suffice to say that the available data used in this research is adequate to mirroring the nature of relationship existing between resource abundance and economic growth and then verify if the economy is suffering from resource curse.

Based on the above limitations, I therefore suggest that further study that incorporate broader channels of transmission be carried out for more knowledge on natural resource abundance and resource curse. Also, resource curse at micro level should also be considered since most studies concentrated more on macro level.

References

- Abubakr, R., Hooi, H., & Clark, J. (2017). The evolution of the natural resource curse thesis : A critical literature survey. *Resources Policy*, 51(June 2016), 123–134.
<https://doi.org/10.1016/j.resourpol.2016.10.015>
- Adams, D., Ullah, S., Akhtar, P., Adams, K., & Saidi, S. (2019). The role of country-level institutional factors in escaping the natural resource curse : Insights from Ghana. *Resources Policy*, 61(March 2018), 433–440.
<https://doi.org/10.1016/j.resourpol.2018.03.005>
- Adekunle, S. B., & Alokpa, M. F. (2020). *African Research Review*. September 2018, 2017–2020. <https://doi.org/10.4314/afrrrev.v12i3.3>
- Aljarallah, R. A., & Angus, A. (2020). Dilemma of Natural Resource Abundance: A Case Study of Kuwait. *SAGE Open*, 10(1). <https://doi.org/10.1177/2158244019899701>
- Anyanwu, J. C. (1992). President Babangida's Structural Adjustment Programme and inflation in Nigeria. *Journal of Social Development in Africa*, 7(1), 5–24.
- Auty, R. M. (1991). *RESOURCE-BASED INDUSTRIALIZATION: Sowing the Oil in Eight Developing Countries*. September, 698–699.
- Barkindo, M. S. (2019). OPEC Annual Statistical Bulletin. *Organization of the Petroleum Exporting Countries*, 54, 132.
- Cramon, S. Von. (2002). *Fostering Sustainable Growth in Ukraine*.
- Daron Acemoglu, Simon Johnson, J. A. R. (n.d.). *An African Success Story: Botswana*.
- Dauvin, M., & Guerreiro, D. (2017). The Paradox of Plenty : A Meta-Analysis. *World Development*, 94, 212–231. <https://doi.org/10.1016/j.worlddev.2017.01.009>
- Energy Commission of Nigeria. (2003). *Federal Republic of Nigeria National Energy Policy*. April, 1–76.
- Gilberthorpe, E., & Papyrakis, E. (2015). The Extractive Industries and Society The extractive industries and development : The resource curse at the micro , meso and macro levels. *Biochemical Pharmacology*, 2(2), 381–390.
<https://doi.org/10.1016/j.exis.2015.02.008>
- Gujarati, D. N. (n.d.). *BASIC ECONOMETRICS*.
<https://data.worldbank.org/indicator/NY.GDP.PCAP.KN?locations=NG&view=chart>.
 (n.d.). *r/NY.GDP.PCAP.KN?locations=NG&view=chart*.

- Ifeacho, C., & Olufemi, O. B. (2014). *Effects of Non-Oil Export on The Economic Development Of*. 3(3), 27–32.
- Ifeakachukwu, P., & John, A. (2013). *Has Oil Revenue Enhanced Non-Oil Export in Nigeria ? A Co-integration Approach*. 1(3).
- Jeffery M. Woodridge. (n.d.). *Introductory Econometrics*.
- Karl, T. L. (2007). Oil-Led Development : Social , Political , and Economic Consequences. *Encyclopedia of Energy*, 4, 661–672.
- Kida, M. I., & Salami, A. (2019). *IMPLICATIONS OF NEGLECTING NON-OIL EXPORTS IN NIGERIA*. August.
- Kromtit, M. J., Kanadi, C., Ndangra, D. P., & Lado, S. (2017). Contribution of Non Oil Exports to Economic Growth in Nigeria (1985-2015). *International Journal of Economics and Finance*, 9(4), 253. <https://doi.org/10.5539/ijef.v9n4p253>
- Larsen, E. R. (2006). Escaping the resource curse and the dutch disease?: When and why Norway caught up with and forged ahead of its neighbors. *American Journal of Economics and Sociology*, 65(3), 605–640. <https://doi.org/10.1111/j.1536-7150.2006.00476.x>
- Lashitew, A. A., Ross, M. L., & Werker, E. (2020). What Drives Successful Economic Diversification in Resource-Rich Countries? *The World Bank Research Observer*, 1–33. <https://doi.org/10.1093/wbro/lkaa001>
- Mehlum, H., Moene, K., & Torvik, R. (2006). Cursed by resources or institutions? *World Economy*, 29(8), 1117–1131. <https://doi.org/10.1111/j.1467-9701.2006.00808.x>
- Ministry of Budget & National Planning. (2017). Economic Recovery & Growth Plan 2017-2020. *Federal Republic of Nigeria*, 73. <https://yourbudgit.com/wp-content/uploads/2017/03/Economic-Recovery-Growth-Plan-2017-2020.pdf>
- Mohsen, A. S. (2015). *Effects of Oil and Non-Oil Exports on the Economic Growth of Syria*. 1(2), 69–78.
- Muhammad, I. (2016). *Munich Personal RePEc Archive Dutch disease or Nigerian disease : a prima facie ? New evidence from ARDL bound test analysis*. 69767.
- Nigeria Vision 20:20. (2009). Nigeria Vision 20 : 2020 Economic Transformation Blueprint October 2009. *Transformation, October*.
- NNPC 2019 ASB. (2019). *2019 Annual Statistical Bulletin*.
- Nwosa, P. I., & Fasina, O. T. (2020). *Trade Policy and Export Diversification in Nigeria*

- in the years 1970-2017 : A Sectoral Analysis*. 8(1), 127–142.
- Olayungbo, D.O., & Olayemi, O. F. (2018). Dynamic relationships among non-oil revenue, government spending and economic growth in an oil producing country: Evidence from Nigeria. *Future Business Journal*, 4(2), 246–260.
<https://doi.org/10.1016/j.fbj.2018.07.002>
- Olayungbo, D Oluseun, & Adediran, K. A. (2017). Effects of Oil Revenue and Institutional Quality on Economic Growth with an ARDL Approach Effects of Oil Revenue and Institutional Quality on Economic Growth with an ARDL Approach. *Energy and Policy Research*, 4(1), 44–54.
<https://doi.org/10.1080/23815639.2017.1307146>
- OPEC. (2018). OPEC Annual Statistical Bulletin 2018. *Organization of the Petroleum Exporting Countries*, 132.
- Profile, S. E. E., & Profile, S. E. E. (2017). *Oil exports and non-oil exports : Dutch disease effects in the Organization of Petroleum Exporting Countries (OPEC) Journal of Economic Studies Article information : July*. <https://doi.org/10.1108/JES-01-2016-0015>
- Riti, J. S., & Gubak, H. D. (2016). Growth of Non-Oil Sectors : A Key to Diversification and Economic Performance in Nigeria. *Public Policy and Administration Research*, 6(3), 64–75.
- Robinson, J. (2010). *The Role of Institutions in Growth and Development* (Vol. 1).
<https://doi.org/10.5202/rei.v1i2.1>
- Romer, D. (2019). Advanced Macroeconomics (Fifth Edition). In *McGraw Hill* (Issue 493).
- Shao, S., & Yang, L. (2014). Natural resource dependence , human capital accumulation , and economic growth : A combined explanation for the resource curse and the resource blessing. *Energy Policy*, 74, 632–642.
<https://doi.org/10.1016/j.enpol.2014.07.007>
- Shin, Y., & Smith, R. J. (2001). *BOUNDS TESTING APPROACHES TO THE ANALYSIS*. 326(February), 289–326. <https://doi.org/10.1002/jae.616>
- Sun, H., Geng, W. S. Y., & Kong, Y. (2018). Natural resource dependence , public education investment , and human capital accumulation. *Petroleum Science*, 15(3), 657–665. <https://doi.org/10.1007/s12182-018-0235-0>

Ugoani, J. N. N. (2017). *International Journal of Economics Examination of the Impact of National Economic Empowerment and Development Strategy on Poverty Reduction in Nigeria*. 3(5), 65–75.

Appendices

Appendix 1: Unit Root Test Results

Unit root test using Augmented Dickey Fuller (ADF) test at levels

Table A-1.1: Unit root test for GDP Per Capita at constant

Null Hypothesis: LNPGDP has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic - based on AIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.214232	0.6555
Test critical values: 1% level	-3.661661	
5% level	-2.960411	
10% level	-2.619160	

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

Table A-1.2: Unit root test for GDP Per Capita at trend

Null Hypothesis: LNPGDP has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 2 (Automatic - based on AIC, maxlag=3)

	t-Statistic
Augmented Dickey-Fuller test statistic	-2.138067
Test critical values: 1% level	-4.284580
5% level	-3.562882
10% level	-3.215267

Table A-1.3: Unit root test for GDP Per Capita at None

Null Hypothesis: LNPGDP has a unit root

Exogenous: None

Lag Length: 2 (Automatic - based on AIC, maxlag=3)

	t-Statistic
Augmented Dickey-Fuller test statistic	0.927583
Test critical values: 1% level	-2.641672
5% level	-1.952066
10% level	-1.610400

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

Unit root test using ADF test at first difference

Table A-1.4: Unit root at constant 1st difference

Table A-1.5: Unit root at trend 1st difference

Null Hypothesis: D(GDPPC) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 2 (Automatic - based on AIC, maxlag=3)

	t-Statistic
Augmented Dickey-Fuller test statistic	-1.746122
Test critical values: 1% level	-4.296729
5% level	-3.568379
10% level	-3.218382

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

Table A-1.6: Unit root at None 1st difference

Null Hypothesis: D(GDPPC) has a unit root

Exogenous: None

Lag Length: 1 (Automatic - based on AIC, maxlag=3)

	t-Statistic
--	-------------

Augmented Dickey-Fuller test statistic	-1.617973	0.0986
Test critical values: 1% level	-2.641672	
5% level	-1.952066	
10% level	-1.610400	

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

Unit root test using Phillips-Perron (PP) test at levels

Table A-1.7: PP unit root test for GDP at constant

Null Hypothesis: GDPPC has a unit root

Exogenous: Constant

Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat
Phillips-Perron test statistic	-0.011931
Test critical values: 1% level	-3.646342
5% level	-2.954021
10% level	-2.615817

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

Residual variance (no correction)

HAC corrected variance (Bartlett kernel)

Table A-1.8: PP unit root test for GDP at trend

Null Hypothesis: GDPPC has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat
Phillips-Perron test statistic	-1.581824
Test critical values: 1% level	-4.262735
5% level	-3.552973
10% level	-3.209642

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

Residual variance (no correction)

HAC corrected variance (Bartlett kernel)

Table A-1.9: PP unit root test for GDP at None

Null Hypothesis: GDPPC has a unit root

Exogenous: None

Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat
Phillips-Perron test statistic	2.088439
Test critical values: 1% level	-2.636901
5% level	-1.951332
10% level	-1.610747

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

Unit root test using Phillips-Perron (PP) test at 1st difference

Table A-1.10: PP unit root test for GDP at constant

Null Hypothesis: D(GDPPC) has a unit root

Exogenous: Constant

Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat
Phillips-Perron test statistic	-3.278570
Test critical values: 1% level	-3.653730
5% level	-2.957110
10% level	-2.617434

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

Table A-1.11: PP unit root test for GDP at trend

Null Hypothesis: D(GDPPC) has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat
Phillips-Perron test statistic	-3.198503
Test critical values: 1% level	-4.273277
5% level	-3.557759
10% level	-3.212361

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

Table A-1.12: PP unit root test for GDP at none

Null Hypothesis: D(GDPPC) has a unit root

Exogenous: None

Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	P
Phillips-Perron test statistic	-2.932837	0
Test critical values: 1% level	-2.639210	
5% level	-1.951687	
10% level	-1.610579	

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

Table A-2.1: ADF unit root test for GCF at constant

Null Hypothesis: LNPGCF has a unit root

Exogenous: Constant

Lag Length: 3 (Automatic - based on AIC, maxlag=3)

	t-Statistic
Augmented Dickey-Fuller test statistic	-1.051321
Test critical values: 1% level	-3.670170
5% level	-2.963972
10% level	-2.621007

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

Table A-2.2: ADF unit root test for GCF at trend

Null Hypothesis: LNPGCF has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 3 (Automatic - based on AIC, maxlag=3)

	t-Statistic
Augmented Dickey-Fuller test statistic	-1.799135
Test critical values: 1% level	-4.296729
5% level	-3.568379
10% level	-3.218382

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

Table A-2.3: ADF unit root test for GCF at none

Null Hypothesis: LNPGCF has a unit root

Exogenous: None

Lag Length: 3 (Automatic - based on AIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	0.968744	0.9077
Test critical values: 1% level	-2.644302	
5% level	-1.952473	
10% level	-1.610211	

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

Table A-2.4: PP unit root test for GCF at constant

Null Hypothesis: LNPGCF has a unit root

Exogenous: Constant

Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-1.064524	0.7178
Test critical values: 1% level	-3.646342	
5% level	-2.954021	
10% level	-2.615817	

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

Table A-2.5: PP unit root test for GCF at trend

Null Hypothesis: LNPGCF has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-2.374242	0.3853
Test critical values: 1% level	-4.262735	
5% level	-3.552973	
10% level	-3.209642	

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

Table A-2.6: PP unit root test for GCF at none

Null Hypothesis: LNPGCF has a unit root

Exogenous: None

Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	0.530442	0.8253
Test critical values: 1% level	-2.636901	
5% level	-1.951332	
10% level	-1.610747	

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

Table A-2.7: ADF 1st difference unit root test for GCF at none

Null Hypothesis: D(LNPGCF) has a unit root

Exogenous: Constant

Lag Length: 2 (Automatic - based on AIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.111824	0.0364
Test critical values: 1% level	-3.670170	
5% level	-2.963972	
10% level	-2.621007	

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

Table A-2.8: ADF 1st difference unit root test for GCF at trend

Null Hypothesis: D(LNPGCF) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 2 (Automatic - based on AIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.820882	0.2012
Test critical values: 1% level	-4.296729	
5% level	-3.568379	
10% level	-3.218382	

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

Table A-2.9: ADF 1st difference unit root test for GCF at none

Null Hypothesis: D(LNPGCF) has a unit root

Exogenous: None

Lag Length: 2 (Automatic - based on AIC, maxlag=3)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.946525	0.0046
Test critical values: 1% level	-2.644302	
5% level	-1.952473	
10% level	-1.610211	

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

Table A-2.10: PP 1st difference unit root test for GCF at constant

Null Hypothesis: D(LNPGCF) has a unit root

Exogenous: Constant

Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-5.127126	0.0002
Test critical values: 1% level	-3.653730	
5% level	-2.957110	
10% level	-2.617434	

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

Table A-2.11: PP 1st difference unit root test for GCF at trend

Null Hypothesis: D(LNPGCF) has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-5.250894	0.0009
Test critical values: 1% level	-4.273277	
5% level	-3.557759	
10% level	-3.212361	

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

Table A-2.12: PP 1st difference unit root test for GCF at none

Null Hypothesis: D(LNPGCF) has a unit root

Exogenous: None

Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

--	--	--

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-5.195757	0.0000
Test critical values: 1% level	-2.639210	
5% level	-1.951687	
10% level	-1.610579	

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

Table A-3.1: ADF level unit root test for Orent at constant

Null Hypothesis: ORENT has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.059276	0.0397
Test critical values: 1% level	-3.646342	
5% level	-2.954021	
10% level	-2.615817	

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

Table A-3.2: ADF level unit root test for Orent at trend

Null Hypothesis: ORENT has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.267982	0.0893

Test critical values:	1% level	-4.262735
	5% level	-3.552973
	10% level	-3.209642

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

Table A-3.3: ADF level unit root test for Orent at none

Null Hypothesis: ORENT has a unit root

Exogenous: None

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.159891	0.2193
Test critical values:		
1% level	-2.636901	
5% level	-1.951332	
10% level	-1.610747	

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

Table A-3.4: PP level unit root test for Orent at constant

Null Hypothesis: ORENT has a unit root

Exogenous: Constant

Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-3.059276	0.0397
Test critical values:		
1% level	-3.646342	
5% level	-2.954021	
10% level	-2.615817	

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

Table A-3.5: PP level unit root test for Orent at trend

Null Hypothesis: ORENT has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-3.138308	0.1145
Test critical values: 1% level	-4.262735	
5% level	-3.552973	
10% level	-3.209642	

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

Table A-3.6: PP level unit root test for Orent at none

Null Hypothesis: ORENT has a unit root

Exogenous: None

Bandwidth: 5 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-0.911114	0.3143
Test critical values: 1% level	-2.636901	
5% level	-1.951332	
10% level	-1.610747	

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

Table A-3.7: ADF 1st difference unit root test for Orent at constant

Null Hypothesis: D(ORENT) has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-6.936448	0.0000
Test critical values: 1% level	-3.661661	
5% level	-2.960411	
10% level	-2.619160	

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

Table A-3.8: ADF 1st difference unit root test for Orent at trend

Null Hypothesis: D(ORENT) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.422479	0.0000
Test critical values: 1% level	-4.284580	
5% level	-3.562882	
10% level	-3.215267	

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

Table A-3.9: ADF 1st difference unit root test for Orent at none

Null Hypothesis: D(ORENT) has a unit root

Exogenous: None

Lag Length: 1 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-7.063911	0.0000
Test critical values: 1% level	-2.641672	
5% level	-1.952066	
10% level	-1.610400	

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

Table A-3.10: PP 1st difference unit root test for Orent at constant

Null Hypothesis: D(ORENT) has a unit root

Exogenous: Constant

Bandwidth: 12 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-8.482141	0.0000
Test critical values: 1% level	-3.653730	
5% level	-2.957110	
10% level	-2.617434	

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

Table A-3.11: PP 1st difference unit root test for Orent at trend

Null Hypothesis: D(ORENT) has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 31 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-15.86902	0.0000
Test critical values: 1% level	-4.273277	
5% level	-3.557759	
10% level	-3.212361	

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

Table A-3.12: PP 1st difference unit root test for Orent at none

Null Hypothesis: D(ORENT) has a unit root

Exogenous: None

Bandwidth: 12 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-8.583868	0.0000
Test critical values: 1% level	-2.639210	
5% level	-1.951687	
10% level	-1.610579	

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

Table A-4.1: ADF level unit root test for corruption at constant

Null Hypothesis: CORRUPT has a unit root

Exogenous: Constant

Lag Length: 1 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.126126	0.2363

Test critical values:	1% level	-3.653730
	5% level	-2.957110
	10% level	-2.617434

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

Table A-4.2: ADF level unit root test for corruption at trend

Null Hypothesis: CORRUPT has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 1 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.048417	0.5536
Test critical values:	1% level	-4.273277
	5% level	-3.557759
	10% level	-3.212361

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

Table A-4.3: ADF level unit root test for corruption at none

Null Hypothesis: CORRUPT has a unit root

Exogenous: None

Lag Length: 1 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-0.191413	0.6094
Test critical values:	1% level	-2.639210
	5% level	-1.951687
	10% level	-1.610579

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

Table A-4.4: PP level unit root test for corruption at constant

Null Hypothesis: CORRUPT has a unit root

Exogenous: Constant

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-1.619756	0.4615
Test critical values: 1% level	-3.646342	
5% level	-2.954021	
10% level	-2.615817	

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

Table A-4.5: PP level unit root test for corruption at trend

Null Hypothesis: CORRUPT has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-1.711306	0.7235
Test critical values: 1% level	-4.262735	
5% level	-3.552973	
10% level	-3.209642	

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

Table A-4.6: PP level unit root test for corruption at none

Null Hypothesis: CORRUPT has a unit root

Exogenous: None

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-0.294654	0.5720
Test critical values: 1% level	-2.636901	
5% level	-1.951332	
10% level	-1.610747	

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

Table A-4.7: ADF 1st difference unit root test for corruption at constant

Null Hypothesis: D(CORRUPT) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.914154	0.0052
Test critical values: 1% level	-3.653730	
5% level	-2.957110	
10% level	-2.617434	

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

Table A-4.8: ADF 1st difference unit root test for corruption at trend

Null Hypothesis: D(CORRUPT) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.888974	0.0243
Test critical values: 1% level	-4.273277	
5% level	-3.557759	
10% level	-3.212361	

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

Table A-4.9: ADF 1st difference unit root test for corruption at none

Null Hypothesis: D(CORRUPT) has a unit root

Exogenous: None

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.963967	0.0003
Test critical values: 1% level	-2.639210	
5% level	-1.951687	
10% level	-1.610579	

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

Table A-4.10: PP 1st difference unit root test for corruption at constant

Null Hypothesis: D(CORRUPT) has a unit root

Exogenous: Constant

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-3.909670	0.0053
Test critical values: 1% level	-3.653730	
5% level	-2.957110	
10% level	-2.617434	

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

Table A-4.11: PP 1st difference unit root test for corruption at trend

Null Hypothesis: D(CORRUPT) has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 3 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-3.845448	0.0268
Test critical values: 1% level	-4.273277	
5% level	-3.557759	
10% level	-3.212361	

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

Table A-4.12: PP 1st difference unit root test for corruption at none

Null Hypothesis: D(CORRUPT) has a unit root

Exogenous: None

Bandwidth: 2 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
--	-------------	--------

Phillips-Perron test statistic	-3.961916	0.0003
Test critical values: 1% level	-2.639210	
5% level	-1.951687	
10% level	-1.610579	

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

Table A-4.13: ADF level unit root test for Edu at constant

Null Hypothesis: EDU has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	0.727983	0.9910
Test critical values: 1% level	-3.646342	
5% level	-2.954021	
10% level	-2.615817	

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

Table A-4.14: ADF level unit root test for Edu at trend

Null Hypothesis: EDU has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-1.499481	0.8094

Test critical values:	1% level	-4.262735
	5% level	-3.552973
	10% level	-3.209642

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

Table A-4.15: ADF level unit root test for Edu at none

Null Hypothesis: EDU has a unit root

Exogenous: None

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

	t-Statistic
Augmented Dickey-Fuller test statistic	1.809944
Test critical values:	
1% level	-2.636901
5% level	-1.951332
10% level	-1.610747

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

Table A-4.16: PP level unit root test for Edu at constant

Null Hypothesis: EDU has a unit root

Exogenous: Constant

Bandwidth: 22 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	1.801088	0.9996
Test critical values:		
1% level	-3.646342	
5% level	-2.954021	
10% level	-2.615817	

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

Residual variance (no correction) 1164.353

Table A-4.17: PP level unit root test for Edu at trend

Null Hypothesis: EDU has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 15 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-1.039221	0.9242
Test critical values: 1% level	-4.262735	
5% level	-3.552973	
10% level	-3.209642	

Table A-4.18: PP level unit root test for Edu at none

Null Hypothesis: EDU has a unit root

Exogenous: None

Bandwidth: 17 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	2.524648	0.9963
Test critical values: 1% level	-2.636901	
5% level	-1.951332	
10% level	-1.610747	

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

Table A-4.19: ADF 1st difference unit root test for Edu at constant

Null Hypothesis: D(EDU) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
--	-------------	--------

Augmented Dickey-Fuller test statistic	-4.916215	0.0004
Test critical values: 1% level	-3.653730	
5% level	-2.957110	
10% level	-2.617434	

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

Table A-4.20: ADF 1st difference unit root test for Edu at trend

Null Hypothesis: D(EDU) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-5.246919	0.0009
Test critical values: 1% level	-4.273277	
5% level	-3.557759	
10% level	-3.212361	

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

Table A-4.21: ADF 1st difference unit root test for Edu at none

Null Hypothesis: D(EDU) has a unit root

Exogenous: None

Lag Length: 0 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.441193	0.0001
Test critical values: 1% level	-2.639210	
5% level	-1.951687	
10% level	-1.610579	

Table A-4.22: PP 1st difference unit root test for Edu at constant

Null Hypothesis: D(EDU) has a unit root

Exogenous: Constant

Bandwidth: 11 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-4.844040	0.0004
Test critical values: 1% level	-3.653730	
5% level	-2.957110	
10% level	-2.617434	

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

Residual variance (no correction)	1210.611
HAC corrected variance (Bartlett kernel)	975.3958

Table A-4.23: PP 1st difference unit root test for Edu at trend

Null Hypothesis: D(EDU) has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 31 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-9.828890	0.0000
Test critical values: 1% level	-4.273277	
5% level	-3.557759	
10% level	-3.212361	

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

Residual variance (no correction)	1118.787
-----------------------------------	----------

HAC corrected variance (Bartlett kernel) 75.64391

Table A-4.24: PP 1st difference unit root test for Edu at none

Null Hypothesis: D(EDU) has a unit root

Exogenous: None

Bandwidth: 4 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-4.390049	0.0001
Test critical values: 1% level	-2.639210	
5% level	-1.951687	
10% level	-1.610579	

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

Table A-5.1: ADF 1st difference unit root test for exchange rate at constant

Null Hypothesis: D(EXCHRATE) has a unit root

Exogenous: Constant

Lag Length: 0 (Automatic - based on AIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.208524	0.0287
Test critical values: 1% level	-3.653730	
5% level	-2.957110	
10% level	-2.617434	

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

Table A-5.2: ADF 1st difference unit root test for exchange rate at trend

Null Hypothesis: D(EXCHRATE) has a unit root

Exogenous: Constant, Linear Trend

Lag Length: 0 (Automatic - based on AIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-3.623998	0.0435
Test critical values: 1% level	-4.273277	
5% level	-3.557759	
10% level	-3.212361	

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

Table A-5.3: ADF 1st difference unit root test for exchange rate at none

Null Hypothesis: D(EXCHRATE) has a unit root

Exogenous: None

Lag Length: 0 (Automatic - based on AIC, maxlag=2)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-2.600509	0.0110
Test critical values: 1% level	-2.639210	
5% level	-1.951687	
10% level	-1.610579	

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

Table A-5.4: PP 1st difference unit root test for exchange rate at constant

Null Hypothesis: D(EXCHRATE) has a unit root

Exogenous: Constant

Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-3.208524	0.0287

Test critical values:	1% level	-3.653730
	5% level	-2.957110
	10% level	-2.617434

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

Table A-5.5: PP 1st difference unit root test for exchange rate at trend

Null Hypothesis: D(EXCHRATE) has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-3.620170	0.0438
Test critical values:		
1% level	-4.273277	
5% level	-3.557759	
10% level	-3.212361	

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

Table A-5.6: PP 1st difference unit root test for exchange rate none

Null Hypothesis: D(EXCHRATE) has a unit root

Exogenous: None

Bandwidth: 1 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-2.515124	0.0136
Test critical values:		
1% level	-2.639210	
5% level	-1.951687	
10% level	-1.610579	

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

Tab

Null Hypothesis: D(TFP) has a unit root
 Exogenous: Constant
 Lag Length: 0 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.523878	0.0011
Test critical values: 1% level	-3.653730	
5% level	-2.957110	
10% level	-2.617434	

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

le A-6.1: ADF 1st difference unit root test for TFP at constant

Table A-6.2: ADF 1st difference unit root test for TFP at trend

Null Hypothesis: D(TFP) has a unit root
 Exogenous: Constant, Linear Trend
 Lag Length: 0 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.448578	0.0066
Test critical values: 1% level	-4.273277	
5% level	-3.557759	
10% level	-3.212361	

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

Table A-6.3: ADF 1st difference unit root test for TFP at none

Null Hypothesis: D(TFP) has a unit root
 Exogenous: None
 Lag Length: 0 (Automatic - based on AIC, maxlag=1)

	t-Statistic	Prob.*
Augmented Dickey-Fuller test statistic	-4.383868	0.0001
Test critical values: 1% level	-2.639210	
5% level	-1.951687	
10% level	-1.610579	

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

Table A-6.4: PP 1st difference unit root test for TFP at constant

Null Hypothesis: D(TFP) has a unit root

Exogenous: Constant

Bandwidth: 31 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-6.308594	0.0000
Test critical values: 1% level	-3.653730	
5% level	-2.957110	
10% level	-2.617434	

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

Residual variance (no correction)	0.006574
HAC corrected variance (Bartlett kernel)	0.000681

Table A-6.5: PP 1st difference unit root test for TFP at trend

Null Hypothesis: D(TFP) has a unit root

Exogenous: Constant, Linear Trend

Bandwidth: 31 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-6.103251	0.0001
Test critical values: 1% level	-4.273277	
5% level	-3.557759	
10% level	-3.212361	

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

Residual variance (no correction)	0.006572
HAC corrected variance (Bartlett kernel)	0.000671

Table A-6.6: PP 1st difference unit root test for TFP at none
Null Hypothesis: D(TFP) has a unit root
Exogenous: None
Bandwidth: 15 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-4.295866	0.0001
Test critical values: 1% level	-2.639210	
5% level	-1.951687	
10% level	-1.610579	

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

Residual variance (no correction)	0.006827
HAC corrected variance (Bartlett kernel)	0.005591

Table A-7.1: ADF level unit root test for oil revenue at constant

Null Hypothesis: D(OILREVP) has a unit root
Exogenous: Constant
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-6.132063	0.0000
Test critical values: 1% level	-3.653730	
5% level	-2.957110	
10% level	-2.617434	

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

Residual variance (no correction)	65343458
HAC corrected variance (Bartlett kernel)	65343458

Table A-7.2: ADF level unit root test for oil revenue at trend

Null Hypothesis: D(OILREVP) has a unit root
Exogenous: Constant, Linear Trend
Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-6.071179	0.0001
Test critical values: 1% level	-4.273277	
5% level	-3.557759	
10% level	-3.212361	

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

Table A-7.3: ADF level unit root test for oil revenue at none

Null Hypothesis: D(OILREVP) has a unit root

Exogenous: None

Bandwidth: 0 (Newey-West automatic) using Bartlett kernel

	Adj. t-Stat	Prob.*
Phillips-Perron test statistic	-6.190664	0.0000
Test critical values: 1% level	-2.639210	
5% level	-1.951687	
10% level	-1.610579	

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

Residual variance (no correction)	65865725
HAC corrected variance (Bartlett kernel)	65865725

Appendix 2: Bound Cointegration Test

Table B-1.1: Bounds test of model of GDP and oil rent

F-Bounds Test

Null Hypothesis: No levels relationship

Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	5.204255	10%	2.08	3
k	5	5%	2.39	3.38
		2.5%	2.7	3.73
		1%	3.06	4.15
Finite Sample: n=35				
Actual Sample Size	31	10%	2.331	3.417
		5%	2.804	4.013
		1%	3.9	5.419
Finite Sample: n=30				
		10%	2.407	3.517
		5%	2.91	4.193
		1%	4.134	5.761

Table B-1.2: Bounds test of model of TFP and oil revenue

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic k	6.695331 3	10%	2.37	3.2
		5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66
Finite Sample: n=30				
Actual Sample Size	30	10%	2.676	3.586
		5%	3.272	4.306
		1%	4.614	5.966

Table B-1.3: Bounds test of model of Institutional quality (QI) and oil revenue

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic k	6.365593 4	10%	2.2	3.09
		5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37
Finite Sample: n=30				
Actual Sample Size	30	10%	2.525	3.56
		5%	3.058	4.223
		1%	4.28	5.84

Appendix 3: Short-run and long-run model

Table C-1.1: Error correction model ECM (short run) for impact oil rent on GDP

ARDL Error Correction Regression
 Dependent Variable: D(LNPGDP)
 Selected Model: ARDL(1, 3, 2, 0, 2, 3)
 Case 2: Restricted Constant and No Trend
 Date: 12/14/20 Time: 15:27
 Sample: 1984 2017
 Included observations: 31

ECM Regression				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(LNPGCF)	0.203098	0.027829	7.298101	0.0000
D(LNPGCF(-1))	0.014675	0.019690	0.745293	0.4684
D(LNPGCF(-2))	0.111345	0.025758	4.322754	0.0007
D(OILRENT)	-0.002076	0.000986	-2.105880	0.0537
D(OILRENT(-1))	0.001967	0.000905	2.173150	0.0474
D(CORRUPT)	-0.172308	0.063758	-2.702537	0.0172
D(CORRUPT(-1))	-0.215141	0.073035	-2.945718	0.0106
D(EDUC)	7.71E-05	0.000117	0.661396	0.5191
D(EDUC(-1))	-0.000311	0.000128	-2.436636	0.0288
D(EDUC(-2))	0.000279	0.000118	2.366601	0.0329
CointEq(-1)*	-0.584020	0.080956	-7.214052	0.0000
R-squared	0.768726	Mean dependent var		0.019139
Adjusted R-squared	0.653089	S.D. dependent var		0.037240
S.E. of regression	0.021934	Akaike info criterion		-4.530121
Sum squared resid	0.009622	Schwarz criterion		-4.021287
Log likelihood	81.21688	Hannan-Quinn criter.		-4.364254
Durbin-Watson stat	2.683831			

* p-value incompatible with t-Bounds distribution.

Table C-1.2: Long-run model of the impact of oil rent on GDP

Levels Equation				
Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
LNPGCF	0.187175	0.082865	2.258800	0.0404
OILRENT	-0.010628	0.004584	-2.318689	0.0360
OILREVP	3.59E-06	1.40E-06	2.565352	0.0224
CORRUPT	0.104986	0.086441	1.214535	0.2446
EDUC	0.000535	0.000293	1.825197	0.0894

C	6.428842	0.454892	14.13269	0.0000
---	----------	----------	----------	--------

$$EC = LNPGDP - (0.1872 \cdot LNPGCF - 0.0106 \cdot OILRENT + 0.0000 \cdot OILREVP + 0.1050 \cdot CORRUPT + 0.0005 \cdot EDUC + 6.4288)$$

Table C-1.3: Error correction model ECM (short run) for impact oil revenue on TFP

ARDL Error Correction Regression
Dependent Variable: D(TFP)
Selected Model: ARDL(1, 3, 0, 4)
Case 2: Restricted Constant and No Trend
Date: 12/16/20 Time: 00:58
Sample: 1984 2017
Included observations: 30

ECM Regression Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
D(OILREVP)	-7.47E-07	1.17E-06	-0.636653	0.5324
D(OILREVP(-1))	-8.45E-06	1.79E-06	-4.723342	0.0002
D(OILREVP(-2))	-3.63E-06	1.44E-06	-2.515867	0.0216
D(EXCHRATE)	0.000709	0.000525	1.350572	0.1936
D(EXCHRATE(-1))	0.001596	0.000586	2.722453	0.0140
D(EXCHRATE(-2))	0.005445	0.000615	8.857285	0.0000
D(EXCHRATE(-3))	0.003211	0.000791	4.060404	0.0007
CointEq(-1)*	-0.443458	0.069328	-6.396555	0.0000
R-squared	0.819517	Mean dependent var	0.022593	
Adjusted R-squared	0.762091	S.D. dependent var	0.086272	
S.E. of regression	0.042080	Akaike info criterion	-3.275316	
Sum squared resid	0.038956	Schwarz criterion	-2.901663	
Log likelihood	57.12974	Hannan-Quinn criter.	-3.155781	
Durbin-Watson stat	2.896508			

* p-value incompatible with t-Bounds distribution.

F-Bounds Test		Null Hypothesis: No levels relationship		
Test Statistic	Value	Signif.	I(0)	I(1)
F-statistic	6.695331	10%	2.37	3.2
k	3	5%	2.79	3.67
		2.5%	3.15	4.08
		1%	3.65	4.66

Levels Equation Case 2: Restricted Constant and No Trend				
Variable	Coefficient	Std. Error	t-Statistic	Prob.
OILREVP	2.58E-05	1.00E-05	2.577335	0.0190
EDUC	-0.000980	0.000497	-1.972334	0.0641

EXCHRATE	-0.001171	0.002059	-0.568596	0.5767
C	0.443623	0.035966	12.33465	0.0000

$$EC = TFP - (0.0000 \cdot OILREVP - 0.0010 \cdot EDUC - 0.0012 \cdot EXCHRATE + 0.4436)$$

Table C-1.4: Error correction model ECM (short run) for impact oil revenue on QI

Dependent Variable: QI

Method: ARDL

Date: 12/15/20 Time: 21:13

Sample (adjusted): 1988 2017

Included observations: 30 after adjustments

Maximum dependent lags: 1 (Automatic selection)

Model selection method: Akaike info criterion (AIC)

Dynamic regressors (4 lags, automatic): OILRENT OILREVP EDUC
PGDP

Fixed regressors: C

Number of models evaluated: 625

Selected Model: ARDL(1, 0, 4, 0, 4)

Variable	Coefficient	Std. Error	t-Statistic	Prob.*
QI(-1)	0.729125	0.080449	9.063182	0.0000
OILRENT	0.010696	0.005315	2.012631	0.0613
OILREVP	1.72E-06	3.47E-06	0.495194	0.6272
OILREVP(-1)	2.76E-06	3.15E-06	0.875500	0.3943
OILREVP(-2)	-1.05E-05	3.93E-06	-2.679335	0.0165
OILREVP(-3)	-1.26E-05	4.46E-06	-2.819603	0.0123
OILREVP(-4)	-1.19E-05	4.64E-06	-2.557532	0.0211
EDUC	-0.003230	0.000854	-3.783246	0.0016
PGDP	0.001421	0.000485	2.926402	0.0099
PGDP(-1)	0.000377	0.000655	0.575642	0.5729
PGDP(-2)	-0.001400	0.000665	-2.106048	0.0513
PGDP(-3)	0.000814	0.000652	1.247966	0.2300
PGDP(-4)	0.001250	0.000629	1.987838	0.0642
C	-3.116222	0.654861	-4.758600	0.0002
R-squared	0.956998	Mean dependent var	1.561111	
Adjusted R-squared	0.922059	S.D. dependent var	0.367458	
S.E. of regression	0.102587	Akaike info criterion	-1.411489	
Sum squared resid	0.168385	Schwarz criterion	-0.757597	
Log likelihood	35.17233	Hannan-Quinn criter.	-1.202303	
F-statistic	27.39038	Durbin-Watson stat	1.950203	
Prob(F-statistic)	0.000000			

*Note: p-values and any subsequent tests do not account for model selection.

Variable	Coefficient	Std. Error	t-Statistic	Prob.
OILRENT	0.039488	0.021724	1.817725	0.0879
OILREVP	-0.000113	3.34E-05	-3.375584	0.0039
EDUC	-0.011925	0.003405	-3.501951	0.0030
PGDP	0.009086	0.002337	3.887780	0.0013

C	-11.50427	3.311258	-3.474289	0.0031
EC = QI - (0.0395*OILRENT -0.0001*OILREVP -0.0119*EDUC + 0.0091 *PGDP -11.5043)				
F-Bounds Test				
Null Hypothesis: No levels relationship				
Test Statistic	Value	Signif.	I(0)	I(1)
Asymptotic: n=1000				
F-statistic	6.365593	10%	2.2	3.09
k	4	5%	2.56	3.49
		2.5%	2.88	3.87
		1%	3.29	4.37
Finite Sample: n=30				
Actual Sample Size	30	10%	2.525	3.56
		5%	3.058	4.223
		1%	4.28	5.84

Table D: Model post estimation test

Table D-1.1: Linearity test for GPD and oil rent model

Ramsey RESET Test
Equation: UNTITLED
Specification: LNPGDP LNPGDP(-1) LNPGCF LNPGCF(-1) LNPGCF(-2) LNPGCF(-3) OILRENT OILRENT(-1) OILRENT(-2) OILREVP CORRUPT CORRUPT(-1) CORRUPT(-2) EDUC EDUC(-1) EDUC(-2) EDUC(-3) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.143298	13	0.8883
F-statistic	0.020534	(1, 13)	0.8883

Table D-1.2 Serial correlation test for GPD and oil rent model

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	1.144492	Prob. F(3,11)	0.3741
Obs*R-squared	7.374367	Prob. Chi-Square(3)	0.0609

Table D-1.3 Heteroscedasticity test for GPD and oil rent model

Heteroskedasticity Test: Breusch-Pagan-Godfrey

F-statistic	0.790829	Prob. F(16,14)	0.6766
-------------	----------	----------------	--------

Obs*R-squared	14.71682	Prob. Chi-Square(16)	0.5455
Scaled explained SS	2.190480	Prob. Chi-Square(16)	1.0000

Table D-2.1 Linearity test for TFP and oil revenue mode

Ramsey RESET Test

Equation: UNTITLED

Specification: TFP TFP(-1) OILREVP OILREVP(-1) OILREVP(-2)
OILREVP(-3) EDUC EXCHRATE EXCHRATE(-1) EXCHRATE(-2)
EXCHRATE(-3) EXCHRATE(-4) C

Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.231195	17	0.8199
F-statistic	0.053451	(1, 17)	0.8199

F-test summary:

	Sum of Sq.	df	Mean Squares
Test SSR	0.000122	1	0.000122
Restricted SSR	0.038956	18	0.002164
Unrestricted SSR	0.038834	17	0.002284

Table D-2.2 Serial correlation test for TFP and oil revenue model

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	2.623139	Prob. F(3,15)	0.0887
Obs*R-squared	10.32307	Prob. Chi-Square(3)	0.0160

Table D-2.3 Heteroscedasticity test for TFP and oil revenue model

Heteroskedasticity Test: ARCH

F-statistic	2.378059	Prob. F(1,27)	0.1347
Obs*R-squared	2.347456	Prob. Chi-Square(1)	0.1255

Table D-3.1 Linearity test for QI and oil revenue model

Ramsey RESET Test

Equation: UNTITLED

Specification: QI QI(-1) OILRENT OILREVP
OILREVP(-1) OILREVP(
-2) OILREVP(-3) OILREVP(-4) EDUC
PGDP PGDP(-1) PGDP(-2)
PGDP(-3) PGDP(-4) C
Omitted Variables: Squares of fitted values

	Value	df	Probability
t-statistic	0.025829	15	0.9797
F-statistic	0.000667	(1, 15)	0.9797

Table D-2.2 Serial correlation test for QI and oil revenue model

Breusch-Godfrey Serial Correlation LM Test:

F-statistic	0.782107	Prob. F(2,14)	0.4764
Obs*R-squared	3.015022	Prob. Chi-Square(2)	0.2215

Table D-3.3 Heteroscedasticity test for QI and oil revenue model

Heteroskedasticity Test: ARCH

F-statistic	2.430726	Prob. F(1,27)	0.1306
Obs*R-squared	2.395151	Prob. Chi-Square(1)	0.1217

국문 요약

나이지리아 석유자원의 경제성장 기여도와 자원의 저주 발생여부에 대한 연구

메튜

협동과정 기술경영경제정책전공

서울대학교 대학원

본 논문에서는 에너지자원부국인 나이지리아를 대상으로 하여 부존 석유자원이 나이지리아의 경제성장에 기여하는 정도를 분석함과 동시에 자원부국에서 발생하는 대표적인 문제인 자원의 저주(resource curse)가 나이지리아에서도 발생하였는지를 세 가지의 계량경제모형을 적용하여 분석하였다. 분석에는 1984년부터 2017년까지의 자료를 활용하였으며, 자기회귀시차분포모형(Autoregressive Distributed Lag (ARDL) model) 및 오차수정모형(Error Correction Model)을 사용하여 실증분석을 실시하였다.

첫 번째 석유 지대(oil rent)와 경제성장간의 장기균형분석에서, 단기에는 두 변수 간에 양의 상관관계가 도출되었으나 장기에는 음의 상관관계가 나타났다. 한편 석유 지대는 지속적으로 양의 값을 가지는 것으로 분석되었다. 이는

단기적으로는 석유생산이 경제성장에 도움을 주었지만, 장기적으로는 그렇지 못함을 보여주며, 또한 석유자원에의 과도한 의존도가 나이지리아에서 자원의 저주를 발생시키는 또 하나의 중요한 원인임을 보여준다. 두 번째 분석모형에서는 TFP와 석유 지대 간 장기 관계가 음수로 나타났다. 이는 석유로 인한 수입 증대가 생산성 감소로 나타나며, 이로 인하여 나이지리아 경제성장에의 기여도가 감소하게 됨을 보여주어 또 하나의 자원의 저주 발생의 증거가 됨을 확인하였다.

세 번째 분석모형에서는 정부 및 공공기관의 수준을 나타내는 지표를 사용하였는데, 이는 정부기관의 부정부패를 나타내는 지표로 해설이 가능하다. 분석결과, 공공기관의 수준과 석유수입과는 음의 상관관계가 나타났는데, 이는 석유수입이 증가할수록 공공기관의 수준이 낮아짐을 의미한다. 이 결과 역시 석유수입이 증가가 장기적으로 나이지리아의 경제성장에 도움이 되지 못하는 또 하나의 증빙이 된다. 이러한 자원의 저주 문제를 사전에 방지하고 부존자원의 개발이 자국의 경제성장에 장기적으로도 도움이 되게 하기 위해서는 자원부국 정부는 효율적인 부존자원 관리 규정의 마련, 석유 이외의 경제성장동력의 개발을 위한 정책수립, 그리고 석유자원 개발로 인한 수익금을 관리할 기금의 수립 등의 정책들을 활용할 필요가 있다. 본 연구의 계량분석결과는 나이지리아를 비롯한 자원부국의 부존자원 개발정책 수립과정에 기초자료로 활용될 수 있을 것이다.

주요어 : 석유, 나이지리아, 경제성장, 자원의 저주, 자원 지대

학 번 : 2019-29405