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ISTANBUL GELISIM UNIVERSITY

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Department of Economics and Finance

THE IMPACT OF CRUDE OIL PRODUCTION ON ECONOMIC GROWTH OF DEVELOPING ECONOMIES: A CASE STUDY OF NIGERIA.

Master Thesis

Franklin Iruoghene ATUAKPOHOR

Supervisor
Asst.Prof. Dr. Edmund Ntom UDEMBA

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DECLARATION

I hereby declare that in the preparation of this thesis, scientific ethical rules have been followed, the works of other persons have been referenced in accordance with the scientific norms if used, there is no falsification in the used data, any part of the thesis has not been submitted to this university or any other university as another thesis.

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ABSTRACT

The economic development of a country depends majorly on the natural resources owned by such country in most cases. However, given that the development of resources contributed to the industrial revolution in the 19th century, there is a great deal of interest in understanding how resource extraction influences economic progress. Both positive and negative pathways via which natural resource development might affect economic growth have been discovered by empirical research on this topic. Despite several findings on natural resource development and economic growth, the subject has remained inconclusive and hugely debatable. The effect of Dutch disease in Nigeria is being debated in different literatures but none of the research tries to use a system of equations analysis in determining its effects in Nigeria. As a result, the main requirement of this research study is to investigate the effect of the Dutch disease as empirically identified in this chapter on the relationship that exists between crude oil production and economic growth in Nigeria while taking into consideration other contributing variables. This research employs an ex-post facto design, utilizing time series data for the periods under investigation to acquire historical document data. The year of data coverage span from 1981 to 2021 totalling a period of 41 years. The major result provided from this analysis is that there is a positive significant impact of crude oil production on Nigeria economic growth measured with GDP per capita. The positive relationship between crude oil production and economic growth suggests that the oil sector plays a crucial role in driving overall economic performance, as measured by GDP per capita, indicating the presence of Dutch disease. Nigeria can navigate the complexities of the Dutch Disease effect, foster sustainable economic growth, and reduce its dependence on the oil sector while promoting a diversified and resilient economy.

Keywords: Economic growth, Dutch disease, Economic diversification, Nigeria.

ÖZET

Bir ülkenin ekonomik gelişimi genellikle o ülkenin sahip olduğu doğal kaynaklara bağlıdır. Bununla birlikte, kaynakların geliştirilmesi 19. yüzyıldaki endüstri devrimine katkıda bulunduğundan, doğal kaynakların ekonomik ilerlemeyi nasıl etkilediğini anlamak büyük bir ilgi konusudur. Bu konuyla ilgili yapılan ampirik araştırmalar, doğal kaynak gelişiminin ekonomik büyümeye etkisini pozitif ve negatif olmak üzere farklı yollarla ortaya koymuştur. Ancak doğal kaynak gelişimi ve ekonomik büyüme konusu birçok araştırmada hala sonuçsuz ve tartışmalıdır. Hollanda hastalığının Nijerya'daki etkisi çeşitli literatürlerde tartışılmaktadır, ancak hiçbir araştırma Nijerya'daki etkilerini belirlemek için denklem sistem analizi kullanmaya çalışmamıştır. Bu nedenle, bu araştırma çalışmasının temel amacı, bu bölümde ampirik olarak belirlenen Hollanda hastalığının, Nijerya'daki ham petrol üretimi ile ekonomik büyüme arasındaki ilişkiye etkisini diğer katkıda bulunan değişkenleri dikkate alarak incelemektir. Bu araştırma, bir eks-post facto tasarımı kullanarak, araştırma dönemi boyunca zaman serisi verilerini kullanarak tarihsel belge verileri elde etmektedir. Veri kapsamı 1981'dan 2021'e kadar olan yılları içermekte olup toplamda 41 yıllık bir dönemi kapsamaktadır. Bu analizden elde edilen temel sonuç, ham petrol üretiminin Nijerya'nın gayri safi yurtiçi hasıla (GSYİH) başına düşen gelir ölçümü olan ekonomik büyüme üzerinde olumlu ve anlamlı bir etkisi olduğudur. Ham petrol üretimi ile ekonomik büyüme arasındaki bu pozitif ilişki, ham petrol sektörünün GSYİH başına düşen gelir gibi genel ekonomik performansı sürdürmede kritik bir rol oynadığını göstermektedir ve Hollanda hastalığının varlığını işaret etmektedir. Nijerya, Hollanda hastalığı etkisinin karmaşıklıklarını yöneterek sürdürülebilir ekonomik büyüme sağlayabilir, petrol sektörüne olan bağımlılığını azaltabilir ve çeşitlendirilmiş ve dayanıklı bir ekonomi oluşturabilir.

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PREFACE

The research provides insights into the Dutch Disease effect in Nigeria. It emphasizes the dominant role of crude oil production in driving economic growth, raises concerns about neglecting other sectors, and highlights the consequences of currency appreciation and rent-seeking behaviours.

The findings contribute to the understanding of Nigeria's economic landscape and suggest the need for policymakers to prioritize economic diversification, effectively manage resource revenues, and maintain a balanced exchange rate policy.

By addressing these challenges and implementing the recommendations, Nigeria can navigate the complexities of the Dutch Disease effect, foster sustainable economic growth, and reduce its dependence on the oil sector. This will promote economic diversification, resilience, and long-term prosperity.

This study would not have been successfully completed without the guidance of my supervisor, Ass. Prof. Dr. Edmund Ntom UDEMBA. He unreservedly demonstrated his intellectual maturity in terms of advice, constructive criticism, and encouragement.

I am also indebted to this university for the opportunity to be under the tutelage of experienced and highly intellectual professors in the Department of Economics and Finance.

It is a great honour for me to be an alumnus of this reputable academic institution and I am proud to carry its emblem throughout my academic and professional caree

INTRODUCTION

Natural resource exploration and extraction, particularly for crude oil, significantly impacts emerging nation economies. However, rapid resource development has led to the “Dutch disease” condition, affecting other sectors. This study aims to explore the concept of natural resource exploitation and Dutch disease, focusing on oil production. It evaluates the effects of Dutch disease and examines the interconnection between these areas and Nigeria as a case study. The chapter includes background information, research problem statement, objectives, questions, hypotheses, scope, justification, significance, and definition of key terms.

CHAPTER ONE

1.1 Research Introduction

Natural resource exploration and extraction, notably for crude oil, has had a substantial impact on the development of many emerging nations' economies. The fast development and domination of the resource sector, however, has had detrimental effects on other economic sectors in several of these nations, a condition known as "Dutch disease". These concepts served as the background of this study, and therefore, the need to explore deeper. On this note, this background study highlights the concept and importance of natural resource exploitation, the concept of Dutch disease, focuses on oil production, evaluates the Dutch disease effects, and examines the interconnection between these areas of discussion and Nigeria as a case study. Generally, this chapter includes the background information, the statement of the research problem, the research objectives, the research questions, and hypotheses, the scope of the study, the justification, significance, and definition of key terms.

1.2 Background Information

Natural resources play important roles in the economic growth of any country. Natural, man-made and human capitals are conventional factors of economic growth and represent the main components in environmental sustainability accounting. In developing countries, natural capital supplements man-made capital, if not substituting it in production. For example, resource revenues and taxes can be used by governments to finance infrastructure projects and human capital formation, which generate economic growth. Revenues from natural resources in capital-scarce developing countries supplement the limited fiscal capacity of governments for spending on human capital assets. But it proved difficult to transform resource revenues into productive assets in resource-rich countries, Venables (2016), and natural resources have negative effects on the provision of productive infrastructures.

Meanwhile, there is considerable interest in understanding how natural resource extraction affects economic growth, as resource development influenced the industrial revolution in the 19th century. The empirical evidence on this subject has revealed both positive and negative channels through which natural resource development can affect economic growth. There is evidence to suggest that petroleum resource exploitation positively affects economic outcomes and improves the welfare of a nation’s populace. This happens through job creation and

revenue generation from exports and windfalls from price shocks expended on productive economic activities. On the other hand, natural resource exploitation has also affected economic growth negatively in some developing mineral-exporting countries. Evidence of negative experiences reveals that natural resource development and dependence lead to deindustrialization and extreme rent-seeking behaviour that further slows economic growth. This negative perspective has been widely observed in developing countries and associated with poor institutions such as Nigeria.

Nigeria is described as a developing economy that is too reliant on crude oil export income (Odularu, 2008). The introduction of petroleum drilling in the 1970s fundamentally altered the structure of the Nigerian economy, resulting in a new political-economic orientation as national wealth surged, opening new opportunities for rent-seeking activities. The nature of state-society interactions swiftly altered with the creation of highly centralised state administrative institutions (like Lagos and, subsequently, Abuja), which were followed by new urbanisation centres (Port Harcourt, Warri, Lagos, Kaduna, Ibadan, and so on) (Obeng-Odoom, 2021). Petroleum production and exports, which account for more than 80% of all income, are a major component of Nigeria's GDP. Agriculture, which had historically formed the foundation of the economy in the 1950s and 1960s, has been pushed to the periphery due to the dominance of crude oil extraction. The Nigerian colonial economy, which was primarily rural, was heavily controlled to boost the colonizing powers' economic success while subjecting peasant farmers. According to Akpan (2012), agriculture was the centre of the Nigerian economy between 1960 and 1970, and it was widely recognized and exploited since it generated the most money for both the people and the government. Apart from meeting the people's local food needs, the production of cash crops such as cocoa, groundnuts, palm goods, and so on was significantly increased as the principal source of Nigeria's monetary gains.

Shahbaz, et al (2019) explores the relative effects of natural resource abundance and natural resource dependence on economic growth for the period of 1980–2015 in 35 natural resource-abundant countries. For this purpose, the relationship between economic growth, natural resource rents per capita, natural resource rents share of gross domestic product, capital, trade openness and financial development is examined. In doing so, Shahbaz, et al (2019) utilized second-generation panel data methodologies to consider the cross-sectional dependence among countries. Their research results show the existence of cointegration between the variables. Moreover, natural resource abundance promotes economic growth, but natural resource dependence prevents economic activity. The study provides guidelines to utilise natural

resources as economic tools to maintain economic development for a longer time. Similarly, Mohamed, (2020) investigates the relationship between natural resource rents, human development and economic growth in Sudan using co-integration and vector error correction modelling (VECM) over the period 1970–2015. From their findings, long-run Granger causality tests show a unidirectional causal relationship running from resource rents to GDP growth as well as from development expenditure to GDP growth. School enrolment, life expectancy and financial development are found to be negatively Granger causing GDP growth. Long-run causal relationships reconfirm that a resource curse exists indirectly mediated by weak human capital. Furthermore, Fubara et al (2019) investigate this issue for the oil-producing (Niger Delta) region in Nigeria using a panel data modelling framework. According to Fubara et al (2019), natural resource extraction has a positive significant impact on the economic performance of states in the oil-producing region, in contrast to the negative impact at the national level. The results bring to the fore, the need for diversification away from oil to other sectors – especially within petroleum resource-rich regions/states of Nigeria. The outcome of the study further highlights another policy issue of better managing oil-resource revenues towards achieving national economic goals including SDGs.

Despite several findings on natural resource development and economic growth, the subject has remained inconclusive and hugely debatable. Further fueling this debate is recent evidence from within-country studies, showing positive and negative outcomes that are different from country-level studies. While the effects of natural resource development on economic growth at the national level has been extensively studied, recent studies based on regional and subnational economy, have revealed important transmission mechanisms at the subnational level differ from the national level. This suggests that the impact of natural resource development at the national level is not necessarily the same for the regional and sub-national levels. It is plausible that some of the negative consequences of resource development (Ejemeyovwi et al., 2018) could be best addressed at the subnational level rather than the national level. Thus, understanding the potential benefits and costs of natural resource extraction at the national and subnational have become crucial to resource-producing economies.

The economic term “Dutch Disease” was first stated in the magazine The Economist published on November 26, 1977 (Anjande and Aor, 2017). Nagasaka, the professor at Takushoku University mentioned the Dutch Disease in his paper. The paper was written for a seminar held in June 2001 organized by the Policy Research Institute in the Ministry of Finance Japan. Dutch

disease in this case explains the relationship between the exploitation of a natural resource and the decline in the other sectors. Corden and Neary (1982) modelled the idea and explained Dutch disease as an adverse effect on the non-booming sector(s) due to the booming sector. In their model, there are non-traded (services sector, e.g. transport, financial services, etc.) sectors and two traded goods sectors (booming and non-booming sectors). The booming sector means the natural resource (mining sector), whereas the non-booming sector is the agriculture and manufacturing sectors. The DD in Nigeria was fully associated with the presence of oil. For this reason, Cussy (1989), as cited in Bature (2013) observe that there are:

- The DD of adjustment by the rise in the nominal exchange rate
- The DD of adjustment by the rise in the general level of prices
- The DD of adjustment by the abolition of the restrictions to changes.

Therefore, Cussy (1989) argue that it is not a hidden fact that the above types of DD were the outcome of booking petroleum activities that greatly influenced the Nigerian economy.

A study of an economic analysis of Dutch disease in Nigeria from 1981-2014 adopting the co-integration regression of fully modified ordinary least squares (FM-OLS) and canonical co-integration regression (CCR) as the modelling approach, by Anjande, and Aor, (2017), revealed a long-run convergence of the variables in the model even though they diverge in the short-run. The result of the study establishes the existence of Dutch disease in Nigeria within the study period. Therefore, Anjande and Asor (2017), the study recommends both vertical and horizontal linkages of the oil and gas sector for effective and efficient application of oil revenue that will reverse the current Dutch disease trend in the economy. These recommendations arise from the need to efficiently utilize the available oil proceeds, given the exhaustible nature of oil resources. Another strand of literature argues on grounds of the resource curse or Dutch disease as evident in countries such as Congo DR. and The Central African Republic. For instance, a study conducted by Tiba (2023) shows that oil rent harms economic growth supporting studies on resource curse using 20 African oil exporting countries spanning 2001-2017 by hiring the panel smooth transition model for estimation.

The effect of Dutch disease in Nigeria is being debated in different literatures but none of the research tries to use a system of equations analysis in determining its effects in Nigeria. This study hopes to add more recent information to existing literature by Gylfason, (2001), Dobrynskaya, and Turkisch, (2009), Sala-i-Martin, and Subramanian, (2013) while contributing to the growing conversation of resources abundant countries being negatively

affected by its presence. The methodology of this study is built on the assumptions laid out by Dobrynskaya, and Turkisch, (2009). This study also creates awareness towards the negative impact of Dutch disease and is important for policymakers to be mindful of the presence of this economic concern.

Meanwhile, an economy that does not seek and prepare to diversify, can equally be ready to crunch. Nations of the world have been endowed with minerals differently, which is why they cannot live in isolation. The argument as to whether there is diversification of their economies or not. The lack of diversification of their economies results from monoculture economic conditions. Several countries have suffered from such crises emanating from the exploitation and development of single sectors of their economies. As a result, the main requirement of this research study is to investigate the effect of the Dutch disease as empirically identified in this chapter on the relationship that exists between crude oil production and economic growth in Nigeria while taking into consideration other contributing variables.

1.3 Research Problem

Due to the country's huge crude oil deposits as evident from the review provided in the research background, the economy of Nigeria has significantly expanded and changed. However, various challenges have been identified in prior research studies on effect of the reliance on oil income and the dominance of the oil industry which may be harmful to the diversification of other sectors and the growth of the economy as a whole. Additionally, according to the research findings by Niftiyev, (2020), and Mien and Goujon, (2021), in a number of resource-rich nations, the Dutch disease effect has been documented, which is characterised by currency appreciation, deindustrialization, and trade imbalances. Therefore, as mentioned in the background information in this current chapter, this study aims to examine the extent to which the Dutch disease effect has affected Nigeria's economic growth and identify potential strategies to mitigate its negative impact.

1.4 Research Aim and Objectives

Following the identification of the research problem, for which it is necessary to find a solution as the primary objective of this study, this research then illustrates the primary objectives of this research, which is intended to evaluate the impact of Dutch disease on crude oil production on economic growth in Nigeria. These specific objectives are to:

1. Analyse the relationship between crude oil production and economic growth in Nigeria.
2. Assess the presence and extent of the Dutch disease effect in Nigeria's economy.

1.5 Research Hypotheses

These hypotheses will guide the statistical analysis and investigation into the relationship between the variables, specifically assessing the impact of crude oil production and the Dutch disease effect on economic growth in Nigeria.

The research hypotheses for this study could be formulated as follows:

- Null Hypothesis (H_0): There is no significant relationship between crude oil production and economic growth in Nigeria.
- Alternative Hypothesis (H_1): There is a significant relationship between crude oil production and economic growth in Nigeria.
- Null Hypothesis (H_0): There is no significant relationship between economic diversification and economic growth in the presence of crude oil production.
- Alternative Hypothesis (H_1): Economic diversification has a significant relationship with economic growth in the presence of crude oil production.
- Null Hypothesis (H_0): The Dutch disease effect does not significantly impact economic growth in Nigeria.
- Alternative Hypothesis (H_1): The Dutch disease effect significantly impacts economic growth in Nigeria.

1.6 Significance of The Study

In general, by concentrating on Nigeria, a significant oil-producing nation in Africa, this study adds to the body of knowledge already available on the Dutch disease impact. Second, the results of this research will shed light on how crude oil output and economic growth in emerging countries are related, particularly in light of the Dutch sickness phenomena. Thirdly, the study's recommendations can inform policymakers and stakeholders in Nigeria and other developing economies on strategies to diversify their economies and reduce dependence on a single resource.

1.7 Scope of The Study

This study focuses specifically on Nigeria, a developing economy that is highly dependent on crude oil production. The analysis and findings are centred on understanding the Dutch disease effect within the Nigerian context. The study will consider a specific period (2006 to 2021), which needs to be clearly defined. The choice of the time scope is aligned with the availability of reliable and relevant data to support the analysis. Furthermore, this study primarily examines the relationship between crude oil production, the Dutch disease effect, and economic growth,

other variables, such as currency appreciation (inflation rate, exchange rate), and economic diversification (agriculture production) are included to assess their impact on economic growth within the context of the Dutch disease effect. In addition, this study adopts a quantitative research methodology, utilising secondary data analysis and econometric techniques to explore the research problem. The analysis is based on the available data sources and the chosen econometric model, such as multiple regression analysis.

While the scope of the study outlined above provides a framework for investigating the Dutch disease effect of crude oil production on economic growth in Nigeria, certain aspects and factors fall outside the scope of this particular study. The study primarily focuses on the macroeconomic impact of crude oil production on economic growth in Nigeria. It does not delve into the micro-level analysis of specific industries, companies, or individual households. Therefore, the study may not capture the detailed effects of the Dutch disease on specific sectors or the behaviour of individual economic agents. Lastly, the scope of the study is likely to be limited to the analysis of the existing data and the period specified. It may not capture the long-term effects of the Dutch disease on economic growth or provide a comprehensive assessment of the future outlook. Factors such as changing global oil prices, technological advancements, policy reforms, and geopolitical shifts may have long-term implications that extend beyond the scope of this study.

1.8 Limitation of The Study

It is important to acknowledge the limitations of this study. Firstly, the analysis will be based on available data and secondary sources, which may have limitations in terms of accuracy and coverage. Secondly, the study will focus primarily on the Nigerian context, and the findings may not be directly applicable to other developing economies. Finally, the study's scope will primarily be limited to evaluating the Dutch disease effect of crude oil production on economic growth and may not cover all possible factors influencing economic performance.

1.9 Definition of Key Terms

Presented below are some of the major key terms associated to the research study:

- Dutch disease: The economic phenomenon characterized by the negative impact on other sectors of the economy resulting from the discovery and exploitation of natural resources, leading to currency appreciation, decreased competitiveness, and potential long-term effects on economic diversification.

- Crude oil production: The extraction and refining of crude oil, a natural resource that serves as a vital energy source and contributes significantly to a country's export revenues and economic activity.
- Economic growth: The increase in the production and consumption of goods and services within an economy over a specific period, usually measured by indicators such as gross domestic product (GDP), employment rates, and per capita income.
- Developing economies: Countries that are in the process of industrialization and experiencing economic growth but still face challenges such as poverty, low per capita income, and limited infrastructure.

1.10 Thesis Structure

The research is divided into five chapters. The 1st chapter discusses the background studies, problem statement, the purpose of investigation, hypothesis, importance, scope, definition of important words, and study structure. The second chapter provides an overview of crude oil production, its benefits, and drawbacks, as well as research on its influence on economic development, a theoretical review and framework, and a critical assessment of relevant empirical material. The third chapter discusses the methodological concerns and approaches used in the investigation. Chapter Four presents the data analysis and findings. Chapter Five summarizes the study's results and offers conclusions and suggestions based on the study's findings.

1.11 Chapter Summary

This chapter provides to the background to the study while highlighting the need to carry out this research and other relevant information related to the research objectives, significance of the study, hypotheses, scope and limitations. In the subsequent chapters, this study will delve into an in-depth analysis of the relationship between crude oil production, the Dutch disease effect, and economic growth in Nigeria, examining the factors contributing to the phenomenon and proposing strategies for mitigating its negative impact.

CHAPTER TWO
LITERATURE REVIEW

2.1 Chapter Introduction

This literature study evaluated and discussed current and relevant academic works. The chapter included speculation, conjecture, and empirical investigations. The positives and drawbacks of oil discovery were all explored; hypotheses suited for explaining the cause or boom crude oil's effects on Nigeria's economy were studied, including empirical research, a summary of the reviewed literature, and rationale for the study.

2.2 Theoretical Structure

To broaden the scope of this research, Dutch disease theory was used to describe the theoretical framework of crude oil output in relation to Nigeria's economic development.

2.2.1 The Hypothesis of Dutch Sickness

The term "Dutch sickness" was coined by The Economist in November 1977 to describe the decline of the Netherlands' industrial economy after the unearthing of natural gas reserves during the 1960s. The term "Dutch disease" has been expanded to include other natural resources that are extracted, such as agriculture, fuel, minerals, oil, and gas. This has been discussed in various studies by Sachs and Warner (1995, 2001), Bulte et al. (2005), and Brunnschweiler and Bulte (2008). The aim is to explicate the potential hindrance to economic advancement that may arise as a result of a resource curse. Countries such as South Africa, Nigeria, Egypt, and Venezuela are frequently referenced as examples of economies that are impeded by the phenomenon known as the resource curse. It is commonly believed that the economies of Hong Kong and Singapore share a similar advantage in that they both operate under conditions of limited natural resources.

The concept of "sectoral booms" was expanded by Corden and Neary (1982) to encompass non-extractive as well as extractive industries. The literature suggests that there are various examples of non-extractive booms, such as tourism in Greece, Cyprus, and Malta as discussed by Copeland (1991) and Palma (2008), the provision of financial services in Switzerland, Luxembourg, and Hong Kong as noted by Palma (2008), and foreign aid in less developed countries as explored by Paldam (1997) and Rajan and Subramanian (2009). According to Torvik (2009), the economies experienced an increase in foreign currency inflows as a result of the replacement of lower-value economic activity with sectoral expansions. However, in

contrast to anticipated outcomes, these unexpected profits have frequently impeded the pace of development. The phenomenon of experiencing adverse outcomes due to the abundance of resources is commonly referred to as a generalized resource curse.

In the field of development economics, the hindrances to economic growth and development that are caused by oil income are commonly known as Dutch Disease (Otawa, 2001). The substantial influx of income derived from petroleum tends to promote extravagant, superfluous, and imprudent expenditures. The augmentation of oil revenue results in a rise in exchange rates and fosters an adverse balance of payments due to the escalation of import expenditures. In brief, the policy has resulted in the disincentivizing of investment in non-oil industries and has undermined the competitiveness of agricultural and manufacturing enterprises. The outsourcing of government and corporate spending multipliers to foreign countries has resulted in a trade-off between employment of labor and other resources and unemployment. The amalgamation of these various pressures culminates in what has been identified by Michael Ross (2001) as the rentier effect, whereby countries that possess oil resources transform into rentier states.

As per the concept of the rentier state, nations that are dependent on external rent, such as revenue generated from oil, exhibit a distinct relationship with their populace as compared to those that primarily rely on taxation. According to Ayodele (2004), states that do not rely on taxes are comparatively less inclined towards democratic practices. The persistence of violence in certain regions, such as the Niger-Delta region, can be attributed to the earnings generated from oil, as commercial oil exploitation has often been a cause of conflict. Frequently, a limited group of small business or government leaders, along with representatives of multinational corporations, receive the economic advantages, while local communities bear numerous hardships such as land expropriation, disturbance of customary lifestyles, environmental destruction, and other related issues without any respite.

The author asserts that local communities are facing a formidable challenge in the form of neoliberal policies that have been orchestrated and enforced by the International Monetary Fund (IMF), World Bank, and World Trade Organization, in conjunction with local political networks. These policies have led to the exploitation of the communities' land, culture, livelihood, and habitat by corporations. Furthermore, the author contends that the judicial system, instead of safeguarding the communities' rights, has been complicit in creating laws that strip them of their rights (Fossey, 2004). The cooperation between political leaders and

transnational corporations, who function as international representatives, leading to the implementation of lenient environmental regulations, favorable tax policies, and the utilization of low-cost and legally ineffective labor. Under such circumstances, companies are able to conduct their operations with disregard for the well-being of the impacted communities, resorting to the use of harmful techniques, hazardous materials, and pollutants that are either banned or subject to strict regulation in developed countries. The set of unfavorable attributes that ensued from the process of oil extraction and trade were labeled as "Dutch Disease" by scholars in the field of economics.

2.3 Theoretical Relationship Between Dutch Disease and Nigerian Economy

According to the many contexts of Dutch Disease hypothesis, it is consistent with Nigeria's economic status. Crude oil, a natural resource that should be the source of economic prosperity, has been a severe setback for the economy. Numerous purposeful attempts by international organizations to resuscitate the country's economy have been futile throughout the years due to the country's severely corrupt and porous bureaucracy (Oboh 2021). As a result, many experts argued that for a nation to be truly independent and free of the Dutch disease, efforts should be moved toward alternative ways of export rather than relying primarily on the resources that have caused the economy the most damage. This entails diversifying the economy from a mono-product economy to a multiproduct one. Because of the chosen diversity, there is a great inclination to development.

2.4 Economic Growth

The term 'Economic Growth' can denote a favorable alteration in a nation's production and provision of goods and services. During this phase, there has been a notable surge in the operations of the securities market, advancements in the field of science and technology, and enhancements in the caliber and level of the capital market's achievements. The present study employs the Gross Domestic Product (GDP) as a measure of economic growth. GDP is defined as the aggregate value of all goods and services produced within a country over a given period, typically a year (Ogundipe et al., 2013). In an optimal scenario, the gross domestic product would be equivalent to the entirety of a nation's economic output. According to Ram (2006), Gross Domestic Product (GDP) represents the aggregate value of all final goods and services produced within the territorial boundaries of a country during a given year.

The Keynesian macroeconomic framework posits that a deficiency in aggregate demand could result in prolonged periods of elevated unemployment. According to Keynes (1973), the

summation of four elements, namely consumption, investment, government spending, and net exports (which represents the disparity between a nation's sales to and purchases from other countries), constitutes the aggregate output of goods and services generated by an economy.

The estimation of gross domestic product typically occurs on an annual basis and encompasses various economic activities such as personal and public consumption, government expenditures, investment, exports, and imports that take place periodically within a specified geographical area (Kairo et al., 2017). The mathematical expression for this is as follows:

$$C + G + I + NX = \text{Gross Domestic Product}$$

The variables in this equation are C for consumption, G for government spending, I for investment, and NX for the country's net exports, which are determined by subtracting total imports from total exports (NX = Exports - Imports).

According to Pham's (2009) definition, economic growth is characterized by an increase in the production of goods and services within an economy, which is quantified by the gradual changes in a nation's gross domestic product. According to Olugbenga and Owoeye (2007), the increase in value of goods and services, irrespective of the magnitude of the growth rate, is a significant factor.

As per the scholarly work of Oteng-Abayie (2011), Henry M. Robert Solow posits that an economic process refers to the favorable alteration in a nation's output level within a specific timeframe. Broadly speaking, the term "economic process" pertains to the advancement of a nation's productive capacities, which may entail an increase in capital accumulation, technological innovation, improvements in the quality and quantity of output, and various other metrics.

2.5 The History of Nigerian Economic Development and The Importance Of Oil Production

Prior studies have demonstrated the importance of oil with respect to the economic development of Nigeria. This incorporates the research conducted by Anthony in 2012. This study investigates the impact of oil on the economic development of Nigeria between 1960 and 2009 through the application of the Granger causality test. The research results indicate that there exists a reciprocal relationship between various factors, including but not limited to, oil and manufacturing, oil and building construction, manufacturing and building and construction, manufacturing and trade and services, as well as agricultural and building and

construction. The analysis highlights the differences between unidirectional causation from the manufacturing sector to agriculture, and from commerce and services to the lubricants industry. The study found no discernible correlation between the agricultural and petroleum industries, as well as between the commercial and service sectors and the building and construction industry. The study proposes regulatory and pricing modifications within the oil industry as a means of incorporating it into the economy and counteracting the adverse impact of oil on the manufacturing subsector.

In a recent empirical study, Opeyemi (2018) examined the correlation between the Nigerian economy's excessive reliance on petroleum. Moreover, the study employed the Ordinary Least Squares (OLS) methodology to analyze annual data encompassing variables such as GDP, inflation rate, petroleum price, and government revenue, among other determinants, spanning the period from 1986 to 2016. The research tries to find out the impact of petroleum shock on various economic indicators. Based on the findings of the study, a slight fluctuation in the global oil market has a limited impact on Nigeria's Gross Domestic Product (GDP) and economic activity in the present era.

Akinyetun (2016) conducted a study on the relationship between Nigeria and oil production, entitled "Lessons for the Future." The study aimed to evaluate the state of Nigeria's economy prior to the discovery of oil in Oloibiri six decades ago, and to analyze the extent to which this valuable resource has impacted the economy. Additionally, the study sought to draw conclusions regarding future strategies for diversifying and technologically enhancing the economy, in order to move beyond its current mono-product status. In contrast, the article posits that boredom has had a transformative effect on the political landscape of the country, prompting individuals to actively engage in politics in order to benefit from the associated opportunities. This situation is unacceptable and must be addressed.

In his empirical study on Nigerian Economic Performance, Gbadebo (2006) employed the conventional Least Square regression methodology to assess the correlation between the petroleum industry and the economic performance of Nigeria. According to the research, the use and export of petroleum have aided in the growth of the Nigerian economy. The study makes several recommendations, one of which is that the government create policies to encourage private sector involvement in the petroleum industry.

According to Oduyemi (2020) resource windfall analysis, the economic process in Nigeria was adversely affected by the oil boom. The phenomenon of the oil curse in Nigeria has been

associated with the emergence of political unrest in the country. According to Frynas (2000), poverty, corruption, and inequality were the underlying factors that led to societal conflicts such as coups and wars. The discourse on diversification should be analyzed from the perspective of sustainable development to establish a strong and significant foundation for economic stability in the short and long run. According to Anyaehie and Areji (2015), the capacity to enhance an economy is crucial in safeguarding its future prospects amidst a surge of economic instability triggered by global competition.

2.6 Nigeria's Economy and Petroleum Output

Petroleum production and export dominate Nigeria's economy, accounting for over 90% of total profits. Agriculture, the 1950s and 1960s economy's traditional backbone, has been pushed to the fringes by its significant role. Peasant farmers in Nigeria were subjected to heavy regulation of the colonial economy, which was predominately rural in origin, to increase the economic success of the conquering powers. According to (Akpan, 2012), agriculture was the hub of Nigeria's economy between 1960 and 1970, and it was nationally reckoned and used since it was the greatest money earner for both the people and therefore the government. Apart from fulfilling local food requirements for the people, the production of cash crops like as cocoa, groundnuts, palm products, and so on was regionally enhanced as the primary sources of Nigeria's currency profits (Luis and Moncayo, 2012).

2.7 Glimpse into Nigeria's Oil Discovery

The advent of petroleum drilling in the 1970s profoundly transformed the structure of the Nigerian economy, resulting in a new political-economic orientation as national wealth increased with new chances for rent-seeking activities. The advent of highly centralized state administrative structures (e.g., Lagos and subsequently Abuja) as well as new centers of urbanization (Port Harcourt, Warri, Lagos, Kaduna, Ibadan, and so on) swiftly transformed the nature of state-society interactions (Obeng-Odoom, 2021). In 1990, the government announced the most major round of oil field licensing since the 1960s. The nonviolent protest of the Ogoni people to oil companies in the early 1990s about the deterioration of their land and lack of monetary gain from oil revenues garnered international attention. Later, in 1995, Ogoni author and campaigner Ken Saro-Wiwa was charged with murder incitement and assassinated by Nigeria's military regime. (Federici, 2002). The discovery of petroleum in Nigeria has both good and bad consequences. On the negative side, this may be evaluated in terms of the surrounding towns where the oil wells are exploited. Several of these communities continue to suffer from environmental deterioration, which results in a lack of means of subsistence and

other economic and social concerns (Elum et al., 2016). Considering the incontrovertible reality that the oil industry is a critical component of the Nigerian economy, there is an urgent need for a suitable and desired global production and export strategy. Given that there are other sectors within the economy, extra money from the oil industry is often invested in them to diversify and raise the overall GDP of the country.

From the start, the quickly developing refining sector was plagued by complaints that its financial profits were being exported or lost due to corruption rather than being utilized to help the millions of people living in the Niger delta on $1 a day or to reduce its impact on the local environment. With oil prices continuing to decrease in an unexpected manner and accounting for a significant portion of the government's foreign earnings, the decision to diversify the economy has been long overdue. The massive wealth created by oil earnings benefits the nation, allowing for more investment and spending. But the enormous, created money went into the administrators' heads, causing them to become a mono-product economy. Despite the huge amount of cash produced by oil, the Nigerian economy has serious economic challenges that impede growth and development.

2.8 Economic Benefits of Crude Oil In Nigeria

The Nigerian petroleum industry plays a significant role in the country's economy, with various implications for employment, gross domestic product (GDP) contribution, local consumption, government revenues, foreign currency reserves, and energy supply. Given below, are some of the benefits of crude oil production in Nigeria:

2.8.1 Employment Possibilities

Nigerians were first engaged in non-basic duties such as the construction of roads and bridges, the clearance of drilling sites, the transportation of supplies and equipment (Chilaka 2019), and hence the construction of staff housing and leisure facilities. Nonetheless, direct oil sector employment in Nigeria is unlikely to grow considerably in the long run since the business is particularly capital intensive, as seen by the industry's large capital-labor ratio when compared to other industries (Emako et al., 2023). Given that the oil industry has a relatively high capital-labor ratio, expansion of oil operations frequently manifests itself not in a proportionate rise in employment instead in an increase in capital investment. This may be particularly true if, after a period of increased extraction, the necessity for more investment in expensive subsequent recovery processes emerges.

2.8.2 Gross Domestic Product Contribution

The assessment of an industry's or sector's economic contribution to GDP over the course of a given accounting period is typically based on the disparity between the value of the industry's or sector's gross output and the value of its inputs, which may include materials, equipment, services, and other relevant criteria. Gross output in the petroleum industry includes the revenue earned from oil exports, domestic petroleum sales for local refining, and domestic gas sales (Ebimobowei et al., 2022). According to Itaman and Awopegba, (2021), the Nigerian petroleum industry experiences a considerable outflow of value added due to the substantial participation of foreign operators. The industry's ability to retain value added within the nation is constrained by this outflow, which takes the shape of factor payments, earnings, dividends, interest, fees, and wages and salaries sent overseas. Consequently, it is deemed more rational to hold the belief that the industry's contribution to the gross domestic product, after subtracting factor payments paid overseas, is significant. By aggregating the various payments received by the government from the sector, it is possible to quantify the value of the industry.

2.8.3 Local Consumption of Products and Services

In addition to the short-term benefits that are accessible to those who adopt these products and services early, there are also secondary effects that have a compounding impact on the levels of production and employment in other related economic sectors. The extent of these impacts overall is contingent upon the scale of the initial investment and the degree to which the local economic system experiences outflows (Awolala, et al., 2023).

2.8.4 Contributions to Government Revenues

The various increments in government revenue over the recent years may be attributed to several factors, including the escalating petroleum production in Nigeria, the substantial surge in petroleum prices, and the resulting advantageous fiscal agreements secured by the government due to its strengthened bargaining power over time (Olujobi 2021). During the initial stages of oil operations in Nigeria, the government found itself in a disadvantaged negotiating position with the oil firms, given the uncertain prospects of establishing a thriving oil industry in the country. The employment of realized prices in the computation of taxable earnings resulted in a reduction of the nation's oil revenue due to the substantial decline in oil prices throughout the majority of 1960 (Osaghae 2023). The aforementioned alterations took place during a time of significant escalation in governmental revenue generated from oil, particularly in the years 1973 and 1974. The substantial surge in gasoline prices in the period of 1973-74 contributed significantly to the rise in oil profits. The future equilibrium between

energy supply and demand will determine how long oil prices will remain high. This equilibrium is reliant on the degree of efficiency in energy consumption and the rate of advancement in alternative fuel development for consumption.

2.8.5 Foreign Currency Reserves

A number of developing nations, particularly those that depend significantly on a small number of primary resources, frequently endure severe currency shortages, which are exacerbated by substantial declines in worldwide commodity rates. The evaluation of the sector's impact on trade is not based on the gross value of petroleum exports, as oil companies retain all revenues generated from foreign exports and only remit the necessary amount to sustain their domestic operations in the producing country.

2.8.6 Contribution to Energy Supply

Ishaq et al (2022) argue that the presence of substantial gas reserves presents a viable opportunity for the provision of cost-effective energy to the industrial and commercial sectors. Shell-BP is currently providing associated natural gas, which is produced alongside petroleum, to the National Electric Power Authority for the purpose of generating thermal electricity. Additionally, the Nigerian Petroleum Refining Company is utilizing this gas as fuel for petroleum refining at Elesa Eleme. Furthermore, various commercial entities located in the vicinity of oil operations are also receiving this gas supply. However, the annual consumption continues to form small part of the total production (Ibrahim et al., 2021). Consequently, the latter, which is currently obtained exclusively from oil fields, falls considerably below its potential productive capability. The aforementioned brief synopsis illustrates that the refining industry makes diverse contributions to the economy of Nigeria.

2.9 Crude Oil's Disadvantages to The Nigerian Economy

In Nigeria, the petroleum industry faces numerous challenges that hinder its efficiency and overall success. Public oversight and bureaucracy play a significant role in impeding decision-making processes (Rogger, 2018), as the Nigerian National Petroleum Corporation (NNPC) lacks the autonomy necessary to effectively regulate the sector. This leads to unnecessary delays and negative consequences in various situations. Furthermore, inadequate investment funds contribute to a decline in oil companies' willingness to invest (Olujobi, 2021; Ross 2003), resulting in persistent delays in financial support for venture operators. Additionally, disturbances within local communities, particularly in the south-eastern region (Anthonia et al., 2021), further disrupt productivity and output due to frequent battles between different

organizations and the government. Petroleum product smuggling and diversion add to the industry's woes, with reports of significant smuggling across borders to exploit pricing disparities (Faleye 2019). This illicit activity often involves tampering with products, compromising their quality and posing environmental hazards. These challenges, coupled with the industry's limited investment and slow technological development, contribute to high production costs and hinder Nigeria's petroleum potential from being fully realized.

2.10 Nigeria's Economic Diversification

The concept of economic diversification is occasionally regarded as separate from that of economic development. According to Herrick and Kindleburger (1983), achieving economic progress requires a fundamental and comprehensive transformation in the technology and institutions that are implicated in the manufacturing and dissemination of goods. The potential for economic diversification in Nigeria to address fundamental requirements for sustainable development, including the fulfillment of basic needs for the impoverished population, such as employment, food, healthcare, clothing, and shelter, is significant. This can be achieved by creating new opportunities for economic activity that cater to a diverse range of individuals.

Diversification refers to the expansion of a society's ability to fulfill the requirements of its populace by enhancing technological progress, socio-cultural arrangements, and a diverse array of economic pursuits, rather than relying solely on the over-utilization of a single natural resource to the extent of depletion. The practices could potentially result in significant environmental consequences, including but not limited to pollution, degradation, and unfavorable coexistence between human beings and the natural world. According to Zhang (2003), the establishment of a broad-based economy ensures fairness for present and future generations.

Empirical evidence suggests that achieving economic diversification from oil is a challenging endeavor on a global scale. The efficacy of economic diversification is contingent upon the implementation of appropriate policies prior to any decline in oil revenue. Both favorable and unfavorable outcomes are predicated on this crucial factor. Malaysia, Indonesia, Mexico, and the UAE, with a particular focus on Dubai, serve as exemplars of nations that have accomplished a significant feat in economic diversification by shifting their economies away from oil. Conversely, Chile has made some strides in diversifying its economy away from copper. In addition to cultivating a conducive economic and commercial atmosphere, these nations prioritized export diversification and enhancement of quality through incentivizing

enterprises to expand their export markets and supporting employees in acquiring the requisite skills and education to augment productivity in pertinent domains. While some oil-exporting countries, including Algeria, Congo, Ecuador, Gabon, and Nigeria, have achieved varying levels of success in their efforts towards economic diversification, Venezuela has not been able to do so. Several factors are associated with the government's dedication to the cause. For instance, the Nigerian government has been discussing the issue of economic diversification for a considerable period, yet no concrete steps or policies have been implemented by various government administrations (Callen et al., 2014).

The current situation in Nigeria serves as a compelling illustration of the inadequacy of governmental efforts to promote economic diversification. During the period when crude oil was being sold at a price exceeding $130 per barrel (Monday and Abdulkadir, 2020), it would have been advisable for the government to augment the foreign reserve in order to enhance the confidence of both foreign and domestic investors. Additionally, a proportion of the revenue generated from the sale of crude oil could have been allocated towards the development of non-oil sectors such as tourism and industrial production. One potential strategy to incentivize investor involvement in the expansion of various industries was identified, although the government's prioritization in this matter was found to be lacking. An additional element to consider is the reliance of the economy on fluctuations in oil prices in order to facilitate the growth of other sectors. The frequent fluctuations in oil prices have posed a challenge for governments, as they struggle to mitigate the effects of a drop in oil prices, which can have long-lasting impacts (Botão et al., 2023). This cycle is further compounded by subsequent drops in oil prices, as governments remain preoccupied with addressing the consequences of previous declines while contending with new ones.

The literature suggests that Nigeria failed to fully utilize the potential benefits of petroleum as a natural resource, instead relying heavily on petroleum as its primary export commodity. Furthermore, the lack of diversification and investment in alternative export commodities, which were expected to stimulate economic growth and enhance the standard of living, was evident. The issue is frequently attributed to the actions of unethical government personnel, spanning across historical and contemporary periods. Additionally, it can be argued that the presence of petroleum resources has had a detrimental impact on the nation's development.

2.11 Relevance of The Dutch Disease Effect to Nigeria's Crude Oil Production And Economic Growth

Nigeria is often cited as a classic case of the Dutch disease effect due to its heavy reliance on oil exports. Oil has been the primary source of revenue for the country, accounting for a substantial portion of its GDP and government budget. While oil exports have brought significant wealth to Nigeria, the overemphasis on this sector has had several adverse effects on the Nigerian economy.

Over the years, Nigeria has experienced noticeable trends such as the appreciation of the domestic currency, an increase in real wages and the service sector, and a slowdown in industrial production. These indicators align with the concept of Dutch disease, which suggests that a country relying heavily on natural resource rents may witness deindustrialization and lower long-term economic growth.

In a study by Laguda (2019), the impact of Dutch disease in Nigeria was analysed using various econometric techniques, including Ordinary Least Squares, Two-Stage Least Squares, and Autoregressive Distributed Lag with a system of equations spanning from 1981 to 2017. The study found that the real wage rate, which reflects labor supply in the economy, confirms one of the assumptions of Dutch disease. It also observed a decline in the manufacturing sector over the years. Based on these findings, recommendations were made for Nigeria, such as providing more funds to the agricultural sector through loans to interested parties, privatizing the downstream production of oil, and diversifying the economy.

Similarly, Anjande and Aor (2017) conducted an economic analysis of Dutch disease in Nigeria from 1981 to 2014. They utilized co-integration regression, including Fully Modified Ordinary Least Squares (FM-OLS) and Canonical Co-integration Regression (CCR), as their modeling approach. By applying the bounds test of co-integration, the study established a co-integrating relationship among the variables, indicating the existence of Dutch disease in Nigeria during the study period. The study recommended both vertical and horizontal linkages of the oil and gas sector to effectively and efficiently utilize oil revenue and reverse the current trend of Dutch disease in the economy. These recommendations stem from the necessity of maximizing the utilization of available oil proceeds, given the exhaustible nature of oil resources.

The insights derived from the studies on Dutch disease in Nigeria highlight the relevance of this phenomenon to the country's crude oil production and economic growth. They emphasize the negative impact of Dutch disease on non-oil sectors, the importance of economic diversification, the influence of labor supply and wage distortions, and the need for effective utilization of oil revenue. Addressing these issues is crucial for Nigeria to overcome the challenges posed by Dutch disease and promote long-term, diversified, and inclusive economic growth.

2.12 Chapter Summary

The present chapter provides an overview of the theoretical underpinnings and a comprehensive review of pertinent literature. The discourse encompassed discussions regarding the extraction of unrefined petroleum and the commencement of petroleum manufacturing in Nigeria. The conjectural segment presents an economic theory that effectively elucidates the role of crude oil in the Nigerian economy, and this aspect was duly addressed within this framework. The Dutch Disease hypothesis was examined. Academic literature was consulted to corroborate the soundness of this research.

CHAPTER THREE
RESEARCH METHOD

3.1 Chapter Introduction

The present study employs a research methodology that incorporates crucial elements with the objective of generating data that can substantiate the reliability of the empirical findings. This study outlines the strategic approach, research methodology, data sources, characteristics of the data and sources, model specification, and analytical techniques utilized.

3.2 Research Design

This research employs an ex-post facto design (Joel, 2021), utilizing time series data for the periods under investigation to acquire historical document data, employed to capture the dynamics of these variables over a specific period, allowing for an in-depth evaluation of the research problem. This served as the basis for establishing a complete connection between the variables. It will involve analysing secondary data from various sources to examine the relationship between crude oil production, the Dutch disease effect, and economic growth in Nigeria.

3.3 Data and Sources

As previously stated, the present study utilizes an ex-post facto research design, which utilizes pre-existing sources of data to achieve the study's objectives. The data used for the purpose of this research were collected from the Central Bank of Nigeria (https://www.cbn.gov.ng/) and World Bank Data (https://data.worldbank.org/). The year of data coverage span from 1981 to 2021 totaling a period of 41 years. The period of estimation is limited to the availability of data from the recommended source.

3.4 Model Specification and Evaluation

The present study employs crude oil production, oil rent, inflation rate, and agriculture as explanatory variables, with GDP per capita being the response variable. This is employed in time series regression to generate reliable parameter estimates. The regression model equation(s) will depend on the specific model specification and the functional forms chosen for the analysis. However, a general example of a multiple regression model equation incorporating the variables mentioned could be:

GDP per capita = β_0 + β_1Crude oil production + β_2Oil rent + β_3 Inflation rate + β_4 Agriculture + ε……(1)

The equation can be simplified into:

$GDPPC = \beta_0 + \beta_1 COP + \beta_2 OR01 + \beta_3 INFR + \beta_4 AGRI + \varepsilon$…….(2)

In this equation, β_0, β_1, β_2, β_3, β_4 represent the coefficients to be estimated for each independent variable, and ε represents the error term capturing unobserved factors affecting GDP per capita.

3.4.1 Variable Description

Variable description in secondary research involves providing detailed information about the variables under investigation, ensuring clarity and consistency in understanding how these variables were measured or defined in previous research. The variables used in this study, categorised as dependent and independent variables are highlighted below:

3.4.1.1 Dependent variable: GDP per capita

The use of GDP per capita as the dependent variable is appropriate for evaluating the impact of crude oil production and the Dutch disease effect on economic growth in Nigeria. By examining changes in GDP per capita, the study can assess the extent to which economic growth is affected by the independent variables. Other studies that used GDP per capita as a dependent variable include Gershon et al (2019), and Babuga and Ahmad, 2022).

3.4.1.2 Independent Variables

a. Crude oil production: This variable is essential for evaluating the relationship between crude oil production and economic growth in Nigeria. It represents the level of crude oil extraction and production, which has significant implications for Nigeria's economy. Higher levels of crude oil production may contribute to increased government revenue, exports, and foreign exchange earnings, potentially impacting economic growth.

b. Oil rent: Oil rent refers to the revenue generated from the extraction and export of crude oil. It represents a significant portion of Nigeria's national income. Including this variable allows for a more nuanced analysis of the economic impact of oil production and its contribution to the Dutch disease effect.

c. Inflation rate: Inflation measures the rate at which the general level of prices for goods and services increases over time. Inclusion of the inflation rate helps account for the potential impact of price changes on economic growth. High inflation rates, often associated with increased government spending fueled by oil rents, can have adverse effects on economic stability and growth.

d. Agriculture production: Agriculture production is an important sector in Nigeria's economy, and its inclusion as an independent variable allows for an assessment of the contribution of non-oil sectors to economic growth. Changes in agriculture production can indicate the presence or absence of economic diversification efforts, which are relevant to understanding the Dutch disease effect.

3.5 Method of Analysis

For the analysis of the data and model, the software Eviews will be utilized. Eviews is a widely used econometric software that provides various statistical tools for time-series analysis, regression analysis, and model estimation. It offers features for data manipulation, model specification, estimation, and diagnostic testing, making it suitable for the analysis of the relationship between crude oil production, the Dutch disease effect, and economic growth in Nigeria.

3.5.1 Descriptive Statistics

Descriptive statistics summary refers to a collection of statistical measures and techniques used to summarize and describe the main characteristics or properties of a dataset. It provides a concise overview of the data, allowing researchers to understand its central tendency, variability, distribution, and other key aspects. This involves examining the basic characteristics of the variables, such as means, standard deviations, and correlations, to gain initial insights into their relationships.

3.5.2 Regression Analysis

Regression analysis is a statistical technique used to examine the relationship between a dependent variable and one or more independent variables. In this research, Ordinary Least Squares (OLS) regression analysis is used to estimate the relationship between the dependent variable, GDP per capita (GDPPC), and several independent variables, including Crude Oil Production (COP), Inflation Rate (InfR), Agriculture (AGRI), and Oil rent (OR01).

OLS regression analysis aims to find the best-fitting linear equation that explains the relationship between the dependent variable and the independent variables. The goal is to estimate the coefficients for each independent variable, which represent the impact or influence of that variable on the dependent variable while controlling for other factors.

To estimate the coefficients, the OLS regression analysis minimizes the sum of squared residuals, which are the differences between the predicted values of GDPPC based on the

regression equation and the actual observed values of GDPPC. The regression analysis determines the values of β_0, β_1, β_2, β_3, and β_4 that minimize this sum of squared residuals.

Once the regression analysis is conducted, the coefficients can be interpreted to understand the impact of each independent variable on economic growth. A positive coefficient suggests a positive relationship, meaning an increase in the independent variable is associated with an increase in GDP per capita. Conversely, a negative coefficient indicates a negative relationship, implying that an increase in the independent variable is associated with a decrease in GDP per capita. The significance of the coefficients is assessed using hypothesis testing, such as t-tests or p-values, to determine if the relationships are statistically significant.

Furthermore, regression analysis allows for additional analysis, such as assessing the overall goodness of fit of the model using metrics like the R-squared value, which represents the proportion of the variation in the dependent variable explained by the independent variables.

3.5.3 Diagnostic Tests

Diagnostic tests, such as the Breusch-Godfrey test for autocorrelation and heteroscedasticity tests, are conducted to assess the assumptions of the regression model and ensure its reliability.

3.5.3.1 *Normality Test*

The p-value of Jaque-Bera (1980) is employed to assess the normality of the residuals in the estimated model. According to the established guideline for this particular test, if the Jaque-Bera probability (p-value) exceeds 0.05, it is not possible to reject the null hypothesis. This outcome suggests that the residual is normally distributed.

3.5.3.2 *Serial Correlation Test*

The existence of serial correlation within the residual of the regression estimation is indicative of biased estimation, as it violates the underlying assumptions of regression estimation. Specifically, the residuals must exhibit uncorrelated behavior in order to ensure accurate estimation. Consequently, the significance of this examination is emphasized. Based on this assertion, the Breusch-Godfrey (1978) test for serial correlation LM is employed to verify the absence of correlation among the residuals. According to the guideline for this particular test, it is specified that if the F-statistic of the BG LM test surpasses the 5% significance level, the null hypothesis (wherein $\rho_1 = \rho_2 = \rho_3 = \ldots \rho_n = 0$) cannot be dismissed. This outcome suggests that there exists serial correlation to the order of p lags in the residual. This This suggests that the series exhibits no serial correlation up to p lags. In the event that the F-statistic is equal to

or below 0.05, the null hypothesis is refuted, thereby verifying the existence of serial correlation.

3.5.3.3 *Heteroskedasticity tests*

The present investigation employs a pair of assessments to verify the lack of heteroskedasticity in the residual. The aforementioned tests are the Breusch-Pagan-Godfrey heteroskedasticity test and the Autoregressive conditional heteroskedasticity (ARCH) test. According to the heteroskedasticity tests employed in the study, it is generally accepted that if the F-statistic of the test exceeds the 5% significance level, the null hypothesis (which posits that the variances of the populations under consideration are equal) cannot be rejected. This observation suggests that the residuals exhibit homoscedasticity.

3.5.3.4 *Stability Test*

To assess the stability of the parameters in the research model, the research technique employs the cumulative sum (CUSUM) of recursive residuals and cumulative sum of squares (CUSUMSQ) test.

3.5.3.5 *Toda-Yamamoto Causality Test*

The Toda-Yamamoto causality test is a statistical test used to analyse the causal relationship between variables. It is commonly employed in econometric research to determine the direction of causality between two variables. In the context of this research, the Toda-Yamamoto causality test is used to investigate whether there is a causal relationship between crude oil production and economic growth. The Toda-Yamamoto causality test is based on the concept of vector autoregression (VAR) models. VAR models are econometric models that estimate the relationships between multiple variables over time. The Toda-Yamamoto causality test extends the VAR model by allowing for the inclusion of lagged values of the dependent variable, which helps to capture potential causal relationships.

A simple VAR model with two variables, crude oil production (COP) and economic growth (EG) is formed as shown below:

$$COP(t) = \alpha + \beta_1 COP(t-1) + \gamma_1 EG(t-1) + \varepsilon_1(t) \ldots\ldots\ldots\ldots\ldots (3)$$

$$EG(t) = \alpha + \beta_2 COP(t-1) + \gamma_2 EG(t-1) + \varepsilon_2(t) \ldots\ldots\ldots\ldots\ldots .. (4)$$

In this model, COP(t) represents crude oil production at time t, EG(t) represents economic growth at time t, and the subscripts indicate the lagged values of the variables. The coefficients β_1 and β_2 capture the effect of lagged values of COP on the current value of COP and EG, respectively. Similarly, the coefficients γ_1 and γ_2 capture the effect of lagged values of EG on the current value of COP and EG, respectively. The $\varepsilon_1(t)$ and $\varepsilon_2(t)$ are the error terms.

To conduct the Toda-Yamamoto causality test, the following steps are typically followed:

1. Estimate a VAR model: A VAR model is estimated using the available data for the variables of interest. In this case, this involve estimating a VAR model with crude oil production and economic growth as the variables.
2. Determine the optimal lag length: The lag length specifies the number of past time periods included in the model. The Akaike Information Criterion (AIC) is used to determine the optimal lag length (lag length = 1).
3. Conduct the Toda-Yamamoto test: The Toda-Yamamoto causality test examines whether there is a causal relationship between the variables. It does this by testing for the significance of lagged values of the dependent variable in explaining the current values of the independent variable(s). If the lagged values are found to be significant, it suggests the presence of causality.
4. Interpret the results: Based on the test results, the direction of causality between crude oil production and economic growth is determined. If the test indicates that lagged values of crude oil production significantly influence current economic growth, it suggests that crude oil production causes economic growth. Conversely, if the test shows that lagged values of economic growth significantly influence current crude oil production, it suggests that economic growth causes changes in crude oil production.

3.6 Chapter Summary

The research design employed in this study was ex-post facto, and the data utilized were sourced from the World Bank databank and United States Energy Information Administration database. The study period spanned from 1981 to 2021. The present investigation employed the Eviews version 10 statistical software for conducting data analysis. Descriptive statistics are employed to organize and synthesize data in order to mitigate ambiguity and enhance its utility and comprehensiveness. The utilization of the unit root test allows for the determination of the stationarity characteristics and integration order of the variables being analyzed. The assessment of the dependability of estimation outcomes involves the utilization of robustness

tests, such as the normality test, serial correlation test, heteroskedasticity test, and CUSUM and CUSUMSQ stability test.

CHAPTER FOUR

RESULT, DISCUSSION AND FINDINGS

4.1 Chapter Introduction

This section provides the findings from the analysis of the data collected to investigate the impact of Nigeria's international trade on the income of the poor using Eview-10, with GDP per capita as the dependent variable and Crude oil production, Inflation rate, Oil rent, and Agriculture, as the independent variables. Firstly, in this section, descriptive statistics of the variables (dependent, and independent) are presented in Table 4.1, to summarise and give key insight on the nature of the whole dataset. Since the analysis followed econometric model criteria, several procedures have been observed to ensure the most appropriate insights were gained from the analysis's outcomes.

4.2 Descriptive Summary

Table 4.1 below illustrates the descriptive information of the measure variables. Contained in the table is the mean score, the maximum and minimum values, the standard deviation, the observations (i.e. the number of years covered), and other information.

	GDPPC	AGRI	COP	INFR	OR01
Mean	1350.354	22.88138	9.709512	18.94905	11.51401
Median	992.7453	22.23471	0.000000	12.87658	11.14464
Maximum	3200.953	36.96508	29.61000	72.83550	28.70544
Minimum	270.0275	12.24041	0.000000	5.388008	1.573876
Std. Dev.	881.8758	4.589772	12.47249	16.65937	6.173340
Skewness	0.418832	0.440302	0.530704	1.854161	0.477526
Kurtosis	1.753158	4.732787	1.368651	5.306526	2.875631
Jarque-Bera	3.854507	6.454107	6.470973	32.58085	1.584635
Probability	0.145547	0.039674	0.039341	0.000000	0.452794
Sum	55364.51	938.1364	398.0900	776.9110	472.0742
Sum Sq. Dev.	31108195	842.6402	6222.517	11101.39	1524.405
Observations	41	41	41	41	41

The table presents statistical measures for various economic variables, including GDP per capita (GDPPC), Crude Oil Production (COP), Inflation Rate (INFR), Agriculture (AGRI), and Oil Rent (OR01). The mean values provide an average measure for each variable. For instance, the mean GDPPC is 1350.354, suggesting that, on average, the GDP per capita across the observations is relatively high. Similarly, the mean values for AGRI (22.88138), COP

(9.709512), INFR (18.9905), and OR01 (11.51401) indicate average levels of agricultural output, crude oil production, inflation rate, and oil rent, respectively.

The standard deviation measures the dispersion or variability of the data points. A higher standard deviation implies a wider range of values within the data set. In this context, GDPPC exhibits a relatively high standard deviation of 881.8758, indicating substantial variation in GDP per capita across the observations. Conversely, AGRI has a smaller standard deviation of 4.589772, suggesting less variability in agricultural output.

The minimum and maximum values provide insights into the range of each variable. For example, the minimum GDPPC is 270.0275, indicating the lowest observed GDP per capita value. Conversely, the maximum GDPPC is 3200.953, representing the highest observed value. Similar interpretations can be made for other variables such as AGRI, COP, EXR, INFR, MAN, and OR01.

The Jarque-Bera test assesses the normality of the data distribution. A low Jarque-Bera value implies that the data follows a normal distribution, while a high value suggests departure from normality. The associated probability indicates the statistical significance of the test. In this case, GDPPC, AGRI, COP, and OR01 have relatively low Jarque-Bera values, suggesting that these variables are approximately normally distributed. However, INFR exhibit higher Jarque-Bera values, indicating departures from normality, which are statistically significant.

4.3 Regression Analysis

The regression equation represents the mathematical relationship between the dependent variable (GDP per capita in this case) and the independent variables (crude oil production, oil rent, inflation rate, and agriculture). It is necessary to have a regression equation to understand the specific impact of each independent variable on the dependent variable and to make predictions or estimate the effect of changes in the independent variables on the dependent variable. Therefore, the regression equation is essential in this case to quantify the relationships between the independent variables and GDP per capita, understand the significance of each variable's impact, and make predictions or estimates based on specific values of the independent variables.

Dependent Variable: GDPPC
Method: Least Squares
Sample: 1981 2021
Included observations: 41

Variable	Coefficient1	Prob.1	Coefficient2	Prob2.
C	2007.352	0.0000*	-169.9827	0.5208
COP	55.62835	0.0000*	17.69364	0.0013*
OR01	-26.15136	0.0200*	13.33602	0.0544*
INFR	-3.828349	0.3296	-3.514704	0.0816
AGRI	-35.98874	0.0093*	7.894800	0.3220
GDPPC(-1)			0.788696	0.0000

***Coefficient1 and Prob1. Represent regression results before correcting for autocorrelation and serial correlation. Coefficient2 and Prob2., represent regression results after correcting for autocorrelation and serial correlation.*

The provided table 4.2 presents the results of an Ordinary Least Squares (OLS) regression analysis with GDP per capita as the dependent variable and several independent variables, including crude oil production, oil rent, inflation rate, and agriculture. Coefficient1 and Prob1. represent regression results before correcting for serial correlation. Coefficient2 and Prob2., represent regression results after correcting for serial correlation. On this note, Coefficient2, and Prob2 are considered mainly in this research.

OLS (Ordinary Least Squares) is a widely used regression method for estimating the parameters in a linear regression model. However, when the assumptions of OLS are violated, such as in the presence of serial correlation in the error terms, the estimates may become biased and inefficient (Dubin 1988, Keele and Kelly, 2006). Serial correlation occurs when the error terms in a regression model are correlated over time. This violates one of the key assumptions of OLS, which assumes that the error terms are independent and identically distributed (i.i.d.) according to Keele and Kelly (2006). When serial correlation is present, OLS estimates may not be the best estimates of the true population parameters. Therefore, correcting for serial correlation and autocorrelation in OLS is preferable because it improves the statistical validity of the regression analysis and ensures that the estimated coefficients are more accurate and representative of the true underlying relationships in the data.

The estimated equation for the model, using the coefficients for only the significant variables (COP and OR01) at 5% confidence level, with the dependent variable GDPPC, after autocorrelation and serial correlation had been corrected, is written as follows:

$$GDPPC = -169.9827 + 17.69364(COP) + 13.33602(OR01) + 0.788696(GDPPC(-1))$$

In this equation, GDPPC represents the dependent variable (GDP per capita), COP represents the variable Crude Oil Production, and OR01 represents the variable Oil rent. The coefficients 17.69364 and 13.33602 represent the estimated effects of COP and OR01, respectively, on GDPPC. The coefficient 0.788696 represents the effect of the lagged value of GDPPC on the current value of GDPPC. The intercept term is -169.9827.

The significance of this scientific investigation cannot be overstated, as African nations blessed with abundant oil resources encounter substantial and enduring challenges arising from unpredictable oil prices and the implementation of counteractive fiscal measures (Eregha & Mesagan, 2020). The scientific rationale behind the outcomes of the relationships between GDP per capita and different variables can be explained as follows:

Positive significant relationship between GDP per capita and Crude oil production

Crude oil production is an important economic activity that can contribute significantly to a country's GDP. Countries with higher levels of crude oil production often experience increased revenues, employment opportunities, and overall economic growth (Karl, 2007; Anyanwu, and Salami, 2021). Therefore, a positive significant relationship between GDP per capita and crude oil production can be expected. Higher crude oil production can lead to increased GDP per capita due to the positive impact of oil-related activities on a nation's economy.

Positive significant relationship between GDP per capita and Oil rent

Oil rent refers to the revenue generated by a country from its oil resources, including royalties, taxes, and other income from oil-related activities. Countries with higher oil rent often have greater financial resources that can be invested in infrastructure development, education, healthcare, and other sectors (Sachs, 2007), leading to increased GDP per capita. Therefore, a positive significant relationship between GDP per capita and oil rent can be expected, as higher oil rent contributes to higher income and economic development.

Additionally, information related to the outcome of the regression analysis are provided in table 4.3 below:

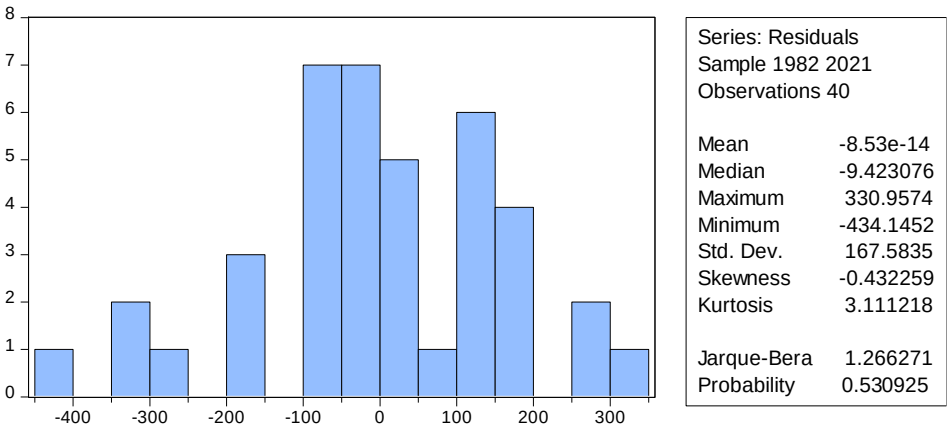
	BC	AC		BC	AC
R-squared	0.853821	0.963958	Mean dependent var	1350.354	1329.416
Adjusted R-squared	0.837579	0.958658	S.D. dependent var	881.8758	882.7288
S.E. of regression	355.4088	179.4833	Akaike info criterion	14.69826	13.35552
Sum squared resid	4547354.	1095285.	Schwarz criterion	14.90724	13.60885
Log likelihood	-296.3144	-261.1105	Hannan-Quinn criter.	14.77436	13.44712
F-statistic	52.56850	181.8692	Durbin-Watson stat	0.975615	1.897286
Prob(F-statistic)	0.000000	0.000000			

***BC and AC mean results before correction of autocorrelation and results after autocorrelation, respectively*

A Durbin-Watson statistic of 1.897286 suggests that there is no strong evidence of positive autocorrelation in the residuals of the regression mode after the presence of autocorrelation has been corrected.

4.4 Normality Test

Normality testing is important in regression analysis to verify the normality assumption underlying the model, ensure the validity of statistical inference, obtain accurate parameter estimates, support hypothesis testing, and validate the overall adequacy of the regression model.



Based on the normality test results, the data appears to be relatively normally distributed. The Jarque-Bera statistic (1.266271) and associated probability (0.530925) suggest no significant departure from normality. The negative Skewness (-0.432259) indicates a slight left skew, while the kurtosis value (3.111218) suggests a distribution similar to a normal distribution in terms of peakedness.

4.5 Serial Correlation Test

Serial correlation testing is important in regression analysis to ensure that the assumptions of the model are met, to obtain efficient parameter estimates, to validate hypothesis tests, and to diagnose and improve the adequacy of the regression model.

From the first regression model, there is presence of serial correlation according to both LM test, and correlogram test.

Breusch-Godfrey Serial Correlation LM Test:

Prob. F(2,34)	0.0165	0.4988
Prob. Chi-Square(2)	0.0123	0.4271

Correlogram Q statistics

	AC	AC2	PAC	PAC2	Q-Stat	Q-Stat2	Prob	Prob2
1	0.434	0.029	0.434	0.029	8.3099	0.0368	0.004	0.848
2	0.076	-0.192	-0.138	-0.193	8.5742	1.6727	0.014	0.433
3	-0.035	-0.146	-0.016	-0.139	8.6302	2.6377	0.035	0.451
4	-0.332	-0.229	-0.374	-0.276	13.871	5.0875	0.008	0.278
5	-0.334	-0.238	-0.043	-0.342	19.333	7.7989	0.002	0.168
6	-0.201	0.118	-0.073	-0.070	21.372	8.4919	0.002	0.204
7	-0.057	0.162	0.070	-0.074	21.541	9.8288	0.003	0.198
8	0.126	0.122	0.047	-0.021	22.392	10.616	0.004	0.224
9	0.220	0.167	0.060	0.104	25.057	12.123	0.003	0.206
10	0.190	0.049	-0.006	0.112	27.116	12.255	0.002	0.268
11	0.147	-0.152	0.060	0.051	28.390	13.590	0.003	0.257
12	0.043	-0.264	0.001	-0.126	28.500	17.758	0.005	0.123
13	-0.103	0.014	-0.037	0.099	29.169	17.771	0.006	0.166
14	-0.165	-0.037	-0.040	-0.067	30.941	17.858	0.006	0.213
15	-0.182	-0.070	-0.051	-0.203	33.187	18.191	0.004	0.253
16	-0.174	0.166	-0.074	-0.058	35.318	20.130	0.004	0.214
17	-0.200	0.046	-0.210	-0.208	38.261	20.286	0.002	0.260
18	-0.104	0.049	-0.047	-0.005	39.094	20.466	0.003	0.307
19	-0.005	0.040	-0.086	-0.048	39.096	20.596	0.004	0.360
20	0.079	-0.043	0.038	-0.015	39.616	20.751	0.006	0.412

Upon the correction of the presence of serial correlation in the model, the probability values (Prob2) in the table range from 0.123 to 0.848. Based on these results, it appears that there is no strong evidence of significant serial correlation in the residuals. The autocorrelation and partial autocorrelation values are generally small and close to zero, indicating weak or no

correlation between the residuals at different lags. The Q-statistic values (Q-stat2) and associated probabilities (Prob2) further support the absence of significant serial correlation.

4.6 Heteroskedasticity Test

Heteroskedasticity testing is important in regression analysis to ensure the validity of statistical inference, improve the efficiency of parameter estimates, diagnose model adequacy, and enhance the robustness of regression results.

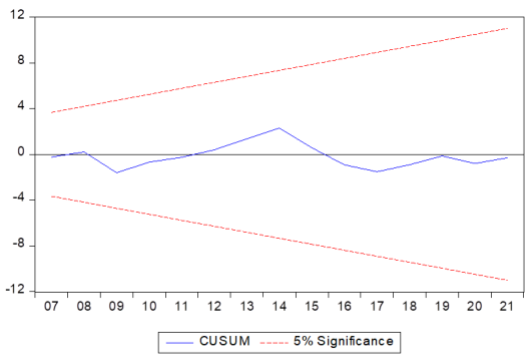
Heteroskedasticity Test: Breusch-Pagan-Godfrey

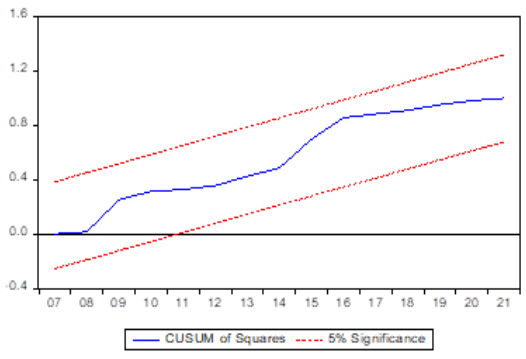
F-statistic	0.781007	Prob. F(5,10)	0.5856
Obs*R-squared	4.493375	Prob. Chi-Square(5)	0.4808
Scaled explained SS	0.932675	Prob. Chi-Square(5)	0.9678

The initial test shows the presence of heteroskedasticity. However, this is corrected by taking the log of all the variables in the model, therefore, the results presented in the table above are obtained. The F-statistic of 0.781007 suggests a low value for the test statistic. The associated probability (p-value) of 0.5856 indicates that the F-statistic is not statistically significant. This implies that there is no strong evidence to reject the null hypothesis of homoskedasticity. In other words, the test does not detect significant heteroskedasticity.

4.7 Stability Test

Stability testing is important in regression analysis to ensure the validity of the model, support accurate forecasting and prediction, inform policy and decision-making processes, and facilitate model comparison and selection. CUSUM and CUSUM of Squares are used to monitor cumulative deviations from an expected pattern over time. They help detect structural changes in mean level or variance in a time series or regression model.





The CUSUM plot remains within certain control limits or stays close to zero, which suggests that there is no evidence of significant structural changes in the time series or regression model. The CUSUM of Squares plot that remains within the control limits which suggests no evidence of significant changes in the variance or volatility of the time series or regression model.

4.8 Toda-Yamamoto Causality Test

The Toda-Yamamoto Causality test is relevant in this case as it helps determine the direction and strength of causal relationships between variables, accounts for bidirectional causality, validates model assumptions, and provides valuable insights for policy implications.

Two factors are taken into consideration before conducting this test, which is the maximum order of integration and optimal lag length.

To determine the maximum order of integration, a unit root test is carried out using both ADF (Augmented Dickey-Fuller) and KPSS (Kwiatkowski-Phillips-Schmidt-Shin) tests. In practice, it is often recommended to perform both the KPSS and ADF tests to gain a more comprehensive understanding of the stationarity properties of the time series.

Key: At level: 0, First difference: 1. Second difference: 2.

Variable	ADF	KPSS
GDPCC	1 (-4.069429)	1 (0.330669)
COP	1 (-6372613)	1(0.118181)
OR01	1 (-7336702)	0 (0.223326), 1 (0.310960)
INFR	1 (-6.549446)	0 (0.309002)
AGRI	1 (-6965308)	0 (0.309933)

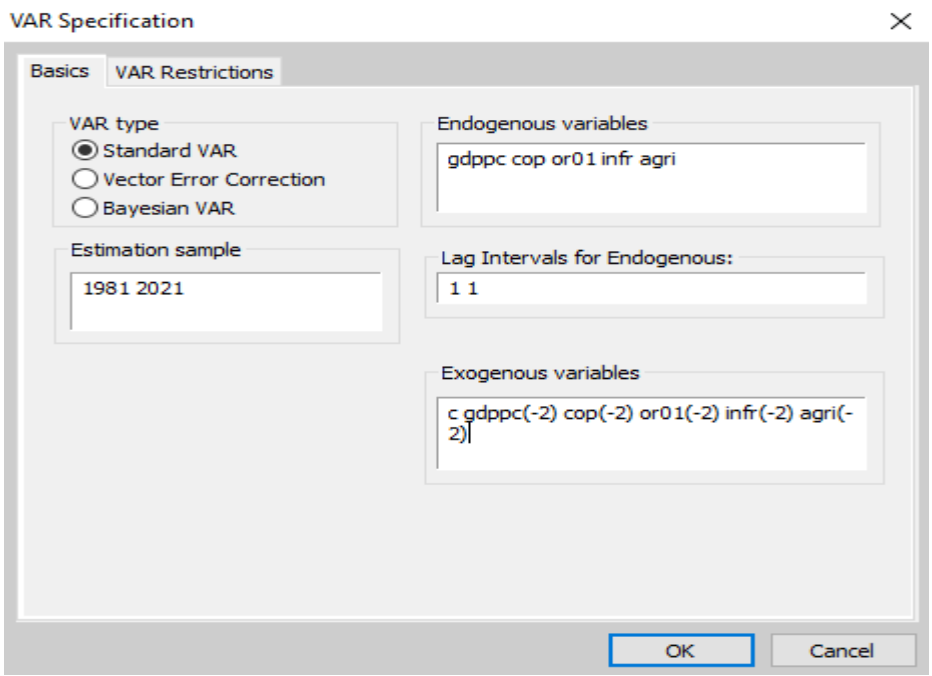
Based on the results from the table, the maximum order of integration is taken as 1. Meanwhile, the next procedure is to take the optimal lag length. A VAR (Vector Autoregression Estimate) test is carried out. Firstly, the VAR is carried out according to the parameters of the original system (see appendix). The lag structure is then estimated, and the result is presented below.

VAR Lag Order Selection Criteria
Endogenous variables: GDPPC COP OR01 INFR AGRI
Exogenous variables: C
Sample: 1981 2021
Included observations: 38

Lag	LogL	LR	FPE	AIC	SC	HQ
0	-797.8902	NA	1.55e+12	42.25738	42.47285	42.33404
1	-696.9211	170.0531*	2.88e+10*	38.25901*	39.55184*	38.71899*
2	-675.2950	30.73192	3.69e+10	38.43658	40.80677	39.27987
3	-651.5320	27.51505	4.79e+10	38.50168	41.94923	39.72830

In the VAR (Vector Autoregression) Lag Order Selection Criteria table provided, the AIC (Akaike Information Criterion) is used to determine the optimal lag length for the VAR model. The AIC is a criterion used to compare different lag orders and select the lag length that provides the best trade-off between goodness of fit and model complexity. The goal is to select the lag order with the lowest AIC value, as it indicates the best balance between model fit and complexity. In this case, the lag order with the lowest AIC value is Lag Order 1, which has an AIC value of 38.25901.

After determining both the maximum order of integration (1) and the optimal lag length (1), the VAR specification is computed as shown in the figure below;



The lag intervals for endogenous is specified as 1, while the exogenous variables are given a lag of 2 (that is, 1(max order integration + optimal lag length). The outcome from this operation

is provided in the appendix. Consecutively, the Toda-Yamamoto is carried out using the VAR Granger Causality/Block Exogeneity Waid Tests as shown in the table below (full table results in appendix);

VAR Granger Causality/Block Exogeneity Wald Tests
Sample: 1981 2021
Included observations: 39

Dependent variable: GDPPC

Excluded	Chi-sq	df	Prob.
COP	1.657968	1	0.1979
OR01	0.321659	1	0.5706
INFR	0.031156	1	0.8599
AGRI	0.039736	1	0.8420
All	1.990360	4	0.7375

These tests are used to assess whether one variable (the potential "explanatory" variable) has a significant causal effect on another variable (the "dependent" variable) in a VAR model. In this case, the dependent variable is GDPPC (GDP per capita), and the potential explanatory variables are COP, OR01, INFR, and AGRI.

Based on the Wald tests, there is no significant evidence to suggest that COP, OR01, INFR, or AGRI Granger cause GDPPC. These results indicate that the past values of these variables do not have a significant predictive power for GDPPC in the VAR model. These outcomes can be further analyse based on individual variable as follows:

- COP: The chi-squared test statistic for the null hypothesis that COP does not have a significant causal effect on GDPPC is 1.657968, with 1 degree of freedom. The associated probability is 0.1979. Since the probability is above the conventional significance level of 0.05, we fail to reject the null hypothesis. This suggests that there is no significant evidence to support the claim that COP Granger causes GDPPC.
- OR01: The chi-squared test statistic for the null hypothesis that OR01 does not have a significant causal effect on GDPPC is 0.321659, with 1 degree of freedom. The associated probability is 0.5706. Again, since the probability is above the significance level, we fail to reject the null hypothesis. This suggests that there is no significant evidence to support the claim that OR01 Granger causes GDPPC.

- INFR: The chi-squared test statistic for the null hypothesis that INFR does not have a significant causal effect on GDPPC is 0.031156, with 1 degree of freedom. The associated probability is 0.8599. Once more, since the probability is above the significance level, we fail to reject the null hypothesis. This suggests that there is no significant evidence to support the claim that INFR Granger causes GDPPC.
- AGRI: The chi-squared test statistic for the null hypothesis that AGRI does not have a significant causal effect on GDPPC is 0.039736, with 1 degree of freedom. The associated probability is 0.8420. Again, since the probability is above the significance level, we fail to reject the null hypothesis. This suggests that there is no significant evidence to support the claim that AGRI Granger causes GDPPC.
- All: The chi-squared test statistic for the joint null hypothesis that none of the variables (COP, OR01, INFR, AGRI) have a significant causal effect on GDPPC is 1.990360, with 4 degrees of freedom. The associated probability is 0.7375. As the probability is above the significance level, we fail to reject the joint null hypothesis. This suggests that collectively, these variables do not have a significant causal effect on GDPPC.

The estimation output for the Toda Tamamoto is provided in the appendix where the optimal maximum order of integration is included.

4.9 Findings

The analysis provided in this section aim to evaluate the Dutch disease effect of crude oil production on economic growth in Nigeria. Therefore, the specific objective is to provide analysis of the relationship between crude oil production and economic growth in Nigeria and assess the presence and extent of the Dutch disease effect in Nigeria's economy. The hypotheses provided in the chapter one of this study guide the statistical analysis and investigation into the relationship between the variables, specifically assessing the impact of crude oil production and the Dutch disease effect on economic growth in Nigeria. These are:

- Null Hypothesis (H_0): There is no significant relationship between crude oil production and economic growth in Nigeria.
- Alternative Hypothesis (H_1): There is a significant relationship between crude oil production and economic growth in Nigeria.
- Null Hypothesis (H_0): There is no significant relationship between economic diversification and economic growth in the presence of crude oil production.

- Alternative Hypothesis (H_1): Economic diversification has a significant relationship with economic growth in the presence of crude oil production.
- Null Hypothesis (H_0): The Dutch disease effect does not significantly impact economic growth in Nigeria.
- Alternative Hypothesis (H_1): The Dutch disease effect significantly impacts economic growth in Nigeria.

On completion of the analysis, the regression analysis after autocorrelation and serial correlation had been corrected thus indicates that:

- There is a positive significant relationship between crude oil production and economic growth in Nigeria.
- There is no significant relationship between economic diversification (agriculture) and economic growth (GDP per capita) in the presence of crude oil production.
- The Dutch disease effect significantly impacts economic growth in Nigeria. This is known from the significant positive impact of crude oil production and oil rent on GDP per capita as evident from the studies of Anjande and Aor (2017), and Ofori, and Grechyna, (2021).

The major result provided from this analysis is that there is a positive significant impact of crude oil production on Nigeria economic growth measured with GDP per capita. The positive relationship between crude oil production and economic growth suggests that the oil sector plays a crucial role in driving overall economic performance, as measured by GDP per capita. This finding aligns with one of the key characteristics of the Dutch Disease effect, which is the disproportionate dominance of the natural resource sector in the economy. This outcome is supporting the findings of Anjande and Aor (2017) but in contrast with the findings of Eregha, and Mesagan, (2020).

Meanwhile, one of the primary issues associated with the Dutch disease effect in Nigeria is the neglects of other sectors. According to Tonuchi, and Onyebuchi, (2019), when a country's economy becomes heavily dependent on a single resource, such as oil, there is a tendency for other sectors, particularly agriculture, to be neglected. As a result, these sectors become less competitive, leading to a decline in their contribution to GDP and overall economic diversification. This overreliance on oil leaves the country vulnerable to fluctuations in global oil prices, making the economy susceptible to external shocks.

The findings from this study show that the analysis does not find a significant relationship between economic diversification (agriculture) and economic growth (GDP per capita) in the presence of crude oil production. This suggests that the country's dependence on agriculture as a sector for economic growth is relatively low. The finding of this analysis is similar to the results of Fubara et al. (2019), which indicated a negative and statistically insignificant impact of natural resource extraction on the non-oil industry. As a result, Fubara et al. (2019), findings do not provide conclusive evidence to support the existence of the "resource curse" at the subnational level in Nigeria.

Additionally, the Dutch disease effect can lead to a phenomenon known as "rent-seeking behaviours." According to the analysis provided in this study, there is a positive significant effect of oil rent on GDP per capita. This is in contrast with the findings from Ofori, and Grechyna, (2021) where a negative significant impact of oil rent was observed. A significant positive effect of oil rent on GDP per capita means that an increase in oil rent is associated with an increase in GDP per capita. This finding suggests that the revenue generated from oil production, such as royalties, taxes, or other forms of income derived from oil resources, contributes to the overall economic growth and prosperity of the country. However, the positive effect of oil rent on GDP per capita does not imply long-term sustainability or diversification of the economy. It is possible that heavy dependence on oil revenues can create challenges related to economic volatility, environmental concerns, and the potential crowding out of other sectors. The lure of easy wealth from the oil sector can divert entrepreneurial talent away from productive sectors and encourage corruption. Government revenues from oil exports may not be effectively allocated or invested, leading to mismanagement and wasteful spending. This can undermine governance, perpetuate inequality, and hinder long-term economic development.

4.10 Chapter Summary

This concluded chapter primarily provides the data analysis results carried out using the various methodological approaches highlighted in chapter three of this study. The regression results after the presence of serial correlation and autocorrelation had been corrected, suggest that crude oil production and oil rent, significantly influence GDP per capita in the studied model. The diagnostic tests which include the normality test shows that the data is normally distributed, there is no strong evidence of significant serial correlation in the residuals, there is no strong evidence to reject the null hypothesis of homoscedasticity, The CUSUM plot and CUSUM of square plot remain within certain control limits or stays close to zero, which

suggests that there is no evidence of significant structural changes in the time series or regression model.

CONCLUSION AND RECOMMENDATION

Research Summary

This study delves into the intricate dynamics of the Dutch Disease effect in Nigeria, specifically focusing on the impact of crude oil production on economic growth. By analysing regression models, examining key variables, and considering relevant literature, this study aimed to unravel the implications of the Dutch Disease phenomenon in Nigeria's economy. Conclusively, the summary of the major findings from this research are thus:

- Positive Impact of Crude Oil Production: The regression analysis unequivocally highlights a significant positive impact of crude oil production on Nigeria's economic growth, as measured by GDP per capita. This finding confirms the dominance of the oil sector in driving overall economic performance.
- Negligible Effect of Economic Diversification (Agriculture): Surprisingly, the analysis reveals that economic diversification, specifically in the agricultural sector, does not exhibit a significant relationship with economic growth.

Conclusion

In conclusion, this research sheds light on the Dutch Disease effect in Nigeria, emphasizing the significant positive impact of crude oil production on economic growth. In addition, Nigeria has not shown a significant diversification. The findings underscore the necessity for policymakers to address the challenges associated with the Dutch Disease by promoting economic diversification, prioritizing the agricultural sector, managing resource revenues effectively, and ensuring a balanced inflation rate policy. By implementing these recommendations, Nigeria can navigate the complexities of the Dutch Disease effect, foster sustainable economic growth, and reduce its dependence on the oil sector while promoting a diversified and resilient economy.

Recommendation

To address the challenges posed by the Dutch Disease effect and foster sustainable economic growth in Nigeria, the following recommendations are put forth as related to the findings presented in chapter four and five of this study:

- Diversification and Industrialization: Policymakers should prioritize the diversification of the economy, particularly through the development and expansion of the

manufacturing sector. This can be achieved by promoting investment, providing incentives, improving infrastructure, and enhancing the business environment to attract domestic and foreign investors.

- Enhancing Agricultural Productivity: While the analysis did not find a significant relationship between agricultural diversification and economic growth, it is imperative to invest in the agricultural sector to enhance productivity, value addition, and resilience. This includes implementing supportive policies, improving access to credit, providing training and technology transfer, and strengthening linkages between farmers and markets.
- Managing Resource Revenues: Given the significant positive impact of crude oil production on economic growth, it is essential to effectively manage resource revenues to mitigate the negative effects of the Dutch Disease. This includes establishing robust fiscal frameworks, promoting transparency, investing in human capital and infrastructure, and diversifying the revenue base.
- Research and Development: Encouraging research and development activities, innovation, and technological advancements in various sectors will foster economic diversification, enhance productivity, and promote sustainable growth.

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APPENDIXES

VAR: Original system parameters used

Vector Autoregression Estimates
Sample (adjusted): 1983 2021
Included observations: 39 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	GDPPC	COP	OR01	INFR	AGRI
GDPPC(-1)	0.883654	0.005363	-0.002780	-0.008478	-9.92E-05
	(0.21008)	(0.00493)	(0.00371)	(0.01252)	(0.00256)
	[4.20629]	[1.08693]	[-0.74851]	[-0.67706]	[-0.03878]
GDPPC(-2)	-0.096416	0.000239	-0.001429	0.002305	-0.000800
	(0.20775)	(0.00488)	(0.00367)	(0.01238)	(0.00253)
	[-0.46410]	[0.04897]	[-0.38894]	[0.18613]	[-0.31602]
COP(-1)	11.36613	0.674452	0.137234	-0.164540	0.006337
	(8.82724)	(0.20734)	(0.15608)	(0.52616)	(0.10751)
	[1.28762]	[3.25294]	[0.87926]	[-0.31272]	[0.05894]
COP(-2)	3.997224	-0.086032	-0.007883	0.314749	0.026996
	(8.66030)	(0.20341)	(0.15313)	(0.51621)	(0.10548)
	[0.46156]	[-0.42294]	[-0.05148]	[0.60973]	[0.25594]
OR01(-1)	5.700876	0.281299	0.345309	0.099712	0.097441
	(10.0518)	(0.23610)	(0.17773)	(0.59915)	(0.12242)
	[0.56715]	[1.19145]	[1.94288]	[0.16642]	[0.79593]
OR01(-2)	-0.511285	-0.014912	-0.071408	0.859181	0.123509
	(8.40572)	(0.19744)	(0.14863)	(0.50103)	(0.10238)
	[-0.06083]	[-0.07553]	[-0.48045]	[1.71481]	[1.20642]
INFR(-1)	-0.489535	0.018839	0.154938	0.664175	0.005445
	(2.77342)	(0.06514)	(0.04904)	(0.16531)	(0.03378)
	[-0.17651]	[0.28919]	[3.15955]	[4.01766]	[0.16121]
INFR(-2)	-0.628972	-0.051365	-0.100130	-0.435827	-0.044501
	(2.82583)	(0.06637)	(0.04996)	(0.16844)	(0.03442)
	[-0.22258]	[-0.77388]	[-2.00401]	[-2.58747]	[-1.29302]
AGRI(-1)	2.986548	0.149105	-0.312437	-0.356817	0.816991
	(14.9823)	(0.35191)	(0.26491)	(0.89304)	(0.18247)
	[0.19934]	[0.42371]	[-1.17941]	[-0.39955]	[4.47730]
AGRI(-2)	17.01141	0.092871	0.484877	-0.752579	-0.290705
	(13.9236)	(0.32704)	(0.24619)	(0.82994)	(0.16958)
	[1.22177]	[0.28397]	[1.96952]	[-0.90679]	[-1.71426]
C	-361.4395	-11.05107	8.106635	35.80122	10.12468
	(338.934)	(7.96095)	(5.99285)	(20.2026)	(4.12799)
	[-1.06640]	[-1.38816]	[1.35272]	[1.77211]	[2.45269]
R-squared	0.957621	0.883118	0.706579	0.586600	0.700047
Adj. R-squared	0.942486	0.841375	0.601785	0.438957	0.592921
Sum sq. resids	1276303.	704.1313	399.0171	4534.613	189.3222
S.E. equation	213.5000	5.014733	3.774998	12.72598	2.600290
F-statistic	63.27115	21.15581	6.742590	3.973098	6.534806

Log likelihood	-258.0590	-111.7600	-100.6847	-148.0793	-86.14644
Akaike AIC	13.79790	6.295383	5.727422	8.157913	4.981869
Schwarz SC	14.26711	6.764593	6.196632	8.627123	5.451078
Mean dependent	1316.199	10.20744	11.96387	19.18975	23.39470
S.D. dependent	890.2500	12.59104	5.982160	16.98998	4.075516

Determinant resid covariance (dof adj.)	9.93E+09
Determinant resid covariance	1.89E+09
Log likelihood	-693.2441
Akaike information criterion	38.37149
Schwarz criterion	40.71754
Number of coefficients	55

VAR after specifying the max order of integration and the optimal lag length

Vector Autoregression Estimates
Sample (adjusted): 1983 2021
Included observations: 39 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	GDPPC	COP	OR01	INFR	AGRI
GDPPC(-1)	0.883654	0.005363	-0.002780	-0.008478	-9.92E-05
	(0.21008)	(0.00493)	(0.00371)	(0.01252)	(0.00256)
	[4.20629]	[1.08693]	[-0.74851]	[-0.67706]	[-0.03878]
COP(-1)	11.36613	0.674452	0.137234	-0.164540	0.006337
	(8.82724)	(0.20734)	(0.15608)	(0.52616)	(0.10751)
	[1.28762]	[3.25294]	[0.87926]	[-0.31272]	[0.05894]
OR01(-1)	5.700876	0.281299	0.345309	0.099712	0.097441
	(10.0518)	(0.23610)	(0.17773)	(0.59915)	(0.12242)
	[0.56715]	[1.19145]	[1.94288]	[0.16642]	[0.79593]
INFR(-1)	-0.489535	0.018839	0.154938	0.664175	0.005445
	(2.77342)	(0.06514)	(0.04904)	(0.16531)	(0.03378)
	[-0.17651]	[0.28919]	[3.15955]	[4.01766]	[0.16121]
AGRI(-1)	2.986548	0.149105	-0.312437	-0.356817	0.816991
	(14.9823)	(0.35191)	(0.26491)	(0.89304)	(0.18247)
	[0.19934]	[0.42371]	[-1.17941]	[-0.39955]	[4.47730]
C	-361.4395	-11.05107	8.106635	35.80122	10.12468
	(338.934)	(7.96095)	(5.99285)	(20.2026)	(4.12799)
	[-1.06640]	[-1.38816]	[1.35272]	[1.77211]	[2.45269]
GDPPC(-2)	-0.096416	0.000239	-0.001429	0.002305	-0.000800
	(0.20775)	(0.00488)	(0.00367)	(0.01238)	(0.00253)
	[-0.46410]	[0.04897]	[-0.38894]	[0.18613]	[-0.31602]
COP(-2)	3.997224	-0.086032	-0.007883	0.314749	0.026996
	(8.66030)	(0.20341)	(0.15313)	(0.51621)	(0.10548)
	[0.46156]	[-0.42294]	[-0.05148]	[0.60973]	[0.25594]
OR01(-2)	-0.511285	-0.014912	-0.071408	0.859181	0.123509
	(8.40572)	(0.19744)	(0.14863)	(0.50103)	(0.10238)

	[-0.06083]	[-0.07553]	[-0.48045]	[1.71481]	[1.20642]
INFR(-2)	-0.628972	-0.051365	-0.100130	-0.435827	-0.044501
	(2.82583)	(0.06637)	(0.04996)	(0.16844)	(0.03442)
	[-0.22258]	[-0.77388]	[-2.00401]	[-2.58747]	[-1.29302]
AGRI(-2)	17.01141	0.092871	0.484877	-0.752579	-0.290705
	(13.9236)	(0.32704)	(0.24619)	(0.82994)	(0.16958)
	[1.22177]	[0.28397]	[1.96952]	[-0.90679]	[-1.71426]
R-squared	0.957621	0.883118	0.706579	0.586600	0.700047
Adj. R-squared	0.942486	0.841375	0.601785	0.438957	0.592921
Sum sq. resids	1276303.	704.1313	399.0171	4534.613	189.3222
S.E. equation	213.5000	5.014733	3.774998	12.72598	2.600290
F-statistic	63.27115	21.15581	6.742590	3.973098	6.534806
Log likelihood	-258.0590	-111.7600	-100.6847	-148.0793	-86.14644
Akaike AIC	13.79790	6.295383	5.727422	8.157913	4.981869
Schwarz SC	14.26711	6.764593	6.196632	8.627123	5.451078
Mean dependent	1316.199	10.20744	11.96387	19.18975	23.39470
S.D. dependent	890.2500	12.59104	5.982160	16.98998	4.075516

Determinant resid covariance (dof adj.)	9.93E+09
Determinant resid covariance	1.89E+09
Log likelihood	-693.2441
Akaike information criterion	38.37149
Schwarz criterion	40.71754
Number of coefficients	55

Toda Yamamoto

VAR Granger Causality/Block Exogeneity Wald Tests
Sample: 1981 2021
Included observations: 39

Dependent variable: GDPPC

Excluded	Chi-sq	df	Prob.
COP	1.657968	1	0.1979
OR01	0.321659	1	0.5706
INFR	0.031156	1	0.8599
AGRI	0.039736	1	0.8420
All	1.990360	4	0.7375

Dependent variable: COP

Excluded	Chi-sq	df	Prob.
GDPPC	1.181422	1	0.2771
OR01	1.419547	1	0.2335
INFR	0.083633	1	0.7724
AGRI	0.179527	1	0.6718
All	3.381166	4	0.4962

Dependent variable: OR01

Excluded	Chi-sq	df	Prob.
GDPPC	0.560267	1	0.4542
COP	0.773097	1	0.3793
INFR	9.982728	1	0.0016
AGRI	1.391018	1	0.2382
All	13.31862	4	0.0098

Dependent variable: INFR

Excluded	Chi-sq	df	Prob.
GDPPC	0.458413	1	0.4984
COP	0.097793	1	0.7545
OR01	0.027696	1	0.8678
AGRI	0.159643	1	0.6895
All	1.008267	4	0.9085

Dependent variable: AGRI

Excluded	Chi-sq	df	Prob.
GDPPC	0.001504	1	0.9691
COP	0.003474	1	0.9530
OR01	0.633506	1	0.4261
INFR	0.025988	1	0.8719
All	0.730183	4	0.9476

Vector Autoregression Estimates
Sample (adjusted): 1983 2021
Included observations: 39 after adjustments
Standard errors in ( ) & t-statistics in [ ]

	GDPPC	COP	OR01	INFR	AGRI
GDPPC(-1)	0.883654	0.005363	-0.002780	-0.008478	-9.92E-05
	(0.21008)	(0.00493)	(0.00371)	(0.01252)	(0.00256)
	[4.20629]	[1.08693]	[-0.74851]	[-0.67706]	[-0.03878]
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	(10.0518)	(0.23610)	(0.17773)	(0.59915)	(0.12242)
	[0.56715]	[1.19145]	[1.94288]	[0.16642]	[0.79593]
INFR(-1)	-0.489535	0.018839	0.154938	0.664175	0.005445
	(2.77342)	(0.06514)	(0.04904)	(0.16531)	(0.03378)
	[-0.17651]	[0.28919]	[3.15955]	[4.01766]	[0.16121]

AGRI(-1)	2.986548	0.149105	-0.312437	-0.356817	0.816991
	(14.9823)	(0.35191)	(0.26491)	(0.89304)	(0.18247)
	[0.19934]	[0.42371]	[-1.17941]	[-0.39955]	[4.47730]
C	-361.4395	-11.05107	8.106635	35.80122	10.12468
	(338.934)	(7.96095)	(5.99285)	(20.2026)	(4.12799)
	[-1.06640]	[-1.38816]	[1.35272]	[1.77211]	[2.45269]
GDPPC(-2)	-0.096416	0.000239	-0.001429	0.002305	-0.000800
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COP(-2)	3.997224	-0.086032	-0.007883	0.314749	0.026996
	(8.66030)	(0.20341)	(0.15313)	(0.51621)	(0.10548)
	[0.46156]	[-0.42294]	[-0.05148]	[0.60973]	[0.25594]
OR01(-2)	-0.511285	-0.014912	-0.071408	0.859181	0.123509
	(8.40572)	(0.19744)	(0.14863)	(0.50103)	(0.10238)
	[-0.06083]	[-0.07553]	[-0.48045]	[1.71481]	[1.20642]
INFR(-2)	-0.628972	-0.051365	-0.100130	-0.435827	-0.044501
	(2.82583)	(0.06637)	(0.04996)	(0.16844)	(0.03442)
	[-0.22258]	[-0.77388]	[-2.00401]	[-2.58747]	[-1.29302]
AGRI(-2)	17.01141	0.092871	0.484877	-0.752579	-0.290705
	(13.9236)	(0.32704)	(0.24619)	(0.82994)	(0.16958)
	[1.22177]	[0.28397]	[1.96952]	[-0.90679]	[-1.71426]
R-squared	0.957621	0.883118	0.706579	0.586600	0.700047
Adj. R-squared	0.942486	0.841375	0.601785	0.438957	0.592921
Sum sq. resids	1276303.	704.1313	399.0171	4534.613	189.3222
S.E. equation	213.5000	5.014733	3.774998	12.72598	2.600290
F-statistic	63.27115	21.15581	6.742590	3.973098	6.534806
Log likelihood	-258.0590	-111.7600	-100.6847	-148.0793	-86.14644
Akaike AIC	13.79790	6.295383	5.727422	8.157913	4.981869
Schwarz SC	14.26711	6.764593	6.196632	8.627123	5.451078
Mean dependent	1316.199	10.20744	11.96387	19.18975	23.39470
S.D. dependent	890.2500	12.59104	5.982160	16.98998	4.075516

Determinant resid covariance (dof adj.)	9.93E+09
Determinant resid covariance	1.89E+09
Log likelihood	-693.2441
Akaike information criterion	38.37149
Schwarz criterion	40.71754
Number of coefficients	55