UNIVERSITY OF CAPE COAST

EFFECTS OF PETROLEUM REVENUE ON ECONOMIC GROWTH IN GHANA

BY

ABASS KORIWIE

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DECLARATION

Candidate's Declaration

I hereby declare that this thesis is the result of my own original research and that no part of it has been presented for another degree in this university or elsewhere.

Candidate's Signature: ..... Date: .....

Name: Abass Koriwie

Supervisor's Declaration

I hereby declare that the preparation and presentation of the thesis were supervised in accordance with the guidelines on supervision of thesis laid down by the University of Cape Coast.

Supervisor's Signature: .....…..... Date: …...….....….....

Name: Prof. John Gartchie Gatsi

ABSTRACT

The use of natural resources for economic growth is one of the most important goals for many countries. Despite the fact that there are numerous factors that influence economic growth, the focus of this study is solely on petroleum revenue and its effects on economic growth. Explanatory design was employed in this study to explain the relationship between petroleum revenue and economic growth in Ghana. The approach used for this study was Quantitative using Time series ARDL model with eleven (11) years quarterly data from 2011 to 2021 was used. The results indicates that Annual Budget Funding Amount (ABFA), Stabilisation Fund, and Petroleum Revenue had a positive and significant impact on economic growth in a long run. However, only ABFA had a positive and significant impact on economic growth in a short run. It can be concluded that, the resilience of the macro economy can promote the desirable implications of total petroleum revenues on economic growth. Hence, inflation, exchange rate, labor, and provision of capital was found to be co-integrated with petroleum revenues and economic growth. There is the need for government revenue on capital spending from the ABFA to be increased since ABFA contributed positively in the long run than the short run.

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DEDICATION

I dedicate this work to my late parents Mr. Ba-ata Ibrahim Koriwie and Mrs Fati Koriwie.

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LIST OF ABBEVIATIONS

ABFA	:	Annual Budget Funding Amount
ARDL	:	Autoregressive Distributed Lag
GDP	:	Gross Domestic Product
GHF	:	Ghana Heritage Fund
GNPC	:	Ghana National Petroleum Company
GPF	:	Ghana Petroleum Funds
GSF	:	Ghana Stabilization Fund
NOC	:	National Oil Company
PIAC	:	Public Interest and Accountability Committee
PRMA	:	Petroleum Revenue Management Act
RER	:	Real Effective Exchange Rate

CHAPTER ONE

INTRODUCTION

The use of natural resources for economic growth is one of the most important goals for many countries. Despite the fact that numerous factors influence economic growth, the focus of this study is solely on petroleum revenue and its effects on economic growth. Discovery of petroleum comes with many prospects, however, gaining the positive impact of petroleum revenue becomes an illusion when the effects of revenue on economic growth is in doubt.

1.1 Background to the Study

In the world all over, natural resources, precisely petroleum revenues play a crucial role in the sustainable growth and general development of countries (Alshubiri, Tawfik, & Jamil, 2020). Natural resources have contributed immensely to both the economic growth and development of some advanced countries (Cronin & Pandya, 2009). Countries such as Qatar, Malaysia, and Australia amongst others are rich in natural resources and have consequently achieved some significant economic growth and development (Gylfason, 2001). Petroleum as a natural resource remains one of the most instrumental factors that can shape both internal and external policies concerning the country's economic structure (Ogbonna & Ebimobowei, 2012). Also, it is a fact that many oil-producing countries depend on petroleum products for some of their industrial activities and as well as using the revenue to finance their economic activities (Adusah-Karikari, 2015).

Nevertheless, some of the countries endowed with petroleum resources such as Nigeria, Sudan, Gabon, Algeria, and Angola among others are still

faced with challenges concerning revenue and its effects on economic growth (Ernest, Akintunde, Bartholomew, 2020). Some of these challenges include difficulties in the sustainability of oil wealth, resulting from the decline in revenue due to oil price volatility than the prices of other commodities (Ouoba, 2020). Nigeria has been faced with a 'resource curse' (Ayanoore, 2017; Ovadia, 2003) and the Niger Delta has been severely impacted by conflict, insurgency, loss of livelihoods, and environmental degradation and these are outcomes associated with the extractive industries (Ayanoore, 2017; Ayelazuno, 2004). This has prompted most of the oil-producing countries to attempt to insulate the economy from the volatility of oil revenues because frequent upward or downward adjustments of fiscal expenditures are costly (Khan, Husnain, Abbas, & Shah, 2019).

Petroleum revenue can raise standards of living and reduce poverty in producing regions only when the revenue is properly managed (Moss, 2011). Though resource endowments alone are not enough to guarantee economic growth, oil revenue has been pivotal to economic development in many of the oil-rich African countries over the past five decades (Ampofo, 2021). Nigeria, Sudan, Gabon, and lately Ghana has petroleum as a major component of export earnings (Eregha & Mesagan, 2020).

The debate about economic development has become a major priority globally. Van Dam and Frenken (2020) stated that economic development can be understood as the acquisition of new capabilities and the combination of resources that yield maximum returns. The contributions of petroleum resources to economic development with economic growth as a component within the African continent are crucial. Countries such as Nigeria, Gabon,

and Ghana just to mention a few, have crude oil as one of their major commodities for export. Nigeria's economy is one of the largest economies in African and it has petroleum as a major natural resource that contributes over 80% of its GDP (Eregha & Mesagan, 2020). Nonetheless, their economy is faced with similar challenges as other resource-endowed countries (Badeeb, Lean, & Clark, 2017). The difficulties in managing oil resources seem to be accentuated by the peculiar nature of oil markets and oil production (Kumah-Abiwu, Brenya & Agbodzakey 2015).

It is common to note, challenges such as the high volatility of oil prices, the enclave nature of the oil sector which gives rise to 'Dutch disease', the exhaustibility of oil reserves, and the high concentration of revenue flows from the oil sector which influences rent-seeking behavior, may lead to governance problems in an oil-producing countries (Kinkin, 2020). In the past, many oil-producing countries have been disappointed in their expectations that favorable resource endowments would lead to rapid improvements in terms of economic growth and development (Panford, 2017: Badeeb, Lean, & lark, 2017).

Petroleum revenue in Ghana is derived from several sources, which include, royalties from oil and gas, surface rentals, additional oil entitlements, participation of the government in petroleum operations, corporate income taxes, gas receipts, and any amount payable by the national oil company, Ghana National Petroleum Corporation (GNPC) (Stephens, 2019). In Ghana, all the sources of petroleum revenues are put together in an account known as a petroleum holding fund (PHF) and within a decade, a total of US$6.55 billion was accrued to the state (Suleman, & Ennin,2023). Though prudent

management of revenues from natural resources has been a challenging task for many developing countries and this includes petroleum revenue in some cases (Ali-Nakyea et al., 2019), petroleum production affects macroeconomic performance in different ways. Oil contributed about US$3.2 billion to the economy in the first five years of production, an average of 7.5 percent of government revenue, and about 4 percent of GDP (Aryeetey & Ackah, 2018).

Though oil revenue in Ghana represents an average of 4% of the total GDP, the minerals component of exports accounts for about 35 percent of the total revenue mobilized by the government annually, and crude oil remains a major factor (Ali-Nakyea, 2019). Ackah et al. (2019) opined that, though the country is having resources including, gold, bauxite, manganese, diamonds, and oil and gas, Ghana remains one of the countries with many developmental challenges in Africa.

However, the contributions of petroleum revenue to the economy of Ghana cannot be underestimated (Ampofo, 2021). One of the major sources of funding for the annual budget of Ghana has been the use of part of the petroleum revenue for almost a decade now (Eregha & Mesagan, 2020). Ghana as a nation is being guided by its history of failure in managing revenues from other natural resources such as gold, timber, and cocoa and the possibility of a resource curse (Ayelazuno, 2014). There was an overwhelming believe that, the windfall revenues from Ghana's new-found wealth needed to be managed judiciously to propel the socioeconomic development of the country (Dah & Suleman, 2010).

The discovery of oil and gas in Ghana is significant as it was expected to ensure optimum benefits to the nation (Gatsi, 2017). It was against this

background that the Parliament of Ghana enacted the Petroleum Revenue Management Act (PRMA) 2011 (Act 815), as amended in 2015 (Act 893), to provide the framework for collection, allocation, and management of petroleum revenue in a responsible, transparent and accountable manner for the benefit of the citizens of Ghana both present and the future (Adam, 2017). Section 21 (2) of the Petroleum Revenue Management Act (2011) states that the use of the annual allocation of the Annual Budget Funding Amount shall be focused on (a) maximizing the rate of economic development; (b) promoting equality of economic opportunity intending to ensure the well-being of citizens; (c) undertake even and balanced development of the regions and (d) be guided by medium-term expenditure framework aligned with the long-term national development plan approved by parliament (Government of Ghana, 2011).

Moreso, Section 36(2) (d) of the Petroleum Revenue Management Act further explained that the purpose of the Petroleum Revenue Management Law was to fast-track the rate of economic growth and ensure equal and balanced development (Ackah et al., 2019). This implies that petroleum revenues should contribute to both national and sub-national development. However, often, discussions related to oil revenues management have been limited to the performance of the Ghana Petroleum Funds, the contribution of petroleum revenues to the GDP, and the transparency measures of the National Oil Company and oil resource management with little concerned about the overall impact on economic growth (Akoto *et al.,* 2021).

Tunyo, et al., (2021) concluded that crude oil production had no impact on the agricultural sector, services sector, exchange rate and inflation and these variables mentioned have significant impact of economic growth.

The distribution of petroleum revenue in Ghana is guided by law (Gatsi, 2017). Section 2(1) of the Petroleum Revenue Management Act, 2011 (Act 815) establishes the Petroleum Holding Fund (PHF) as a public fund to receive and disburse petroleum revenue due the Republic of Ghana. The total amount of petroleum funds received since inception till end of 2021 is US$7.33 billion. Out of this amount, the Annual Budget Funding Amount has received approximately US$2.90 billion representing 40% of the total earnings within the period (Kwarteng, 2022). Also, the GNPC as the National Oil Company has received about US$2.23 billion representing 30% of the total revenue earned. While the Ghana Stabilization Fund and the Ghana Heritage Fund have each received approximately of US$1.546 billion representing 21% and US$653,70 million representing 9% respectively.

From the collection and the distribution of petroleum revenues into various accounts such as Annual Budget Funding Amount and Ghana Stabilization Fund are geared towards economic growth. However, matching the annual GDP growth to the Total Petroleum Revenue, ABFA and the Ghana Stabilization Fund have not indicated the rate of economic growth within the periods of the allocations (Armah-Attoh, 2015). The table below shows the TPR, ABFA, SF and that of GDP growth in Ghana over the eleven years period.

Table 1: Petroleum revenue distribution and GDP growth

YEAR	TPR	ABFA	GSF	GDP GROWTH
2011	444.12	166.96	54.81	14.0
2012	541.62	286.55	16.88	9.3
2013	846.77	273.20	245.73	7.3
2014	978.02	409.07	271.76	2.9
2015	396.17	292.98	15.17	2.1
2016	247.18	98.38	29.51	3.4
2017	539.83	169.46	142.68	8.1
2018	977.12	235.1	305.72	6.2
2019	937.58	395.47	188.3	6.5
2020	638.64	273.38	116.63	0.5
2021	808.61	352.79	159.24	5.1

The various amounts allocations on the table above were in millions in US Dollar ($) and the GDP growth is measured in percentage (%).

Corollary to the above, conducting an empirical study on the effects of petroleum revenue on economic growth in Ghana is necessary to proffer ideas that can propel the yearning development the citizens so desired. Prudent management of revenues from natural resources has been a challenging task for many developing countries and this includes petroleum revenue (Ali-Nakyea et al., 2019). The study focuses on the effects of petroleum revenue on economic growth following the Petroleum Revenue Management Act 2011 (Act 815) as amended in 2015 (Act 893), which makes provision for spending and savings of the petroleum revenues that are accrued to the state (Ackah et al., 2020).

1.2 Statement of the Problem

Natural resources, specifically petroleum resources, play a vital role in the economic development of many countries. Most oil-producing countries rely heavily on oil sector revenue to finance infrastructure projects and achieve sustainable development. However, there are concerns regarding the sustainability of oil wealth, resulting from the decline in revenue and volatility in oil prices globally (Alshubiri et al., 2020). Again, some oil-producing countries have been disappointed in their expectations that favorable resource endowments would lead to rapid improvements in terms of economic growth and development (Kinkin, 2020; Panford, 2017). This has been mainly due to the variance in the outcomes from the petroleum revenue disbursements and the expected impact on the overall economy.

The story is not different in Ghana. At the advent of the discovery of petroleum resources on the shores of Ghana, the expectation of the citizenry skyrocketed, with hopes of economic transformation following the commercialization of the resource (Ackah & Salifu, 2019). This was accentuated by a popular statement by the then President, John Agyekum Kuffuor. In his words, "even without oil, we are doing so well, with oil as a shot in the arm, we're going to fly" (Aryeetey & Ackah, 2018). The announcement came with huge expectations throughout Ghana. However, after producing oil in commercial quantities in Ghana for over a decade now, what have been the effects of petroleum revenue on economic growth in Ghana?

At the time Ghana's commercial production of oil started, with a price assumption of US$ 75 per barrel, the World Bank's estimates put potential

government revenue at US$ 1 billion on average per year between 2011 and 2029 (Kwasi, 2010). It was presumed that if all or about 80% of the expected revenue above was gained and channeled into productive sectors of the economy, a moderately or positively sustained long-term economic development could be achieved. However, over a decade of commercial production, there is no study on the effects of petroleum revenue on the economic growth in Ghana (Alemzero *et al.*, 2021).

Extant literature has documented the impacts of petroleum and other natural resource exploration on the growth of the respective economies (Nathaniel, 2021; Rjoub et al., 2021; Ofori & Grechyna, 2021). However, the majority of these studies were conducted in other jurisdictions outside Ghana. For instance, Asagunla and Agbede (2018) conducted a study on oil revenue and output growth in Nigeria using time series analysis to estimate the relationship between oil revenue and economic growth. However, the results from these studies cannot be relied upon for policy recommendations due to the difference in geopolitical country dynamics such as the size of the economy, institutional settings, and quantity produced among others.

Even though some studies have been conducted within Ghana's Petroleum space since the country started commercial production, not much study has examined how petroleum revenues have impacted economic growth in Ghana. For example, Aryeetey and Ackah (2018) conducted a study on the boom, bust, and dynamics of oil resource management in Ghana, without any focus on its impact on economic growth. Dah and Suleman (2010) looked at foreign direct investment inflows to Ghana following the oil production and the appropriate Government policies necessary for the use of oil revenues but

did not include the effects of the petroleum revenue on the economic growth in Ghana. Similarly, Nashiru (2019) explored the effects of oil and gas exploration on the socio-economic development of Jomoro District of Ghana. Also, Ackah et al. (2019), conducted a desk review to examine the development plans of three district assemblies around the petroleum-producing area and concluded that there was pressure on social amenities especially, electricity. However, the research methods for the study were purely qualitative through a desk review. Also, Acquah-Andoh, Gyeyir, Aanye, and Ifelebuegu (2018) conducted a study on Oil and Gas Production and the Growth of Ghana's Economy, and the study did not present the effects of petroleum revenue on the economic growth in Ghana.

Consequently, there is a need to examine the effects of petroleum revenue on the economic growth of Ghana to ascertain how the discovery has impacted the Ghanaian economy. More so, under Section 36(2) (d) of Ghana's Petroleum Revenue Management Law (Act 815), the purpose of the Petroleum Revenue Management Law is to fast-track the rate of economic growth and ensure equal and balanced development (Ackah et al., 2019). This further necessitates the need to assess the contribution of petroleum revenue impact on the economic growth in Ghana. This study is crucial to ascertain the level of impact of petroleum revenues on economic growth as a key mandate for the petroleum management act 2011, (Act 815).

Furthermore, examining the effects of petroleum revenue on economic growth in Ghana through the use of Annual Budget Funding Amount (ABFA), the stabilization fund, and total petroleum revenues will propel efforts in ensuring that, priority areas receive the right revenues, and that these revenues

are used to achieve equitable and value-oriented national development for the current as well as the future generation (Ali-Nakyea, 2019).

Consequent to the above, this study examines the effects of petroleum revenue on economic growth in Ghana.

1.3 Purpose of the Study

The purpose of the study is to examine the effects of Petroleum Revenue on Economic Growth in Ghana.

Specifically, the study seeks to;

i. assess the effect of Annual Budget Funding Amount on economic growth in Ghana
ii. analyze the effect of stabilization fund on the economic growth in Ghana
iii. measure the effects of the total petroleum revenue on the economic growth in Ghana in a short run

1.4 Research questions

i. What is the effect of Annual Budget Funding Amount on economic growth in Ghana?
ii. What are the effects of the stabilization fund on the economic growth in Ghana?
iii. What is the effect of the total petroleum revenue on economic growth in Ghana in a short run?

1.5 Significance of the Study

An assessment of petroleum revenue effects on economic growth will be very prudent in an effort towards maximizing the potential of petroleum revenue which has the tendency to change the economic outlook of Ghana

Additionally, the outcome of the study will provide knowledge for further studies, the results of the study will also add up to the existing literature for future learning purpose which will contribute significantly to academia.

Also, government agencies in charge of petroleum revenue distribution will need the results to make well-informed decisions. The study seeks to assist policy makers, to make an informed decision concerning petroleum revenue management especially the Annual Budget Funding Amount (ABFA) to maximize the fullest positive impact of petroleum revenue in Ghana. Knowing the economic impact of petroleum revenue distribution will enable policymakers and implementers to put in measures to improve upon revenue management.

1.6 Delimitation

The study is to be conducted on the effects of petroleum revenue economic growth in Ghana's economy. Both independent and dependent variables for the study are petroleum revenue and economic growth. The indicators used in measuring economic growth are some selected indicators from World Bank Economic indicators and include, GDP, inflation, rate of unemployment, and level of income. This study used only secondary data from institutions such as the finance ministry, the Bank of Ghana, and the Public Interest and Accountability Committee (PIAC).

1.7 Limitations of the Study

The method for the study was quantitative, not without its drawbacks, it is obvious one being the resources and skills required; one researcher may not be skilled in quantitative methods and may have to call on the expertise of someone else, or another team, which will increase the cost.

1.8 Organization of the Study

The study is organized into five chapters. Chapter one comprises the introduction, background to the study, statement of problem, purpose, and objectives of the study, the research questions, the significance of the study, delimitation of the study, and the organization. Chapter two looked at the review of related literature to the study. Chapter three of the study focused on the research methods. Whiles analysis of data and graphical representation of data will be imputed in chapter four. Chapter five of the study looks at the findings, conclusion, and recommendations.

CHAPTER TWO

LITERATURE REVIEW

2.0 Introduction

This current study investigates the effect of petroleum revenue on the economic growth of Ghana. The overall objective of this chapter is to assess the importance of the general field of study and then to explore the research gab the study fills. The review of related literature for this study is structured in three folds: theoretical, conceptual, and empirical review. The theoretical review aims to objectively examine theories that are in line with the research objectives. The conceptual review on the other hand emphasis the conceptual basis of the study. The empirical review seeks to examine similar scholarly works, books, and paper presentations conducted with different methodologies that are in line with the research objectives.

Therefore, this literature review seeks to investigate the work performed by individuals related to the effects of petroleum revenues on economic growth by focusing primarily on the Annual Budget Funding Amount, Ghana Stabilization Fund, and the total petroleum on economic growth in Ghana.

2.1 Theoretical Review

Theories adopted concerning petroleum revenue effects on economic growth include; Solow Growth Model and the paradox of plenty. These theories are in line with the objectives of the study.

2.1.1 Solow Growth Model

In 1956, Solow proposed a neoclassical growth model in opposition or as an alternative to Keynesian growth models (Solow, 1988). The Solow

model of economic growth provided foundations for models embedded in the new theory of economic growth. Solow sets up a mathematical model of long-run economic growth (Carlsson, 2022). The Solow Economic growth model is the dynamic process between inputs (capital, labor, and other factors) and output, this model explains the different conditions and how they affect the output of an economic growth (Joo & Shawl, 2023). The model analyses economic growth growth employing the aggregate productions functions as Y t = F K t, A t L t, where: (Y) output, (K) capital stock, (L) labor or total employability, and (A) effectiveness of the labor. The Solow model has been consistent for measuring economic growth.

In assessing the effect of petroleum revenue economic growth, the primary aim of the study was to analyze the impact of Annual Budget Funding Amount, Ghana Stabilization Fund and that of the Total Petroleum Revenue on the economy. Using capital, labor, inflation and real exchange rate as control variables, the Solow growth model is one of the most appropriate economic growth theories for the study. Nweze and Edame (2016) conducted a study to Investigate the relationship between oil revenue and Economic Growth in Nigeria that oil revenue and the study revealed positive relationship in the long-run but has a negative relationship with economic growth in the short-run.

Cantah, and Asmah, (2015) also used the Solow model of growth to look at the crude oil price and growth of output in Ghana and it was revealed that, oil price increases had a negative impact on economic growth in both the short run and long run. The annual operational and investment budget of the government may receive up to 70% of those benchmark revenues known as

the Annual Budget Funding Amount (ABFA). The remaining money will be invested in the Ghana Petroleum Funds (GPFs), which includes the Ghana Heritage Fund (GHF) to support development for future generations.

2.1.2 Paradox of Plenty

The term "paradox of plenty" is what most social scientists use to describe the "resource curse" that befalls many resource-rich economies (Ologunde et al, 2020; Olao, 2019; Annan, 2011). Nations with large deposits of natural resources, such as oil and gas most often perform worse concerning economic growth than countries with fewer resources (Arthur, 2014; Daniele, 2011). Venables (2016) argued that despite the enormous wealth and opportunities associated with oil discovery, such endowments many times impede economic growth. In country after country, natural resource extraction has helped raise living standards while failing to produce self-sustaining growth (Sachs & Warner, 1995). In addition to these growth failures, there has been a high possibility of weak democratic development, corruption, and even civil war (Humphreys, 2005; Sala-i-Martin & Subramanian, 2003; Ross, 2001).

According to Obeng-Odoom (2012) and Sala-i-Martin and Subramanian (2012), the 'resource curse' connotes the inverse relationship between resource wealth and the health of an economy. To them, three ways of explaining the inverse relationship between resource boom and the 'paradox of plenty include; the petroleum resource wealth increasing the chances of rent-seeking behavior which may lead to corruption and its concomitant negative effects on the economy, the dependence on oil makes a country vulnerable to global fluctuations in oil prices and investing in oil may drive

out investment in other sectors or increase the value of the local currency, making local exports uncompetitive.

However, Weisbrot et al. (2006) asserts that there was a great level of variation in the prospects of natural resources among resource-rich countries. Some resource-rich countries, usually developed ones have performed far better than their counterparts in the developing world. Ross (2003) stated that the narrative about variation concerning countries can best fit in the case of Indonesia and Nigeria. The two countries comparably had per capita incomes and were heavily dependence on oil sales about three decades ago, yet, Indonesia's per capita income is almost four times that of Nigeria in recent times. The basic question to ask is what Indonesia did right that Nigeria could not do.

As Hannesson (2001) explains, perhaps investing in the highest-returning assets such as basic infrastructure is the best way to make resource wealth permanent. Again, Weisbrot et al. (2006) argued that varied effects of resource wealth on the well-being of citizens could also be found within the country's educational system and other institutions as well. Resource-endowed countries often suffer from a high level of inequality even though some have performed well. As Sarraf and Jiwanji (2001) explained, resource wealth was mostly in the possession of a few corporations and a few public elites which often turned to engage in rent-seeking activities. In effect, the natural resource wealth has benefited mostly the elites in the resource-rich countries through certain dubious practices.

According to Ali-Nakyea (2019), there were countering arguments against the theory of the paradox of plenty. He stated that the Natural

Resource Charter 2014, a recent policy initiative founded by distinguished scientists and academicians, had recommended twelve best practice guidelines for overcoming the paradox of plenty. The principles were intended to cover the sequence of decisions that governments must make concerning resource extraction. These included creating the right environment for responsible investment, good fiscal terms, contract due diligence, strong institutions and regulations, macroeconomic management, and sustainable economic growth strategies.

The economic impact of ABFA, GFS and TPR could be positive or negative depending on other factors. In the measure of the effects of Annual Budget Funding Amount, Ghana Stabilization Fund and The Total Petroleum Revenue on economic growth in Ghana can be done in isolation. Ackah et al. (2019) stated that Ghana was still faced with challenges of unemployment and infrastructural deficits, despite being part of oil-producing countries over a decade now. Aubynn, (2017) stressed that Ghana has been a rich country with natural resources such as gold, bauxite, iron, diamonds, and timber among others making it economically significant in the context of economic growth. Aubynn, (2017) added that, the activities of petroleum exploration as affected agricultural activities such as crop farming, fishing, livestock other related economic activity in Ghana. Ackah et al. (2019) however argued that the industrial sector which includes the oil sector was quickly gaining traction as a viable alternative source of economic growth in Ghana. Therefore, there is a need to assess the effects of petroleum revenue on the economic growth in Ghana.

2.2 Conceptual Review

This section seeks to look at the related concepts concerning the study. The concepts include petroleum in Ghana, petroleum revenue in Ghana, Annual Budget Funding Amount (ABFA), Ghana Stabilization Fund (GSF), and economic growth.

2.2.1 Petroleum in Ghana

Campbell (2002) describes Petroleum as a compound that includes high concentrations of any of the following substances: Thermal and biological hydrocarbon gas found in conventional reservoirs as well as in gas hydrates, tight reservoirs, fractured shale, and coal, Condensates, Crude oils, Natural bitumen in reservoirs, generally in siliciclastic and carbonate rocks. Alshubiri, Tawfik, and Jamil (2020) viewed petroleum as a natural resource that has immensely contributed to the development of the economy, this includes direct creation of employment and increase GDP growth in nominal terms.

Ghana has a long history of petroleum resources in order words, oil and gas. Ghana's discovery could be traced to the late 1800 to early 1900 (Otoo, 2015). The production and export of oil in Ghana have a long-standing history and can be traced back to the 1970ies when oil was first drilled along the Western Coast of Ghana (Skaten, 2018). The production reached substantial amounts and began to play a role in the structure of the Ghanaian economy in 2007 when oil was discovered in commercial quantities (Asafu-Adjaye, 2010). Oil was found offshore along Cape Three Points in the Western Region by a consortium after years of prospecting. The discovery which unitized two production wells in the Deep-water Tano block and the

West Cape Three Points block was named Jubilee Field in commemoration of Ghana's 50th anniversary as an independent nation. Other major discoveries have resulted in current production in a second oil field, the Tano Enyire Ntomme (TEN) which began production in 2014 (Asafu-Adjaye, 2010).

Jubilee Field started with a daily production of 80,000 barrels per day and has currently reached a production level of 110,000 barrels per day which is almost at the expected peak of 120.000 barrels per day. The table below summarizes the total production and revenue earned from oil production. The major part of Ghana's oil sector activity is predicted to concentrate in six districts in the Western Region. These districts are coastal and have communities that are dependent on fishing as a main means of livelihood. Several forums were carried out to discuss the likely impact of oil and gas discovery on communities in affected districts an in the management of the wealth for the benefit of all Ghanaians. Amongst the major stakeholders who took part in the discussion were the Government, Companies involved in oil extraction, Traditional Authorities, Fishers folks, and Civil Society Organizations. Gyampo et al. (2020) stated that June 2020 marked thirteen years of commercial discovery of oil in Ghana, and over ten years since the beginning of production, how significant has the oil revenue contributed to the economic growth of Ghana?

2.2.2 Petroleum Revenue in Ghana

The Petroleum Revenue Management Act 2011 (Act 815) was approved in April 2011. This was aimed at providing a clearer means by which revenues accrued from the commercialization of petroleum resources can be protected and used in the most responsible way for the benefit of the

citizenries' (Ghana News Agency, 2011). Additionally, it provides a clearer overview of how petroleum revenue from upstream and midstream operations can be collected, allocated, and managed in a responsible, transparent, and sustainable means which can benefit citizens in Ghana (Ackah et al., 2020). The act establishes the Petroleum Holding Fund, the Ghana Stabilization Fund, and the Ghana Heritage Fund (Otoo, 2015). Otoo added that the success of the development of this act was a result of substantial contributions from the public and civil society who are stakeholders. The PRMA was enacted to provide a framework for the upstream petroleum sector on the collection, distribution, and management of all revenue associated with the sale or other commercial activities of oil and gas resources produced in Ghana for the benefit of Ghanaians.

Petroleum revenue in Ghana is derived from several sources, which include, royalties from oil and gas, surface rentals, additional oil entitlements, participation of the government in petroleum operations, corporate income taxes, gas receipts, and any amount payable by the national oil company, Ghana National Petroleum Corporation (GNPC) (Stephens, 2019). All these revenues are paid into an account known as a petroleum holding fund (PHF) with the Bank of Ghana. Though prudent management of revenues from natural resources has been a challenging task for many developing countries and this includes petroleum revenue in some cases, petroleum production affects macroeconomic performance in different ways (Ali-Nakyea et al., 2019). Also, Suleman and Ennin (2023) delve into the challenges associated with petroleum revenue management, such as governance issues, revenue volatility, and the impact of global oil price fluctuations on Ghana's economy.

Under the PRMA, the GNPC receives 55 percent or less of the carried and participating interest. The budget receives 70 percent or less of the benchmark revenue. The benchmark revenue is the expected petroleum revenue based on a seven-year moving average. The percentage of petroleum revenue that goes into the budget is the annual budget funding amount (ABFA). The ABFA is shared between the priority areas, the Ghana Infrastructure Investment Fund and the PIAC. The remaining 30 percent of the benchmark revenue goes to Ghana. Petroleum Funds, which are shared between the GSF (21%) and the GHF (9%). The GSF is used to cushion government expenditure when there is a petroleum revenue shortfall, and an excess of the cap is sent to the sinking (debt repayment) and contingency funds. The GHF is an endowment for future generations. The PRMA sets out the framework to regulate the allocation and management of revenues realized from petroleum production in Ghana. The amendment of sections of the Act in 2015 was intended to strengthen it and make compliance easier.

If correctly handled, petroleum revenue can considerably contribute to economic growth. However, four different characteristics of petroleum revenue may have a detrimental macroeconomic impact. These impacts are volatility, potential Dutch disease, exhaustibility, and the assumption that petroleum revenue is free money. Oil revenues are unpredictable and can be very unstable, which in turn affects budget spending, so the government can balance the economy through the mechanisms of an oil fund while funding investments for savings purposes as well (Djokoto, 2012).

The PRMA makes provision for the responsible use of such revenues and provides a framework through which the relevant public agencies are to

collaborate (Aryeetey & Ackah, 2018). It ensures not only the sustainable use of the revenues for economic growth but for national development, and also ensures accountability to the public through the dissemination of information regarding all petroleum receipts regularly for public knowledge and consumption. The Act is guided by one major principle: petroleum resources as stipulated in Article 257(6) of the Constitution belong to the people and are vested in the President in trust for and on behalf of the people of Ghana (Constitution of Ghana, 1992). As such, all activities related to such resources must benefit the citizens of Ghana. It is under this principle that the PRMA makes provision for a public accountability body (PIAC), which is charged with ensuring that the managers of the resource uphold their responsibilities about the law.

The fiscal model for managing petroleum revenues has three components, these include; allocation to the national Oil Company for financing its equity cost, allocation to the Annual Budget of the Government for financing developmental projects, and allocation to the Ghana Petroleum Funds for savings and cushioning the budget against crude oil price fluctuations.

Amoako-Tuffour (2011) and Gatsi (2017) stated that petroleum revenue in Ghana is distributed following the petroleum revenue management act 2011 (Act, 815). Gatsi added that Ghana's Parliament passed the Petroleum Revenue Management Act (Act 815) in 2011 which defines the framework for petroleum revenue inflows and outflows and clear rules for disbursement. According to Stephens (2019), the ABFA is a percentage of petroleum revenue that is used to fund community and national development

programs. In 2011, Ghana passed the Petroleum Earnings Management Act (PRMA), which established institutions and systems to manage the petroleum sector's revenue.

2.2.3 Annual Budget Funding Amount (ABFA)

Annual Budget Funding Amount means the amount of petroleum revenue allocated for spending in the budget within the current financial year. ABFA has been the major way for using petroleum revenue in financing the national budget. PRMA places particular emphasis on the need to ensure efficient allocation, responsible use, and effective monitoring of ABFA expenditure. As a result, the PRMA (as amended) underscores the importance of proper planning and prioritization of budget expenditures, thereby suggesting ABFA expenditures be guided by a medium-term development strategy aligned with a long-term development plan. ABFA spending falls along three core themes: public investments (capital spending including allocations to the Ghana Infrastructure Investment Fund (GIIF), consumption (recurrent spending), and PIAC Funding. Within public investments and consumption (and in the absence of a long-term development plan), twelve (12) priority areas are to guide revenue utilization.

Ogbe et al. (2021) the Annual Budget Funding Amount (ABFA) is the percentage of petroleum revenue allocated to Ghana's development initiatives. The Petroleum Revenue Management Act (PRMA, 2011) and its amendment (PRMA, 2015) set forth the rules and regulations that regulate the collection, allocation, and use of petroleum revenue. The Act's main purpose is to encourage transparency, responsibility, and accountability in resource management for the benefit of all Ghanaians (PRMA, 2011). In practice, it

presents the strongest link between petroleum revenues and inclusive economic growth. Accordingly, its use and expenditures are required to be subject to the same budgetary processes. The Annual Budget Funding Amount (ABFA) is a portion of Ghana's petroleum revenue allocated for budgetary support for the government's development agenda. The ABFA allocations from 2011 to 2020 amounted to GHS12.318 billion, while the actual disbursement was GHS6.669 billion, resulting in a significant difference (Suleman, & Ennin, 2023). The difference between ABFA allocations and actual disbursements can be attributed to various factors including revenue fluctuations, budgetary priorities, administrative processes, legislative approval and oversight, economic conditions, and project implementation challenges (Ackah & Salifu, 2019). Also, changes in national development plans, infrastructure projects, and social programs can influence how funds are utilized, potentially resulting in variations between allocations and disbursements (Ackah et al., 2019). Therefore, the need to assess the effects of the revenue on the economic growth within both short and long run.

The Petroleum Revenue Management Act mandates the establishment of many funds by the government, including the Petroleum Holding Fund (PHF), which is responsible for collecting and allocating all petroleum income. The government projects its annual "benchmark" income, which includes payments for the operation of the Ghana National Petroleum Company (GNPC). The annual operational and investment budget of the government may receive up to 70% of those benchmark revenues; this is referred to as the Annual Budget Funding Amount (ABFA). The remaining money will be invested in the Ghana Petroleum Funds (GPFs), which includes

the Ghana Heritage Fund (GHF) to support development for future generations.

The total revenue Ghana received from the production of oil between 2011 and 2018 amounted to $5.013 billion (Public Interest and Accountability Committee [PIAC], 2019). Part of this revenue was allocated to the Annual Budget Funding Amount (ABFA), which is likely to reduce the revenue-spending gap of the government and affect the fiscal balance of the country (PIAC, 2019). However, the fiscal balance position of the Ghanaian economy has been deteriorating from 4.3 percent of GDP in 2011 to 6 percent at the end of 2017 despite oil proceeds received (BoG, 2013; 2018).

Additionally, ABFA disbursements did not comply with the requirement of the law which is; the section 18 (1) PRMA 2011(Act 815) stated that, the Annual Budget Funding Amount from petroleum revenue shall not be more than seventy percent (70%) of the Benchmark Revenue. And section 18(2) the act also reiterated that, the exact percentage of the Benchmark Revenue which shall be allocated annually to the Annual Budget Funding Amount shall be guided by a medium-term development strategy aligned with a long term national development plan, the absorptive capacity of the economy as well as the need for prudent macroeconomic management. With the ranged from 70.7 to 91.9 percent in 2011 and 2012, will lead to less money being paid into the GHF and GSF as more money is released than is allowed under the national annual budget. The PIAC expressed worries about this issue in its 2013 semi-annual report and suggested that individuals in charge of determining the benchmark revenues pay more attention to the elements or variables they employed in their estimates.

2.2.4 Ghana Stabilization Fund (GFS)

Gyeyir, (2019) conducted A study to evaluate the impact of volatile petroleum receipts on the GSF among others and the study revealed that, transfers into the GSF has been influenced to various degrees by total petroleum receipts, the variance between benchmark and actual revenues, transfers to the National Oil Company and discretion around transfers into the Fund in its initial years of operation. He added that, Out of the total of US$ 714,608,340 withdrawn from the GSF between 2014 and 2018, 86.72 percent was transferred into the Debt Service Account and used to retire some marketable debt instruments. Gyeyir, (2019) however concluded that, the GSF has impacted minimally on its primary object of cushioning or sustaining public expenditure capacity during periods of unanticipated petroleum revenue shortfalls.

Adam (2017) conducted a study on the Ghana petroleum revenue management act: he argued that the stabilization fund, as the name implies, was meant to absorb and cushion the economy in times of low Oil prices and other external shocks the economy may face, or other deficits in Oil revenues that have been anticipated. He added that the fund receives nothing more than 70% of the funds dedicated to the two petroleum funds. However, Adam was of the view that there were many complexities in executing and interpreting the PRMA and that has caused digressions from the spirit of the act.

Amankwah-Asiamah (2018) opined that the Ghana Stabilization Fund (GSF), the object of the GSF as per Section 9(1) of the PRMA as amended was to cushion the impact on or sustain public expenditure capacity during periods of unanticipated petroleum revenue shortfalls. Thus, the GSF is

created to allow the government to take from it in times of shocks to the economy such as the 2015- 2017 commodities price slump and the 2020 Coronavirus (COVID-19) pandemic. Both of these events caused significant unanticipated shortfalls in oil revenue, necessitating the sourcing of extra monies to shore up the budget. The GSF is allocated not more than 70% of GPF allocations that is, a maximum of 21% of total petroleum revenues, excluding the NOC funding. The Minister of Finance under Section 23(3) of the PRMA is given the power to place an annual cap on the GSF, subject to parliamentary approval. Once this cap is attained, the accumulated mounts over the cap can be transferred into the Contingency Fund or used for debt repayment.

Davis et al. (2001) consider the function and misuse of savings and stabilization funds in managing non-renewable resource wealth. They argue that the existence of funds has rarely been able to address the issue of volatility in oil prices and especially that of savings for future use to the expected standard and hence there seems to be a strong case for government to be cautious about policies about oil revenue. The principle underlying the stabilization fund is applaudable. However, the government should be cautious about the use of the resources saved in the fund as suggested above by Davis et al. (2001). It should not be used as a source of funds to cover up the shortfalls in the general budget whether they occur as a result of oil price volatility or not. The use of the fund to supplement the shortfall in non-oil revenue should be prohibited otherwise it will encourage the government to relax in the mobilization of traditional revenue which could promote

indiscipline in the fiscal policy process that can feed into dependence on oil funds.

Cumulatively, allocations or receipts from 2011-2020 and investment income from the fund amounted to US$1.41 billion. The fund has earned Ghana about US$24 million as income (returns) from investments over the period.

2.2.5 Economic Growth

Economic growth is a primary focus of macroeconomists, which rely on quantifiable metrics such as gross national product or aggregate income (Feldman & Storper, 2018; Smith, Newhouse & Freeland, 2009). Godwin (2007) defined economic growth as an increase in real gross domestic product (GDP). That is, gross domestic product adjusted for inflation. Dalevska et al. (2019) gave meaning to economic growth as an increase in a country's production or income per capita. Understanding the causes of the business cycle and the conditions that gave rise to fresh chances that moved the economy ahead to a higher economic growth trajectory were central to Schumpeter's thinking. Economic development, according to Schumpeter, implies a fundamental restructuring of an economy. This entails changing the industrial structure, the population's educational and occupational qualities, and the social and institutional fabric as a whole (Coscieme et al., 2020). Feldman and Storper (2018) argued that while economic development aims at changing an existing economic framework to allow individuals to work more productively resulting in economic shifts toward higher-value activities, growth is evaluated by putting more people to work within that framework and measure of output.

Adam Smith and David Ricardo, hold the view that there has been a deep belief that countries that have been blessed with natural resources such as oil and gas should base their development on these resources and use them as a key route to sustainable economic growth (Badeeb, Lean, & Clark, 2017). Evidence has been provided in a good number of studies to indicate that the abundance of natural resources, or at least an abundance of unique natural resources, decreases economic development (Okoye, 2015). According to Sachs and Warner (2001), one may trace the idea of a 'natural resource curse' back to the 1970s. A significant body of research has emerged over two decades later, proposing a correlation between resource development, economic underperformance, and different socio-political ills (Sachs & Warner 2001).

The table below indicates the GDP growth rate all the sectors of the economy from 2014 to 2021.

Table 2: GDP Growth rate in all sectors of the economy

YEAR	2014	2015	2016	2017	2018	2019	2020	2021
GROWTH_GDP	2.9	2.1	3.4	8.1	6.2	6.5	0.5	5.1
GROWTH_COCOA	4.3	-8.0	-7.0	9.2	3.7	5.4	1.4	10.4
GROWTH_CONSTRUCTION	-0.4	9.5	8.4	5.1	1.1	-4.4	3.1	6.0
GROWTH_CROP	2.8	1.7	2.2	7.2	5.8	5.3	8.6	8.9
GROWTH_EDUC	-0.3	-0.5	2.3	6.3	3.9	9.4	7.8	-3.9
GROWTH_ELECTRICITY	1.3	17.7	-5.8	19.4	5.5	6.0	9.9	7.9
GROWTH_FINANCE_INSURANCE	21.4	12.9	8.0	-17.7	-8.2	1.6	9.3	2.4
GROWTH_FISHING	-23.3	8.5	3.1	-1.4	-6.8	1.7	14.1	14.2
GROWTH_FORESTRY	-1.5	-3.9	2.9	3.4	2.4	-1.7	-9.4	4.4
GROWTH_GDP_INFM	2.7	2.8	2.7	6.1	2.6	5.9	-0.8	4.5
GROWTH_HFS	1.5	4.1	2.3	7.6	3.2	6.0	-37.0	4.7
GROWTH_HSW	2.7	-4.4	4.0	14.1	22.6	10.4	5.9	7.6
GROWTH_ICT	29.7	11.9	5.6	4.2	13.1	46.5	21.5	31.7
GROWTH_INDUSTRY	1.1	1.2	4.3	15.6	10.5	6.4	-2.5	-0.5
GROWTH_LIVESTOCK	5.1	5.2	5.4	5.7	5.4	5.4	5.4	5.5
GROWTH_MANUFACTURING	-2.6	3.7	7.9	9.5	4.1	6.3	1.9	8.1
GROWTH_MINING	5.4	-8.3	-0.2	30.8	23.3	12.6	-9.2	-12.2
GROWTH_OIL	**9.3**	**2.0**	**-15.6**	**80.3**	**7.9**	**14.4**	**-4.6**	**-12.6**
GROWTH_OSA	1.4	2.7	-0.1	5.3	3.1	2.6	-17.2	11.1
GROWTH_PADSS	-3.5	-2.6	8.9	4.2	4.3	3.7	10.0	25.5
GROWTH_PASS	6.8	1.4	-4.2	2.9	0.3	5.1	-6.2	10.8
GROWTH_REAL_ESTATE	-0.3	3.1	3.2	3.8	-6.5	19.9	11.7	8.9
GROWTH_SERVICE	5.2	2.9	2.8	3.4	2.8	7.6	0.7	9.4
GROWTH_TRADE	2.0	0.5	-0.4	8.2	2.8	3.7	-2.9	6.3
GROWTH_TRANSPORT_STORAGE	5.8	2.6	1.1	8.9	1.1	4.3	4.1	7.2
GROWTH_WATER_SEWAGE	5.9	13.9	-11.8	6.1	-3.6	-4.4	2.2	26.0

Unfortunately, Sachs and Warner (1995) identified that resource sectors have weak linkages with the rest of the economy because imported inputs and capital-intensive production generate little employment. Therefore, the real impact on overall economic growth depends on how wealth is used. Edjekumhene et al. (2018) also stated that historical economic records showed that, natural resource-endowed countries in the developing world have generally tended to be quite disappointing in terms of economic growth or development.

Karl (2007) added that capital intensiveness in exploiting oil in most developing countries has transferred employment power to foreign investors who have the necessary capital to invest. From Karl's point of view, the phenomenon creates fewer jobs for the local people than is expected and the situation therefore led to government share of the revenue as the only way to economic transformation.

Sachs and Warner (1995) again argue that oil abundance is a key negative determinant of economic growth though Sachs and Warner argument may sound controversial, their point was to emphasize how the natural resource has not yielded the anticipated benefits. A country can experience a windfall, which raises income and consumption in all periods but does not produce faster growth, and indeed it may even slow growth (Collier et al., 2010). Thus, the empirical observation from the above suggests that resource-abundant economies tend to have lower aggregative growth, but not sufficient to demonstrate that oil is always a curse.

Though the agricultural sector for a relatively long time has been the largest in terms of employment, the sector started experiencing frequent

contractions from the beginning of commercial exploration of oil in Ghana (Siakwah, 2017). As the importance of the extractive sector has risen, it appears agriculture sector growth has slowed down, the agriculture sector experienced its lowest growth (0.8 percent) in more than two decades in 2011, the same year in which Ghana started oil production in commercial quantities (World Bank, 2018). In contrast, the industrial sector grew by over 41 percent in the same year. Since then, even though the agriculture sector has shown some recovery, it has never fully recovered its former vibrancy. Thus, its share of GDP has declined, relative to both the services and the industrial sector. The share of the agriculture sector in total GDP has fallen from 29.8 percent in 2010 to 18.9 percent in 2016 (World Bank, 2018).

Ghana was placed among the group of countries with a lower middle income following a three-fold increase in its real gross domestic product (GDP) (African Economic Outlook, 2010). Furthermore, the country's stable democratic and social environments have boosted foreign investors' confidence, triggering a rise in investment (Aryeetey & Fenny, 2017). The significant increase in Ghani's real GDP rate from 4.7% in 2009 to 5.9% in 2010 signifies how strong Ghana's economic growth has been over those years. Growth strengths were even higher as real GDP of 12% growth rate and about 11.0% GDP were anticipated for the years 2011 and 2012 respectively relying on the start of earnings from oil production which began in December 2010 (African Economic Outlook, 2010).

Also, it has been real that, an increase in revenue from natural resource discovery will de-industrialize or de-agriculturalize a nation's economy (Nweke, 2015). According to Nweke, the de-agriculturalize occurs through

higher the exchange rate which makes the manufacturing or agricultural sectors less competitive and public services entangled with business interests. Ghana has already benefited a total sum of $4.009 billion from petroleum revenue in the seven years of petroleum production and has earned a total amount of US$666.4 million in the 2020 financial year and US$937.6 million in the 2019 financial year. Out of US$666.4 million in 2020, an amount of US$638.64 million was distributed, the ABFA received a total of US$ 273.38 million, while the GPFs received US$ 166.61 million. The GPFs were further distributed to the GSF (US$ 116.63 million) and the GHF (US$49.98 million), in line with the Petroleum management act 2011 (Act 815).

The focus of the African Economic Outlook was however more on GDP which is a microeconomic indicator and cannot entirely represents economic development through the distribution of petroleum revenue. There are many ways of measuring the economic growth of a country and these include real output per capita and growth in real gross domestic product. Suleman and Zaato (2021) however added that it would be necessary to have a national development plan or medium-term strategic framework which enables the government to realistically manage Ghanaian citizens' expectations of the contribution of the petroleum sector to national development.

2.3 Empirical Review

Reviews of the relevant literature were offered in this section regarding the study's objectives. There was a need to analyze the literature because it produced diverse findings to support the study's conclusions. This section reviewed existing literature relating to the effects of petroleum revenue on economic growth in Ghana in a bid to further explain the objectives of the

study. This section was grouped into sub-sections to provide reviews of the literature concerning each objective

2.3.1 Annual Budget Funding Amount (ABFA) Effect on Economic Growth

Anaman and Darko (2018) argued that, after eight years of petroleum revenue receipts, there was little to show the petroleum revenues investments toward development priorities. The duo added that the discretionary powers of the Minister to select priority areas for Annual Budget Funding Amount (ABFA) investment and to cap the Ghana Stabilization Fund (GSF) remain an obstacle to achieving the objectives of the ABFA and the GSF. However, the effect of petroleum revenue on economic growth in Ghana has not been measured in the study of Anaman and Darko.

Gatsi (2017) opined that some of the revenue allocation decisions are inherently political and the requirements for economic performance have little consideration on deciding how much should be allocated to which priority area as spelled out in the petroleum management act 2011. However, this has not measured the impact of ABFA on the economic growth in Ghana after the establishment of the petroleum management act 2011.

The contribution of the agricultural sector to GDP has continually declined despite the revenue from the ABFA channeled for the improvement of this sector. This decline has been attributed to the inconsistencies of the oil revenue investment in the sector and the misapplication of agricultural receipts to other sectors such as the use of 69 percent of the revenue to fund sea defense projects (Ackah, 2016).

Ghana as a petroleum-producing country has a fiscal regime that has been specifically designed towards maximizing revenue in favor of the state. The sharing of surpluses derived from the successful exploration, discovery, and production of oil and gas is between the government and the oil company. Stephens (2019) opined that GNPC with carrying and participating interest receives no more than 55% GNPC, after the disbursement to the GNPC, the budget through ABFA receives no more than 70% of the remaining funds. The Heritage Fund receives not less than 30% and the Stabilization Fund not more than 70% of the remaining funds after disbursement to the budget (ABFA). Though all the aforementioned largely depends on the percentage of the shareable revenue derived from the sales of produced crude oil and natural gas, surface rentals, and taxes, how effective is petroleum revenue distributed in Ghana?

Amoako-Tuffour (2011) concluded that petroleum revenue distribution in Ghana is done following the petroleum revenue management Act 2011 (Act 815) as amended in 2015 (Act 893). However, there are some instances where the petroleum revenue distribution may not be in line with the PRMA 2011. This is because some management decisions are mostly politically influenced as suggested by Gasti (2010). The Petroleum Revenue Management Act of Ghana, 2011 (Act 815) lays down the main requirements for the government of Ghana's accounting, collection, monitoring, and use of petroleum revenues. According to Gatsi (2017), the legislation sets an upper limit for a given benchmark revenue for the amount of petroleum revenue that may be directed to the national budget.

Adam (2017), added, petroleum revenue management Act (PRMA) of Ghana has arguably enhanced the accountability of allocating petroleum revenue. Adam's assertion was confirmed by the Committee on Public Interest and Accountability (PIAC), the Ministry of Finance, the National Petroleum Corporation of Ghana, and the Bank of Ghana's publications on how much and where petroleum revenues are collected.

These revenues are very limited in their ability to contribute to significant improvements in the lives of Ghanaian citizens. This is because petroleum revenues were contributing only an average of 4% of the national budget from 2011 to 2016. A transparent process of setting national spending priorities and outlining how each sector of the economy would thus contribute would reduce the lack of confidence and suspicion that citizens have towards the management of the petroleum sector.

In high demand, gas, and oil are naturally important resources, but the revenues generated from their exports are not always a blessing due to policy failure, inefficient investment, rent-seeking, and corruption (Ali-Nakyea, 2019).

2.3.2 Ghana's Stabilization Fund on Economic Growth

Gyeyir (2019) examined the Ghana stabilization fund with a focus on the impact of volatile petroleum receipts on the GSF and measure the effect of discretionary capping of the Fund since its establishment in 2011. Gyeyir pointed out that GSF has contributed very little in terms of its intended purpose. Qualitative comparative analysis and sensitivity analysis techniques were used and it was realized that transfers into the GSF have been influenced by total petroleum receipts, the variance between benchmark and actual

revenues, as well as transfers to the National Oil Company. Gyeyir's findings concluded that, out of the total of US$ 714,608,340 withdrawn from the GSF between 2014 and 2018, a greater amount was used to retire some marketable debt instruments (loans).

Stephens (2019) opined that Ghana Stabilization Fund's primary goal was to mitigate the effects of or maintain state expenditure capacity during periods of unexpected deficits in petroleum revenue. The government can therefore use this Fund to balance the budget in cases where there are economic shocks or unexpected shortfalls in oil revenue. However, the focused of the study was more on the collection of petroleum revenue and the challenges associated. Stephen thus did little on the effects of the revenue on economic growth in Ghana.

Ayensu (2013) concluded that Ghana's petroleum funds allocation by the Government of Ghana was for strategic sectors of the economy. However, the study conducted by Ayensu was more focused on distribution and did not the effects of the Ghana Stabilization Fund on economic growth. Ayensu's study relatively falls within the earliest days of the petroleum revenue management act 2011 which was subsequently amended in 2015.

Brunnschweiler, Edjekumhene, and Lujala (2020) opined that many developing countries depend heavily on their natural resource industries to collect the revenue required to grow their economies and provide their people with better living conditions for instance, from 2010 to the end of 2014, nearly three billion dollars (US$ 2.811 billion) has accrued to the state of Ghana through petroleum revenues. Tullow Oil Ghana for example offered 114 scholarships in 2013 alone and the company is expected to sponsor at least 50

Ghanaian nationals annually to pursue various careers within the petroleum industry (Acquah-Andoh, et al., 2018). GNPC as well as the Ministry of Energy and Petroleum have scholarship and training programmes with similar objectives. Capacity-building programs in various aspects of the oil and gas value chain are commendable features of the local content arrangement (Acquah-Andoh et al., 2018). Erum and Hussain (2019) attested that in economic development and sustainable growth of countries, natural resources, specifically crude oil, play a vital role. Oil and non-petroleum resources are major sources of government revenue for many economies around the world.

2.3.3 Petroleum Revenue on Economic Growth in Ghana

David et al., (2020) opined that the activities of oil and gas exploration were considered impacting negatively on many livelihoods because, there was an astronomic rise in food prices, accommodation hikes in communities around exploration areas, and the general cost of living.

Jones et al. (2015) argued that total revenue has a long and short-run equilibrating relationship with economic growth in Nigeria. This was revealed after a time series analysis was done using data ranging from 1986 to 2012 of total revenue and real gross domestic product collected from the Central Bank of Nigeria and the National Bureau of Statistics. However, Nigeria shared of petroleum revenue to GDP was about 80% which is entirely different from Ghana's situation in which the shared of petroleum revenue to the GDP is less than 10%.

Adabor and Buabeng (2021) estimated an increase in oil revenue generates a significant increase in the economic growth of Ghana. Thus, oil revenue boosts economic growth. The duo was of the view that the inflow of

foreign direct investment through oil and gas activity has accelerated the economic growth of Ghana but the findings did not capture the effects of the total petroleum revenue gained annually on the economic growth.

Victor (2015) opined there is a long-run positive influence of oil revenue on industrial growth in Nigeria. Victor added that sustained policy formulation and implementation in the petroleum sector of the economy through the involvement of stakeholders were key to achieving economic growth through petroleum revenue. The formulation and implementation of oil revenue should therefore be judiciously used to facilitate infant industries through advanced industrial policies like import substitution, among others

Yaqub (2019) conducted a study on the impact of oil revenue volatility on the real exchange rate and the structure of the economy and concluded that the Iraqi economy was subject to the Dutch disease phenomena during the period of high petroleum revenue returns. He argued that there was an appreciation of the country's currency thereby reducing the competitiveness of the country's traditional export sector in the international market. However, Yaqub's accretion was based on the data on Iraq and therefore could not best fit the situation Ghana's petroleum revenues effects on economic growth.

Oshionebo (2018) argued that the framers of the Petroleum revenue management act have granted many powers to the minister in charge of finance which to some extent was a hindrance to economic growth. Oshionebo however, tilted his argument much towards the weakness of the Petroleum Revenue Management Act and therefore did little on the impact of petroleum revenue on economic growth in Ghana.

Nasiru (2019) conducted a study that revealed that there was an inverse relationship between oil and gas exploration and the livelihoods of Ghanaians most especially those within host communities. The claims of Nasiru were further supported by Ackah et al. (2019) who argued that oil production tends to worsen the unemployment situation in Ghana due to the nature of skilled labor desired by the petroleum industry. However, the duo did not specify the effects of the revenue on economic growth.

Akoto et al. (2019) conducted a study that revealed that there was a weak negative relationship between petroleum revenue and the human development index. Akoto et al. observed that an increase in petroleum revenue either showed little or no impact on the living conditions characterized by low quality of spending. This was against the popular notion that an increase in petroleum revenue would certainly improve the living conditions of citizens. Nevertheless, the study was conducted using simple regression analysis with the quarterly data of oil revenues from 2010 to 2018 from the Ministry of Finance. And this could not measure the impact of control variables such as inflation and local currency depreciation.

Edjekumhene et al. (2018) however argued that the economic performance of emerging world countries with abundant natural resources has been mediocre at best. Edjekumhene et al. further added, mining and oil-exporting economies in particular, have underperformed concerning economic growth as compared to resource-poor countries over the last few decades, considering the large earnings that have accrued to these resource-rich countries over time. The infamous phenomenon known as the "resource curse" arose from the poor socio-economic development of several resource-rich

countries. Come to think of it, how does one consider natural resources as the cause of the underdeveloped nature of resource-endowed nations? The answer is obviously no! Gyampo (2016) therefore believes that one of the main reasons for the underperformed economy of developing countries with natural resource endowment is the lack of transparency in the administration of funds collected by governments in resource-rich countries.

Acquah-Andoh, Gyeyir, Aanye, and Ifelebuegu, (2018) added that evidence suggested at current petroleum production levels the revenue was not a significant contributor to Ghana's Gross Domestic Product (GDP) taking into account, the contribution of other sectors of economy. The study however revealed that the consistent appreciation of Ghana's real effective exchange rate between 2010 and 2013 resulted in a deterioration of the competitiveness of the non-oil sector and a declining contribution of the agricultural sector to GDP which further eroded the net impact of petroleum production (Acquah-Andoh, 2018).

Table 3: Summary of empirical review

Author	Title	Methods	Key findings
Otoo (2015)	A Review of Ghana's Heritage Fund under the Ghana Petroleum Revenue Management Act 2011 (Act 815)	Qualitative methods	The GSF and GHF were necessary for future purposes
Anaman and Darko (2018)	Is Ghana's Petroleum Revenue Management Act (PRMA), 2011 (Act 815) an effective public financial management tool for public investment and consumption smoothing?	Qualitative method	After 8 years of petroleum revenue receipts, there was less to show that revenues have been invested to achieve development priorities. Discretionary powers of the Minister to select priority areas for ABFA and to cap the Ghana GSF remain an obstacle to the objectives of the ABFA and the GSF.
Adabor and Buabeng (2021)	Oil Revenue and Economic Growth Nexus: Further Empirical Evidence from Ghana using an ARDL Approach	Quantitative methods	An increase in oil revenue generates a significant increase in economic growth of Ghana
Victor (2015)	The empirical analysis of oil revenue and industrial growth in Nigeria	Quantitative methods	Petroleum revenue has positive impact on industrial growth in Nigeria
Simon-Oke (2016)	Petroleum resources and Nigeria poverty profile	Quantitative methods	The study revealed high rate of poverty despite the numerous advantages derived by the country from petroleum resources
Otaha (2012)	Dutch Disease and Nigeria Oil Economy	Qualitative methods	Oil-dependent states have performed worse in terms of economic growth and development than non-oil states in recent years
Jones et al. (2015)	Total revenue and economic growth in Nigeria: empirical evidence	Qualititative methods	Total revenue has long and short run equilibrating relationship with economic growth in Nigeria.
Gyeyir (2019)	The Ghana stabilisation fund: Relevance and impact so far	Qualititative methods	It concludes that the GSF has impacted minimally on its primary object of cushioning or sustaining public

			expenditure capacity during periods of unanticipated petroleum revenue shortfalls.
Yaqub (2019)	Impact of oil revenue volatility on the real exchange rate and the structure of economy: Empirical evidence of "Dutch disease"	Mixed methods	Iraqi economy was subject to have the Dutch disease phenomena during the boom.
Akoto, Afayori, Abu, and Arthur (2021)	Assessment of Oil Revenue and Its Impact on Human Development in Ghana	Quantitative Methods	The study revealed a weak negative relationship between petroleum revenue and HDI. It was also observed that an increase in petroleum revenue either showed little or no impact on HDI
Abdlaziz, et al. (2021)	The Impact of Oil Price Shocks on the Military Expenditure of Selected MENA Oil Exporting Countries: Symmetric and Asymmetric Cointegration Analysis	Quantitative methods	empirical findings reveal that oil price has a positive and significant effect on military spending in all cases except Tunisia
Oshionebo (2018)	Sovereign wealth funds in developing countries: a case study of the Ghana Petroleum Funds	Quantitative Methods	Petroleum revenue management act did not prioritize economic growth because minister of finance has much discretion
Nasiru (2019)	The Effects of Oil and Gas Exploration on the Socioeconomic Development of Jomoro District of Ghana	Quantitative	The study revealed that there is an inverse relationship between oil and gas exploration and the livelihoods of the people in the host communities
Edjekumhene et al (2018)	Examining transparency and accountability within the Oil and gas sector: impact evaluation of key provisions in Ghana's Petroleum Revenue Management Act	Mixed method	At the individual outcome levels, the PIAC Leaders' Forum was found to have positive effect on knowledge and awareness of natural resource revenues. However, citizens do not feel of entitled to natural resources revenues
Oteng-Ababio (2018)	The Oil is Drilled in Takoradi, but the Money is Counted in Accra': The Paradox of Plenty in the Oil City, Ghana	Qualitative Methods	The results point to the accentuation of socio-economic risks in the community following the inflow of oil revenue which is shaping government's macro-level policies.
Acquah-Andoh et al.	Oil and Gas Production and the Growth of	Quantitative	The evidence suggests that at current production levels,

(2018)	Ghana's Economy: An Initial Assessment	Methods	petroleum is not a significant contributor to Ghana's GDP after adjusting for the contribution from other sectors of the economy
Gatsi (2017)	Oil and Gas Management in Ghana	Quantitative methods	Petroleum agreements recognized the Ghana Revenue Authority as the main collector of petroleum tax revenue in Ghana
Gyampo, (2016)	Transparency and Accountability in the Management of Oil Revenues in Ghana	Qualitative methods	PRMA has increased transparent and accountable use of oil revenues, but will do better if certain critical bills are passed and proactive interventions by government and policymakers within Ghana's petroleum sector
Amoako-Tuffour (2011)	Public Participation in the Making of Ghana's Petroleum Revenue Management Law	Qualitative	Ghanaians seem certain of greater transparency and accountability if petroleum revenues are assessed, collected and accounted for by a team, rather than by a single institution
Gatsi (2010)	Oil Revenue Collateralisation in Ghana	Qualitative	Prudent management and effective governance and accountability structures may fortify the current policy desire to accelerate social and economic infrastructural development
Dah & Sulemana (2010)	The Contribution of Oil to the Economic Development of Ghana: The Role of Foreign Direct Investments (FDI) and Government Policies.	Qualitative Methods	It was established through our case study of Angola that oil attracts foreign direct investment because oil is a location attraction which attracts foreign firms.

2.4 Conceptual framework

The Petroleum Revenue Management Act [Act 815] (2011) established the basic parameters for accounting, collecting, reporting, and utilizing petroleum income owed to the Ghanaian government (Amoako-Tuffour, 2011). The statute defines the maximum amount of petroleum revenue that can be directed into the national budget for specified benchmark revenue. The law regulates the operation and administration of the business of the savings, and that the money will be managed responsibly.

Section 2(1) of the Petroleum Revenue Management Act, 2011 (Act 815) establishes the Petroleum Holding Fund (PHF) as a public fund to receive and disburse petroleum revenue due the Republic of Ghana. The receipt and disbursement of petroleum revenue from the PHF as provided for by the PRMA are presented in Figure 1

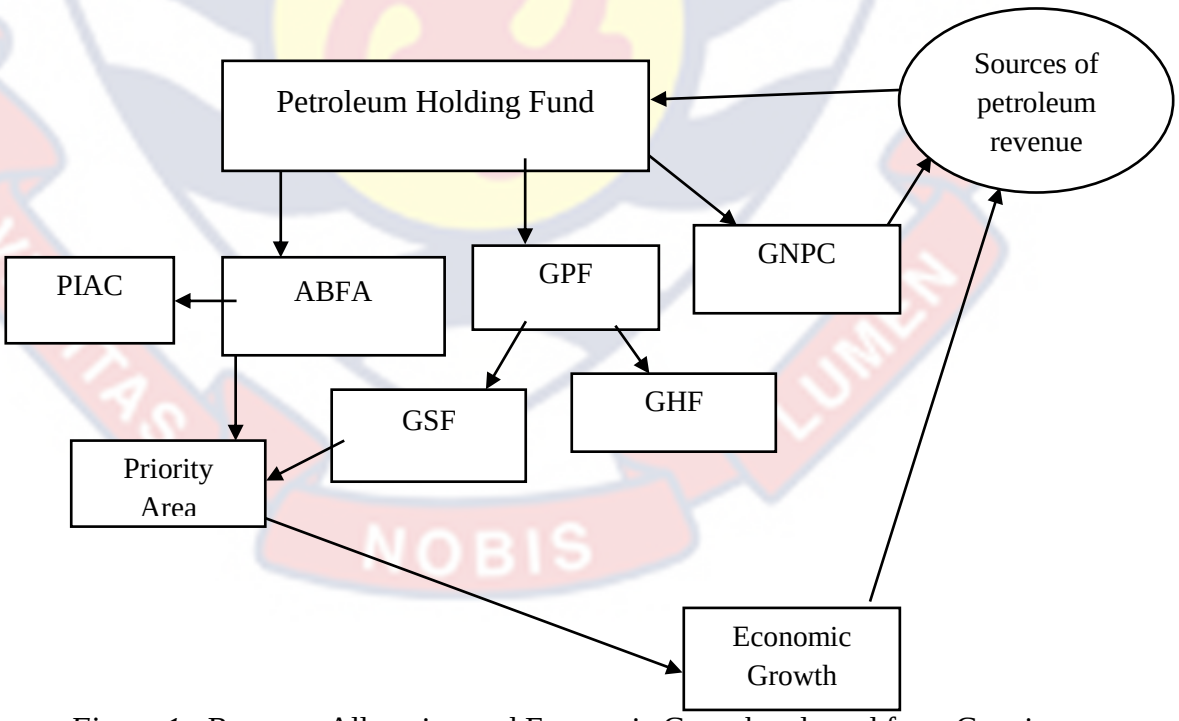

Figure 1: Revenue Allocation and Economic Growth: adapted from Gyeyir, (2019).

This framework is to analyze the potential effects of petroleum revenue on the economic growth of Ghana. The first stage is collecting the revenue from the source. The sources include Royalties from oil and gas, surface rentals and other receipts from petroleum operations and sale or export of petroleum, Receipts from direct and indirect participation in petroleum operations by the government, Corporate income taxes from upstream and midstream petroleum companies, Any amount payable by the national oil company as corporate income tax, royalty, dividends, or any other amount due following the laws of Ghana, Any amount received by government such as capital gains tax derived from the sale of ownership of exploration, development and production rights. Production and signature bonuses and Additional oil entitlements.

According to the PRMA 2011 (Act 815) the various revenues are collected in the petroleum holding fund. Among other allocations stipulated by the Act, the ABFA receives not more than 70% of the benchmark petroleum revenue while the Ghana stabilization fund receives not more than 70% of the 30% revenue allocation to the Ghana petroleum fund. The ABFA funds have been primarily focused on developmental projects such as infrastructure. On the other hand, the stabilization fund also accrues amounts that can be drawn to cushion the economy of Ghana in times of shocks or unexpected decline in petroleum revenues in other to support budgetary expenditure. Due to the strategic allocations of these funds, this current study conceptualizes that they have positive implications for Ghana's economic growth.

2.5 Summary

This chapter focused on the theoretical, conceptual, and empirical foundations of the study. The theories reviewed included the Dutch disease and the Paradox of Plenty. The key concepts reviewed include Petroleum revenue in Ghana, economic growth, and petroleum revenue management in Ghana. Scholarly works on leading works were reviewed in the empirical review section of this chapter.

CHAPTER THREE

RESEARCH METHODOLOGY

3.0 Introduction

The purpose of this study was to investigate the effect of petroleum revenue on economic growth in Ghana. This chapter addresses the research methodology which served as the blueprint for the conduct of this study. Specifically, the chapter emphasized the research design and approach, data collection procedures and methods, and discusses the procedures and techniques utilized to acquire and analyse the data for this current research.

3.1 Research Paradigm

According to Hallebone and Priest (2008), the research paradigm reflects the philosophy of scientific research and the scientific approach that is considered most appropriate to the purpose, context, and focus of the research task. The appropriate paradigm for this study was positivism. According to Collis and Hussey (2014), the positivist and interpretive research paradigms form the main paradigms for research. Whereas positivist theorists understand and interpret social realities objectively with facts, interpretive theorists understand and interpret social realities subjectively with exploration.

However, Collis and Hussey (2014) argue that other paradigms fall within the main research paradigms depending on the extent to which a study is of the positivist and interpretivist research paradigms. This study seeks to adopt the positivism-research paradigm. Saunders, Lewis, and Thornhill (2012) explained that the positivism paradigm claims that scientific research considers observable social reality and finally makes law-like generalizations.

The fact that such social reality is observable means that it can be measured and quantified into variables. Thus, the use of the positivism paradigm involves collecting data on variables, analyzing data by the use of statistical tests of significance, and affirming or rejecting hypotheses to make generalizations. The positivism paradigm of research produces generalizable findings which are normally reported quantitatively and also allows for the possibility of making predictions about general phenomena (Hallebone & Priest, 2008).

The positivist research paradigm was adopted for this study because this study is a purely qualitative study that explains the relationship between petroleum revenue and economic growth. Data were analyzed to establish objective relationships among the variables by using tests for statistical significance, and finally accepting or rejecting hypotheses to establish whether petroleum revenue influences economic growth in Ghana.

3.2 Research Design

The main research designs are exploratory, descriptive, or explanatory (Saunders et al., 2019). The study employed the explanatory research design. According to Saunders et al. (2012), empirical studies that seek to establish cause-and-effect relationships between variables may adopt an explanatory research design. Explanatory research design emphasizes studying a situation to explain the relationships between variables. Explanatory research was employed in this study to explain the relationship between petroleum revenue and economic growth in Ghana.

Further, the explanatory research design is usually associated with the positivist research paradigm (Saunders et al., 2019). The explanatory research

design from the positivists' perspective considers the relation between variables is explained through the lens of objectivism. Consequently, the researcher measures and understands the effect of one variable on the other objectively without consideration of subjectivity in the social contexts of the phenomenon under investigation.

3.3 Research Approach

Saunders, et al (2012) indicated that the research approach consists of quantitative, qualitative, and mixed-method research approaches. For the quantitative research approach, research hypotheses are tested by analyzing quantitative data, usually collected through a quantitative process. The quantitative research approach applies to studies that entail the test for hypotheses and statistical significance of relationships in datasets. On the other hand, for the qualitative research approach, texts, symbols, images, and other non-numerical data form the data to be analyzed and obtained through a qualitative process. In qualitative research, numbers are not used to describe the data (Polkinghorne, 2005). Hence, such data can be gathered through observations, and interviews with participants. The mixed method is the combination of both quantitative and qualitative approaches.

Since this current study utilizes a quantitative dataset and tests for the statistical significance of the research hypotheses in other to establish the relationship between the variables under investigation, the quantitative research approach was appropriate for this current study.

The quantitative research approach gives a large exposure to a series of events which allows the combination of statistics in a large sample (Amarantunga & Baldry, 2002). More so, quantitative approaches enable the

application of statistical methods, hence, it makes it easy to generalize the results from the research. Further, the quantitative approach produces concrete conclusions. This is because the results are usually based on quantitative measures instead of mere interpretation and hence enable future applications and comparisons with other studies.

3.4 Model Specification

The purpose of the study was to establish the effect of petroleum revenue on the economic growth of Ghana. Following the works of Asomani et al. (2019), the Aggregate Production Function was employed which was also augmented by the Solow Growth model to serve as the theoretical basis upon which the analysis is modeled. Equation (Eqn) (1) represents the Aggregate Production Function.

$$Y_t = A_t L_t^{Bn} K_t^{Bx} \quad \text{---------- (1)}$$

From equation (1), Y_t represents the aggregate output of the economy (real GDP per capita) at a time (t). The variable L_t represents the stock of labor measured as the Labour Force Participation (percentage of the total population between the ages 15 and 64 years) while K_t, the capital input is measured as an amount of gross fixed capital formation at a time (t) respectively. Bn and βx represent the coefficients of elasticity of labor and capital inputs. The variable A_t represents the Total Factor Productivity which accounts for other factors aside from labor and capital that causes production to increase. Thus, it is a vector of other independent variables that theoretically and empirically have effects on the dependent variable.

Further, this study hypotheses that petroleum revenue has implications for economic growth. Thus, petroleum revenue, ABFA, and SF have

implications for the economic growth of Ghana. Therefore, while using inflation (INF) and real effective exchange rates (RER) as control variables A_t could be represented as:

$$A_t = f(ABFA, SF, PR, INF, RER) =$$

$$ABFA_t^{B1} SF_t^{B2} PR_t^{B3} INF_t^{B4} RER_t^{B5} - - - - - - - - (2)$$

Consequently, substituting equation 2 into equation 1 results in:

$$Y_t = ABFA_t^{B1} SF_t^{B2} PR_t^{B3} INF_t^{B4} RER_t^{B5} K_t^{B6} L_t^{B7} e_t^{ut} \quad \text{---------- (3)}$$

In other to operationalize the model, logarithm is applied to equation 3. This is written into equation 4 as:

$$lnY_t = B_0 + B_1 lnABFA_t + B_2 lnSF_t + B_3 lnPR_t + B_4 lnINF_t + B_5 lnRER_t + B_6 lnK_t + B_7 lnL_t + u_t \text{ ---------- (4)}$$

Where the B_0 is the intercept and B_1 to B_6 are the coefficients of the variables and u_t is the error term. The time series properties of the data made the Autoregressive Distributed Lag (ARDL) estimation technique use at capturing the dynamic process of the model.

3.5 Data Processing and Analysis

This study examined the effects of petroleum revenue on economic growth using the Autoregressive Distributed Lag (ARDL) framework by Peseran, Shin and Smith (2001). The ARDL approach accommodates variables being of mix orders, I(1) and I(0). The ARDL technique uses lags of the variables to specify models in other to address issues of endogeneity. Given the small sample size of the study the ARDL remains a useful technique. Specification of the models would be based on considerations of the Akaike automatic selection. Therefore, the long run levels model of the ARDL framework is as presented in equation 5.

$$lnY_t = B_0 + B_1 lnABFA_t + B_2 lnSF_t + B_3 lnPR_t + B_4 lnINF_t + B_5 lnRER_t + B_6 lnK_t + B_7 lnL_t + u_t \text{ ---------- (5)}$$

Whereas the short-run model to be estimated is given as;

$$\triangle lnY_t = \sum_{i=1}^{w} \theta_1 \triangle lnY_{t-i} + \sum_{i=1}^{p} B_1 \triangle lnABFA_{t-i} + \sum_{i=1}^{q} B_2 \triangle lnSF_{t-i} + \sum_{i=1}^{r} B_3 \triangle lnPR_{t-i} + \sum_{i=1}^{s} B_4 \triangle lnINF_{t-i} + \sum_{i=1}^{t} B_5 \triangle lnRER_{t-i} + \sum_{i=1}^{u} B_6 \triangle lnK_{t-i} + \sum_{i=1}^{v} B_7 \triangle lnL_{t-i} + \partial EC_{t-1} + u_t \quad ---------- (6)$$

Where Δ is the difference operator, and EC_{t-1} is the error correction term lagged one period. βi, where i=1,.,.,7 represents the elasticity coefficients of the respective variables, with ∂ showing the speed of adjustment. q….w are the lag term and u is the stochastic error term.

In other to examine the effects of the ABFA, Stabilisation fund and petroleum revenue on economic growth, the study applied test estimations making the model robust for cointegration and error-correction. Estimation of an ARDL model involves the following steps.

First, the time series properties of the data were assessed. The study applied the Augmented Dickey–Fuller (ADF) and the Phillip-Perron (PP) unit root tests to observe the stationarity properties of the data. The absence of unit roots in the data makes the data suitable for ARDL estimation. Secondly, the bounds test for cointegration using the ARDL procedure developed by Pesaran, Shin, and Smith (2001) is conducted. Finally, post estimation tests

relating to the stability and diagnostic tests of the ARDL model is appraised to ensure robust estimates are used.

3.6 Data Sources, Description and Measurement

This study used primarily secondary data sources. The variable of interest for this current study includes economic growth, ABFA, stabilization fund, and total petroleum revenue whiles capital, labor, inflation and effective exchange rate serve as control variables. The variables were chosen with recourse to the economic theory, existing literature, and significance to the research. The time series data employed was quarterly data spanning from 2011 to 2021. In the context of this study, the variables used are described, measured, and operationalized as follows;

3.7 Economic Growth (Y)

Economic growth is the continuous increase in the real output or real gross domestic product of a country within a period (Ho & Iyke, 2018). The real GDP per capita is used as a measure of economic growth in this study. GDP per capita is seen as an adequate measure of economic growth due to its high correlation with the size of the economy concerning the living standard of an economy for some time. GDP per capita is supported as a measure of economic growth in the works of Ho and Iyke (2018), Nkansah (2018), Ibrahim (2011), and others.

3.8 Annual Budget Funding Amount (ABFA)

The ABFA is the portion of petroleum revenue allocated to support the annual budget of Ghana. The ABFA funds have been primarily focused on developmental projects such as infrastructure. Expenditure on developmental projects leads to sustainable economic growth (Anarfo, Agoba, & Abebreseh,

2017). Therefore, this study hypotheses that the utilization of ABFA funds leads to economic growth. The time series data on quarterly ABFA amounts was accessed from the Ministry of Finance and PIAC.

3.9 Stabilization Fund (SF)

The stabilization fund also accrues amounts that can be drawn to cushion the economy of Ghana in times of shocks or unexpected decline in petroleum revenues in other to support budgetary expenditure. The contingency nature of these funds enables the Ghanaian economy to manage unexpected shocks. Therefore, this study hypotheses that the utilization of stabilization funds leads to economic growth. The time series data on quarterly stabilization funds were retrieved from the Ministry of Finance and PIAC.

3.10 Inflation (INF)

Inflation is a sustained increase in the general prices of goods and services over some time. Price stability is an indicator of a stable macroeconomic environment of a country. Usually, a high rate of inflation in a country can reduce the return on investment and is an indicator of macroeconomic instability. Inflation (INF) as measured by the consumer price index reflects the annual percentage change in the cost to the average consumer of acquiring a fixed basket of goods and services that may be fixed or changed at specified intervals, such as yearly. Most studies have considered inflation to have a major impact on economic growth (Ho & Iyke, 2018; Asomani et al., 2019; and Ibrahim, 2011).

3.11 Real Effective Exchange Rate (RER)

Real Effective Exchange Rate is the weighted average of a country's currency relative to an index or basket of other major currencies adjusted for

the effects of inflation. When the real effective exchange rate increases, it is an indication of the real depreciation of local currency relative to other foreign currencies. Depreciation of the local currency stimulates exports and hence growth rate is also influenced positively. Even though import volume decreases, the value of imports increases in domestic currency terms because the currency has depreciated. An appreciation of the domestic currency makes exports from the home country more expensive and so decreases demand for the home country's exports and foreign exchange earnings and hence hampering economic growth. The works of Ho and Iyke (2018), Asomani et al (2019), and Ibrahim (2011) give empirical support for real effective exchange rate as a major determinant of economic growth.

3.12 Capital Stock (K)

Gross fixed capital formation as a percentage of GDP is used as a measure of total capital. Gross fixed capital formation refers to land improvements, plant, machinery, equipment purchases, construction of roads, railways, and the like, including schools, offices, hospitals, private residential dwellings, and commercial and industrial buildings.

Aggregate Production Function was employed which was also augmented by the Solow Growth model to serve as the theoretical basis upon which the analysis is modeled, the necessity of capital influencing and consequently economic growth has been much emphasized in literature. This therefore made the use of capital (K) as control variable more appropriate in the study. The measure of Gross fixed capital formation as a percentage of GDP as a measure for capital stock is usually found to have significant impact

on economic growth in most studies (Nkansah, 2018; Ho & Iyke, 2018; Asomani et al., 2019; and Ibrahim, 2011).

3.13 Labour Force (L)

Labour participation rate of total population is employed as a proxy for labour force. It denotes a proportion of the total population aged between fifteen (15) and sixty-four (64) years which is the active and productive population in the country. Solow (1956) and Swan (1956) advised that labour force should be included in the growth model because of its effect on the work force and this has been proven empirically in many researches that included labour force to be a good determinant of economic growth.

Aggregate Production Function was employed which was used and augmented by the Solow Growth model to serve as the theoretical basis upon which the analysis is modeled, labour (L) was an integral part of the equation. Therefore, using labour as a control variables been be more appropriate in this study. Labour participation rate as a proxy for labour force has been used in several other studies such as Asomani et al. (2019), Nkansah (2018), Ho and Iyke (2018) and Ibrahim (2011).

3.14 Data Analysis

The estimations begin with an investigation of the stationarity properties of the variables in Equation (1). The parametric augmented Dickey-Fuller (ADF) method by Dickey and Fuller (1979, 1981) and the non-parametric Phillips-Perron (PP) procedure by Phillips and Perron (1988) are used. Examining stationarity is particularly important in order to avoid spurious regressions. These procedures are also relevant for small sample size time series data such as this. In addition, the PP test serves as a robustness

check on the ADF test results as it is able to correct for higher level serial correlation as well as heteroscedasticity that may be present in the ADF results. By the tests, the null hypothesis of unit root, hence, non-stationarity is examined against the alternative hypothesis of no unit root, implying stationarity in each method.

The Software Used

Stata: this is a versatile statistical software that includes features for time series analysis, including ARDL modeling (Becketti, 2013). With Stata, researchers can estimate ARDL models, perform diagnostic tests, and visualize the results using its intuitive interface. Stata also offers extensive documentation and support for users conducting time series analysis with ARDL. Stata is a widely used statistical software package that offers robust capabilities for time series analysis, including the estimation and testing of ARDL models. Its user-friendly interface and specialized commands make it a valuable tool for researchers working with time series data (Kothari, 2015).

3.15 Chapter Summary

This study adopted the positivists-research paradigm with an explanatory research design while applying the quantitative approach to research. The study used variables that includes economic growth, ABFA, stabilization fund, petroleum revenue, inflation, real effective exchange rate, capital, and labor. The quarterly data used spanned from 2011 to 2021. The sources for the data were from the Ministry of Finance, PIAC, Ghana Statistical Service and the World development indicators database. The ARDL estimation technique was the main statistical tool for the analysis of the data.

Summary of Data Characteristics Variables	Notation	Measurement	Source
Economic growth	Y	GDP per capita	WB
Annual Budget Funding Amount	ABFA	Amounts expensed from ABFA account	PIAC, MoF
Stabilisation fund	SF	Amounts expensed from SF account	PIAC, MoF
Petroleum revenue	TPR	Total petroleum receipts from Ghana's crude oil production	PIAC, MoF
Inflation	INF	Changes in consumer price index	GSS
Real Effective Exchange Rate	RER	weighted average of cedis relative to an index other major currencies	WB
Capital Stock	K	Gross fixed capital formation as a percentage of GDP	WB
Labour Force	L	Labour participation rate of total population	WB

Note: World Bank (WB), Public Interest Accountability Committee (PIAC), Ministry of Finance (MoF), and Ghana Statistical Service (GSS).

CHAPTER FOUR

RESULTS AND DISCUSSION

4.0 Introduction

This chapter presents and discusses the estimation results. The results of the descriptive statistics of the variables, unit root test, and the Autoregressive distributed lag (ARDL) estimation were presented and discussed. Further, post-diagnostic estimations of the results were presented to affirm the robustness of the model. Economic growth was the dependent variable while ABFA, stabilization fund, and petroleum revenue were the independent variables. Other independent variables employed as control variables were inflation, real exchange rate, capital, and stock of labor.

4.1 Descriptive statistics

The study examined the descriptive statistics of the relevant variables involved in the study, as presented in Table 2. Table 2 presented economic growth (Y) measured with real GDP per capita, Annual Budget Funding Amount (ABFA), Stabilisation Fund (SF), Petroleum revenue (PR), an exchange rate (ER) measured with real effective exchange rate index (2010=100), inflation measured with consumer prices (annual %), capital (K) proxied with gross fixed capital formation (% of GDP), and labor (L) proxied with labor force participation (% of total population, 15-64).

From Table 2, it could be observed that all the variables have positive averages. It was noted that petroleum revenue and labor were positively skewed, implying that the majority of the values are greater than their means. This is a result of the means less than their respective medians. However, the other remaining variables recorded positive skewed values indicating that the

majority of the values were less than their means. From the Jarque-Bera test, the variables were normally distributed ($p>0.05$), except petroleum revenue and labor ($p < 0.05$). The quarterly data spans from 2011 to 2021, giving 44 respective observations for the data analyses.

Table 4: Descriptive statistics of data

	lnY	lnABFA	lnSF	lnPR	lnINF	lnRER	lnK	lnL
Mean	8.495	17.904	16.961	18.831	5.528	1.244	2.982	4.244
Median	8.465	17.907	16.703	18.628	5.592	1.394	2.938	4.239
Maximum	8.616	18.641	18.814	21.191	6.241	1.793	3.296	4.261
Minimum	8.338	16.887	15.149	17.558	4.870	0.406	2.483	4.237
Std. Dev.	0.085	0.469	1.037	0.655	0.399	0.462	0.240	0.008
Skewness	-0.154	-0.448	-0.020	0.794	-0.183	-0.617	-0.429	1.061
Kurtosis	2.020	2.565	2.105	5.264	1.777	1.925	2.474	2.590
Jarque-Bera	1.936	1.819	1.473	14.016	2.988	4.912	1.858	8.561
Probability	0.380	0.403	0.479	0.001	0.225	0.086	0.395	0.014
Sum	373.791	787.793	746.271	828.544	243.239	54.729	131.220	186.722
Sum Sq. Dev.	0.310	9.439	46.213	18.449	6.849	9.191	2.474	0.003
Observations	44	44	44	44	44	44	44	44

Source: Author's Computation, Koriwie (2022)

4.2 Unit root test

The time series properties of a data should be stationary before robust estimations could be made. Therefore, the data has unit root when it is non stationary. The ARDL approach accommodates variables integrated of order zero (at levels) or one (first difference). The Phillip-Perron unit root test was carried out to check the stationarity of the data. This is presented in Table 3. Table 3 indicates that real GDP per capita, inflation, real exchange rate and capital were integrated of order one [I(1)], except ABFA, SR, PR and labour which are integrated of order zero [I(0)]. This implies that the ARDL approach is suitable to model the dataset since the data has no I(2).

Table 5: Phillip-Perron unit root test results

	At Level		At First Difference		
	t-Statistic	Prob.	t-Statistic	Prob.	Order of Integration
lnY	-1.5863	0.4808	-7.6278	0.000	I(1)
lnABFA	-3.4023	0.0163			I(0)
lnSF	-3.6861	0.0078			I(0)
lnPR	-5.0853	0.0001			I(0)
lnINF	0.3718	0.9794	-5.7637	0.000	I(1)
lnRER	-1.5989	0.4745	-5.5676	0.000	I(1)
lnK	-2.132	0.2336	-6.371	0.000	I(1)
lnL	-3.3613	0.0181			I(0)

Source: Author's Computation, Koriwie (2022)

4.3 Multicollinearity Test

There are issues of multicollinearity when there is/are high correlation(s) between the variables in a model. Presented in Table 4 is a correlation test among the variables to test for multicollinearity. From Table 4, there are weak (r = 0.1) to moderate (r = 0.61) correlations among the variables.

Table 6: Multicollinearity test

	lnY	lnABFA	lnSF	LnPR	lnINF	lnRER	lnK	lnL
lnY	1.00							
lnABFA	0.28	1.00						
lnSF	0.27	0.49	1.00					
lnPR	0.34	0.43	0.53	1.00				
lnINF	0.45	0.11	0.12	0.21	1.00			
lnRER	0.52	0.09	0.05	0.17	0.97	1.00		
lnK	0.10	0.04	-0.08	-0.05	0.10	0.24	1.00	
lnL	-0.61	-0.05	-0.01	-0.11	-0.56	-0.33	-0.45	1.00

Source: Author's Computation, Koriwie (2022)

4.4 Lag Length Selection

The ARDL estimation technique employs number of lags of the dependent and independent variables to estimate the model. Therefore, a suitable lag length was computed from Akaike Information Criterion (AIC) among other criteria, as presented in Table 5. Table 5 indicates that the lag length selected by the AIC is two (* indicates lags selected by criteria).

Table 7: Lag length determination

Lag	LogL	LR	FPE	AIC	SC	HQ
0	262.79	NA	7.43E-16	-12.13	-11.80	-12.01
1	500.59	373.69*	2.00e-19*	-20.41	-17.43*	-19.32*
2	565.18	76.89	2.72E-19	-20.44*	-14.81	-18.37

* indicates lag order selected by the criterion
LR: sequential modified LR test statistic (each test at 5% level)
FPE: Final prediction error
AIC: Akaike information criterion
SC: Schwarz information criterion
HQ: Hannan-Quinn information criterion

Source: Author's Computation, Koriwie (2022

4.5 Cointegration Results

After the lag length was determined, an F-test for the joint significance of the coefficients of lagged levels of the variables was conducted. Thus, each of the variables in the model is taken as dependent variable and a regression is run on the others. The null hypothesis of no long run relation was tested. Thus, the null hypothesis is that the coefficients of the long run model is simultaneously equal to zero.

Table 8: F Bounds test results for cointegration

Test Statistic	Value	Signif.	I(0)	I(1)
			Asymptotic: n=1000	
F-statistic	16.29103	10%	2.03	3.13
K	7	5%	2.32	3.5
		2.50%	2.6	3.84
		1%	2.96	4.26
Actual Sample Size	41		Finite Sample: n=45	
		10%	2.238	3.461
		5%	2.643	4.004
		1%	3.595	5.225
			Finite Sample: n=40	
		10%	2.26	3.534
		5%	2.676	4.13
		1%	3.644	5.464

Source: Author's Computation, Koriwie (2022)

From Table 6, the F bounds test result indicates the presence of cointegration among the variables. There is evidence of cointegration when the F-statistics is higher than the upper bounds at the various significant levels presented in Table 6. This implies that the variables move together in the long-run. Therefore, economic growth ABFA, stabilisation fund, petroleum revenue and the other control variables are cointegrated. Further, the presence of cointegration implies that the long-run model can be estimated.

This connotes that when petroleum revenues are allocated effectively as in the context of Ghana's ABFA and stabilisation fund, there is a long run relationship with economic growth. This result agrees with the findings of Adabor and Buabeng (2021) who found a cointegrating relationship among oil revenue, economic growth and other macroeconomic indicators in Ghana.

Again, Olayungbo and Adediran (2017) also found a cointegrating relationship among petroleum revenues, economic growth and other economic indicators in the context of Nigeria. Further, results from Javed and Husain (2020) indicated that when oil revenues are allocated to building infrastructure, as in the case of Ghana's ABFA, there tend to be a long-relationship between petroleum revenues and economic growth.

4.6 ARDL Long-run Levels Equation

Table 9 shows the results of the long-run estimate based on unrestricted constant and no trend. The coefficients indicate the long-run elasticities.

Table 9: Long-run levels model

Variable	Coefficient	Std. Error	t-Statistic	Prob.
lnABFA	0.2049	0.0532	3.8490	0.0013
lnSF	0.0891	0.0280	3.1794	0.0055
lnPR	0.0256	0.0097	2.6497	0.0169
lnINF	-0.0281	0.0195	-1.4390	0.1683
lnRER	0.0474	0.0285	1.6654	0.1141
lnK	0.3650	0.0652	5.5953	0.0000
lnL	7.3995	0.3414	21.6756	0.0000

Source: Author's Computation, Koriwie (2022)

From Table 9, the long-run result shows that annual budget funding amount (ABFA), stabilization fund (GSF), total petroleum revenue (TPR), capital (K), and labor (L) force had a significant effect on economic growth, at the 5 percent level of significance. However, inflation and real exchange rates had an insignificant impact on economic growth in the long run.

From the results, a 1 percent increase in the ABFA will result in economic growth increasing by 0.20 percent in the long run, at the 5 percent significant level. In view of the above results, the question one of the research has been answered, ABFA contributes to economic growth in Ghana. This results affirmed to the study by Anarfo, Agoba, and Abebreseh, (2017) that, expenditure on developmental projects leads to sustainable economic growth. Therefore, this study concluded that, the utilization of ABFA funds leads to economic growth.

This result implies that, in Ghana's context, proceeds from petroleum revenue contribute to economic growth. Revenue allocations to the ABFA to finance priority areas of economic development have been observed to have the highest magnitude of impact on economic growth. As over 75 percent of the ABFA is allocated to supporting capital spending whereas the remaining goes to recurrent spending and PIAC funding, increasing it would result in economic growth as shown in the results. According to economic theory, government expenditure induces economic growth by enhancing capital formation and efficiency, and by increasing the supply of scarce resources that hitherto was not available.

Again, a 1 percent increase in the stabilization fund increases economic growth by 0.03 percent in the long run, at the 5 percent significant level. With this, the stabilization fund shown to have a significant impact on economic growth in the long run. In light of the government's withdrawals of funds from the stabilization fund to support the budget in times of economic shocks and sudden dips in petroleum revenues, it provides a useful avenue for economic growth. According to Kar and Bhattacharya (2011), the impact of

unexpected shocks on an economy has dire consequences for economic growth. Thus, creating a fund like the stabilization fund to support the economy in times of economic shocks and unexpected oil revenue underperformances becomes useful to safeguarding economic growth. Carlos (2021) argued that lending provides an avenue for economies to ward off the consequences of unexpected shocks. Also, this results has confirmed the position of Gyeyir (2019) that, Ghana Stabilization Fund has contributed to its intended purpose, though he added that, the contribution of Ghana Stabilization Fund was not significant as intended. Furthermore, the finding shares the same consensus with that of Brunet, Saez, and Perez (2021), they found that public funds meant for unexpected economic shocks provides economic edge for economies to manoeuvre such shocks; thereby, sustaining economic growth.

Also, economic growth increases by 0.09 percent when total petroleum revenue is increased by 1 percent, at the 5 percent significant level. Total petroleum revenue has been found to have a positive and significant effect on economic growth. This indicates the beneficial role of the PRMA in distributing petroleum revenues to priority developmental areas contributes to economic growth. As the distribution of petroleum revenues focuses on all vital aspects of economic development, economic activity is stimulated and total economic output grows. However, Oshionebo (2018) contended that the PRMA grants more autonomy to the government in the utilization of petroleum revenues in the guise of politics which limits economic growth. Nonetheless, the findings of Adabor and Buabeng (2021) lend support to this current finding. Adabor and Buabeng (2021) found that oil discovery drives

FDI-inflows into the host economy for oil production, which further leads to the inflow of oil revenues which generates economic growth.

The provision of capital investments serves the long-term purpose of businesses to survive and expand their operations. The survival and expansion of businesses stimulate production and economic activity which boosts economic growth. The findings of Nyarko-Asomani, Bhasin, and Aglobitse (2019) provide support to this current finding. Nyarko-Asomani et al. (2019) found that capital spending has a positive and significant impact on economic growth. Sánchez-Juárez, and García-Almada (2016) also affirm these results with evidence that public investment has a crowd-in effect on economic growth.

In addition, the stabilization fund is evident to have a significant beneficial impact on economic growth in the long run. In light of the government's withdrawals of funds from the stabilization fund to support the budget in times of economic shocks and sudden dips in petroleum revenues, it provides a useful avenue for economic growth. According to Kar and Bhattacharya (2011), the impact of unexpected shocks on an economy has dire consequences for economic growth. Thus, creating a fund like the stabilization fund to support the economy in times of economic shocks and unexpected oil revenue underperformances becomes useful to safeguarding economic growth. Carlos (2021) argued that lending provides an avenue for economies to ward off the consequences of unexpected shocks. However, the finding shares the same consensus with that of Brunet, Saez, and Perez (2021). Brunet et al. (2021) found that public funds meant for unexpected economic shocks

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This current finding contradicts that of Olaungbo and Adediran (2017) who found a negative effect of oil revenues on Nigeria's economic growth in the long run. Olaungbo and Adediran (2017) attributed their findings to the Dutch disease. In Ghana's context, the Dutch disease is far-fetched with recourse to this current finding. Consequently, Doraisami (2015) found that the role of effective oil revenue management prevents Dutch disease and contributes much to economic growth. Likewise, Ahmad and Masan's (2015) findings also support the positive and significant effect of petroleum revenue on economic growth.

Drawing from the outcomes of the study, in terms of the relationship among ABFA, stabilization fund, petroleum revenue, and economic growth,

the government channel of oil revenues to viable and sustainable activities results in economic growth. The government's usage of oil revenues on infrastructure, sustainable social programs, and other projects as prescribed by the PRMA has a lasting favorable impact on the economy of Ghana. Moreover, investment in capital projects which are mostly public goods has higher social returns than private returns due to its associated market failure which can be encountered when undertaken by private investors (Appiah, 2014).

In addition, for the control variables inflation and real effective exchange rate do not significantly affect economic growth whereas capital and labor have significant effects on economic growth. From extant studies, Madurapperuma (2019) found a negative and significant effect of inflation on economic growth. Whereas Mallik and Chowdhury (2001) found a positive and significant relationship. Khan and Senhadji (2001) found an insignificant effect of inflation on economic growth, as revealed in this study. Consequently, contemporary studies (for instance: Boujelbene, 2021; Law, Ng, Kutan, & Law, 2021) are investigating the nonlinearity or quadratic relationship between inflation and economic growth.

In the same vein, a real effective exchange rate has an insignificant impact on economic growth, at a 5 percent level of significance. This outcome corroborates with that of the result of Nkansah (2017) who found that the real exchange rate has an insignificant effect on economic performance. However, the result contradicts Aksoy and Salinas (2006) who found a positive and significant relationship between real effective exchange rate and economic growth. Also, Answar and Nguyen (2010) and Asomani et al. (2019) found a

negative and significant impact of the real exchange rate on economic growth. These conflicting findings could be due to the time-varying effect of exchange rates on economic growth investigated by studies (Wen, Xiao, Huang, & Xia, 2018; Lilley, Maggiori, Neiman, & Schreger, 2022).

The coefficient of capital shows that a 1 percent increase in capital input would result in a 0.37 percent increase in economic growth, at a 1 percent significance level in the long run. The sign of the capital variable supports the theoretical conclusion that capital contributes positively to the growth of output since the coefficient of capital in this long-run growth equation is positive and significant. This positive relationship between capital stock and economic growth is consistent with the expectation of the classical economic theory which argued that capital plays a vital role in the growth of an economy. The finding is in line with the findings of Asomani et al. (2019), Nkansah (2019), and Shaheen, Ali, Kauser, and Bashir (2013). It is also consistent with conclusions reached by Ibrahim (2011) and Asiedu (2013) in the case of Ghana. Ibrahim (2011) and Asiedu (2013) found a positive and statistically significant effect of capital on economic growth in Ghana.

Finally, the results show that the coefficient of the labor force (L) is positive and statistically significant signaling a positive influence on economic growth in the long run. The labor force is positive and significant at 1 percent, indicating that an increase in economic growth by 7.3995 percent is a result of a 1 percent increase in the labor force (L). This is consistent with the argument of Asomani et al. (2019) and Ayibor (2012) who asserted that there can be no growth achievement without the involvement of labor as a factor input, hence, the positive and significant coefficient. This result however contradicts the

works of Sakyi (2011) who found a negative effect of labour on economic growth.

4.7 Short-run Model Estimation

The existence of a long-run relationship between economic growth and its exogenous variables allows for the estimation of long-run estimates. Some descriptive statistics can be obtained from Table 10.

Table 10: Short-run estimation

Variable	Coefficient	Std. Error	t-Statistic	Prob.
C	-11.9784	1.0429	-11.4857	0.0000
D(lnABFA)	0.0564	0.0128	4.3870	0.0004
D(lnABFA(-1))	-0.0311	0.0137	-2.2757	0.0361
D(lnSF)	0.0071	0.0035	2.0236	0.0590
D(lnSF(-1))	-0.0116	0.0037	-3.1409	0.0060
D(lnTPR)	-0.0201	0.0120	-1.6787	0.1115
D(lnINF)	-0.0015	0.0022	-0.6683	0.5129
D(lnINF(-1))	-0.0187	0.0033	-5.6442	0.0000
D(lnRER)	-0.0712	0.0083	-8.5905	0.0000
D(lnK)	0.0712	0.0123	5.7838	0.0000
D(lnK(-1))	-0.0755	0.0162	-4.6679	0.0002
D(lnL)	8.1840	2.3197	3.5280	0.0026
D(lnL(-1))	-4.0279	2.4563	-1.6398	0.1194
CointEq(-1)	-0.5784	0.0502	-11.5112	0.0000
R^2	0.9280	Mean dependent var		0.0216
Adjusted R^2	0.8889	S.D. dependent var		0.0338
S.E. of regression	0.0112	Akaike info criterion		-5.8598
Sum squared resid	0.0030	Schwarz criterion		-5.2565
Log likelihood	125.3366	Hannan-Quinn criter.		-5.6452
F-statistic	23.7813	Durbin-Watson stat		2.3018
Prob(F-statistic)	0.0000			

Source: Author's computation

From Table 10, it could be observed that the adjusted R^2 is approximately 0.89. Thus, approximately 89 percent of the variations in economic growth is explained by the independent variables. Also, a considerable DW-statistics of approximately 2.3 reveals that there is no autocorrelation in the residuals. The results also showed that the coefficient of the lagged error correction term, CointEq(-1), exhibits the expected negative sign (-0.5784) and is statistically significant at 1 percent. This indicates that approximately 58 percent of the disequilibrium caused by the previous quarter's shocks converges back to the long-run equilibrium in the current quarter.

Consistent with the long-run results, the coefficient of ABFA has a positive and significant impact on economic growth of 0.06 in the short run, at a 5 percent level of significance. This indicates that if Ghana were to increase her ABFA spending by 1 percent in the short run, economic growth will increase by approximately 0.06 percent. This clearly shows the important role of ABFA expenditure in the economy particularly in the short run. However, a previous quarter's ABFA expenditure hurts economic performance. In all, ABFA converges with a postie effect on economic growth. Thus, in the short run when ABFA expenditure is utilized for developmental projects, economic activity is stimulated through the creation of employment; thereby, economic growth is boosted.

In addition, the current stabilization fund allocation has an insignificant effect on economic growth. Though the result indicated 0.007 increased in economic growth with 1 percent increase in petroleum revenue at 5 percent

significance level, 1 percent increase in the previous quarter's stabilization fund leads to a 0.01 decline in economic growth.

On the other hand, petroleum revenue does not have a significant impact on economic growth in the short run, at the 5 percent level of significance. This implies that in the short run petroleum revenue is not meaningful to economic growth. It could be argued that this finding is due to the PRMA which allocates petroleum revenues into various funds used for economic development. Thus, the total utilization of petroleum revenues for developmental activities takes a long time. Hence, the significance of petroleum revenue to boosting economic growth in the long term.

However, this current finding is contrary to that of Adabor and Buabeng (2021) who found a positive effect of oil revenues on economic growth. Besides, Acquah-Andoh et al. (2018) also reported that oil production in Ghana does not significantly contribute to economic performance. This current study can be reconciled with the aforementioned studies in terms of the time-varying trend in the international prices of oil and the fact that this current study captures a relatively longer data span. Thus, in the years when oil revenues declined, any proceeds from oil production would not have significantly affected economic growth.

Furthermore, the impact of inflation and real effective exchange rate on economic growth in the short run was not consistent with that of the long run. From the results, current inflation does not significantly affect economic growth in the short term. Nonetheless, a previous quarter's inflation significantly affects economic growth negatively. Similar to this current finding, Mwakanemela (2013) found that inflation negatively affects

economic growth significantly. This result is plausible because rising inflation connotes relatively higher rising prices of goods and services which affects firms and individuals in the economy thereby worsening economic growth. Barro (2013) argued rising inflation causes cost inputs for the production sectors of the economy to increase which leads to disruption of economic activity.

Moreover, a real effective exchange rate has a negative and significant impact on economic growth, at the 5 percent level of significance. This indicates that a 1 percent increase in the real exchange rate will lead to a 0.07 percent decline in economic growth in the short run. This means that if the country's currency depreciates, it has adverse implications on economic growth in the short run. Thus, as expected, a depreciation of the domestic currency makes Ghanaian exports relatively cheaper and as such leads to an increase in demand for exports from foreign economies and by extension economic performance increases whereas an appreciation of the domestic currency makes exports more expensive and as such reduces economic performance in the short run. This finding contradicts that of Nkansah (2017) who found that the real exchange rate has a positive and significant impact on economic growth in the short run. Asomani et al. (2019) found that the real exchange rate has a negative and significant impact on economic growth in the short run affirms the findings of this study.

Nonetheless, capital and labor have a significant impact on economic growth as indicated by theory. Consistent with the findings of Githanga (2015) for Kenya; and Nkansah and Ibrahim (2011) for Ghana, the coefficient of capital stock maintained its positive sign and is statistically significant at a 1

percent significance level which is consistent with the long-run result. This means that in the short run, a 1 percentage point increase in capital stock will induce economic growth to increase by approximately 0.07 percent. This indicates the crucial role that capital stock plays in Ghana's growth process. The sign of the capital stock variable supports the theoretical conclusion that capital contributes positively to the growth of the economy both in the short run and in the long run since the coefficient of capital in these two periods is positive and significant.

Finally, the labor force did not maintain its expected positive sign in the long run. This result, however, shares similar findings with Ho and Iyke (2018) and Sakyi (2011) who found a negative and statistically significant effect of labor on economic growth in Ghana. The authors argued that this is an indication of the growing unemployment problem and the low productivity of labor in Ghana. They further argued that the economy of Ghana is based on land-intensive agriculture, capital-intensive mining, and labor-intensive petty trading all of which have limited employment and income generation benefits for the country in the short run.

4.8 Diagnostic Tests

Diagnostic tests were conducted for the ARDL model to ensure that the model gives robust estimates. The tests, as reported, in Table 8 indicate that the estimated model passed the Breusch-Godfrey Serial Correlation LM Test for serial correlation, the Breusch Pagan-Godfrey heteroskedasticity test for heteroskedasticity, and the Ramsey RESET test for functional form specification.

Table 11: Diagnostics test on ARDL model

	F-statistics	Probability
Serial Correlation	2.179	0.1333
Heteroskedasticity	0.606	0.8185
Functional form specification	0.414	0.5254

Source: Author's computation

4.9 Stability Tests

The cumulative sum of recursive residuals (CUSUM) and cumulative sum of squares of recursive residuals (CUSUMSQ) plots were examined to check whether the model the long run multipliers of the model were stable. Figure 2 presents the CUSUM and CUSUMQ to appraise the parameter stability of the model.

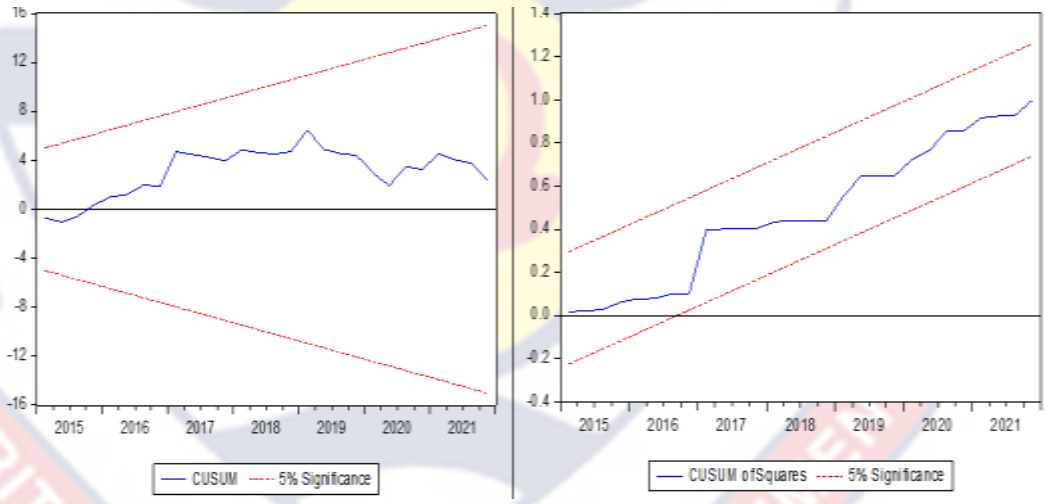

Figure 2: CUSUM and CUSUMQ for parameter stability

The plots of CUSUM and CUSUMQ for the estimated ARDL model. The plot suggests the absence of instability of the coefficients since the plots of all coefficients fall within the critical bounds at a 5 percent significance level. Thus, all the coefficients of the estimated model are stable throughout the study.

4.10 Chapter Summary

This study applied the ARDL estimation to model the relationship between ABFA, stabilization fund, and petroleum revenue and economic growth in Ghana. The other macroeconomic variables used as control variables included inflation, real exchange rate, capital, and labor. The study used quarterly data spanning from 2011 to 2021. The results indicated that ABFA, stabilization fund, and petroleum revenues have a positive and significant impact on economic growth in the long run. However, only ABFA had a positive and significant effect on economic growth in the short run.

CHAPTER FIVE

SUMMARY, CONCLUSIONS, AND RECOMMENDATIONS

5.0 Introduction

This chapter aims to summarise the conduct of the thesis, conclude the study and offer recommendations. Thus, this chapter entails concluding the findings and also providing policy recommendations. The chapter begins with a summary, conclusion, and outline of policy recommendations.

5.1 Summary of the study

The purpose of the study was to examine the effects of petroleum revenue on economic growth in Ghana.

Specifically, the study sought to;

i. Analyze the effect of ABFA on economic growth in Ghana.
ii. Analyze the effect of the stabilization fund on the economic growth in Ghana.
iii. Assess the effects of the total petroleum revenue on the economic growth in Ghana.

Drawing from the Solow Growth model and Paradox of Plenty to describe the relationship between petroleum revenue and economic growth, the empirical literature, on the other hand, indicated that studies have not focused on the effect of the components (ABFA and stabilization fund) of petroleum revenues on economic growth. Therefore, the study applied the ARDL estimator to model the relationship among ABFA, stabilization fund, total petroleum revenue, and economic growth. The quarterly time series data spanned from 2011 to 2021. The variables employed for the study were economic growth (measured with real GDP per capita) as the dependent

variable and ABFA, stabilization fund, petroleum revenue, real exchange rate, inflation, capital, and labor force as the independent variables.

5.2 Summary of the key findings

The results of the cointegration analysis showed the presence of a co-integrating relationship among economic growth, ABFA, stabilization fund, petroleum revenues, exchange rate, inflation, capital, and labor force. It was revealed that the variables were cointegrated.

It was revealed that ABFA expenditure has a positive and significant impact on economic growth in the long run. While in the short run, the current ABFA expenditure was also found to have a significant and positive effect on economic growth.

Furthermore, in both the long and short-run dynamics, the stabilization fund has a significant effect on economic growth. Specifically, the stabilization fund has positive implications for the expansion of the economy in the long run. However, in the short run, a negative impact was revealed.

In addition, total petroleum revenue only has a positive and significant effect on economic growth in the long run. However, this does not manifest in the short-run dynamics, as an insignificant effect of total petroleum revenue on economic growth was recorded.

5.3 Conclusions

The main aim of this research was to analyze the impact of petroleum revenue on the economic growth of Ghana. The findings from this research demonstrate that the objectives of the study have been achieved.

With regards to the ABFA, the study concludes that the revenue allocations of the ABFA to support priority capital spending and other economic

development activities enhance the growth of the economy. Thus, the ABFA improves the economic performance of Ghana.

In the case of the stabilization fund, the research concludes that the stabilization fund serves useful contingency purposes to support the budgetary spending of the government which have desirable implications for economic growth.

In terms of total petroleum revenues expenditure, it could be concluded that the various allocations of oil revenues into the various funds, as guided by the PRMA, do not have an immediate impact on the economy; however, the subsequent utilization of the revenues eventually boosts economic growth. Finally, it could be concluded that the resilience of the macroeconomy can promote the desirable implications of total petroleum revenues on economic growth. Hence, inflation, exchange rate, labor, and provision of capital were found to be cointegrated with petroleum revenues and economic growth.

5.4 Recommendations

From the evidence provided in this study, the following recommendations can be offered;

1. Revenue expenditure on capital spending from the ABFA should be increased by the government. Because not less than 75 percent of the ABFA funds is channeled to capital spending, increasing such quota for capital expenditure from the ABFA will bring desirable economic results.
2. In light of the purpose of the stabilization fund, the government should ensure that the stabilization funds are used prudently to ensure that the fund is continuously available to cushion the economy of Ghana in

times of shocks and unexpected decline in petroleum revenues, in other to support budgetary expenditure.

3. Given the beneficial impact of petroleum revenues in engineering economic growth, the government should invest in oil explorations and production to increase the sales of oil to accrue more petroleum revenues.
4. The government should strengthen the macroeconomy, by focusing on inflation, exchange rate, ensuring the quality of labor, and provision of capital, to enhance economic growth.

5.5 Suggestions for future research

Concerning the scope of this study, future studies have various areas to look at, as indicated below;

1. Follow on studies can investigate the individual effect of the other various components of the PRMA on economic growth.
2. Potential studies can analyze the role of exchange rate volatilities in the relationship between petroleum revenues and economic growth.
3. Further studies should examine the challenges of the PRMA in allocating petroleum revenues.

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