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ISTANBUL UNIVERSITY

GRADUATE SCHOOL OF SOCIAL SCIENCE

ENGLISH ECONOMICS DEPARTNMENT

MASTER THESIS

NATURAL RESOURCE AND ECONOMIC GROWTH IN SUB SAHARAN AFRICA: RESOURCE CURSE

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2504170024

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ISTANBUL, 2019

T.C.
İSTANBUL ÜNİVERSİTESİ
SOSYAL BİLİMLER ENSTİTÜSÜ

YÜKSEK LİSANS
TEZ ONAYI

ÖĞRENCİNİN;

Adı ve Soyadı	: KHAMIS HAJI DUNIA	**Numarası**	: 2504170024
Anabilim Dalı / Anasanat Dalı / Programı	: İNGİLİZCE-İKTİSAT	**Danışmanı**	: PROF. DR. MUHİTTİN KAPLAN
Tez Savunma Tarihi	: 22.07.2019	**Saati**	: 14.00
Tez Başlığı	: NATURAL RESOURCE AND ECONOMIC GROWTH IN SUB SAHARAN AFRICA: RESOURCE CURSE.		

TEZ SAVUNMA SINAVI, İÜ Lisansüstü Eğitim-Öğretim Yönetmeliği'nin **36. Maddesi** uyarınca yapılmış, sorulan sorulara alınan cevaplar sonunda adayın tezinin **KABULÜNE** OYBİRLİĞİ / ~~OYÇOKLUĞUYLA~~ karar verilmiştir.

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ABSTRACT

NATURAL RESOURCE AND ECONOMIC GROWTH IN SUB SAHARAN AFRICA: RESOURCE CURSE

KHAMIS HAJI DUNIA

Sub Saharan Africa is highly endowed with natural resources but its economic performance has always been poor and disappointing over the years, however the data shows significant economic improvement in the region from the beginning of the 21st century onward. The main objective of this study is to examine the impact of natural resource abundance on economic growth in SSA and whether the resource curse has been reversed or not in recent years by econometric analysis using panel data for twenty one SSA countries for the 1980-2016 period. The model of our study uses, economic growth for economic performance as the dependent variable, resource abundance, degree of trade openness, domestic investments, foreign direct investments (FDI), annual population growth rate and civil war (dummy) are used as independent variables. In order to examine the reversal of the curse in the region from 2000 onward, we first have to show the presence of the curse at the first place and that's why we decompose the time into sub periods of 1980-2000 and 2000-2016 in order to capture the impact of natural resource abundance in each sub period and observe any structural changes that led to this improvement of economic performance over the years. Furthermore, the improvement of economic performance in SSA from 2000 onward indicates the structural changes in the region and to determine these changes we use aggregate and disaggregate GDP and we decompose the disaggregate GDP into three main sectors which are, agricultural sector, industrial sector and services sector and understand how each sector is affected by the presence of resource abundance in SSA. The findings of this study show that the resource abundance has a negative impact on the economic growth for the 1980-2000 period suggesting the presence of resource curse in this period.

However, the results also show the positive relationship between natural resource abundance and economic growth for 2000-2016 period and in addition to that our findings indicates that industrial sector is positive related to the economic growth and this is because foreign direct investments (FDI) have been investing heavily in manufacturing sector and now the raw materials and other natural resources are used within the region instead of being exported and that's why they have been contributing positively to the economic growth in recent years. The sign of the sectoral changes in the region is the indication of the reversal of the curse from the beginning of 21st century in SSA. Overall the presence of natural resource abundance in this region has not been an important factor to the economic growth like one would expect but we expect this to change in the near future because of the signs of the curse reversal, new economic diversifications policies and new agreements like AfCFTA and the use monetary union like ECO.

Keywords: Resource curse, Sub Saharan Africa, Resource abundance, Economic growth, Aggregate and Disaggregate GDP, AfCFTA

PREFACE

The reason why I changed my career from engineering to economic simply because I want to understand how economic behave and how I will be able to help my country from long lasting poverty. From the beginning of my master education I started researching and learning the reasons behind poor economic growth of Africa despite being endowed by natural resources. The inspiration behind this study is just a desire to help my country in any way possible in eradicating poor standard of life. They study came to the picture because of this peculiar phenomenon of Resource curse, where resource rich-countries experiencing with disappointing and poor economic performance especially those in Sub Saharan Africa to compare with resource-poor countries whose economies performing better. This study is so paramount in a fight against poverty in Africa, because it will highlight the reasons behind the slow economic growth and will offer solutions on how to benefit from the minerals available in their countries and how they can improve human capital in Africa. The results of this study are interesting because its shows the presence of the Resource curse in the earlier years but from 2000 onward there is reversal of the curse signs, so this shows that African leaders are heading to the right directions with their economic and political policies.

ACKNOWLEDGEMENTS

First and foremost I would like to thank and praise Allah the Almighty for his continuous blessings throughout my research study and enabled me to finish my work successfully and in good condition.

Secondly, I would like express my deep and sincere gratitude to my research supervisor Prof. Dr. Muhittin Kaplan for his advices and guidance from the beginning of my research until the end of my work. I'm forever grateful for his vision, comments, wisdom and his sophisticated knowledge that made me finish my thesis and make this study as clear as possible today.

Thirdly, my gratitude goes to all my professors in Economic (English) department at Istanbul University for their immense knowledge, advices and continuous support throughout my master degree. On top of that my appreciation goes to all my class-mates for their knowledge and help throughout my time at Istanbul University.

Lastly but not the least I would like to express my special thanks to my parents for their endless prayers and their continuous support in all my life. I wouldn't have finished my research study without the motivations, comments and support from my beautiful wife Dr. Ummi-Thamrat Said who pushed me and brought the best out of me throughout my study, so the very special gratitude goes to her.

ISTANBUL, 2019

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GDP : Gross domestic product

SSA : Sub Saharan Africa

US : United States

DRC : Democratic Republic of Congo

CAR : Central Africa Republic

IMF : International Monetary Funds

EKC : Environmental Kuznets Curve

BP : British Petroleum

RE : Resource Endowment

RD : Resource Dependence

GNP : Gross National Product

WITS : World Integrated Trade Solution

OECD : Organization for Economic Co-operation and Development

FAO : Food and Agriculture organization

ECOWAS : Economic Community of West African States

AfCFTA : African Continental Free Trade Area

CHAPTER ONE

INTRODUCTION

1.1 Background

Historically Sub Saharan Africa and Africa as a whole has been a primary example of a natural resource abundant region that has been experiencing with slow and poor economic performance and associated with high level of corruption, civil war and rent seeking activities. The negative impact of natural resource on the economic growth is what referred to as **Resource Curse**. The poor structure and economic performance of Sub Saharan African countries is closely related to the two main historical events. First reason is slave trade which crippled African economies and had long term negative impact on the wellbeing of Africa until today. The second reason is colonialism which its main aim was to exploit the physical, human and economic resources of Africa and benefit the colonizing nation. These are the main reasons that altered the African economies fundamentally and until today this region is struggling economically because of that. African economic performance before slave trade and colonialism was not far behind the rest of the world, because African states were heavily involved in intra-African and international trades of gold under the leadership of the Mali Empire, Ghana Empire, Songhai Empire and era of Pharaoh in Egypt.

After the end of colonialism which is 1960s for many African nations Africa had to start over and reshaping its economic structures, and the economic performance of many African economies for the 1960-1980 period equaled to of many other areas of the world and annual GDP growth grew on average of 5%. For the 1980-2000 period many African economies collapsed because of external shock of oil price increase and growth reached to -2.49% and inflation reached a record high of 27.45%. Reasonable high economic growth was recorded from 2000-present and largely from the increase in price from their primary exports goods and growth increase by 6.67% and this growth rate was more than the rest of the world. This study intend to investigate the role of natural resource abundance on economic growth changes in each of these time periods and also examine how structural changes and sectoral composition changes such as agricultural, industrial and services impacted the economic performance changes over the years.

From the beginning of 21st century there has been a significant improvement of economy in SSA region, in 1999 the average GDP per capita in SSA was 567.864 US dollars and just about seventeen years later in 2017 the average GDP per capita of this region was 1,574.767 US dollars (World Bank) more than double, which is remarkable considering the history of SSA economic speed and this was achieved in a shorter period of time. This growth may not seem much in western countries standards, but when you look back in 1975 the average GDP per capita of SSA was 404.192 US dollars and twenty four years later in 1999 the GDP per capita grew less than double with only GDP per capita of 567.864 US dollars (World Bank). From these data, we can see a noticeable improvement of standard of living, education quality, governance and got international attention and attract foreign investors and developers. These economic and social development is what make many economists and politicians wonder and ask if the resource curse has been reversed and whether the changes in sectoral composition like agricultural,

industrial and services sectors have been the drive force for the improvement of economic performance in this part of the world.

A sizable literature has emerged examining the impact of natural resource abundance on the economic performance of resource-abundant countries. The existing empirical literature mainly focused on the impact of resource on growth at aggregate level, and most of their findings show the negative relationship between natural resource abundance and economic growth which is referred to as a resource curse and with a few exceptional studies that found positive relationship. Some of the theories that were explained in the current literature on what could be the reasons for the success of resource-rich countries like Botswana and failure of other resource-rich countries like Sierra Leone even though they are both rich in diamond are: *(i)* The Dutch Disease, *(ii)* Rent seeking, *(iii)* Institutional quality, *(iv)* Volatility of commodity prices, *(v)* Economic mismanagement, *(vi)* Resources depletion theory and *(vii)* The drag resource theory. Although there is sizable literature on the impact of natural resource abundance on economic growth, Sub Saharan Africa specifically has not been investigated much, and the current literature has not examined the impact of natural resource abundance on disaggregated growth level and changes in sectoral composition.

Figure 1 illustrates the relationship between Natural resource (% GDP) and an annual growth of GDP per capita for a cross-section of countries. The share of natural capital in national wealth as a fraction of GDP appear on the horizontal axis and an Annual growth of GDP per capita as a fraction of economic growth on the vertical axis. The relationship on average is negative, the correlation suggests there is no positive correlation between natural resource wealth and economic growth, which is referred to as a resource curse.

Resources-poor countries like Asia tigers which includes South Korean, Singapore, Hong Kong and Taiwan are performing much better without natural resources other things remain constant to compare with those resources-rich like Kuwait, United Arab Emirates, Congo, Zambia, Gabon, Sierra Leone and Venezuela which perform poorly despite having abundance of natural resources.

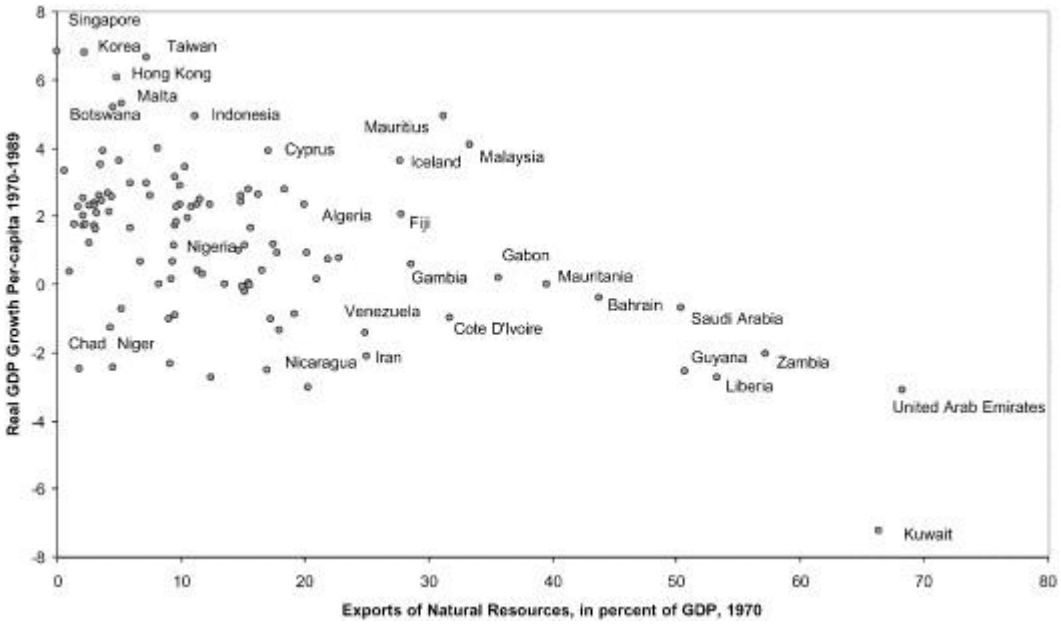

Figure 1: Natural Resource abundance and growth

Source: Sachs and Warner (2001)

1.2 The Research Objectives

The overall objective of this study is to empirically investigate the relationship between natural resources abundance and economic growth in Sub Saharan Africa and examine whether the curse has been reversed or not in recent years by using panel data from twenty one SSA countries for the 1980-2016 period. But also in this study we are going to examine how other determinants of growth like trade openness, foreign direct investments, gross fixed capital formation, population growth and civil war impact the economic performance of SSA. From the beginning of 21st century SSA has been experiencing with noticeable economic growth where the average growth recorded higher than other areas of the world which was not the case for the 1980-2000 period when SSA average growth recorded lower than that of the rest of the world. To understand these economic changes in a relationship with natural resource abundance we divide our analysis into 1980-2000 and 2000-2016 sub periods and also to understand how structural changes have affected growth, we use both aggregate and disaggregate GDP to highlight the changes in sectoral compositions.

An important aspect of this study is that it provides the investigation of natural resource abundance on aggregate economic growth level in each time period and also the effect of natural resource abundance in each sectoral composition changes that is disaggregated growth that is GDP composition in agricultural, industrial and services sector.

1.3 Methodology of the Research

In this study we test the hypothesis using econometric analysis of the panel data from twenty one Sub Saharan African economies for the 1980-2016 period. To estimate what impact natural resource abundance has on economic growth over the years we decompose time period into two sub periods: That is 1980-2000 and 2000-2016 so that we get full knowledge on what role natural resource abundance has played on economic performance on each of this time period. And to understand the reasons on why the economic growth has been behaving differently in each of these time period, we focus on the structural changes that have been happening in the region and to achieve that we examine the impact of natural resource on both aggregate and disaggregate economic growth. For the aggregate growth we use real GDP per capita annual growth rate for each time period and for disaggregate growth rate we decompose GDP into three main sectors which are agricultural, industrial and services sector and we use real value added per capita by agricultural, industrial and services sector also for each time period, the details for these estimations are provided in chapter 4. Also we use other economic growth determinants such as trade openness, foreign direct investments, domestic investment, population growth rate and civil war (dummy) to control for the regressions.

To estimate our regressions we use two methods as mentioned above for both aggregate and disaggregate growth equations (6&7) and we first estimate the relationship between resource abundance and growth rate for the 1980-2000 period, for the 2000-2016 period and for the 1980-2016 overall period. After estimating for aggregate growth we then repeat the same regressions except now we use disaggregated growth and examine how each sectoral changes impact the role of resource abundance on the growth rate.

1.4 Significance of the Study

This study gives significant theoretical and empirical contribution to the existing body of research knowledge. The first empirical contribution this study is adding to the literature is Sub Saharan Africa as our target population, because the most of the current literature has investigated the impact of resource abundance on economic growth for developing countries which is a broad area of investigation, so this study will narrow it down for specific Sub SSA since this region has not been examined much. Second empirical contribution is the time period covered in this study, existing research knowledge has not focused much in recent year's economic growth that's why we decompose into two sub periods: 1980-2000 and 2000-2016 periods in order to catch the effect of resource abundance for recent and early years and also to capture the overall impact of natural resource abundance on economic performance over the years in SSA. Third empirical contribution probably the most important one is the use of both aggregate and disaggregate GDP growth in the study, we have seen a lot of previous studies on resource abundance and economic growth and to our knowledge we have not seen any study that focuses on the changes in sectoral composition, the reason why we use disaggregate GDP is simply because we want to examine how sectoral changes like agricultural, industrial and services sectors have impacted the role of natural resource abundance on economic performance over the years. Another important contribution will be the use of new variables such as presence of civil war in the region and how it impacted the growth rate which has not been investigated much in the literature.

This study is important to the literature because it specific investigates the resource curse phenomena in SSA region and since the beginning of the 21st century there has been significant economic growth in this region which make a ground for further and deep investigation of this noticeable growth rate. Countries like Ethiopia, Ivory Coast, Rwanda, Senegal Djibouti, Tanzania, Ghana, Burkina Faso, Benin and Niger have been among the fast growing economies in Africa (IMF, 2018). The remarkable economic growth in Sub Saharan Africa in recent years make many economists to question whether the famous and notorious notion of Resource Curse has been reversed or not in this region.

The findings of this study will have a significant contributions to the literature and will answer the above question on whether the curse has been reversed or not in this part of the world in recent years, not only that the findings will also impact the researcher's approaches on their future researches on this subject. In addition to that policy makers will use these findings to evaluate their approaches on the management of their natural resource revenue and how structural changes can be used effectively and impact growth positively.

1.5 Organization of Study

The rest of this study is organized as follows: Chapter 2 reviews the literature on the relationship between natural resource abundance and economic growth which includes introduction of the chapter in section 2.1, section 2.2 we discuss economic growth theory and section 2.3 discusses all the resource curse theories which explain the theoretical findings of the previous studies which are Dutch disease, rent seeking, commodity price volatility, institutional quality, economic mismanagement theory, resource depletion theory and resource drag theory. Section 2.4 points some of the empirical findings of the previous studies, the methods used and their findings.

Chapter 3 illustrates the economic performance of Sub Saharan African economies over the years and introduction of the chapter is explained in section 3.1. Section 3.2 give a great length on the Sub Saharan Africa region, and economic performance of Africa before slave trade and colonialism is discussed in section 3.3 and the impacts of salve trade and colonialism are discussed in section 3.4 and 3.5 respectively. Section 3.6 focuses on the economic performance of Africa after the Colonialism and section 3.7 describes the sources of wealth for Africa and later discuss the trade in African nations. Chapter 4 provides empirical analysis of the study and section 4.1 is introduction of model and data , regression model is explained in section 4.2 and all the data and variables of the study are defined and explained in detail in section 4.3, section 4.4 presents all the findings of the study and interpretations of the coefficients. And final section is conclusion of our study where scope of the study, limitations of the study, policy recommendations and further research will be discussed.

CHAPTER TWO

A REVIEW OF THE LITERATURE ON RESOURCE CURSE

2.1 Introduction

The aim of this chapter is to provide further details on the existing knowledge of the Resource curse phenomena and understand how these studies investigated the impact of natural resources abundance on economic performance. In this chapter we are going to examine the existing theoretical and empirical theories that led to the resource curse, types of methodologies they used which include the models, variables used, data types used, time frames covered and the target populations used in the existing literature and how they are linked to our study so that we understand what exactly is missing in the literature and how this study will contribute to the existing knowledge on the effect of natural resource abundance on economic performance.

This chapter is important because it gives review of both empirical and theoretical existing literature, in this chapter we also discuss the limitations of the existing literature and the criticism of the current theories. Literature will help us determining the best methodologies for this study and show the relevance of our study problem to the current literature. Our research will be able to close the knowledge gap between existing literature and what is missing to the literature.

In this chapter the literature is divided into three subsections, the first section gives the existing literature on the economic growth models the second section explains the theoretical findings of the existing researches which point out all the theories of the resource curse phenomena.

And the third section of this chapter explains the empirical findings in the current literature which mentions all the methodologies used and the findings of the previous studies on the impact of natural resource abundance on the economic performance.

The rest of this chapter is organized as follow: section 2.2 gives details on the existing literature of the economic growth theory and the factors affecting it, section 2.3 explains the existing theories on the resource curse and last section 2.4 mentions the empirical findings of the previous studies that investigate the effect of resource abundance on economic growth.

2.2 Economic Growth Theories

Robert Solow growth model (1956) is an Exogenous Neoclassical model which consider external factors to predict the economic growth. Solow model suggested that without any technological progress which is determined by the external factors, economic growth cannot be achieved and emphasized that economic growth rate in the long run does not depends on the rate of savings and labor force but rather it is the technological progress that brings a persistent increase in per capita output. Solow model framework includes: production technology with constant return to scale, savings as a constant fraction of output and substitutability between labor and capital, so with all these assumptions Solow concluded that there will be no growth increase in per capita output in the long run until technological progress enters the scenario and with labor augmenting technological progress, productivity of labor rises which shifts the production function upwards and results is an increase in per capita output.

Hence the growth of per capita income can only come from the technological progress that is exogenous and unexplainable by the model.

Solow economic growth model:

$$Y = F(K, AL) \quad (1)$$

Where Y denotes GDP growth which depends on the exogenous factor technology denoted by letter A and it's a labor augmenting factor, meaning that technological progress is always associated with labor efficiency in the long run, labor force L by which the more educated people are, the more productive their labors are, capital K which include human capital and physical capita that includes machines and tools, factories and highways. In a Solow model when investments increase capital per labor ratio will also increase and as a result the output per labor will eventually increase. And when population rate increase capital per labor will decrease and as a result out per labor will also decrease in the long run. The influential paper published by in 1991 titled "A Contribution of the Empirics of Economic Growth" of Gregory Mankiw, David Romer and David Weil that evaluated the empirical implications of the Solow model and concluded that the theory performed very well and suggested that it could be improved even more by extending the model to include human capital. They recognized labors in different economies may present different work experience, skills and education level (Charles I. Jones, 2013). Solow growth model provided an important cornerstone for understanding why some countries flourish while other impoverished (Charles I. Jones, 2013).

The weakness of Solow economic growth model is that technological progress has been assumed to be exogenous, it implies that investments and other factors cannot bring an improvement in technology, it's unrealistic as the investment in human capital generates new ideas which is an important source of technological progress, Research and Development (R&D), education and innovations.

Due to the weakness of Solow model new economic growth model emerged which is Endogenous growth theory (1980s) which argues that economic growth is generated from within a system as a direct results of internal processes rather than external. The endogenous growth model emphasizes on investment in human capital as the only source of long run growth and technological progress is endogenous as it improves through learning by doing, investments in education, investment in Research and Development (R&D) and investment in other forms of human capital. In endogenous growth model permanent government policies changes will affect economic growth rate permanently in a long run. One of the simplest endogenous model is AK model that allows for endogenous growth in a sense that government policies can influence the long run growth rate. Under AK model- without technological progress, with just the help of human capital, economic growth can be achieved (Charles I. Jones, 2013).

Here we explain the linkage between resource curse theories and economic growth models. According to the Solow's growth model equation (1) GDP will increase when labor force and capital increase in the long run, and in the resource abundant countries, the booming sector always crowd outs other sectors because all the focus will be in the resource sector by attracting more labors and capital, as a results the manufacturing sector will decline by having few labor force and less capital and hence GDP of that country will decrease and this is known as the Dutch disease theory.

Another cause of resource curse is the rent seeking activities in the resource-rich countries where only small elite group benefit from the revenues generated by the resource rents as a result only small amount of capital will be available for economic sectors and production sectors and according to the equation (1) the less the capital the less the production and hence economic growth will eventually stagnate and decline and this happen because of the poor institutional quality that fail to control for corruption in these countries in the long run.

Moreover poor human capital investments, poor R&D investments and poor educational policy lead to the inferior and slow technological progress which is the essential for the increase in output production according to the endogenous economic growth theory equation (1), so economic mismanagement will lead to the GDP decrease of a country because of the poor allocation of the resources. Also volatility in commodity prices increase uncertainty to the economies, which results decrease in investments and hence low capital in the production and as we have seen from Solow's model, when capital decrease so does production. In addition to the above resource curse theories we also have resource depletion and declining of the resource sector will lead to the drag of the economies and this is because when a resource declines or a certain resource sector declines, even the labors and capital toward these sectors will decline too and eventually GDP will decrease as results of the low production and demand.

2.3 Theoretical Review on Resource Curse

The purpose of this section is to point out all the existing theories of the resource curse phenomena. The resource curse theory is defined as the phenomena in which the countries with natural resource abundance experience with stagnant economic performance. In practice the resource curse theory is a complex phenomenon, because there are countries that are endowed with natural resources and their economies perform well and there are other resource-poor countries and their economies are better than those with natural resources other things remaining the same.

In this section all the existing resource curse theories that explain the causes of this peculiar phenomena will be explained in details, how they cause the natural resource to be a curse instead of being a drive force of the economic growth, their criticisms and limitations are also mentioned. The existing resources curse theories includes Dutch disease, rent seeking, commodity prices volatility, institutional quality, economic mismanagement, resource drag theory and resource depletion theory.

2.3.1 Dutch Disease

The origin of the Dutch Disease goes back to the late 1950s when Netherlands discovered the natural gas which led to the booming of the gas export and the appreciation of the Dutch currency (guilder) as a result of this boom, the inflation in Netherlands has increased and in turn reduced international competitiveness and profitability of manufacturing and service sectors (Thorvaldur Gylfason, 2001).

Dutch Disease was reviewed when Sachs and Warner (1995) study statistically confirmed the negative correlation between abundance of natural resources and economic growth and the findings of Sachs and Warner (1995) led to resource curse theory.

The Dutch Disease is an economic term, referring to a coexistence of booming sector and lagging sub-sectors of traded goods in the economy. Booming sector pressures the lagging one by pulling the resources from the later one, and causing the rise of relative price of non-traded goods (Corden & Neary, 1982). Sachs & Warner's model based on crowding-out logic (Dina Akylbekova, 2015).

Natural resources production naturally crowds-out growth-generating sectors of the economy. The Dutch Disease model (Sachs & Warner, 1995, 1999, 2001) defines growth-generating sector as manufacturing. According to Corden & Neary (1982) in the Dutch disease model the economy has three sectors: a tradable natural resources sector, a tradable manufacturing sector and a non-traded sector which includes services. Only manufacturing and non-traded sectors use capital and labor. In resource abundant economies, tradable production is allocated within the natural resources sector, and capital and labor are used in non-traded sector. The manufacturing sector tends to decline as a result of natural resource sector booming, while non-traded sector expands. Increased revenues from the resource rents lead to excess demand for non-traded goods (services) and hence non-traded goods prices increase. Non-traded goods are used as inputs in manufacturing sector, thus higher prices for inputs in combination with fixed international prices lead to lower profits in manufacturing sector (Akylbekova, 2015) and eventually the decline in manufacturing sector suppress the economic growth. The appreciation of the resource abundant currencies make everything in the countries become expensive and that include the higher price level for non-tradable sectors and since non-tradable sector is the inputs of the manufacturing sector as a result this sector will be using expensive domestic inputs as a result selling outputs with high price in international markets and losing its competitiveness.

Consequently, manufacturing sectors fail to develop, while non-tradable sectors continue to expand (Sachs & Warner, 1997) and for that reason the export products in natural resource-rich countries always collapse because of appreciation of the currency that lead to the high price of the export products.

Despite the fact that the Dutch disease theory is the most used theory used to explain the resource curse phenomena, it has its limitations by suggesting the presence of negative relationship between economic performance and natural resource regardless of the other factors and hence this theory fails to explain cases such as Norway, Botswana, Australia and others resource-rich countries that are benefiting from the resource rents and managed to escape from the Resource Curse. The failure of Dutch disease theory to explain on why other resource abundant countries are benefiting from the resources shows the weakness of the model because it cannot explain the existence of important pre-conditions that cause the curse. These important pre-conditions might include either the quality of institutions, the structure of economy or something else (Dina Akylbekova, 2015).

2.3.2 Rent Seeking

Another important existing theory that explains the cause of resource curse in the resource abundant countries especially those developing ones is the rent-seeking which is defined as the use of a corporation, association or a population's resources to generate personal gain, without contributing to society's development through wealth creation. The concept refers to all the activities that harm the political and institutional stability such as corruption. People seek political rents when they try to obtain benefits for themselves through their political influence.

The rent-seeking has proved to be an underlying cause of the resource curse. The idea of rent-seeking has a long history in economics dating back during slavery days when local slave traders were seeking for the rents and selling other people to the Europeans, section 3.4 point out this as an impact of slave trade on the economic growth of Africa and seminal work of Tullock (1967) and later Anne Krueger (1974) introduced the label for it. Gylfason (2001), Limi (2007), Deacon and Rode (2012), argue that in some countries, the windfall of resource revenues increases the power of elites who have the capacity to widen income inequalities. Instead of investing the resource rents to upgrade infrastructure and sustainable economic development for all, the elites or powerful groups generally take a large share of these revenues and distribute it for the benefit of their immediate circles (Clark et al, 2016). Windfall resource revenues are also considered a main cause for conflict between elite group such as politicians, local tribes, and citizens which leads to the civil war resulting a poor economic performance (Davis and Tilton, 2005; Limi, 2007).

The Rent-seeking theory is different from the Dutch disease because it explain the phenomena of the resource curse by the distribution struggle of profit generated from natural resources in resource abundant countries, as power groups try to distribute the rents for themselves and their inner circle. A classic example of the rent-seeking activities is a corporation or a group of people that influence the government or public officials to obtain tariff protection, loan subsidies or grants. The same phenomena is observed when the company in charge of a resource extraction seeks restriction on imports of the given resource. While such activities generate financial profits to the company, they present no advantage to the society, taxpayers in particular.

The practices of rent-seeking put the resource revenues in the hands of a small group of people and thus, making it difficult for the governments to ensure the general welfare of their populations. To protect their profits from taxation, powerful groups allocate their profit in the shadow sector, which has lower rate of return. The official sector has high returns, and countries with powerful groups respond to increased revenues by high fiscal spending and slower economic growth. Rent seeking activities can only benefit few people in the country, and since government don't get the rents from the natural resources available in the country, economic growth retards and inequality distribution of income rise among the people.

The justification of the resource curse by rent-seeking makes sense. However, the problem is that the rent-seeking model is a political causal channel that depends on the institutions of the particular country. In rent seeking model, quality of institutions are the determining factors of the rent seeking activities in the resource abundant countries. Thus, resource curse is determined by the institutional quality rather than the rent seeking per se (Akylbekova, 2015).

2.3.3 Volatility in Commodity Price

Another theory through which the resource curse may operate is the volatile nature of natural resources prices in global markets. When the price of natural resources keep changing in the world market, the market for these resource becomes unstable and uncertainty increase which pose a huge problem to the resource abundant countries because uncertainty prevent effective planning for the economic development (Clark et al. 2016). Volatility nature in commodity prices shrinks government revenues and foreign exchange earnings, reducing nations' abilities to meet the conditions required for expansionary monetary policy when it would otherwise be beneficial Davis and Tilton (2005).

Commodity prices goes through huge swings, and since many resource rich economies in SSA are highly dependent on natural resources revenues, these changes in natural resources prices affect their earnings and slow down the growth of the countries. The best real life example of volatility in commodity price is the oil crisis of 1973 that affected the barrel price in the following year (1974), with an increase from the initial price of 3 dollars to 12 dollars. In 1986, the inverse trend was observed, with a decline in the barrel price from 27 dollars to less than 10 dollars. So this volatility of the oil prices will affect more the oil dependent countries like Venezuela, Nigeria and Saudi Arabia, and we have seem quite frequently how Venezuela struggles even more when the oil price declines.

According to Humphreys et al. (2007) international borrowing can intensify the magnitude and effect of the volatility nature of the natural resource because when commodity prices are high, natural resource abundant economies borrow plenty of money from abroad expecting to pay the debts when they receive their revenues from selling their resources, but then when price fall, they get less revenues than they expected as a result they default on their debts, thus increase the magnitude of downturns. This response pushed many resource rich countries into debt crises in the 1980's (Van der Ploeg, 2011). Commodity prices goes through huge swings, and since many resource rich economies in SSA are highly dependent on natural resources revenue, this endanger these countries for engaging in excessive borrowing which eventually harm the their economies and slow down the growth. Commodity prices goes through huge swings, and since many resource rich economies in SSA are highly dependent on natural resources revenue, this endanger their economies for engaging in excessive borrowing which eventually harm the country and slow down their growth (Van der Ploeg, 2007).

Volatility in commodity price is another theory that suggests the reason for the resource curse in the resources-rich countries and why there is a negative relationship between natural resources and economic growth, and that's why economist suggest the policy of diversification of country's economy to different sectors. Recent example is Saudi vision 2030 is a plan to reduce Saudi Arabia's dependence on oil, diversify its economy, and develop public service sectors such as health, education, infrastructure, recreation and tourism. Saudi will not solely be depending on oil sector, other sectors of economies will be source of their national income by understanding the danger of the volatility nature of the oil price to their economy.

2.3.4 Institutional Quality

Natural resource abundant countries always experience slow and poor economic performance, high level of corruption and civil war (Auty, 1993). This happen most in the developing countries like those in SSA region because of bad institutional quality, which includes poor anticorruption policy, unaccountability in the public sector, poor government effectiveness which cause the increase of rent seeking activities in the country where few elite group benefit from the resources revenues and eventually lead to the civil war over the fight of who control and benefit from these resources that available in the country, as a result the resources turned into curse and hence stagnate the economic growth in the region. Combination of bad properties rights and imperfect markets and poorly functioning legal system can contribute to the poor economic performance.

The institutional quality role in determining how natural resources affect economic growth has been a divergence point in the resource curse literature. Literature emphasizes that it is the quality of institutions that determines whether resource rents pose a resource curse or blessing to the resource abundant countries (Clark et al. 2016).

The main findings of the study by Mehlum et al. (2006) is that the mix of weak institutions and natural resource abundance causes the resource curse and natural resources abundance does hinder economic growth only in countries with grabber friendly institutions, while countries with producer friendly institutions are not affected by resource curse.

The rent-seeking model assumes that institutions may decrease or even prevent rent-seeking from harming the economy, but the model fails to incorporate institutions into the analysis thus it is unclear whatever the rent-seeking or the quality of institutions determine the economic performance of resource abundant countries. Comparing to the Dutch disease model both the rent-seeking and institutions models do reject the idea of unconditional negative correlation between natural resources abundance and economic growth (Akylbekova, 2015).

The reasons why Botswana and Norway have escaped from the resource curse and enjoy the natural resources rents is because they have superior institutional quality, they have good anticorruption policy, there is voice accountability in the public sector, political leaders and citizens respect the rule of law and the presence of properties rights, all these characteristics make their institutions to be superior and effective in the economic growth. While countries with inferior institutions such as Nigeria, Venezuela, Mexico and Congo have worse economic performance comparing to Botswana and Norway.

2.3.5 Economic Mismanagement

Policymakers may fill with overconfidence in their economies when they receive plenty of revenues from natural resources rents (Limi, 2007). Governments of resource abundant economies may relieve pressures regarding tax collection because of having ready revenues from the resource rents and the need for fiscal discipline and governments may exploit this reduced constraint on expenditures or reduced need to impose non-resource taxes to offset pressures they would otherwise face for political reforms (Clark et al., 2016). "Some curse skeptics might argue that a government differently minded might precisely use resource rents to invest in needed infrastructure, or use resource rent windfalls to ease the implementation of needed political reforms in Pareto improving ways that compensate losers" (Ramez Banded et al., 2016).

Natural resource dependency may also decrease people's motivations on working hard and stop being creative and innovative for the development of their country because they earn high level of wages from the booming natural resource sector and empirical findings show that school enrollment in all level is negative related to the resource dependence (Gylfason et al., 1999) and also public expenditure on education relative to national income is inversely related to natural capital (Gylfason, 2001) that's how economic mismanagement can lead to the resource curse for the resource-rich countries.

2.3.6 Natural Resources Depletion

Declining of natural resources in the resource abundant countries has been one of the reason that lead to the resource curse phenomena. This is due to the highly dependence of natural resources revenue for the development of their countries, so when resources decline causes the decline of their income and as so their economic growth. Recent literature with the analysis of environmental Kuznets curves (EKC), the hypothesis that there exist an "inverted U" shaped relationship between resource depletion and level of per capita income. This explains that as per capita income increases, environmental degradation rises initially but then eventually declines (Edward B. Barbier, 2002).

Resources are depleted when it is being used faster than it can replenish itself. This all began during the industrial revolution, as our culture advanced and our species invented many things that will make our lives easier, our demand for raw materials increased by leaps and bounds. We get these resources from the other. The problem is, we're using too much and without care. Our planet just can't keep up with our ever increasing demands. There are various causes of resources depletion which includes, overpopulation, with 7 billion people on the planet earth, the demand on Earth's resources continue to increase. Overconsumption is another reason because of the excessive and unnecessary use of resources like deforestation and destruction of the ecosystems leading to loss of biodiversity. The technological and industrial development, erosion, pollution and contamination of resources will cause the decline of resources. Coal is the most used fossil fuel and a non-renewable energy source. Peak coal extraction is predicted between 2025 and 2048. In 2011, it was estimated that we have enough coal to meet global demands for 188 years.

If the demand increases, the timeframe will decrease. Without oil, global transportation will be severely debilitated. The BP Statistical Review of World Energy estimates that there is 188.8 million tons of oil left in the known oil reserves as of 2010, from this statistical country like Nigeria, Venezuela and Saudi Arabia are affecting more, because their income will drop as oil reserve decline, because their economies depends on the oil extraction. If our current demand continues, this oil will only be enough to supply the world demands for the next 46.2 years. As of 2010, the known reserves of natural gas was estimated to last 58.6 years with the current global production. Fishermen from a lot of coastal provinces report a decline in their catch. Other marine species such as the tuna is close to extinction due to overfishing.

Unless resource abundant countries change their approach and management on the natural resources by diversifying their economies on to other sectors like manufacturing sector, they will be at risk of resource curse because what they depend on getting their income from is slowly declining and this will slow stagnate the economic growth in their countries.

2.3.7 Resource Drag Theory

Resource drag attributes to the slow growth in the economy to a sluggish resource sector because of the declining of resource consumptions in a long term. Resource drag may cause the resource curse in a long run when natural resource business is turning into technology and some countries are closing fossil-fuel power and shifting policy towards a cleaner energy sources. A recent analysis of the global coal industry by the international Energy Agency highlights the growing number of countries adopting climate policy goals that facilitate the move away from coal, so when this happen the resource abundant countries that depend on coal will pay the heavy prices because of the declining consumption on coal and may cause the resource curse eventually.

And data shows that demands for coal in North America and Europe will decline as they adopt the new anti-pollution policies, so when this happen it will drag the economic growth for the coal dependent economies. And being endowed with coal will not be beneficial anymore because there will be no market for it. New data have emerged and show that for the first time ever, renewables are bigger contributor to Unites States of America (USA) energy than coal. Solar, wind and hydroelectric plants surpassed American coal in April 2019 (Bloomberg business, 2019). According to Graham Davis most resource prices have been declining over a period of 1970-2010, when resource prices fall because of the declining industry for that particular resource, so does resource output and so does the economic growth.

Graham Davis (2011) undertakes an empirical work and points out that the relatively slower growth in mineral and energy economies may suggest a resource drag, where optimally managed per capita resource production does not grow substantially over time. This introduces a drag on the measured growth of per capita economic output. Making use of statistical tools, Davis (2011) was the first to test the hypothesis established by Sachs and Warner (1995).

After controlling for changes in mineral production, Davis found that booming mineral and energy economies grow faster than they otherwise would. Simultaneously, busting mineral and energy economies grow slower than they otherwise would.

2.4 Review of the Empirical Studies on Resource Curse

There is a vast empirical literature on the relationship between natural resources and economic growth and some explaining the negative impact of natural resource on the economic growth which is referred as resource curse and others explain the positive impact on natural resources on growth. The term natural resource curse was defined as "the adverse effects of a country's natural resource wealth on its economic, social, or political well-being." (Michael L. Ross 2014). But what are 'natural resources'? Different definitions have been offered and in the earlier writings (Sachs and Warner 1995; Collier and Hoeffler 1998) include not only petroleum and other minerals but also agricultural commodities. Agricultural commodities were excluded in the recent literature since they are produced, not extracted, and hence fail to meet standard definitions of natural resources (Mehrdad, V., 2017).

We are going to classify the current empirical studies on impact of natural resource on economic growth according to their findings and conclusions, data used in the studies, methods they used, model they estimated, variables they used, time periods they covered and the target population they used.

The phenomena was empirically confirmed by the series of works undertaken by Sachs and Warner (1995, 1997, 1999 and 2001) by the means of cross-sectional studies. In the early series of works undertaken by Sachs and Warner (1995, 1997, and 1999) used 95 developing countries with high ratio of natural resources exports to GDP in 1970 as (the base year) for 20 years for the 1970-1990 period. They used real growth per person as a dependent variable and natural resource abundance measured as of natural resource exports as share of GDP as independent variable and trade openness, investment, rule of law, terms of trade, initial per capita income, trade policy, investment rates and government efficiency as control variables in their regression model. Their findings were connecting negative relationship between natural resources and economic growth.

Economies with a high ratio of natural resource exports to GDP in 1971 also tended to have low growth rates during the subsequent of 1971-89 period (Sachs and Warner 1995). But in the later study of Sachs and Warner (2001) added geography variables like % land within 100km coast, km to closet major port and % land in geographical tropics in their regression in order to capture the omitted variables in their previous works and their findings were still the same that, there is negative relations between natural resource abundance and economic growth.

While the early empirical findings are attributed to Sachs and Warner the term "resource curse" was first coined by British economist Richard M. Auty who was addressing how the countries with natural resources abundant usually experience slow and poor economic growth with high corruption and violence to compare with other resource-deficient countries. In Richard M. Auty (1998) study found that since 1960s there were disappointing economic growth of resource-abundance countries. The study identified two models; the staple trap model which traces a closure to a trade policy that heightens the specialization of the economy on the resource sector and leads to the depletion in investment efficiency and second model was the sequenced industrialization model.

After the work of (Sachs and Warner, 1995) to open the door for further studies on resource curse, many other studies emerged and followed their footsteps and that include Ding and Field (2004) who explored whether natural resource abundance leads to slower rates of economic growth by distinguishing between natural resource dependence (RD) and natural resource endowment (RE). Their study used Sachs and Warner country data, but used capital stock data from World Bank for the 1970- 1990 period. The study used annual GDP per capita growth as their dependent variable, and independent variables used; initial GDP, investment, trade openness, rule of law, terms of trade, resource dependence (RD) and resource endowment (RE).

The results showed that while resource dependence has a negative effect on economic growth rates, confirming the main findings of the natural resource curse literature which was the same as that of Sachs and Warner (1995), and mentioned that natural resource endowment had a positive impact on growth. Conclusively, the impacts of natural resources on growth disappear when resource dependence and resource abundance enter into one equation.

Mehlum et al. (2006) study also revisited Sachs and Warner (1997b) study and used their data and methodology, they used 87 countries as their sample target for the 1965-1990 period. Dependent variable used was average growth rate of real GDP per capita and explanatory variables are: initial income level expressed as the log of GDP per head of the economically active population in 1965, trade openness, resource abundance as the share of primary exports in GNP in 1970, investments as the average ratio of real gross domestic investments over GDP, and finally added institutional quality to the model which is an index ranging from zero to unity.

The institutional quality index is an unweighted average of five indexes based on data from Political Risk Services: a rule of law index, a bureaucratic quality index, a corruption in government index, a risk of expropriation index and a government repudiation of contracts index. Their findings were when institutions are “grabber friendly” resources push aggregate income down, while resources under “producer friendly” institutions raise income. Mehlum at el. (2006) emphasized on the importance of institutional quality and institutions are the determining factor of the resource curse.

After the work of Mehlum at el. (2006) introduced the institutional quality being the determining factor of whether the natural resource pose as curse or blessing. Boschini, Pettersson and Roine (2007) also proposed that the extent to which natural resources are good or bad for growth depends on two dimensions. First, natural resources do not, by themselves harm growth just like what Ding and Field (2004) pointed out, but become a problem in the absence of good institutions and second, for some types of resources this problem is bigger than for others. Both studies find empirical support for the basic idea that resources can have positive effects on growth depending on institutional quality.

In the existing literature, there are studies that based their investigations on the specified country and some of them is Atsushi Limi (2006) who investigated how Botswana escaped the resource curse, study cross-countries with both developing and high income economies, data from 1980-2002 time periods. Real GDP per capita growth rate used as dependent variable, mineral resource abundance, governance indicator which include; voice and accountability, control of corruption policy, political stability, government effectiveness, quality of regulation and rule of law. Another explanatory variables are population growth rate, average tax rate and degree of trade openness. Their findings were in developing countries in particular, the quality of regulation, such as the predictability of changes of regulations, and anticorruption policies, such as transparency and accountability in the public sector, are most important for effective natural resource management and growth. Atsushi also used Voice and accountability, political stability, government effectiveness and control of corruption in his model to understand how these variables play the role on economic growth in the presence of abundant natural resources.

Limi found out that, the interaction terms between resource abundance and governance have significant positive coefficients, meaning that if the country has good governance, particularly in terms of voice and accountability, government effectiveness, the quality of regulation, and anticorruption policies, resource wealth is conducive to economic development. Because this result is statistically robust, it can be concluded that resource abundance does not guarantee faster growth, but with proper government resource management, growth can be generated from resource richness similar findings to that of Mehlum et al. (2006) and Boschini et al. (2007). In other words, the absence of the positive relationship between resource abundance and economic development is attributable to a lack of good governance.

Another country based research is Malik et al (2009) study examining natural resource abundance and economic growth in Pakistan using the time series data for the 1975-2006 period. This study used real GDP of Pakistan as economic growth as dependent variable, and for explanatory variables agricultural, fuel and mineral as percentage of GDP have been taken as a proxy for natural resource abundance. The other type of variables used as explanatory are expenditures on health and education as a percentage of GDP. The last one consists of inflation rate, trade openness and investment as a percentage of GDP. The findings are there is an adverse nexus between exports related natural resources as ratio of GDP and economic growth.

Another previous study that explained in depth the Resource curse phenomena and how natural resources impact the economic performance on resource-endowed countries is Frankel (2010) that explained what could be the reasons of the curse which included long-term trends in world commodity prices, volatility, crowding out of manufacturing, civil war, poor institutions, and the Dutch disease. His conclusion was, firstly, high commodity price volatility will impose risks and high transaction cost that will affect economic development. Secondly specialization in natural resources can be detrimental if its crowds out manufacturing sector that will cause the negative impact on the economy. Thirdly presence of natural resources may cause civil war as we have seen time after time, country like Sierra Leone and Congo which hinder the economic growth. Fourthly endowments of "point source" commodities (oil and minerals and some crops) can lead to poor institutions, such as corruption, inequality, class structure, chronic power struggles, and absence of rule of law and property rights. Natural resource wealth can also inhibit the development of democracy, though there is not good evidence that democracy per se (as opposed to openness, economic freedom, decentralization of decision-making, and political stability) leads to economic growth.

And lastly the Dutch disease, resulting from a commodity boom, entails real appreciation of the currency and increased government spending, both of which expand nontraded goods and service sectors such as housing and render uncompetitive non-commodity export sectors such as manufactures. If and when world commodity prices go back down, adjustment is difficult due to the legacy of bloated government spending and debt and a shrunken manufacturing sector.

Jeremy Clark et al. (2016) study also aiming at surveying the recent literature of the natural resource curse hypothesis. The study reviews the theoretical mechanisms through which natural resource wealth might slow economic growth, and then the empirical studies that test for an effect overall, or an effect on factors typically associated with economic growth. The findings was, literature has produced conflicting evidence, with no consensus on the net effect of natural resources in an economy. Overall they argued that evidence for a negative effect of natural resource dependence on economic growth remains convincing, particularly for developing economies and particularly working through factors closely associated with growth.

Not all existing literature agree with the of Sachs and Warner (1995) on resource curse, there are natural resource curse critics in the literature and some of them is the study of Lederman and Maloney (2007) which used cross-section and panel data for the 1980-1999 period and measure of natural resource is primary exports divided by total merchandise exports plus primary exports divided by GDP. The findings of this study show no evidence in cross-section of a negative impact of resource abundance on growth, nor in the panel systems estimation.

This was followed by another resource critics of Brunnschweiler and Bulte (2008) study which used sample of 60 countries for the 1970-1989 period from five regions, Europe, North America, Central and South America, Africa and the Middle East, Asia and Oceania. Natural resource abundance was proxied by the GDP shares of total resource and mineral resource exports plus the logs of total natural capital and mineral resource assets per capita and their results showed that resource dependence does not affect growth and resource abundance positively affects growth and institutional quality.

Another critics of natural resource curse was Alexeev and Conrad (2009) research study which used OPEC members and the major non-OPEC oil producers of more than 2 million barrels of oil per day and natural resource abundance measure was hydrocarbon deposits per capita plus oil per GDP ratio. Findings of this study was that effect of a large endowment of oil and other mineral resources on long-term economic growth of countries has been on balance positive.

Furthermore Cavalcanti et al. (2011) researched 53 oil exporting and importing countries for the 1980-2006 period and used real value of oil production per capita as their natural resource measure and their results showed oil abundance has a positive effect on both income levels and economic growth.

Also Boyce and Emery (2011) used panel data for U.S. States for the 1970-2001 period and natural resource abundance measure used real natural resource price and natural resource sector employment. Findings of the study indicates that resource curse can only be determined by an investigation of the correlation between resource abundance and income levels results show this relationship is positive.

In more recently study that had different outcomes as that of Sachs and Warner (1995) is Boschini, Pettersson and Roine (2012) study that analyzed the interaction effect and its possibility to reverse the resource curse. Explanatory variables was the share of primary export in GDP but was decomposed in order to examine if different type of resources have different effects, and it was decomposed into; agricultural raw material, food exports, fuel and ores and mineral and used 75 countries as a sample size. Natural resource rents was also used that included forest rent, oil rent and mineral rents. Institutional quality and dummy variable was also used as explanatory variables in which different starting dates was used from 1965, 1975 and 1985 to 2005.

Their findings was although the reversal looks somewhat more promising but the size of the coefficients indicate that to the extent that there is a reversal is quite weak.

Maria Zagozina (2014) study is another critic of resource curse that examines the natural resources and economic development in the former Soviet countries over the periods of 13 years from 1999-2001. Real GDP per capita as dependent variable, institutional quality, trade openness, investment and natural resource abundance which have both point source and non-point sources. Their findings show highly significant positive effect of resource exports on economic growth for both point and diffuse resources. Agricultural export in GDP provide the highest effect on economic growth while institutional quality shows a little impact on the economic growth.

And Muhammad Shahbaz et al. (2018) paper investigated the stimulating role of natural resource in financial development for the case of USA for the 1960-2016 period. They included education, economic growth and capitals as additional determinants. The empirical findings of the study shows the presence of cointegration between financial development and determinants of growth, and in the long run natural resource abundance contribute to the financial development, education and economic growth both have a positive effect on financial development, while capitalization and financial development have an inverse relationship.

The last but not the least critic of the natural resource curse is James (2015) study which used 111 resource producing countries and used different growth for the 1970-2010 period. Natural resource goods as share of income is the measure of natural resource abundance and results of this study is that, in all growth periods the relationship between resource dependence and economic growth in resource production sector is non-negative which is same results as the above critics results and different from that of Sachs and Warner (1997) study.

Edward B. Barbier (2002) used a different approach on its study and discussed the hypothesis of Environmental Kuznets Curve (EKC), and this hypothesis explained that environmental pollution caused the natural resources depletion causing the resources-rich countries facing slow economic growth as a result of resources depletion from the surrounding environment. Edward B. Barbier suggest that specific policies to protect the environment are necessary for sustaining economic welfare for present and in the future.

From the literatures we have seen that most of these previous studies suggest that there is inverse relationship between natural resources abundance and economic growth especially in the developing countries because their economies are highly dependent on their natural resources. With some exception studies in which their results showed positive relationship between natural resource and economic performance and other showed the sign of the curse reversal, and we have resource-abundant countries to prove these findings, because for every Nigeria and Venezuela which are rich in oil and still suffer with resource curse, there is Norway and Saudi Arabia which are rich in oil just like Nigeria and Venezuela but much developed, and also there is Sierra Leone rich in diamond suffers resource curse but southern part of the continent there is Botswana which benefits from its diamond resource revenue.

The common reason so far to why resource abundance present both economic winners and losers lies between the qualities of institutions in the countries (Mehlum et al., 2006). In the wake of recent years significant economic growth in SSA there is sign of natural resource curse being reversed into blessings, because the economies in the region have been performing well and no recent severe civil war and due to the investments in industrial sector. The literature has not yet presented any study that light on the recent relationship between natural resource abundance and economic growth in SSA region and light on the sectoral composition changes.

Because SSA region has not be investigated much to the wake of recent years strong economic growth in the connection with natural resource, this study is important to examine whether the curse has been reversed in SSA and if structural changes and large foreign investments in the region are the reasons behind these significant economic growth.

CHAPTER THREE

ECONOMIC PERFORMANCE OF SUB SAHARAN AFRICAN (SSA) COUNTRIES

3.1 Introduction

It is often argued that the poor economic structure of the Sub Saharan African nations, and their economic performance is closely related to the two main historical events. First reason is slave trade which crippled African economies (Walter Rodney, 1972) and had long term negative impact to its economies until today (Nunn, 2008). The second reason is colonialism which main aim was to exploit the physical, human and economic resources of Africa and benefit the colonizing nation. These are the main reasons that altered the African economies fundamentally and until today this region is struggling economically because of that.

The main objective of this chapter is to provide the fundamental background of the economic performance and structure of SSA countries will go all the way back before slaves trade and colonialism and understand how Africa was performing economically with all the trades and other sources of wealth. In this chapter we will also discuss the economic performance of SSA after the slave trade and colonialism and make sense on how these two historical reasons crippled the economies of the Africa for a very long time. This chapter also explain how Africa is recovering from these but on top of that we will also discuss the recent economic growth changes of the region after the independence (1960 for most countries) that will include inflations, unemployment rate, growth rate and trade growth over the years.

Understanding the economic growth history and economic structure of Sub SSA before and after slave trade and colonialism will give us the complete picture of how this region has evolved economically and for that reasons we decompose the time periods into sub periods so we understand the economic performance of each time periods and we show these changes with the help of descriptive statistics.

The rest of this chapter is arranged as follow in section 3.2 explain our target population which is SSA and its income level followed by section 3.3 which explain the economic performance of SSA as a whole before slave trade and colonialism, section 3.4 and 3.5 break down the impact of slave trade and colonialism on Africa economic performance and economic growth of SSA after the colonialism is explained in section 3.6 and the final section in this chapter is 3.7 which gives details on the source of wealth for Africa.

3.2 Sub Saharan Africa (SSA)

The target population of our study is Sub Saharan Africa, the area of African continent that lies south (below) of Sahara desert (*see* **Figure 2**). SSA is huge, its area is larger than that of China, the United States and India combined or five times larger than that of the 28 countries of the European Union (Biodun Olamosu and Andy Wynne, 2015). According to the United Nations, it consists of all African countries that are fully or partially located south of the Sahara dessert. World Bank lists 48 of Africa's 54 countries as sub-Saharan, excluding Algeria, Djibouti, Egypt, Libya, Morocco and Tunisia. The statistics show the total population in 2017 of Sub Saharan Africa is over 1.06 billion (World Bank).

The 48 countries of the region are also extremely varied, both in size and economic history, with many small countries and giants such as Nigeria. The area consist of

48 countries according to the World Bank, but due to unavailability of data, some of these countries will not be selected for our study. A sample of twenty one countries from SSA will be selected for this study, their income level and real GDP are also displayed (*see* **Table 1**).

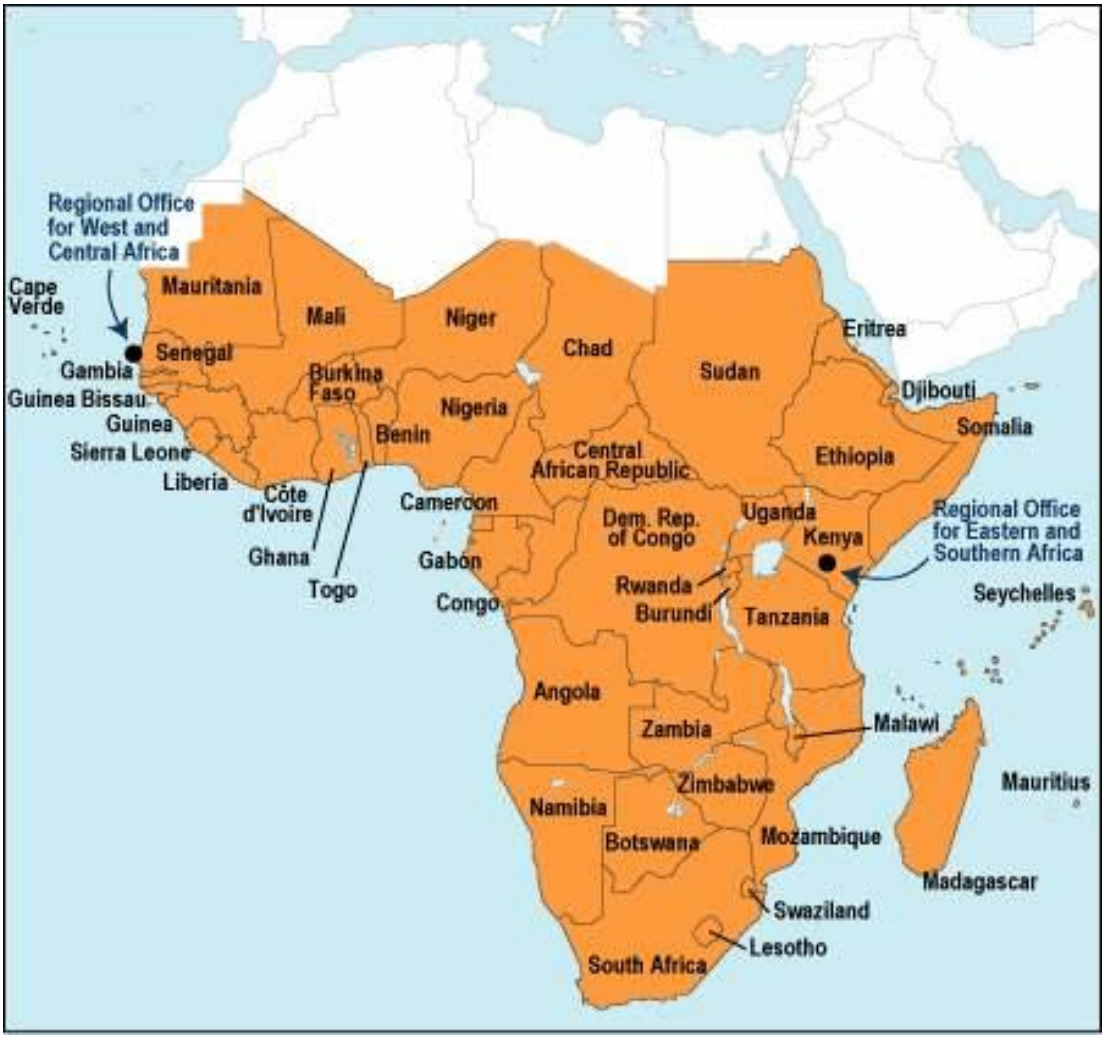

Figure 2: Map of Sub Saharan Africa (mapped in orange)

Source: Idowu Jonson

Table 1: Income of Selected African Countries

Country	Real GDP ($ billion)	Real GDP per capita ($)	Income Level
Angola	101.673	3413.66	Lower-Middle Income
Botswana	17.24	7523.28	Upper-Middle Income
Cameroon	36.364	1511.82	Lower-Middle Income
Central African Republic	1.56	335.03	Low Income
Chad	12.269	823.43	Low Income
D. Republic of Congo	33.277	409.12	Low Income
Gabon	19	9385.81	Upper-Middle Income
Ghana	50.62	1755	Lower-Middle Income
Guinea	10.48	824.11	Lower Income
Kenya	58.11	1169.22	Lower-Middle Income
Mali	14.146	762.95	Low Income
Namibia	14.797	5839.88	Upper-Middle Income
Niger	8.504	395.96	Low Income
Nigeria	460.456	2412.20	Lower-Middle Income
Rwanda	9.338	764.89	Low Income
Sierra Leone	3.496	462.69	Low Income
South Africa	426.813	7525.29	Upper-Middle Income
Tanzania	50.1	894.02	Low Income
Uganda	28.578	666.74	Low Income
Zambia	27.985	1635.49	Lowe-Middle Income
Zimbabwe	17.985	1088.06	Low Income

Source: World Bank (estimates of 2017)

The poor economic performance of SSA is associated with corruption activities and poor institutional quality in the region among many other reasons. To understand how far behind from the rest of the world SSA is, table 2 represents the control of corruption as one of the institutional quality index in SSA which is ranging from -2.5 for the lowest and 2.5 for the highest and this region has the lowest control of corruption index, country like Angola, Chad and Equatorial Guinea had -1.44, -1.49 and -1.81 respectively in 2016, this shows how high corruption level in these countries is. Despite the highly economic and social improvement of SSA in recent years, this part of the world is still experiencing with low level of life standards that is caused by high level of corruption.

Table 2: Control of corruption, Institutional quality index

Country	2000	2002	2004	2006	2008	2010	2012	2014	2016
Angola	-1.52	-1.18	-1.31	-1.22	-1.28	-1.33	-1.27	-1.44	-1.44
Botswana	0.83	0.66	0.9	0.97	1.04	1.03	0.93	0.85	0.93
Cameroon	-1.19	-1.17	-1.11	-1.09	-.102	-1.06	-1.26	-1.16	-1.15
CAR	-1.18	-1.09	-1.39	-1.21	-1.12	-0.93	-0.99	-1.16	-1.28
Chad	-1.11	-1.15	-1.38	-1.35	-1.52	-1.38	-1.31	-1.32	-1.49
DRC	-1.55	-1.29	-1.45	-1.53	-1.24	-1.44	-1.31	-1.30	-1.34
E. Guinea	-1.55	-1.43	-1.66	-1.59	-1.47	-1.47	-1.52	-1.77	-1.81
Gabon	-0.71	-0.59	-0.85	-0.97	-1.08	-0.87	-0.7	-0.69	-0.75
Ghana	-0.1	-0.41	0.25	-0.02	-0.07	-0.01	0.13	-0.19	-0.16
Guinea	-0.95	-0.72	-0.92	-1.12	-1.2	-1.2	-1.04	-1.06	-0.92
Kenya	-1.06	-1.0	-0.86	-0.93	-1.06	-0.91	-1.09	-0.93	-0.89
Mali	-0.84	-0.68	-0.59	-0.48	-0.53	-0.68	-0.83	-0.75	-0.66
Namibia	0.58	0.18	0.16	0.24	0.61	0.34	0.34	0.29	0.33
Niger	-0.88	-0.99	-0.82	-0.85	-0.72	-0.66	-0.64	-0.69	-0.63
Nigeria	-1.22	-1.43	-1.34	-1.12	-0.89	-1.05	-1.17	-1.27	-1.03
Rwanda	-1.22	-1.43	-1.34	-1.12	-0.89	-1.05	-1.17	0.76	0.64
S. Leone	-0.89	-0.83	-0.91	-1.02	-0.97	-0.77	-0.95	-0.94	-0.81
S. Africa	0.63	0.35	0.46	0.45	0.21	0.13	-0.12	-0.06	0.12
Tanzania	-0.81	-0.80	-0.56	-0.23	-0.42	-0.54	-0.76	-0.75	-0.5
Uganda	-0.87	-0.91	-0.78	-0.79	-0.83	-0.92	-0.99	-1.09	-1.06
Zambia	-0.72	-0.73	-0.59	-0.55	-0.39	-0.51	-0.28	-0.34	-0.4
Zimbabwe	-0.98	-1.23	-1.33	-1.36	-1.36	-1.37	-1.37	-1.44	-1.25

Source: Global economy

Africa has the richest concentration of natural resources such as oil, copper, diamonds, bauxite, lithium, gold, hardwood forests, and tropical fruits. It is estimated that 30% of the earth's mineral resources are found in the African continent. Additionally, Africa has the world's biggest precious metal reserves on earth. Table 3 shows much natural resources contribute to the national income of the ten most mineral rich-countries in Africa in 2015, Congo Democratic Republic, Guinea, Zambia, Mozambique had 30.65%, 17.73%, 16.19%, and 14.17% of GDP respectively came from resource rents, data show how important these resources are to their growth and how dependent their economies are on the resources.

Table 3: Ten most mineral rich-countries in Africa

Country	Resources % of GDP
Botswana	1.41
Congo Democratic R.	30.65
South Africa	4.53
Tanzania	3.42
Namibia	3.42
Mozambique	14.17
Zambia	16.19
Guinea	17.73
Niger	13.32
Ghana	12.42

Source: World Bank and Rising Africa (2015)

3.3 Economic Performance of Africa before Slave Trade and Colonialism

Before the "Scramble for Africa," or the official partition of Africa by the major European nations, African economies were advancing in every area, particularly in the area of trade. Africa before slave trade and colonialism was not economically isolated from the rest of the world. Indeed, African states had engaged in international trade from the time of the pharaohs of ancient Egypt, and West Africa specifically had developed extensive international trading systems during the eras of Ghana, Mali, and Songhai. In the ancient Mali Empire gold was traded through trans- Saharan trade route to the North African costs and expanded their trade and reached the Mediterranean (The Metropolitan Museum of Art, 2000).

Trade was facilitated by the abundance of iron, copper, gold, and ivory and easy access to the Niger and Senegal Rivers and their tributaries. The Ghana kings, residing in the capital at Koumbi Saleh, grew immensely rich, building up stockpiles of the gold nuggets only they were permitted to possess. Consequently, the reputation of Ghana spread to North Africa and Europe, where it was described as a fabulous land of gold (Mark Catwright, 2019). These huge empires relied heavily on the taxing of foreign trade to finance government expenditures. The wealth of these nations was dependent largely on the trade in gold, but also on the levying of customs, taxes, booty from foreign expeditions, and fees associated with administrative offices (Joshua D. Settles, 1996).

3.4 Impact of Slave Trade on Africa Economic Development

The African economies were fundamentally altered by the Atlantic slave trade because it encouraged the capture of slaves instead of land for cultivation and discouraged state-building and encouraged slave raiding (Walter Rodney, 1972). In Nunn (2008) study finds there is a long term negative effect between slave trade and economic performance. At the beginning of the 20th century SSA was an overwhelmingly land-abundant region characterized by shortages of labor and capital, this shortage of labor was due to the slave trade Gareth Austin (2010). Manning (1990) and Jones (1978) concluded that slave trade slowed population growth in Africa. In contrast, the population of Europe grew over four-fold in this period. During slave trade era the rent seeking activities was heavily involved when the local people were helping Europeans in capturing the slave and sell them and make profit out of them and some of them took corruption, so as we saw in chapter 2 rent seeking theory being the cause of the resource curse because it goes all the back in history during the slavery. Given the extractive economic and political institutions based on the slave trade, industrialization did not spread to SSA, which stagnated or even experienced economic retardation as other parts of the world were transforming their economies (Daron Acemoglu & James A. Robinson, 2012).

3.5 Impact of Colonialism on Africa Economic Development

The imposition of colonialism on Africa altered its history forever which occurred right after the end of slave trade. African modes of thought, patterns of cultural development, and ways of life were forever impacted by the change in political structure brought by colonialism (Joshua D. Settles, 1996). As we have seen from section 3.2 before the slave trade and colonialism African economies was not that far behind the rest of the world.

The aim of colonialism is to exploit the physical, human, and economic resources of an area to benefit the colonizing nation. European powers achieved this goal by encouraging the development of a commodity based trading system, a cash crop agriculture system, and by building a trade network linking the total economic output of a region to the demands of the colonizing state. The development of colonialism and the partition of Africa by the European colonial powers hampered the natural development of the African economic system (J D. Settles, 1996). However, even more significant to the era of colonialism is the era of the Atlantic slave trade. As Europeans exercised greater control over the natural resources available in Africa as they began to establish colonies in Africa, the prices for these raw material were driven down. Thus we see that the European colonizing powers sought to control the economics of Africa more and more.

The economic goals of colonialism were simply to provide maximum economic benefit to the colonizing power at the lowest possible price of the local states. As the effects of the Berlin Conference which establish the rules of the partition game became clear, those areas of Africa which had previously been developing significant trade and economies of their own were brought under the control of European economic policies and were doomed for failure. To the British, French, and Germans, the primary colonizing nations, the individual needs of their colonial subjects were not important. Instead the desire to "vertically integrate" the colonies of Europe by controlling production from start to finish became the overriding goal of colonial agents (Amina Zailani, 2015).

Because of industrial revolution Europe was rapidly developing and therefore needed the raw materials that Africa had to offer. Prior to partition, the European powers had to contend with the varying moods of African governments that, although dependent on international trade, still exercised significant control over their economic development. These nations could produce what goods they desired, some for export and some for internal consumption. Colonialism forced these nations to produce solely for the export market, thereby keeping prices low for their European consumers.

Prior to the partition of Africa, the continent had become increasingly integrated economically, with trade occurring north - south and east -west. The policies of the governing powers redirected all African trade to the international export market. Thus today, there is little in the way of inter - African trade, and the pattern of economic dependence continues.

The imposition of colonialism on the continent of Africa occurred for many reasons, not the least of which was economic. Before to this development, Africa was advancing and progressing economically and politically. Colonialism encouraged this development in some areas, but in many others severely retarded the natural progress of the continent. Had colonialism never been imposed on Africa, its development would be significantly different and many of the problems that plague it today would not exist (JD Settles, 1996)

3.6 Economic Performance of Sub Saharan Africa after the Colonialism

This section aims to provide an overview of the economic history of SSA since independence (around 1960 for most countries). From the end of the 19th century SSA suffered around 60 years of colonial loot and before that suffered the worst crimes in the human history of slave trade and as a result, "on a continent of household-based agrarian economies with very limited long-distance trade, colonialism imposed cash-crop production for export, and mineral extraction, with manufacturing supposed to come later" (J. Saul and Colin Leys, 1999).

The relative underdevelopment of the African economies can therefore be traced to a number of factors. As a result of colonialism, many of its national economies became virtual monoculture (mineral or commodity) exporters. They are also dependent on imports for equipment, capital goods, and the bulk of their consumer goods, know-how and technology. By the 1980s only five countries (Benin, Sierra Leone, Morocco, Senegal and Zimbabwe) had diversified export bases (Olamosu and Wynne, 2015).

Primary production still dominates SSA's exports. The economies of many African countries are heavily dependent on the export of one or two commodities. As a result they are more susceptible to the impulses of world price changes and other external shocks than more diversified economies. The result of such adverse shocks from the late 1970s and the subsequent introduction of neoliberalism, was the further growth of incredible inequality within Africa.

While over two thirds of Africans still exist on less than $2 a day, there are also Africans among the richest people in the world. Aliko Dangote of Nigeria, with a net worth of 17 billion US dollars, is richer than anyone in Britain. Nicky Oppenheimer and Johann Rupert of South Africa are richer than all but three people in Britain. There is great inequality between countries in Sub-Saharan Africa. Economically, the continent is dominated by Nigeria and South Africa; combined they account for around three quarters of the region's GDP.

Economies of sub-Saharan Africa can be broadly divided into three sub-periods: 1960-1980, 1980-2000 and 2000-present periods.

1960-1980 Periods

When the growth of many African economies equaled to that in many other areas of the world, in this time periods annual GDP growth of SSA was about 5 percent. **Figure 3** demonstrates the comparisons between annual GDP growth between Sub Saharan Africa and World for the 1960-1980 period in which on average the speed of economic growth were matching.

1980-2000 Periods

When economic growth collapsed in many African countries as a result of the external shocks of oil price increases, declining of trade which reached to 39.73% in 1983 compared to 57.7% tat of 1980 (*see* **Table 4**). In this period the economic growth reached to minimum of -2.49%, Inflation in the region reached the record high of 27.45% (*see* **Table 4**).

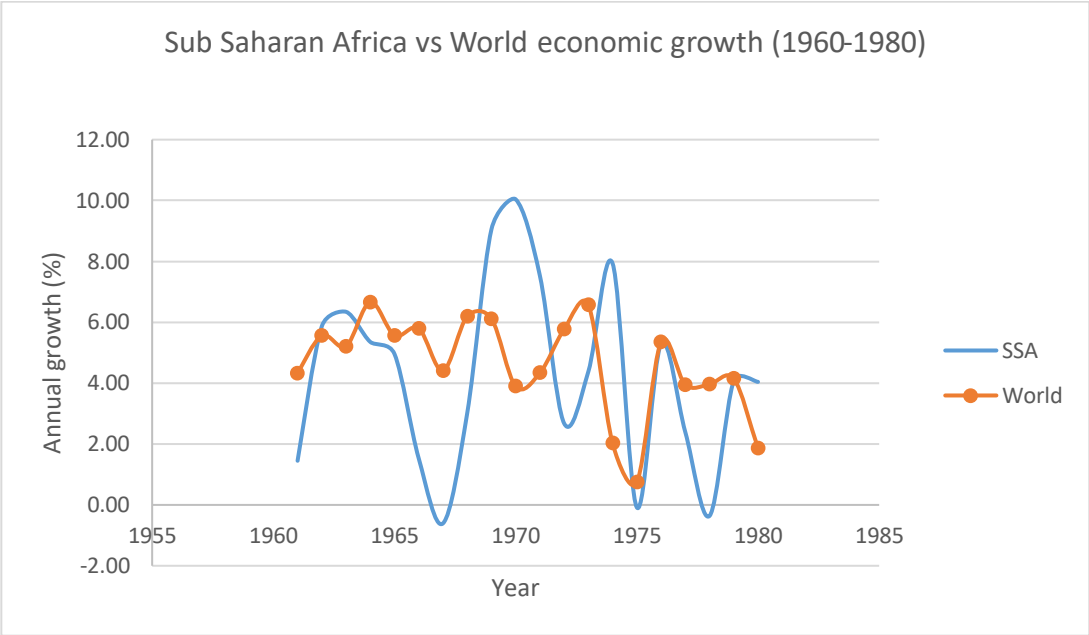

Figure 3: Sub Saharan Africa vs World economic growth from 1960-1980

Source: World Bank

Table 4: Sub Saharan Africa economic changes from 1980-1999

Year	Growth (%)	Inflation (%)	Trade (%)	Unemployment
1980	4.04	13.61	57.70	N/A
1981	-0.46	12.29	48.10	N/A
1982	-1.13	12.10	43.85	N/A
1983	-2.49	11.48	39.73	N/A
1984	2.61	11.12	41.08	N/A
1985	1.76	9.41	42.92	N/A
1986	1.62	6.86	40.49	N/A
1987	2.73	7.63	42.64	N/A
1988	4.49	8.35	41.43	N/A
1989	2.52	8.05	45.21	N/A
1990	2.38	7.55	42.60	N/A
1991	0.39	8.93	42.47	7.02
1992	-0.37	9.49	43.18	7.03
1993	-0.92	9.53	43.32	7.33
1994	1.20	27.45	44.91	7.39
1995	3.37	11.43	50.00	7.45
1996	5.17	7.19	50.67	7.46
1997	3.59	7.65	52.88	7.53
1998	2.37	6.44	50.38	7.45
1999	2.13	4.36	48.13	7.68

Source: *World Bank*

Note: N/A shows the absence of data due to the data unavailability.

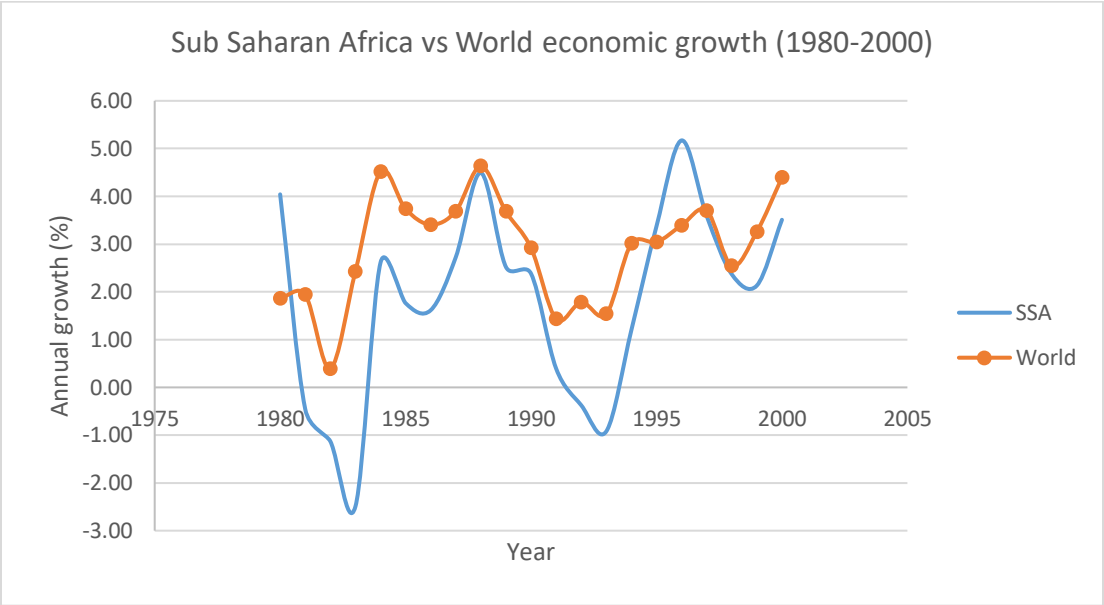

Figure 4: Sub Saharan Africa vs World economic growth from 1980-2000

Source: World Bank

Figure 4 illustrates the annual economic growth between SSA vs World for the 1980-2000 period, where SSA economies were falling behind the rest of the World to a point where the average annual growth reached -2.49% and the rest of the World was 0.39% in 1983.

2000-Present Periods

When many African economies recorded reasonable economic growth largely from the significant increase in the prices received for primary products—annual GDP growth reached 6.67% at some point. **Figure 5** illustrates from 2000s on average the GDP annual growth in Sub Saharan Africa grew more than the rest of the world. This is what this study is based on, the natural resources abundance impact on the recent significant economic growth on the region.

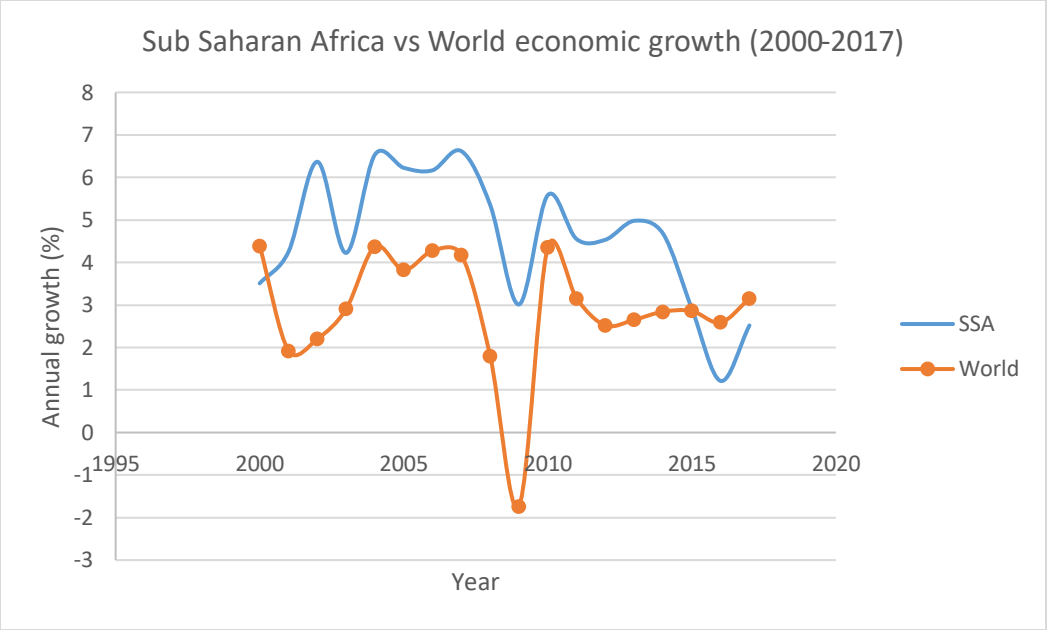

Figure 5: Sub Saharan Africa vs World economic growth from 2000-2016

Source: World Bank

Figure 6 illustrates the rapidly economic growth of SSA from the beginning of the new millennium to the present time. From the beginning of 1990 until 2000 the GDP was moving slow and steady, but from 2000 forward the growth was fast and rapidly.

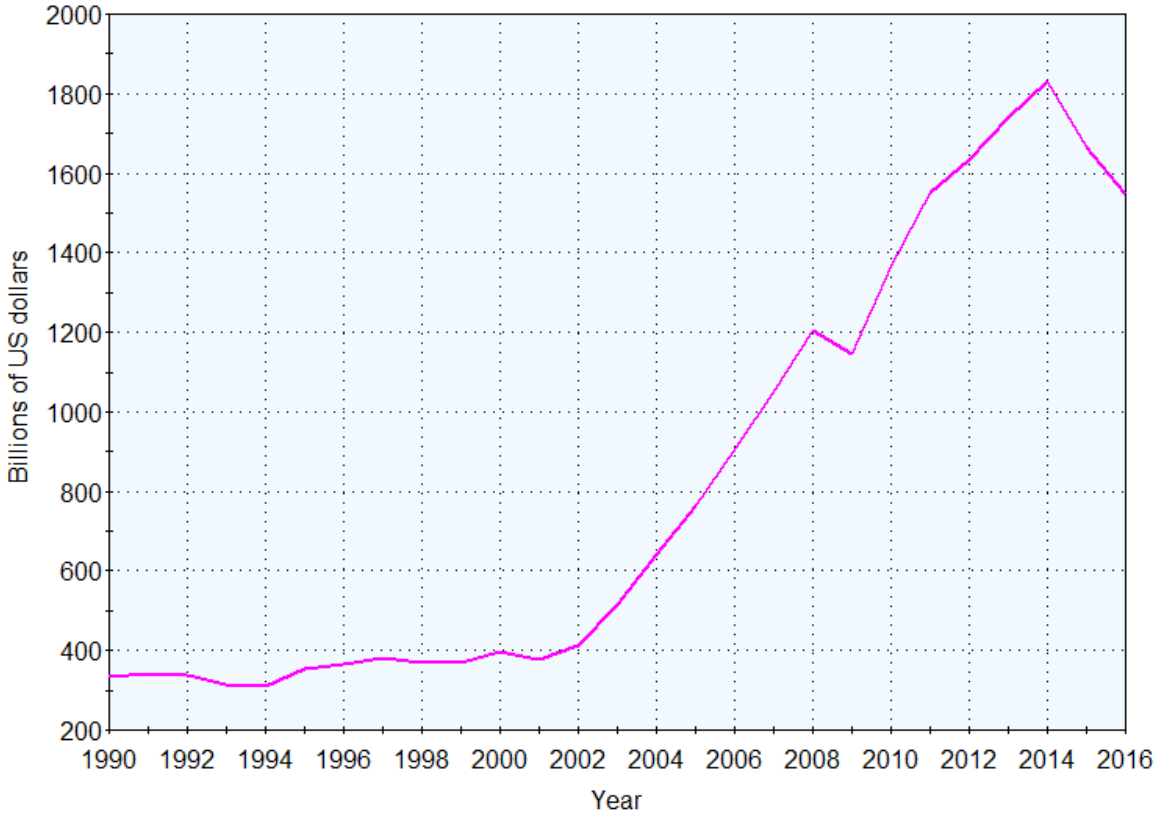

Figure 6: GDP of Sub Saharan Africa (1990-2016)

Source: World Bank

The economies of SSA finally managed to achieve reasonable economic growth since the early years of the 21st century achieving average GDP growth of 6 percent each year for the 2002-2008 period (*see* **Table 5**). Of the world's 15 fastest growing economies in 2010, ten were African. But this was mainly driven by the price boom for primary products. Over 50 percent of the economic growth of SSA in the 21st century was due to increase in commodity revenues thanks to higher demand especially from emerging economies such as India and China (*see* **Table 6 & 7**). The countries to which SSA exports have diversified. The proportion of exports, going to the BRICS (Brazil, Russia, India, China and South Africa) have increased from less than a tenth in 2002 to more than a third in 2012. This is now comparable to the level of exports to the European Union and the United States combined. China is now the largest destination for African exports taking nearly a quarter of the total (having increased from only 5 percent in 2000). China has also become the largest single trading partner for the region, a key investor and provider of aid.

Other significant factors in sub-Saharan Africa's growth included huge inflows of foreign direct investment, mainly for the extractive industries, development aid and increased remittances from nationals working abroad. Remittances from Africans working outside Africa exceeded foreign direct investment from 2007 and overtook development aid from 2010. But above all these there has been a big shift from exclusive to inclusive political and economic institutions in SSA region, where the economic institutions have improved and elevate the economic growth by managing their natural resources rents. However, prices for export goods remain volatile and so place future economic growth at a significant risk. Therefore growth in Africa has been followed by a return to uncertainty in recent years. Growth declined after 2007, although it was still 5.58 percent in 2010 and reached 4.98

percent in 2013 and became more erratic as a result of the impact of the great recession and the decreasing rates of growth in China (*see* **Table 5**).

Commodity prices remain at historically high levels although they weakened in 2013. The world prices of agricultural goods, metals and minerals fell by nearly 10 percent in the first six months of 2013 compared to the year before and there remains at least the potential for a longer-term decline.

Table 5: Sub Saharan Africa economic changes for the 2000-2016 period

Year	Growth (%)	Inflation (%)	Trade (%)	Unemployment
2000	3.51	4.50	62.03	7.68
2001	4.25	5.15	62.96	7.67
2002	6.37	4.71	59.60	7.88
2003	4.23	5.68	59.04	7.71
2004	6.57	4.14	56.48	7.31
2005	6.23	6.60	59.16	7.10
2006	6.17	6.39	61.41	6.73
2007	6.62	6.55	63.61	6.27
2008	5.35	10.30	68.33	5.85
2009	3.01	7.32	59.63	6.19
2010	5.58	3.98	62.01	6.32
2011	4.55	5.05	66.07	6.16
2012	4.53	6.59	63.27	6.02
2013	4.98	4.91	59.48	5.92
2014	4.68	4.40	58.16	5.89
2015	2.92	3.86	53.06	6.07
2016	1.21	5.43	51.35	6.24

Source: World Bank

3.7 Source of Wealth in Sub Saharan Africa

The Sub Saharan African economies mainly depends on agriculture, industrial productions, natural resources extraction and trade. On average, agriculture contributes 15% of total GDP of SSA, however it ranges from below 3% in Botswana and South Africa to more than 50% in Chad (OECD/FAO 2016). On average manufacturing production adds value of 10.17% of total GDP while natural resource rents contributes 9.27 % of total GDP on the region (World Bank 2017). Overall trade in SSA make an average of 51.2% of total GDP of the region (World Bank 2017). In 2013 the trade share 68.33 percent of the total GDP in the region (*see* **Table 4**).

3.7.1 Trade in Africa

Since the beginning of new millennium, the SSA economies have grown significantly, this growth is mainly because of increasing in both intra-African and international trade. Although intra-African cross-border investments have increased over the past decade they still only account for 18% of total investments to Africa, and 12% of Africa's total foreign investment, compared to 59% of intra-Europe trade and 68% of intra-Asia (African Union, 2019). The biggest challenge that trans-African trade facing is poor infrastructures in the continent which lead to the low trade within African countries. China is the biggest trading partner with Africa, but also the biggest investor on the African market. United States, India, Germany, United Kingdom, Spain, Italy and Netherlands are other top trading partners with SSA.

Table 6 & 7 represent SSA top 5 trading partners, in which China is the largest exporter, in 2017 alone China exported 37.387 Billion US dollars' worth of products which make 16.42 percent share of trade for SSA. And India is the largest market for their goods where SSA exported 19.685 Billion US dollars' worth of products to India which make 9.28 percent share of the trade in the region (WITS 2017).

Table 6: Sub Saharan Africa top 5 exports partners

Market	**Trade (US $ mil)**	**Partner share (%)**
India	19,685	9.28
China	18,520	8.73
United States	14,919	7.03
Netherlands	9,617	4.53
Spain	8,458	3.99

Source: *WITS 2017*

Table 7: Sub Saharan Africa top 5 imports partners

Exporter	**Trade (US $ mil)**	**Partner share (%)**
China	37,387	16.42
South Africa	14,891	6.54
Germany	13,443	5.90
India	13,148	5.77
United States	11,742	5.16

Source: *WITS 2017*

Table 8 and 9 present SSA top five sectoral exports and imports partners respectively where SSA exported 7.424 billion US dollars of manufacture goods to China which makes about 7.7% share of all exports to China, and it only exports 1.081 billion US dollars of agricultural raw materials to China in2017 which makes about 5.84% share of all exports to China. 30.86% of export products from SSA to United States comes from manufacture goods and only 1.17% comes from agricultural raw materials. SSA imports about 34.657 billion US dollars of manufacture goods from China which makes 92.7% of all the imports from China and only 1.16% of exports from China comes from agricultural raw materials and this because this part of the world is blessed with agricultural products and raw materials so it does not import much of that, but one would expect not to import any agricultural raw materials at all. From **table 9** we can see that most of SSA imports is manufacture goods that's because in this region there is still shortage of industries and poor productivity in comparison to many other places in the world, 78.38% of all imports from United States to SSA are manufacture goods, 68.12% of all imports from South Africa and Germany to SSA are also manufacture good. South Africa is the top SSA country that exports 68.12% of its manufacture goods because it is the industrial power house in the continent and 0.96% of its agricultural raw materials to its neighboring countries. In 2017 SSA exported more than 212 billion US dollars' worth of goods for all products and imported more than 227 billion UD dollars. Raw materials exported and imported accounted for 44.07% and 11.24% respectively, intermediate goods exported and imported accounted for 28.75% and 22.28% respectively, consumer goods exported and imported accounted for 18.17% and 37.07% respectively and capital goods exported and imported accounted for 8.48% and 26.15% respectively (*see* **Table 9.1**). From these data we can SSA is exporting more of its raw materials instead of

using these to their industrial sector and turn them into a manufactured goods and export them for a higher prices.

As a result they import 37.07% of consumer goods from the same raw materials they exported before and buying them for even a higher prices and that's why SSA has always had a big current account deficit because this region imports more goods than it exports.

Table 8: Sub Saharan Africa top 5 sectoral exports partners

Market	**Trade (US $ mil)**		**Partner share (%)**	
	Agr Raw	**Manuf.**	**Agr Raw**	**Manuf.**
India	466.319	2,018	2.37	10.26
China	1,081	7,424	5.84	7.7
United States	175.197	4,602	1.17	30.86
Netherlands	532.501	998.65	5.55	10.41
Spain	78.931	1,746	0.93	20.66

Source: WITS 2017

Note: Agr Raw and Manuf. represents agricultural raw materials and manufactures respectively.

Table 9: Sub Saharan Africa top 5 sectoral imports partners

Exporter	**Trade (US $ mil)**		**Partner share (%)**	
	Agr Raw	**Manuf.**	**Agr Raw**	**Manuf.**
China	434.534	34,657	1.16	92.7
South Africa	143.153	10,141	0.96	68.12
Germany	81.226	9,157	0.60	68.12
India	72	8,809	0.55	67
United States	166.491	10,523	1.42	78.38

Source: WITS 2017

Note: Agr Raw and Manuf. represents agricultural raw materials and manufactures respectively.

Table 9.1: Sub-Saharan Africa Products by Stages of Processing exports and import

Product group	Export (US$ million)	Import (US$ million)	Export product share (%)	Import product share (%)
All products	212,075	227,744	100	100
Raw materials	93,458	25,606	44.07	11.24
Intermediate goods	60,962	50,732	28.75	22.28
Consumer goods	38,538	84,435	18.17	37.07
Capital goods	17,978	59,554	8.48	26.15

Source: WITS 2017

CHAPTER FOUR

AN EMPIRICAL ANALYSIS OF THE RESORUCE ABUNDANCE ON ECONOMİC GROWTH

4.1 Introduction

Since the beginning of the new millennium we have seen the significant economic development of SSA and drive international attention on how much and fast this region is blooming economically, seven out of top ten richest countries in Africa are from SSA which includes, Namibia, South Africa, Botswana, Gabon, Mauritius, Seychelles and the leading country Equatorial Guinea. Before 2000 SSA region was famously known for being blessed with abundant of natural resources but still this region had a slow and poor economic performance and this phenomena is referred to as resource curse as mentioned in the previous chapters. Understanding the driving factors in a connection with natural resource abundance that led to this economic growth improvement in SSA region is what motivated our research.

The primary aim of this chapter is to empirically examine the role of natural resource abundance on economic performance of SSSA for the 1980-2016 period and also determine whether the resource curse has been reversed or not in recent years. As mentioned before natural resource capital has been playing a major role in the economic performance of resource-rich countries, and whether the resources become curse or blessings that will depend on the policies of that particular country.

In this chapter we will discuss all the methodologies of our study that will include regression models, variables of the study, our target population, time periods covered, all the data types and final discuss our empirical findings, their interpretations and how significant they are to our research. This study covers twenty one SSA for the period of 37 years which is divided into two sub periods because we first want to empirically examine the impact of the natural resource abundance on economic growth for each period i.e. for the 1890-2000 period, for the 2000-2016 period and for the 1980-2016 overall period so that we can observe any structural changes that lead to this growth changes. From chapter 2 different studies have emerged and investigated the role of resource abundance on the economic growth and some of them proved the existence of resource curse but we have seen little to none in the current literature discussing the structural changes and how each sector is affected by the presence of the resource curse and that's why in this study we use aggregate real GDP growth as dependent variable and then disaggregate the GDP into three sectors of GDP composition, which is value added from agriculture, value added from industry and value added from services. Independent variables includes resources abundance proxied by total natural resource rents as a share of GDP and control variables such as trade openness, foreign direct investment, gross fixed capital formation, population growth rate and dummy variable civil war.

Due to the data unavailability twenty one SSA countries are chosen in the scope of this research, including the current largest economy of the whole continent which is Nigeria, panel data for the 1980-2016 period will be used throughout this study, and data are taken from the World Bank, IMF, WITS, FRED and UNCTAD United Nations.

The rest of this chapter is as follow; in section 4.2 presents all the regression models and all variables of the study are defined in this section, section 4.3 define all the data types, their sources, also in this section data are empirically analyzed that will include unit root test and panel data estimation and in subsections Wald and Hausman tests are explained. Section 4.4 presents the empirical findings of the study and all the tests results, where subsections 4.4.1 presents unit root tests results, sub section 4.4.2 illustrates Wald tests results and sub section 4.4.3 presents Hausman tests results. Finally in subsections 4.4.4 and 4.4.4.1 presents OLS estimates results for the impact of natural resource abundance on growth of Sub Saharan Africa for aggregate and disaggregate GDP respectively.

4.2 Regression Model

Panel data model

$$Y_{it} = \alpha_i + \beta_i x_{it} + \varepsilon_{it} \quad (2)$$

$$Y_{it} = \alpha_i + \beta_1 x_{1it} + \beta_2 x_{2it} + \cdots + \beta_n x_{nit} + \varepsilon_{it} \quad (3)$$

Where Y_{it} is the observation on the dependent variable for cross-sectional unit i in period t. X_{it} is the vector of independent variables (vector of resource variables and control variables) observed for the cross-sectional unit i at period t, β is a vector of parameters (coefficient), α_i is a fixed parameter or unit-specific and time-invariant y intercept, ε_i is observation-specific errors, recorded for the cross-sectional unit i in period t. i = cross sectional unit each of the SSA countries in this study and t is the time period 1980-2016.

For this study the extended version of the above model will be used, which is

$$GDP_{it} = \alpha_i + \beta_1 Resources\ abundance_{it} + \beta_2 Control\ Variables_{it} + \varepsilon_{it} \quad (4)$$

Substituting our indicators from above equation will yield the following model

$$GDP_{it} = \alpha_i + \beta_1 NR_{it} + \beta_2 X_{it} + \beta_3 CW + \varepsilon_{it} \quad (5)$$

For aggregate GDP

$$GDPPCR_{it} = \alpha_i + log\beta_1 NR_{it} + log\beta_2 OPEN_{it} + log\beta_3 GFCF_{it} + log\beta_4 FDI_{it} \quad (6)$$
$$+\beta_5 POP_{it} + \beta_6 CW + \varepsilon_{it}$$

For disaggregate GDP

$$logGDPPC_{it} = \alpha_i + log\beta_1 NR_{it} + log\beta_2 OPEN_{it} + log\beta_3 GFCF_{it} + log\beta_4 FDI_{it} \quad (7)$$
$$+\beta_5 POP_{it} + \beta_6 CW + \varepsilon_{it}$$

Econometric expectation;

$\beta_1 > 0$, $\beta_2 > 0, \beta_3 > 0,\ \beta_4 > 0,\ \beta_5 > 0, \beta_6 < 0$

Where GDPPCR of equation (6) is the annual growth rate of the aggregate real GDP per capita and GDPPC of equation (7) is the disaggregate real GDP composition per capita of agriculture, industry and services, NR is the resource abundance, OPEN is the trade openness as a share of GDP, GFCF is the gross fixed capital formation as share of GDP is the domestic investments, FDI is the foreign direct investments as a share of GDP, POP is the population growth rate and CW is our dummy variable of civil war and Ɛ is error term.

4.2.1 Variables of the Study

This study employs panel data of twenty one SSA countries for the 1980-2016 period. The data involves the aggregate annual percentage growth rate of the real GDP per capita and disaggregated components of GDP per capita which consists of value added from agriculture, industry and services as share of GDP as our dependent variables, natural resources abundance, and control variables as our explanatory variables.

Dependent variables: One of the dependent variable in this work is the economic growth or the economic performance of SSA region. The economic growth is proxied by the annual percentage growth rate of the aggregate real GDP per capita and transformed into the logarithm form $logGDPPCR$ equation (6). Annual percentage growth rate based on constant 2010 US dollars per capita is gross domestic product divided by midyear population. GDP at purchaser's price is the sum of gross value added by all resident producers in the economy plus any product taxes and minus any subsidies not included in the value of the products, it is calculated without making deductions for depreciation of fabricated assets or for depletion and degradation of natural resources (World Bank).

Another dependent variables are disaggregate GDP composition per capita which is transformed into a logarithm form $logGDPPC$ equation (7), which include GDP composition of agriculture per capita, GDP composition of industry per capita and GDP composition of services per capita.

Independent variables: In this study we use natural resource abundance as our independent variable represented by the total natural resources rents share of GDP and we transform into a logarithm form $logNR$ equations (6&7). In order to control for our results, we use control variables such as degree of trade openness and transform into a logarithm form $logOPEN$ equations (6&7) which is the sum of imports and exports of goods and services measured as a share of country's gross domestic product (%GDP) (World Bank). Gross fixed capital formation into a logarithm form $logGFCF$ equations (6&7) shows the percentage of GDP used as domestic investments, annual population growth rate POP equations (6&7), foreign direct investment (%GDP) is an investment made by a firm or individual in one country into business interests located in another country, we transform into a logarithm form $logFDI$ equations (6&7) and civil war in a country as our dummy variable CW equations (6&7).

4.3 Data

This study uses panel data from across-countries within our target population for the 1980-2016 period divided into sub period of 1980-2000 and 2000-2016 in order to understand how resource abundance have impacted economic growth in SSA in each period over the years. This study uses secondary data, aggregate real GDP per capita annual growth rate (GDPPCR), natural resource abundance (NR) as the total natural resource rents as share of GDP, trade openness (OPEN) as a share of GDP and population growth rate (POP) are collected from World Bank and FRED data. Disaggregate GDP composition per capita (GDPPC) of agriculture, industry and services, foreign direct investment (FDI) as a share of GDP, gross fixed capital formation (GFCF) as a share of GDP data collected from UNCTAD database.

4.3.1 An Empirical Analysis of the Data

This section presents the procedures of the empirical analysis of data in our study in order to understand the true meaning of our results. In our analysis the panel data of twenty one SSA countries will be used and according to the nature of our time series data few analyses must be made and pre conditions must be met in order to avoid any wrong regressions and interpretations of our results.

In order to avoid biased and spurious results in our study we first check for the presence of unit root in our data, we use Augmented Dickey Fuller (ADF) test to check for stationarity and make sure all the data are stationary. We utilize Durbin Watson (DW) test to check for serial auto correlation in our data and make sure there is no serial auto correlation, we use Biased corrected scaled LM,

Pesaran scaled LM and Pesaran CD tests to check for cross-dependence correlation test between countries and we also check for multicollinearity between the independent variables and make sure there is no multicollinearity. Since we use panel data we have to choose between fixed effect vs pooled OLS model and we use Wald Tests for that and to choose between fixed vs random effect model and we perform Hausman test for that.

4.3.1.1 The Panel Unit Root Test

The classical Augmented Dickey Fuller (ADF) is implemented as our panel unit root test to check for stationarity of the data and avoid any spurious regression. The Augmented Dickey Fuller (ADF) regression is written as follow:

$$\Delta Y_{it} = \alpha_{it} + \delta_i Y_{i_{t-1}} + \sum_{j=1}^{k_i} \beta_j \Delta Y_{i_{t-j}} + \varepsilon_{i_t} \quad (8)$$

Where Y_{it} is an observation on the dependent variable for the cross-sectional unit i in period t, α_{it} is a deterministic term, δ_i is the autoregressive coefficient and k_i is a lag order specific to the cross sectional unit i.

Null hypothesis H_0: $\delta = 0$ presence of unit root in the data, i.e. data are non-stationary.

Alternative hypothesis H_1: $\delta < 0$ no unit root in the data, i.e. data are stationary.

4.3.1.2 Panel Data Estimation Models

In the disciplines of econometrics and statistics, panel data or longitudinal data refers to multi-dimensional data that generally involves measurements over some period of time (Mike Moffatt, 2019). As such, panel data consists of researcher's observations of numerous phenomena that were collected over several time periods for the same group of units or entities (states, companies, individuals, countries etc.). For example, a panel data set may be one that follows a given sample of individuals over time and records observations or information on each individual in the sample. There are three types of panel data estimation models: the fixed effects estimation model, the random effects estimation model and the pooled OLS estimation model depending on the number of cross sectional units (Sub-Saharan African countries in our case) and the number of time periods. The choice for the best model is determined by a series of tests. Before we address the relevant tests, we stress the characteristics of each model.

a) The Pooed OLS Estimation Model

It is the most restrictive panel data model, because it ignores that fact that the data are panel data, in other words this model deny the heterogeneity or individuality that exist among cross-countries, that's why it is not used much in the literatures.

The pooled OLS model is expressed as;

$$Y_{it} = \alpha + \beta X_{it} + U_{it} \quad (9)$$

Where i is a cross-section units, in our study i represents SSA countries, t is a time-period of our study which is 1980-2016, Y_{it} represents dependent variable X_{it} represents independent variables or explanatory variables, β represents coefficient of the explanatory variables and U_{it} represents the error term.

b) The Fixed Effects Estimation Model

This model allows the individual-specific effect α_i to be correlated with the regressor X_i, in this model each individual has a different intercept term α_i and the same slope parameters.

The general fixed effect model is expressed as:

$$Y_{it} = \beta X_{it} + U_{it} \quad (10)$$

But in fixed effect model error term is disintegrated into time-invariant component α_i and within- entity error term ε_{it}

$$U_{it} = \alpha_i + \varepsilon_{it} \quad (11)$$

Now α_i becomes y intercept or a fixed unit parameter to be estimated

$$Y_{it} = \alpha_i + \beta X_{it} + \varepsilon_{it} \quad (12)$$

c) The Random Effects Estimation Model

This model assumes that the individual specific- effect α_i are distributed independently of the regressor, here we have composite error term U_{it}, which decomposes into the random term V_i from probability distribution and observation specific-error term ε_{it}.

$$U_{it} = V_i + \varepsilon_{it} \quad (13)$$

Which yield below expression

$$Y_{it} = \beta X_{it} + V_i + \varepsilon_{it} \quad (14)$$

Here V_i is not fixed, but it is random term taken from probability distribution.

d) Pooled OLS vs Fixed Effect Model (Wald Test)

To determine the appropriate model for the regression between pooled OLS and fixed effect model, we adopt Wald test. Pooled OLS is appropriate model if p-value of F-statistics is greater than 0.05 and fixed effect model becomes appropriate when p-value of F-statistics is less than 0.05.

$H_0 : C_i = C_j = 0$, Pooled OLS is appropriate

$H_1 : C_i \neq C_j \neq 0$, Fixed effect model is appropriate

Where $C_i \; and \; C_j$ are the coefficients of our independent variables.

e) Fixed Effect vs Random Effect Model (Hausman Test)

The Hausman test is used to make a choice for the most adequate model between fixed effects model and random effects model in our study so that we get the most appropriate and reliable model for our panel data. Random effects (RE) is preferred under the null hypothesis due to higher efficiency, while under the alternative fixed effects (FE) is at least as consistent and thus preferred.

Null hypothesis $H_0 = Cov(\alpha_i, X_{it}) = 0$

Alternative hypothesis $H_1 = Cov(\alpha_1, X_{it}) \neq 0$

H_0 : Random effects model is appropriate

H_1 : Fixed effects model is appropriate

4.4 Empirical Findings of the Study

This section presents the empirical results of our study and according to the nature of our time series data we first analyzed our data by checking for the presence of unit root in our data, in selection of the best model for the study, we present the results of Hausman test in selection between fixed and random effect models and final we present the ordinary least square results, their interpretations and significance to our study.

4.4.1 Unit Root Test Results

Table 10 presents the results of Augmented Dickey Fuller (ADF) test equation (8) which check for panel unit root in the regressions in order to avoid any spurious results. The ADF tests show that the panel unit root test results for the 1980-2000 period that natural resource abundance (logNR), disaggregated GDP per capita composition of both industry (GDPPCIND) and services (GDPPCSER) have a unit root, suggesting that they are not stationary at level, but after taking the first difference they all become stationary I(1) and the rest of the variables are stationary at level I(0) (table 10). The ADF tests show that the panel unit root test results for the 2000-2016 period that natural resource abundance (logNR), trade openness (logOPEN), gross fixed capital formation (logGFCF), disaggregated GDP per capita composition of both industry (GDPPCIND) and services (GDPPCSER) have a unit root, suggesting that they are not stationary at level, but after taking the first difference they all become stationary I(1) and the rest of the variables are stationary at level I(0) (table 10). The ADF tests show that the panel unit root test results of period 1980-2016 that only disaggregate GDP per capita composition of industry (GDPPCIND) and services (GDPPCSER) have a unit root, suggesting that they are not stationary at level, but after taking the first difference

they all become stationary I(1) and the rest of the variables are stationary at level I(0) (table 10). I(0) shows that in this particular series there is no unit root meaning that the series is stationary at level and hence there is no need to taking any differences. And I(1) shows the presence of unit root in the particular series meaning that it becomes stationary after taking the first difference.

Table 10: Results of Augmented Dickey Fuller (ADF) unit root test.

Variables	1980-2000	2000-2016	1980-2016
logNR	I(1)	I(1)	I(0)
logOPEN	I(0)	I(1)	I(0)
logGFCF	I(0)	I(1)	I(0)
logFDI	I(0)	I(0)	I(0)
POP	I(0)	I(0)	I(0)
GDPPCR	I(0)	I(0)	I(0)
GDPPCAGR	I(0)	I(0)	I(0)
GDPPCIND	I(1)	I(1)	I(1)
GDPPCSER	I(1)	I(1)	I(1)

Note: I(0) stationary at level and I(1) becomes stationary after the first difference. Equations (6&7)

4.4.2 Wald Tests Results

Table 11 represents the Wald tests results undertaken in our study in deciding the most adequate model between pooled OLS and fixed effect model for all our regression models. When p-value is greater than 0.05 we accept our null hypothesis meaning that pooled OLS model is appropriate and when p-value is less than 0.05, we reject the null hypothesis and hence the alternative hypothesis is preferred, that is fixed effect model is appropriate. And from the results in table 11 show that p-value is less than 0.05 suggesting that fixed effect model is more appropriate than pooled OLS model.

Table 11: Wald test results

GDPPCR	(1980-2000)				(2000-2016)				1980-2016			
GDPPC	GDPPCR	AGR	IND	SER	GDPPCR	AGR	IND	SER	GDPPR	AGR	IND	SER
F-Statistics	20.16	1681.53	17.15	20.20	43.04	2079.45	15.72	24.18	44.53	15.60	23.78	18.40
P-value	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

4.4.3 Hausman Tests Results

Table 12 presents the results of all the Hausman tests performed in our study, when the p-value is greater than 0.05 we accept the null hypothesis meaning that random effect model is preferred and when p-value is less than 0.05 we reject null hypothesis meaning that fixed effect model is preferred. Our results show that both random and fixed effect models are preferred for different regressions. In economics studies fixed effect model is always preferred for various reasons: *(i)* Fixed effect model reduce the chance that a relationship between dependent and independent variables is driven by omitted variables by introducing dummy variables in the regressions, *(ii)* Fixed effect model take control of unmeasured characteristics and in our case is dummy variable civil war, *(iii)* Random effect model main assumption is that individual specific error must be uncorrelated with the regressors and since our countries are at the same region, these unobserved variables maybe correlated to other explanatory variables between the countries and may remain fixed within the single individual and hence fixed effect is more appropriate, *(iv)* Another reason is that regression for the 1980-2000 and 2000-2016 periods have larger number of cross-sections which is twenty one countries than time period and that's why from econometric point of view fixed effect is more adequate than random effect model. From all these economic and econometrics reasons, we will be using fixed effect model throughout this study.

Table 12: Hausman test results

GDPPCR	(1980-2000)				(2000-2016)				1980-2016			
GDPPC	GDPPCR	AGR	IND	SER	GDPPCR	AGR	IND	SER	GDPPR	AGR	IND	SER
Chi-Sq. Statistics	1.73	50.41	2.43	5.91	2.41	28.75	5.90	1.09	21.32	7.59	24.45	13.42
P-value	0.94	0.00	0.88	0.43	0.88	0.00	0.43	0.98	0.00	0.27	0.00	0.04

Note: Equations (6&7) for the references

4.4.4 **OLS Results of the Impact of Natural Resource Abundance on Economic Growth of Sub Saharan Africa (Aggregate GDP)**

Having determined the suitable model, this study employs fixed effect panel data model in all estimations equations (6&7). Furthermore, in this study we divide our time periods into sub periods, and we use aggregate and disaggregate GDP in order to catch the impact of resource abundance in SSA for each time period.

Table 13 presents the results obtained from estimating equation (6) using fixed effect model for the 1980-2000 period with 420 observations undertaken R-squared is 0.3991 showing that the growth rate in this period is explained at the rate of 39.91% by all the independent variables in the model, and also we utilize Durbin Watson (DW) test to check for serial autocorrelation and the results show DW stat is 1.97 which is close to 2, this result suggests the absence of serial auto correlation in the residuals. We also check for cross-section dependence and since our cross-sections N is greater than time period T, we use Pesaran scaled LM test and the p-value result is 0.2079 which is greater than 0.05, so we accept the null hypothesis of no cross-section dependence among our residuals. The dependent variable of this regression is aggregate real GDP per capita growth GDPPCR and our results show that resource abundance (logNR) is negatively significant at 5% significance level, this results show that resource abundance has a negative relationship with economic growth in Sub SSA for the 1980-2000 period and suggesting the presence of resource curse in the region in this period, so this results agree with Sachs and Warner (1995) study.

Gross fixed capital formation (logGFCF) is positively significant at 1% significance level to the economic growth, while population growth (POP) is

negatively significant at 10% significance level showing that during this period population was growing faster than the speed of technological progress , suggesting that population growth for the 1980-2000 period had a negative impact on economic growth. Results show civil war (CW) is negatively significant at 1% significance level, meaning that civil war has a strong negative impact on economic growth in SSA region. But degree of trade openness (logOPEN) and foreign direct investment (logFDI) both are insignificant, although their signs are positive (*see* **Table 3**).

***Table 13*: Results of OLS estimator method using fixed effect model for aggregate GDP** *Dependent variable is GDP per capita growth*

Variables	(1980-2000) β_i (standard error)	(2000-2016) β_i (standard error)	(1980-2016) β_i (standard error)
logNR	-1.5401** (0.7181)	2.6618** (1.1082)	0.1903 (0.3747)
logOPEN	1.0175 (0.7930)	-0.8642 (1.4839)	1.3143** (0.5987)
logGFCF	2.3609*** (0.7938)	0.9342 (1.2788)	2.7057*** (0.5644)
logFDI	0.2243 (1.5372)	5.1541** (2.0177)	1.5975 (1.1877)
POP	-0.4627* (0.2387)	1.4213** (0.6843)	0.0145 (0.1919)
CW (Dummy)	-38.3112*** (3.7377)	-23.7198*** (2.0084)	-28.3002*** (3.7377)
Constant	-10.5216* (5.9477)	-19.1995*** (7.3319)	-18.4089*** (4.3309)
Observations N	420	336	777
F-statistics	5.5200	6.6339	8.2508
R-squared	0.3991	0.4806	0.4174
Durbin-Watson stat	1.9737	1.7308	1.8863
Pesaran scaled LM	0.2079	-	-
Pesaran CD	-	0.1131	-
Bias-corrected scaled LM	-	-	0.0854

Note: (*) represents 10% significance level, (**) represents 5% significance level and (***) represents 1% significance level.

Table 13 also presents the results of OLS estimator equation (6) method using fixed effect model for the 2000-2016 period. Aggregate real GDP per capita growth rate (GDPPCR) is a dependent variable in this regression with 336 observations undertaken in this regression R-squared is 0.4806 meaning that growth rate is explained by 48.06% by the independent variables of this model. For serial auto correlation we utilize Durbin Watson and the results show DW stat 1.7308 and since its close to 2, this results suggests that there is no seral auto correlation in the residuals, and for cross-section dependence test we use Pesaran CD (2004) test because N > T and the result of p-value is 0.1131 which is greater than 0.05, so we accept the null hypothesis at 5% significance level that there is no cross-section dependence in the residuals. The results (*see* **Table 13**) shows natural resource abundance (logNR) is positively significant at 5% significance level, this means for 2000-2016 period the resource abundance in SSA has a positive impact on economic growth, which is different for the 1980-2000 period, so these results suggest the reversal of the resource curse, so significant economic growth from the beginning of the new millennials in SSA region is because the curse has been reversed to blessings in recent years. But another interesting result is that now both foreign direct investments (logFDI) and population growth (POP) are positively significant and the reason why resource curse was revered during this period is because now foreign investors are invested heavily in other sectors that led to the boost of economic growth and eventually reversal of the resource curse. These results suggesting that foreign investments now has been a drive force to the economic growth in the region and also population growth has also been another positive factor to the economic growth this because more labors are needed in order to keep up with the technological progress and increase production and output in SSA.

Results show that civil war (CW) is strongly negative significant at 1% significance level, this because foreign investors decrease when there is a civil war in the country as results the economy will stagnate and country will suffer and pay heavy price. Degree of trade openness (logOPEN) is not significant with negative and domestic investments (logGFCF) which is gross fixed capital formation is also not significant to the economic growth but has a positive sign. For the 2000-2016 period there is sign of reversal of the curse and this because of increase in FDI and relatively decrease in civil war in the region.

Table 13 shows the results of OLS estimator method using fixed effect model for the 1980-2016 overall period with aggregate real GDP per capita growth (GDPPCR) as our dependence variable, these results show the overall impact of natural resource abundance (logNR) in SSA region over the years. The results suggest the presence of resource curse for the 1980-2000 period and also the results show the reversal of the curse for the 2000-2016 period. With 777 observations undertaken in this regression R-squared value is 0.4174 suggesting that the aggregate GDP per capita growth (GDPPCR) is explained by the independent variables by 41.74% in the model. Durbin-Watson (DW) results is 1.8863 which is close 2 and for this result we conclude that there is no serial auto correlation in residuals. We use Bias-corrected scaled LM test to check for cross-sectional dependence in residuals and our p-value result is 0.0854 which is greater than 0.05 and hence we accept the null hypothesis at 5% significance level that there is no cross-sectional dependence in the residuals. The results show that resource abundance (logNR) is insignificant, this suggests that overall resource abundance has not been an important drive factor for SSA economic growth and this because of the presence of the resource curse before 2000 and after 2000 we see the reversal of the curse signs.

Overall the degree of trade openness (logOPEN) is positively significant at 5% significance level meaning that trade openness has been a drive force for the economic growth in SSA throughout the years and gross fixed capital formation (logGFCF) is also positively significant at 1% significance level, this result shows that domestic investments have been a key factor for the economic development in the region over the years. However as expected the presence of civil war (CW) in the region has been bad for the economies of the region as the result shows civil war is negatively significant at 1% significance level, foreign direct investments (logFDI) and population growth rate (POP) are both not significant but with positive signs.

4.4.4.1 Disaggregate GDP

We now disaggregate GDP into three components which are agriculture, industry and services in order to investigate further the impact of resource abundance in each of these sector and examine any changes in sectoral component and any structural changes over the years and because presence of natural resource abundance has different effects to each of the component of GDP. **Table 14** displays the results of OLS estimator method using fixed effect model for the 1980-2000 period, dependent variable is the real GDP component per capita which is value added by agriculture per capita, value added by industry per capita and value added by services per capita. With 420 observations in each of the regression R-squared values are 0.9733, 0.3152 and 0.3633 for Reg1, Reg2 and Reg3 respectively, meaning that our dependent variables are explained by independent variables for about 97.33%, 31.52% and 36.33% respectively.

Durbin-Watson test results are 2.3912, 1.7096 and 2.0637 for Reg1 (agriculture), Reg2 (industry) and Reg3 (services) respectively, these results suggest the absence of serial auto correlations in residuals in all three regressions.

In this regressions we use Pesaran CD (2004) to check for cross-sections dependence in the residuals since we have N > T and p-values results are 0.2157, 0.4369 and 0.6557 for Reg1, Reg2 and Reg3 respectively and all these results are greater than 0.05 so we accept the null hypothesis at 5% significance level that there is no cross-sectional dependence in the residuals. The results show that natural resource abundance (logNR) is negatively insignificant to all three components of GDP this is because, we have seen in table 13 that during 1980-2000 period there was resource curse in the region as a result none of these sectors were contributing to the economic and this prove the presence of the curse during this time periods.

One among the cause of resource curse is when natural resource sector (booming sector) crowds out the industrial sector or busting sector and that's why our result shows that industrial sector became insignificant to the economic growth. Trade openness (logOPEN) is only significant to the industry sector while gross fixed capital formation (logGFCF) is significant in all three sectors, foreign direct investments (logFDI) and population growth rate (POP) are both not significant in each of the three sectors during this time and civil war (CW) is negatively significant in all sectors and this because civil war is the outcomes of the resource curse.

***Table 14*: Results of OLS estimator method using fixed effect model for disaggregate GDP** *Dependent variable is logGDP component per capita (for the 1980-2000 period)*

Variables	Reg1 (Agriculture)	Reg2 (Industry)	Reg3 (Service)
logNR	-0.0136 (0.0117)	-0.0024 (0.0111)	-0.0170 (0.0121)
logOPEN	0.0105 (0.0130)	0.0284** (0.0120)	-0.0003 (0.0134)
logGFCF	0.0320** (0.0129)	0.0468*** (0.0128)	0.0429*** (0.0134)
logFDI	-0.0178 (0.0252)	-0.0043 (0.0248)	-0.0045 (0.0260)
POP	-0.0033 (0.0039)	0.0053 (0.0039)	-0.0005 (0.0040)
CW (Dummy)	-0.6137*** (0.0608)	-0.5311*** (0.0605)	-0.6576*** (0.0632)
Constant	0.8802*** (0.1695)	-0.2537*** (0.0949)	-0.1028 (0.1005)
Observations N	420	420	420
F-statistics	295.0195	6.9549	4.7413
R-squared	0.9733	0.3152	0.3633
Durbin-Watson stat	2.3912	1.7096	2.0637
Pesaran CD	0.2157	0.4369	0.6557

Note: (*) represents 10% significance level, (**) represents 5% significance level and (***) represents 1% significance level.

Table 15 presents the results of OLS estimator method using fixed effect model for the 2000-2016 period, dependent variable is the real GDP component per capita which is value added by agriculture per capita, value added by industry per capita and value added by services per capita. With 336 observations in each of the regression R-squared values are 0.9830, 0.3010 and 0.2867 for Reg1, Reg2 and Reg3 respectively, meaning that our dependent variables are explained by independent variables for about 98.30%, 30.10% and 28.67% respectively.

Durbin-Watson test results are 2.5285, 2.0773 and 1.8302 for Reg1, Reg2 and Reg3 respectively these results are all close to 2 which suggests that there is no serial auto correlation and since we have N > T we use Pesaran CD (2004) to check for cross-sectional dependence and p-value results are 0.2850, 0.2092 and 0.4484 for Reg1, Reg2 and Reg3 respectively and all these values are greater than 0.05 suggesting that we accept the null hypothesis at 5% significance level that there is no cross-sectional dependence among the residuals. The results show that resource abundance (logNR) is strongly positive significant at 1% significance level with industry sector, this result confirms the reversal of the resource curse for the 2000-2016 period (*see* **Table 12**). All the countries that benefit from natural resource abundance have strong industrial sectors, and have strong economic diversification, taking the earnings from resource rents and invest them in manufacturing sectors and this result suggests that among the reason on why SSA is turning the curse into blessing because of the improvement of industrial productions in the region, once it was a busting sector and now turning to booming sector and overcome the Dutch disease. Trade openness (logOPEN) is negatively significant with agricultural sector, gross fixed capital formation (logGFCF) is positively significant for both agricultural and services sectors, foreign direct investments (logFDI) is positively significant to the industrial sector suggesting

that during this period foreign investors invested in manufacturing sector and instead of exporting their raw materials and natural resources like they used to do, now they are using them in their industries and that's why they were able to reverse the curse. And population growth rate (POP) is not significant to any of the sectors while civil war (CW) still shows the negative relationship in all these sectors as expected (*see* **Table 15**).

Table 15*: Results of OLS estimator method using fixed effect model for disaggregate GDP *Dependent variable is logGDP component per capita (2000-2016 time periods)

Variables	Reg1 (Agriculture)	Reg2 (Industry)	Reg3 (Service)
logNR	0.0009 (0.0199)	0.1175*** (0.0350)	-0.0135 (0.0132)
logOPEN	-0.0698*** (0.0267)	0.0020 (0.0469)	-0.0246 (0.0177)
logGFCF	0.0462** (0.0232)	-0.0163 (0.0404)	0.0752*** (0.0152)
logFDI	-0.0330 (0.0364)	0.2258*** (0.0637)	-0.0041 (0.0240)
POP	-0.0045 (0.0127)	0.0142 (0.0216)	0.0021 (0.0081)
CW (Dummy)	-0.2277*** (0.0361)	-0.4352*** (0.0634)	-0.1003*** (0.0240)
Constant	0.8597*** (0.2090)	-0.7990*** (0.2315)	0.0387 (0.0872)
Observations N	336	336	336
F-statistics	402.4862	3.0882	2.8822
R-squared	0.9830	0.3010	0.2867
Durbin-Watson stat	2.5285	2.0773	1.8302
Pesaran CD	0.2850	0.2092	0.4484

Note: (*) represents 10% significance level, (**) represents 5% significance level and (***) represents 1% significance level.

Table 16 shows the results of OLS estimator method using fixed effect model using disaggregate real GDP in overall time periods for the 1980-2016 period, dependent variable is the real GDP component per capita which is value added by agriculture per capita, value added by industry per capita and value added by services per capita. With 756 observations in each of the regression R-squared values are 0.2323, 0.2910 and 0.2479 for Reg1, Reg2 and Reg3 respectively, meaning that our dependent variables are explained by independent variables for about 23.23%, 29.10% and 24.79% respectively.

Durbin-Watson stat results are 2.4641, 1.790 and 1.9476 are for Reg1, Reg2 and Reg3 respectively and these results suggest that there is not serial auto correlation in the residuals. The results from table 16 shows that resource abundance (logNR) is not significant for all three sectors, meaning that the presence of natural resource abundance in SSA has not been contributing to the economic growth throughout the years, this is because before 2000 the evidence shows the presence of the curse in the region and after 2000 we have seen the reversal of curse signs, our expectation is to see positive impact of resource abundance to the economies of the region as we have seen the positive signs for this, the results show over the years the trade openness have been positively significant to the industrial sectors and insignificant to other sectors, domestic investments (logGFCF) have been strongly positive significant to all sectors throughout the years meaning that domestic investments have been a key factor of the economic growth in the region. Increase in foreign direct investments (logFDI) has been a significant determinant of the industrial sector improvements, population growth rate (POP) has not been significant to the growth over the years and civil war (CW) in the region has been affecting economic growth negatively over the over and lead to the poor economic conditions in the region (*see* **Table 16**).

Table 16: *Results of OLS estimator method using fixed effect model for disaggregate GDP Dependent variable is GDP component per capita (1980-2016 time period)*

Variables	Reg1 (Agriculture)	Reg2 (Industry)	Reg3 (Service)
logNR	0.0022 (0.0070)	0.0058 (0.0089)	-0.0005 (0.0063)
logOPEN	-0.0115 (0.0110)	0.0436*** (0.0139)	0.0037 (0.0099)
logGFCF	0.0285*** (0.0103)	0.0555*** (0.0130)	0.0292*** (0.0093)
logFDI	0.0033 (0.0215)	0.0485* (0.0271)	-0.0015 (0.0193)
POP	0.0045 (0.0035)	0.0050 (0.0044)	0.0055* (0.0031)
CW (Dummy)	-0.3286*** (0.0331)	-0.4435*** (0.0418)	-0.2363*** (0.0298)
Constant	-0.0649 (0.0786)	-0.5266*** (0.0992)	-0.0948 (0.0707)
Observations N	756	756	756
F-statistics	3.4434	4.670	3.7506
R-squared	0.2323	0.2910	0.2479
Durbin-Watson stat	2.4641	1.790	1.9476

Note: (*) represents 10% significance level, (**) represents 5% significance level and (***) represents 1% significance level.

CONCLUSION

In this study we attempted to examine the impact of natural resource abundance on the economic growth of Sub Saharan Africa, whether the resource abundance has positive or negative effect on the economic development of this region. The decision to undertake this study emerged from the poor economic conditions that has been present for years in SSA despite being endowed with natural resources. There are different theories that explain the resource curse phenomena including: The Dutch disease, rent seeking activities, institutional quality, commodity prices volatility, resource mismanagement, resource depletion and resource drag theory. Our study covers twenty one SSA countries for the 1980-2016 period but we decompose into 1980-2000, 2000-2016 sub periods and for the 1980-2016 overall period. Also we use aggregated real GDP and disaggregated real GDP into three components which are agriculture sector share of GDP, industrial sector share of GDP and services sector share of GDP in order to observe any sectoral and structural changes. The findings show that resource abundance has a negative impact on economic growth for the 1980-2000 period (*see* **Table 10**) and we confirmed this result by using disaggregated real GDP components which confirmed the presence of the curse in this period because resource abundance was not significant to all three GDP components (*see* **Table 14**).

The results also show that the resource abundance has a positive impact to the economic growth for the 2000-2016 period showing that the curse has been reversed in the region (*see* **Table 11**) and our disaggregated real GDP component results also support this reversal of the curse by showing that resource abundance has a positive impact on the industrial sector in this period (*see* **Table 15**) but also foreign direct investment (FDI) played a very important role by investing to the manufacturing sectors and instead of exporting the natural resource available they are instead used in the industrial sector and that's why the resource curse was reversed that lead to the economic performance improvement in SSA in the recent years. The results show that the presence of natural resource in SSA has not been an important factor on the economic growth of this region as many would expect it to be and this is because of the presence of the natural resource curse, however since the beginning of the new millennium there is a sign of reversal of this curse and the structural changes and increasing of investments to the industrial sector are the main reasons for the turning the curse into blessings in this region (*see* **Table 13 & 16**).

This research faced many drawbacks and limitations and the major problem was the data unavailability, according to World Bank there are 48 Sub Saharan African countries, but due to the unavailability of data for most countries we were forced to use sample of only twenty one countries and if we had data for more countries our results would be close to the real population. Our study covers from 1980 because before this year there are no data for most of these countries and hence we couldn't observe the impact of resource abundance on growth rate from the earlier years. Had all the data were available we would have investigated the earlier periods than 1980, and another problem is missing of data, some countries have data that are missing so we had to take the average of data so that we could fill all the missing

data and we had to add constant value in all data sets so that have a balanced panel data.

From the results of our study we came up with few policies recommendation on how to manage the natural resource especially in resource-rich countries. Results of this research show that there is a sign of reversal of the resource curse in SSA when industrial sectors is booming and when investors investing in the manufacturing sector, so we recommend the economic policy makers and investors to shift their economies from a single source of income to multiple source of income by investing the revenues from resource rents into other sectors mainly being manufacturing sector so they can turn the curse into blessings and this is what Norway and Botswana have been doing and that's why they have been benefiting from the natural resources . But we also recommend political leaders in resource-rich countries to attract more foreign investors and domestic investors because our results show that investments play a huge positive role in boosting economic growth in this region. Intra-Africa trade is extremely important for the economic development of the continent, so infrastructures must be improved and hence increase logistic performance within African countries and beyond. Recently we have seen a promising step toward increasing the intra-African trade and economic development by Economic Community of West African States (ECOWAS) by adopting a single currency (ECO) within this community by 2020 and hoping for the improvement of economies in this region and also free trade bloc that will create economic integrated in African continent. Another agreement is African Continental Free Trade Area (AfCFTA) which was signed in Kigali 2018 is another positive policy and should be recommended and applied throughout all the African nations because these two trade blocs will boost trades and hence economic performance of the continent.

In order to enjoy fully the benefits of the natural resource available in this region or any other place, political stability must be maintained as our results show, the presence of civil war in the region is a huge factor that lead to it poor economic performance so we recommend democracy and accountability because that is the only way to guarantee peace and political turmoil. Further researches on the subject of the impact of natural resource abundance on economic growth are needed in order to investigate further on other determinants of resource curse and its reversal in resource-rich countries, further researches can investigate whether the institutions quality of this region are good enough for the reversal of the curse or not, and if they have played any role in recent significant economic growth in SSA. Another important addition to the further researches is investigating the effect of ECO (ECOWAS single currency) to the economic growth of Sub Saharan Africa and also further researches and studies can examine how Africa Continental Free Trade Area (AfCFTA) will impact the economic performance of the region in the future. Also further researches can use more than twenty one countries in order to cover more ground for investigation and their studies will cover a bigger time periods with better results. Future researches can also decompose resource abundance into different components: oil rents, mineral rents, forests rents and natural gas rents so that we can see the impact of each natural resource to the economic growth. We will need further researches will show if the resource curse reversal will be sustainable in the future and if Sub SSA will continue to benefit from their minerals rich.

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APPENDIX

Table 17: Descriptive statistics

Sample: 1980 2016						
	GDPPCR	NRR	OPEN	GFCF	FDI	POPR
Mean	0.776922	13.09858	59.08486	19.37875	2.261318	2.699562
Median	1.322000	9.906454	53.48000	18.87307	1.188901	2.731775
Maximum	36.98090	63.55008	152.5500	54.11085	46.49370	7.917892
Minimum	-47.80555	0.000000	6.320343	-2.424358	-28.62426	-6.184857
Std. Dev.	5.760419	11.24002	26.45429	8.340147	4.243240	0.993848
Skewness	-1.105350	1.609364	0.663477	0.559259	3.546615	-2.144113
Kurtosis	15.64962	5.522908	3.119962	3.473925	36.20935	22.36738
Jarque-Bera	5338.639	541.4809	57.47196	47.77537	37334.03	12739.05
Probability	0.000000	0.000000	0.000000	0.000000	0.000000	0.000000
Sum	603.6685	10177.59	45908.94	15057.29	1757.044	2097.560
Sum Sq. Dev.	25749.57	98038.32	543067.6	53977.04	13971.94	766.4814
Observations	777	777	777	777	777	777

Table 18: Descriptive statistics (GDP component per capita)

Sample: 1980 2016			
	GDPCAGR	GDPCIND	GDPCSER
Mean	206.4601	878.6885	842.9876
Median	172.2707	211.0253	319.2690
Maximum	594.0978	12443.37	4775.153
Minimum	56.57756	21.24953	62.84291
Std. Dev.	109.6197	1926.773	1077.002
Skewness	1.265044	4.175057	1.778918
Kurtosis	3.863003	21.37689	5.132707
Jarque-Bera	231.3556	13190.69	557.0649
Probability	0.000000	0.000000	0.000000
Sum	160419.5	682741.0	655001.3
Sum Sq. Dev.	9324794.	2.88E+09	9.00E+08
Observations	777	777	777