2021

NATURAL RESOURCE CURSE, ECONOMIC FREEDOM, ECONOMIC GROWTH AND DEVELOPMENT: CASE OF AFRICA

Oluwatomisin Shalom Akinbo
Michigan Technological University, oakinbo@mtu.edu

NATURAL RESOURCE CURSE, ECONOMIC FREEDOM, ECONOMIC GROWTH AND DEVELOPMENT: CASE OF AFRICA

By

Oluwatomisin Shalom Akinbo

A THESIS

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF SCIENCE

In Applied Natural Resource Economics

MICHIGAN TECHNOLOGICAL UNIVERSITY

2021

This thesis has been approved in partial fulfillment of the requirements for the Degree of MASTER OF SCIENCE in Applied Natural Resource Economics.

College of Business

Thesis Co-Advisor: *Gary Campbell, PhD*

Thesis Co-Advisor: *Emanuel Xavier-Oliveira, PhD*

Committee Member: *Brian Barkdoll, PhD*

College Dean: *Dean Johnson, PhD*

Table of Contents

List of Figures v

List of Tables vi

Acknowledgements vii

Abstract viii

1 Introduction 1

2 Case Study: Resource curse narrative in selected African countries 10

3 Literature review and hypotheses development 19

3.1 Theoretical Background 19
3.2 Natural Resource 19
3.3 Natural Resource Curse 21
3.4 Economic Freedom 23
3.5 Hypotheses Development 24
3.5.1 Natural resource dependence, economic growth and development 25
3.5.2 Natural resource dependence, manufacturing, and services dependence 26
3.5.3 Natural resource dependence and agriculture dependence 28
3.5.4 Economic freedom, economic growth and development 28
3.5.5 Economic freedom and natural resources dependence 29
3.5.6 Economic freedom, dependence on manufacturing and agriculture 30
3.5.7 Economic freedom and service dependence 31
3.5.8 Size of government, economic growth, and development 32
3.5.9 Legal system, property rights, rate of economic growth and development 32
3.5.11 Freedom to trade internationally, rate of economic growth and development 34
3.5.12 Regulatory burden, rate of economic growth and development 35
3.5.13 Sound money, dependence on natural resources, manufacturing, services and agriculture 36
3.5.14 Freedom to trade internationally and dependence on natural resources and agriculture 36
3.5.15 Freedom to trade internationally and dependence on the manufacturing sector 37

3.5.16 Freedom to trade internationally and dependence on the service sector 38

4 Research Methodology 39
4.1 Study Area 39
4.2 Research Approach 40
4.3 Data sources, collection, and treatment 40
4.4 Economic Freedom of the World (variable) 42
4.5 Summary Statistics 43
4.6 Estimation Techniques 44

5 Econometric results and discussion 45
5.1 Model specification 45
5.2 Model 1A: National Accounts Identity 50
5.3 Model 1B: National Accounts Identity+ interaction effects 50
5.4 Model 2A: National Accounts Identity+ Economic Freedom of the World (EFW) 52
5.5 Model 2B: National Accounts Identity+ Economic Freedom of the World (EFW) + interaction effects 52
5.6 Model 3A: National Accounts Identity + Economic Freedom of the World (distinct) 54
5.7 Model 3B: National Accounts Identity+ Sound money and Free trade + interaction effects 55

6 Summary, conclusions, and policy recommendations 58

7 Appendix 61
Table 4. Correlation Matrix 61
Table 5: Sample Results I 62
Table 6: Sample Results II 63

8 References 64

List of Figures

Figure 1. Total GDP and Natural resources in Africa (1999 to 2018)……..……..7

Figure 2. GDP per capita and Natural resources per capita (1999 to 2018)……..…….8

Figure 3. Percentage of Natural Resources as a share of GDP (1999 to 2018)……...……9

List of Tables

Table 1. Summary statistics (per capita) for Africa …….42

Table 2. Log-log Model Coefficients of GDP per Capita for Africa……49

Table 3. Log-log Model Coefficients of GDP per Capita for Africa……49

Acknowledgements

I would like to express my profound gratitude to my advisors, Professor Gary Campbell and Professor Emanuel Xavier-Oliveira, for their inestimable guidance and encouragement throughout the course of this research. I would also like to thank my committee member, Professor Brian Barkdoll for his great contributions and quality feedback on the thesis draft. My great appreciation is extended to the College of Business, Michigan Technological University for providing me with support which influenced my decision to pursue my graduate studies in the United States. My heartfelt gratitude is expressed to Kazeem Ogunsusi for his immense support and assistance rendered towards formatting of the thesis. I really appreciate Kazeem Kareem for his great motivation. I would also like to acknowledge my family for their relentless encouragement and love. Finally, I am thankful to my friends and the African Students Organization at Michigan Tech.

Abstract

Over the years, there has been discord or lack of agreement on the effect that natural resources have on economic growth and development. This study adopts output approach to investigate the effect that natural resources and institutions (Economic Freedom) have on economic growth for the period of 1960 to 2020 using World Bank data. The analysis employs Multiple Regression Analysis based on augmented Ordinary Least Squares Regression methods. The results are mixed, as the outcome indicates that, while natural resources are positively related to economic growth, there exists a crowding out effect between natural resources and two sectors of the economy namely, agriculture, and manufacturing. An Economic Freedom Index was also positively related to economic growth. Sound Money and International Trade Freedom had a significant positive relationship on economic growth while Size of the Government, Legal System, Property Rights, and Regulatory Burden were insignificant. The study recommends Hartwick's rule of sustainability and economic diversification as this helps to reduce volatility, facilitate international trade freedom and the development of a sound money system.

1 Introduction

Economic growth refers to the increase in the gross domestic product or output of a country at a given point in time while economic development is an all-encompassing phenomenon which encapsulates economic growth with other noticeable positive changes in the society and economy. In other words, economic growth is quantitative while economic development is both quantitative and qualitative (Jhingan,1997). Though these two are often used interchangeably, economic growth is a prerequisite to economic development. Economic development is often characterized with poverty reduction, advances in technology, higher life expectancy, reduced inequality of income and wealth, reduction in unemployment, and increased access to the basic necessities of life, such as food, shelter, and clothing.

Natural resources, human resources, capital goods, and technology are the four main determinants of economic growth of most countries (Samuelson and Nordhaus, 2000). While the economic growth of countries such as China, United States, Germany, and South Korea is heavily dependent on their highest rate of technology, Africa boasts of the richest concentration of natural resources such as oil, diamonds, copper, bauxite, lithium, gold, and tropical fruits. It is estimated that about 30% of the world's mineral reserves are found in Africa (Adu and Dramani, 2018).

Natural resources are defined as "stocks of materials that exist in the natural environment that are both scarce and economically useful in production or consumption, either in their raw state or after a minimal amount of processing" (WTO,2010). The benevolent attribute

of mother nature has granted her the ability to "bestow" upon countries with a variety and vast amount of natural resources, while others at the extreme end of the spectrum do not have as much. Countries with an abundance of natural resources, therefore, are often considered 'blessed' due to the pivotal role that these resources play.

There are two main contrasting views about the role of natural resources, however, with some authors believing that natural resources are a blessing while others think of them as a curse. Some of the proponents in the positive school of thought that emphasize that natural resources serve as a grease to economic development are Adam Smith, David Ricardo, and Walter Rostow. Rostow (1961) argued that being endowed with natural resources acts as a catalyst to spur developing countries from a state of under-development to industrial take-off. Rostow confirmed that the take-off stage is an industrial revolution where most economies are seen as self-reliant, besides experiencing radical changes in production methods.

From time immemorial, natural resources have contributed positively to economic growth. Several countries such as Canada, Finland, Norway have attributed their growth and diversification to the abundance of natural resources, they attested that these resources have also played a major role in the development of technologies and capital goods industries (World Bank, 2001). Natural resources play a very crucial role in the economic growth and development of many countries. Besides being a major contributor to industrial development and a means of foreign exchange, they also create markets, encourage investment, and serve as a source of livelihood by creating job opportunities for people.

This was the prevalent view until the early 1980s when authors such as Sachs and Warner (1995), with contrasting views, started making solid cases for their arguments.

A major crisis that birthed this contradictory school of thought was the oil boom which led to Dutch disease, a term coined by The Economist Magazine in 1977 in an attempt to analyze the Netherlands' economic situation after large natural gas fields were discovered, thus leading to increased economic development in the natural gas sector while the manufacturing sector experienced a decline as a result of neglect. The discovery of large natural gas reserves in the Netherlands led to huge capital inflows from an increase in export revenue and this caused the demand for Dutch currency to rise, leading to a real exchange rate appreciation. Hence, the manufacturing sector struggled to compete in international markets due to this appreciation. (Benkhodja, 2014)

Several studies have also established and buttressed the fact that natural resources are not a determinant of economic growth. These authors with the pessimistic view argued that countries endowed with abundant natural resources have experienced less economic growth and extreme poverty, citing African countries such as Nigeria, Angola, and the Congo as examples, including Venezuela and some Middle Eastern countries. This paradox whereby countries rich in natural resources are faced with low per capita income and a lower quality of life is termed a 'natural resource curse' (Auty, 1993). Contrary to this, several East Asian countries which include Korea, Taiwan, Japan, Singapore, and Hongkong have experienced a higher standard of living and improved economic development despite being blessed with few natural resources.

In a bid to address the natural resource curse, Eifert et al. (2003) expressed that natural resources affect both the economy and institutions. Several authors such as Mehlum et al. (2006) and Rabah et al. (2007) have questioned some of the findings of the pessimistic views and have identified the critical importance of institutions in being instrumental to channeling natural resource wealth into economic growth paths. According to them, sterling institutional quality in a country with enormous natural resources can cause a switch from being resource cursed to resource blessed. Mehlum et al. (2006) documented that for 'grabber-friendly' (more prone to corruption) institutions, resource wealth mostly reduces aggregate income while for producer-friendly (less prone to corruption) institutions, hence resource wealth will increase aggregate income. Albeit several studies (Bulte et al., 2005 and Sala-i-Martin and Subramanian, 2013) have also shown the existence of a negative relationship between natural resource wealth and institutions.

My research was borne out of a lack of consensus on the role that natural resources play on economic growth and development. Having an answer to this question while adopting a different approach (output) will be useful towards providing insights and policy recommendations or suggestions, which are valuable towards achieving economic growth and development. This study adds to the existing literature in two distinct ways. First, in its measure of national income, it adopts a product method which is otherwise known as the value-added method. This method focuses or highlights the net value added to the product at various production stages. The economy is often broken down into different industry or sectors to include natural resources, agriculture, services and manufacturing. The national income is then computed by adding the total output. The advantage of this

method is that it not only summarizes national income but also the contribution of each sector to the national income and the relative importance of different sectors to each other.

Second, to examine the effect of natural resources on economic growth, this research makes use of the World Bank's updated data for the period of 1960 to 2020. The uniqueness of this study also lies in the adoption of an intrinsic approach by going into more detail to break down the Economic Freedom of the World (EFW) index into several areas and checking for the possible interactions between this individual EFW areas and natural resources, besides identifying the effect of an aggregate EFW index on natural resources. The study also attempts to analyze the impact of economic freedom on economic growth and the interaction effect between natural resources and economic freedom on the major sectors of the economy namely; services, agricultural and manufacturing.

Though resource curse is not limited to Africa, this study focuses mainly on African nations because resource wealth and curse have a more debilitating and catastrophic effect on these countries. This is because the sudden discovery of natural resource in these countries usually lead to concentration of wealth in the hands of a few that control rent (income derived from the ownership of land and other natural resources in fixed supply), while the majority of the people are being excluded from these rents or rewards for being blessed with natural resources. The Frasier Institute (2020) in their Economic Freedom of the World report listed the Central African Republic, Democratic Republic of Congo, Zimbabwe, Republic of Congo, Algeria, Iran, Angola, Libya, Sudan, and Venezuela as the

ten lowest-rated countries in terms of economic freedom (ability of individuals to take part in economic pursuits).

Figure 1 shows the total GDP and natural resources for 50 African nations during the period of 1999 to 2018 (20 years). Figure 2 shows the same variables but in per capita terms (GDP divided by total African population and natural resources divided by total African population. Figure 3 depicts the share of natural resources on GDP which is computed as natural resources divided by GDP. These three figures are similar in interpretation as the graphs suggest that the share of natural resources on GDP (both aggregate and per-capita level) was increasing steadily from 1999 to 2008. This share of natural resources on GDP then dropped in 2009. This sharp decline in 2009 could be a result of the great economic recession during that period. The share of natural resources on GDP also increased for the years 2010 to 2012, declined through the years 2013 to 2016, and then increased steadily for the years 2017 to 2018. These plots include 50 of the 54 African countries. The four countries excluded due to lack of several data are: Djibouti, South Sudan, Somalia, and Eritrea (as indicated in Tables 4 and 5 of the Appendix section).

The rest of the paper is organized as follows. Section 2 describes the narratives of several African countries that have suffered from the resource curse syndrome and also the case of Botswana with contradictory results. Section 3 reviews related literature and develops hypotheses. Section 4 describes the research methodology. Section 5 analyzes the data and interprets the results. Finally, Section 6 summarizes the findings, concludes the study, and recommends effective policies.

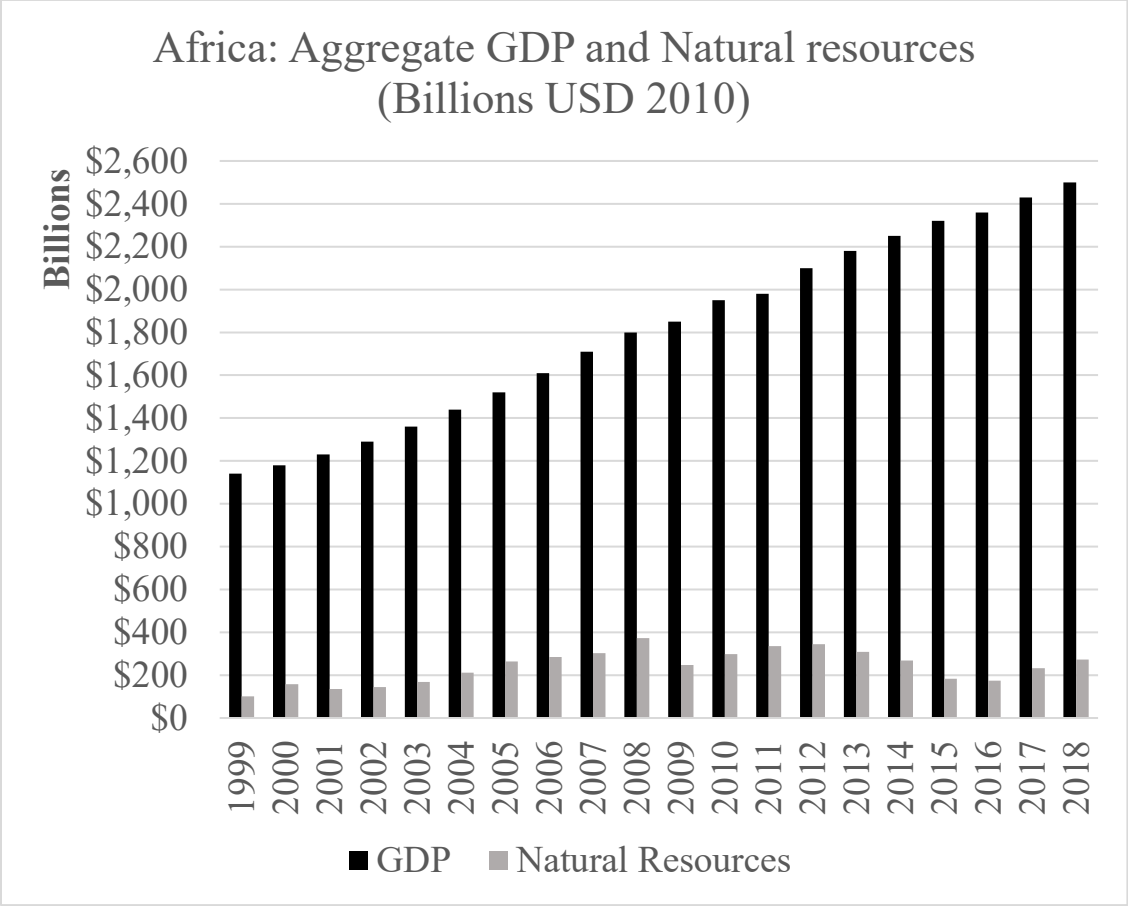

Figure 1: Total GDP and Natural resources in Africa (1999 to 2018)

Source: World Bank data

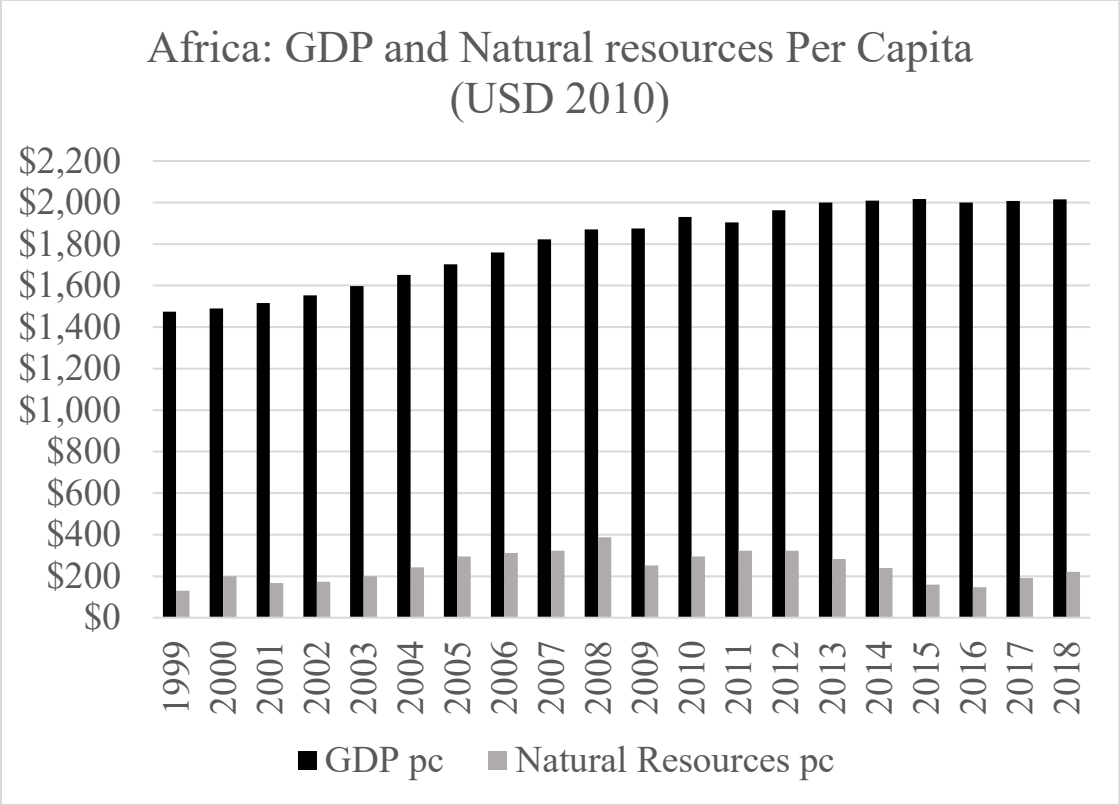

Figure 2: GDP per capita and Natural resources per capita (1999 to 2018)

Source: World Bank data

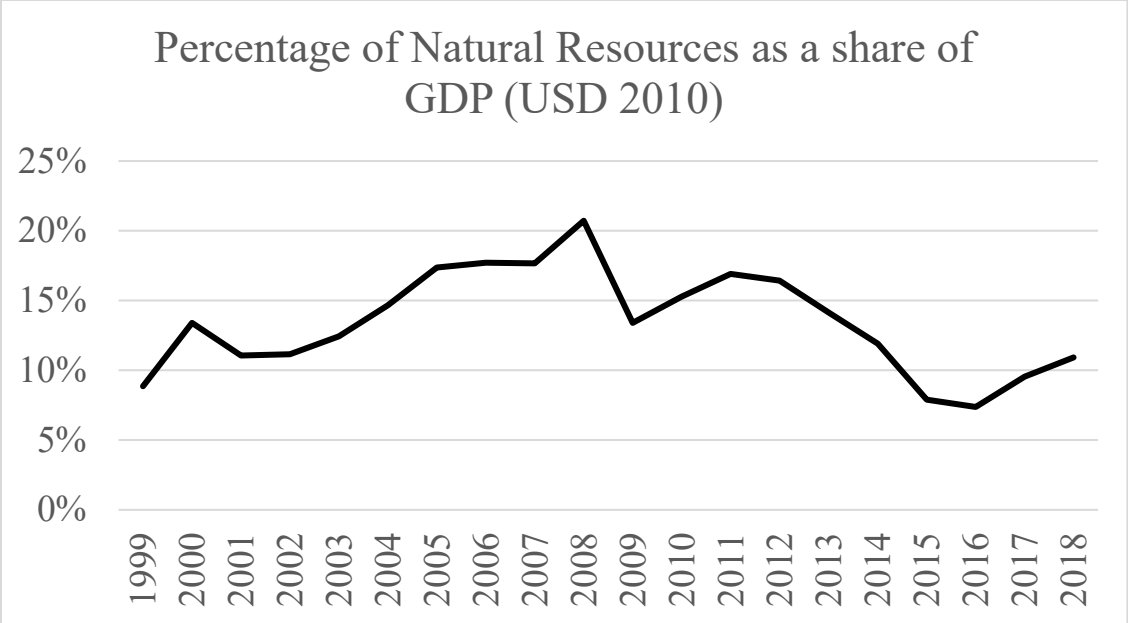

Figure 3: Percentage of Natural Resources as a share of GDP (1999 to 2018)

Source: World Bank data

2 Case Study: Resource curse narrative in selected African countries

Many African nations are endowed with natural resource wealth, which can metamorphose their economies for the better. However, the discovery of these natural resources has been accompanied with conflict, environmental damage, political instability, corruption, nepotism, and even lower standards of living in most of these countries. On the other hand, Botswana and Ghana are among the very few African countries that have avoided the curse.

Nigeria was a predominantly agrarian society and one of the highest producers of Agricultural resources in the world (Statista, 2020). Most of Nigeria's foreign exchange earnings were gotten through the exportation of cash crops. Different regions of the country specialized in the commercial production of agricultural products with which they were most blessed. This was evident through the exportation of rubber from the southern region, cocoa and coffee from the western region, palm oil and kernels from the eastern region, and hides, skins, and groundnuts from the northern region. Kano, Nigeria produced so many groundnuts that the sacks were towered towards the sky in pyramid-like structures resembling the Egyptian Pyramids. In 1965, about 70 percent of the total labor force were employed by the agricultural sector of the economy and the sector was also a major contributor to the GDP. (Cooke, 2016).

A transmission channel of the resource curse is notable through the Dutch disease syndrome mentioned earlier. The discovery of crude oil in 1956 at Oloibiri, Niger-Delta area of Nigeria marked the beginning of significant changes in the structure of the Nigerian

economy as well. The country rose to being the largest producer of oil in Africa (EIA, 2016) and a top exporter of oil in the world. As a result of this, the real exchange rate appreciated, which in turn increased the real wage of workers and led to a decline in the export of agricultural goods. Ironically, a country being consistently ranked as the fastest growing economy in Africa and often referred to as the "giant of Africa" (in terms of its large population and natural resource endowment) is also one in which Human Development Report (2020) estimates that about 46.4% of its population live in multidimensional poverty, a composite measure of deprivations encountered by individuals involving three poverty dimensions namely health, education, and standard of living, with an additional 19.2% categorized as being vulnerable to multidimensional poverty.

Another economic reason for the evidence of the resource curse is a result of unstable commodity prices. Commodity prices tend to be highly volatile because the demand and supply for them are inelastic in the short run. Also, the supply for forest resources might be influenced by nature or weather. Speculation also affects the volatility of commodity prices as a result of investors buying and selling oil futures. For example, an expectation that oil prices will rise will encourage investors to buy more at a present moment, hence causing an increase in price. Countries that specialize in commodities with substantial price volatility usually experience more volatility in their terms of trade, they are also faced with less foreign direct investment and lower growth rates than their counterparts who specialize in commodities with more stable prices or in countries that are industrial leaders (Blattman et al. 2007).

One of the political reasons for resource curse is rent seeking. Rent seeking is a phenomenon in which an entity or individuals tend to increase their wealth without creating a reciprocal means of generating wealth. These activities include lobbying, subsidies, tariffs, and grants. Financial gains and benefits are gotten through rent seeking by manipulating the distribution of economic resources. Resource-rich countries are more prone to rent seeking activities than resource poor ones (Leite and Weidmann, 1999; Torvik, 2002). Political rent seeking is a means through which resource revenue from natural resources are concentrated in the hands of the few elites and politicians, hence widening the income inequality gap. It also discourages the flow of foreign direct investment, encourages the emergence of inefficient firms while hindering economic growth and development in the region (Go et al. 2007).

Conflict is another political cause of the natural resource curse. Several authors have argued that countries with natural resources are more likely to be involved in conflict than countries that are resource poor. Natural resources can often speed up internal conflict when several groups or sections vie for the power or authority over the resources. This is the case in countries like the Democratic Republic of the Congo (DRC), Libya, Angola, Iraq, and Nigeria (Niger-Delta).

The DRC, while sitting on an estimated unexplored and pristine deposit of mineral ore reserves worth an excess of $24 trillion (Morgan, 2009), is considered one of the richest countries in the world in terms of natural and mineral resources, producing over 70% of the world's cobalt (Felix, 2019). Yet in 2018, about 73% of its population lived on less

than $1.90 per day, which is the international poverty threshold level (World Bank, 2021). The first civil war took place in Zaire (present-day Democratic Republic of Congo) from October 1996 to May 1997, whereas the second one started in 1998 and lasted till 2003. Before the war, Mobutu, a dictator and authoritarian ruled Congo for thirty-two years. He planned several coups, and his administration was plagued with corruption and chaos. These years of war have destroyed the little infrastructure left behind under the Mobutu regime, while instability caused by war has left the citizens in abject poverty, battling a low standard of living, diseases, malnutrition, and a high rate of illiteracy. The latest 2020 Human Development Index ranks DRC 175th out of 189 countries.

Besides cobalt, copper, tin, and uranium, Congo is also rich in diamonds. These diamonds are mined in several areas including farmlands (farming used to be a prevalent activity in Congo), thus leading to insecurity and food shortages. Sometimes these diamonds are referred to as blood diamonds or conflict diamonds because of the hazardous and dangerous activities the people often engage in before these diamonds are mined and due to the involvement of young children in the process. The artisanal miners range from young children who often drop out of school to assist in mining, to middle aged, and old people living on less than one dollar per day. The use of simple tools is prevalent during this activity and often times the miners lack protective equipment such as hats, gloves, and shoes, hence, leading to severe injuries and death. Global Witness estimates that these diamonds are often sold for only one-fifth of their original price. Due to the high rate of poverty in the region, these diamonds are sold at such extremely low prices to anyone who is willing to buy from the miners. Also, the lack of regulation in the industry has

encouraged environmental degradation, violence, workers' exploitation, and abuses. These natural resources often instigate internal conflicts and they are used to finance or fuel conflicts and civil wars. It has been observed that states that are rich in oil are sometimes targets of international conflict, for example the case of Iraq invading Iran and Kuwait.

The Niger-Delta region of Nigeria is really unique in its biodiversity and is notable for having the most important mangrove forest in Africa and third largest mangrove forest in the world (Usman and Adefalu, 2010; Ikemeh, 2015). From being homes to a wide range of lowland rainforest, freshwater forest, and a large aquatic ecosystem, this region is also one of the richest and diverse range of flora and fauna, that also include threatened, endemic, and endangered species (Ikemeh, 2015). This encouraged fishing, farming, and other services that have contributed to a successful means of livelihood for the people. This area is one of the largest oil producing regions in Africa. Ironically, most of the people lack access to basic healthcare, education, and infrastructure. In addition to numerous cases of oil spillage by oil companies, Amnesty International (2018) estimated that since 2011, Shell Oil Co. alone has reported about a thousand spills, which is an equivalent of 17.5 million liters, estimated to be about the size of seven Olympic swimming pools. As huge as this seems, the quantity is apparently underestimated.

The mismanagement of oil by the international companies (mainly associated with a high level of corruption) responsible for the commercial oil production has led to a huge amount of land, water, and air pollution, thus displacing people out of their main occupations, mainly fishing and farming. Amnesty International (2018) identified the Niger-Delta

region as one of the most polluted places on earth. This pollution has also escalated an unemployment crisis in the region. The opposition group, known as the Niger-Delta Avengers, have expressed anger and strife against this inhumane exploitation their region has faced and hence incited violence and conflicts in the Niger-Delta area of Nigeria. The Avengers have been responsible for crude oil pipeline vandalization, oil bunkering, and many cases of kidnapping.

In a similar vein, Angola, the second largest oil producer in Africa after Nigeria, is a country that also falls under the resource-cursed category. Plagued with persistent civil war, lack of democracy, competition over natural resources, and corruption, the aftermath effect of this is widespread poverty and slow economic diversification. Collier and Hoeffler (2002), in their analysis of 52 countries over a period of almost forty years, asserted that countries that trade primary commodity exports are more prone to civil war. They argued that the existence of natural resources in a country speeds up the chances of a civil conflict in that country. The probability that a country with no natural resources will face civil war is 0.5 percent while the probability that a country with a natural resources-to-GDP share of 26 percent is 23 percent. Humphreys (2005) also confirmed that resource wealth has a positive correlation with civil war.

Angola was not totally free nor democratic since it was a country with records of severe human right abuses, absent political rights, and systematic denial of basic civil liberties. Angola gained independence from Portugal in 1974 and this led to a power struggle among three opposition parties, namely People's Movement for the Liberation of Angola (MPLA),

National Union for the Total Independence of Angola (UNITA), and The National Front for the Liberation of Angola (FNLA). Each of these factions had foreign political backings. The MPLA was backed by Cuba and the Soviet Union, while UNITA was backed by apartheid South Africa and the USA, and FNLA was formerly supported by the USA. This led to a fifteen-year civil war that was directly connected to control of the state and resources. From an economic perspective, the oil sector accounting for about 50 percent of the GDP, over 90 percent of the export earnings and about 75 percent of government revenue caused Angola's economy to experience a significant growth rate, however, this was negatively affected by the 2009 global recession. The country was able to bounce back from this recession and grew again in 2010. The thriving oil sector was responsible for high inflation in the prices of goods and services and caused a neglect of the agricultural and industrial sector. Again, a country endowed with a vast amount of natural and mineral resources ranging from copper, manganese, iron, gold, oil, and even timber still has about 70 percent of its population living in poverty and consistently ranks among the countries with the lowest Human Development Index. (Inge Amundsen , 2014).

Nonetheless, do we assume that every African country that is resource endowed is naturally or automatically cursed? Though many African countries blessed with natural resources are found guilty of this curse, the answer to this depends on the African country under consideration and the economic and institutional framework upon which these countries operate. It is important to note that an African country such as Botswana, through her diamond wealth, has managed to escape the resource curse and has experienced significant economic growth and development. Firstly, after gaining independence, Botswana avoided

civil war and strife associated with independence. The Botswana government also came up with a strong political and economic institutional framework pivotal to achieving political stability and economic growth. One reason is to ensure that corruption is minimized. This was evident in the Corruption Perception Index (an index that ranks countries based on the perceived levels of government corruption), ranking Botswana as the least corrupt country in Africa. The existence of a viable regulatory environment and logical, equitable rule of law has also encouraged foreign direct investments and enabled businesses to thrive.

In addition, Botswana invested a lot of her resources on education, healthcare, and infrastructure. This conforms with Hartwick's rule of sustainability which prescribed reinvesting resource rents, thus keeping the value of net investments equal to zero. "Invest all profits or rents from exhaustible resources in reproducible capital such as machines. This injunction seems to solve the ethical problem of the current generation shortchanging future generations by overconsuming the current product, partly ascribable to current use of exhaustible resources" (Hartwick, 1977). This weak sustainability by Hartwick suggests keeping all capital constant, hence balancing depreciation with investment. The result of this is constant consumption and constant net national product. This rule emphasizes that a constant level of consumption can be maintained perpetually from an environment or natural resource endowment if all the scarcity rents from resource extraction are invested into capital. Botswana was able to successfully avoid the Dutch disease by maintaining a fiscal budget surplus and a trade surplus. The country averted the adverse effects of commodity price volatility by saving the income generated through diamond mining. The Public Service Debt Management Fund and the Revenue Stabilization Fund were also set

up to provide the government revenue from diamonds gradually instead of dispensing all at once. All of these served as major impetus for Botswana towards improving economic growth and living standard of the people.

3 Literature review and hypotheses development

3.1 Theoretical Background

In a bid to further clarify concepts and propose relationships among the main concepts in this study, while buttressing the main findings of this study, there is a need to review existing literature related to the topic. This aspect has been further broken down into several sections. The first three sections provide more insights on the concepts of natural resource, natural resource curse and economic freedom respectively. The next sections then develop hypotheses while reviewing relevant literature.

3.2 Natural Resource

Natural resource is a broad term which is interpreted differently by several authors. Clarifying the definition of a natural resource is an important factor since it determines how it is measured. Natural resources are assets which occur naturally and are beneficial towards providing raw materials and energy, which are used in economic activity (or that may provide such benefits one day) and are subject primarily to quantitative depletion through human use (OECD, 2005).

Natural resources can be further broken down into two groups based on their availability, namely renewable and non-renewable. The difference between these two is in their regenerative ability. While the former (forest and water resources) is available in infinite quantity and can be replaced, the latter, which comprises fossil fuels and minerals, cannot be replaced when used up.

Another lack of consensus in the definition of natural resources is whether to include agricultural commodities or not. Forest resources are often termed natural resources while agricultural products are not included because they are often grown with the efforts of humans and fertilizer. Though several authors have included agricultural products in their definition of natural resource, others are beginning to exclude them because they are produced, not extracted and on some occasions, they yield unfavorable results, hence should not fit in the natural resource category (Ross, 2015). This research is in accord with this definition, a reason why the natural resource and agricultural sectors will be presented as distinct in our study. A distinction was also made between point source and diffuse source, with the former relating to resources extracted from a narrow geographic or economic base, for example, oil, mineral, and plantation crops (Isham et. al, 2005), while the latter includes crops such as rice and wheat. Several authors have also argued that point-source resources are more liable to exert a negative impact on economic growth than diffuse resources because these point source resources have a higher tendency to spur rent seeking activities and expropriation. Natural resources can also be defined as sources of material and energy that are economically attainable in the natural environment in raw form prior to their conversion through human activity (INSEE, 2021).

Since most of our data are sourced from the World Bank, for consistency purposes in this study, we will adopt World Bank's definition of natural resource rents to include an aggregate of oil, natural gas, coal (hard and soft), mineral, and forest rents (World Bank, 2021).

3.3 Natural Resource Curse

Natural resource development often constitutes a significant production land. Countries with abundant resources have always been termed “fortunate”, however several authors (Lal and Myint 1996, Auty, 2001, Gylfason; 2001, Sala-i-Martin and Subramanian; 2003) have found that natural resources have a negative influence on economic growth, this is also known as the resource curse paradox. Palley (2003) asserted that natural resource wealth has been responsible for stagnation and conflict, strife, poverty and political instability, besides serving as an obstacle to democracy and growth in developing countries (under which category many African countries fall). Sachs and Warner’s seminal paper (1995) established that there was a negative relationship between the availability of natural resources and economic growth. This was corroborated by Gelb (1998), whose analysis confirmed the resource curse phenomenon. According to his research findings, oil economies were worse off than non-oil economies in the efficiency of domestic capital formation during the boom period.

The Natural Resource Governance Institute (2015) identified several factors responsible for the resource curse which include the Dutch disease, democracy, conflict, inefficient spending and borrowing, and weaker institutional development amongst others. Similarly, Badeeb et al. (2017) identified two distinct transmission channels of the resource curse, namely economic and political. From an economics perspective, countries with abundant natural resources usually experience stunted economic growth due to the Dutch disease phenomenon, failures of economic policy, volatility of commodity prices, and the neglect

of education. From a political perspective, rent seeking, corruption, and the presence of weak institutions have been identified as the causes for a resource curse.

Sachs and Warner (1995), through their study (one of the most cited works on resource curse) were able to gather data for the time periods 1970 to 1989 and used cross-section growth regressions to demonstrate the resource curse paradox by proving that a high rate of natural resource exports was responsible for slower growth rates in the countries that were studied.

On the other hand, in a recent study by Brunnschweiler and Bulte (2006), they described the resource curse phenomenon as a basic tale of paradox and "red herring," probably borne out of confusing interpretation. Brunnschweiler and Bulte (2006) also explained the importance of distinguishing between resource dependence (output) and resource abundance (stock) as both are often (sometimes mistakenly) used interchangeably, hence, might lead to inaccurate results when analyzing the effects that natural resources have on economic growth. While resource dependence refers to the extent to which a country depends on her resource revenues or resource wealth, resource abundance on the other hand signifies a country's estimated stock of natural resource endowments which include deposits of minerals, oil, and gas (Brunnschweiler and Bulte, 2008). Through their findings, they were able to prove that resource dependence by itself has no effect on growth, whereas resource abundance positively affects growth and institutional quality, thus negating the resource curse paradox. Muhammand Shabaz et al (2019) on the other hand while exploring the relative effects of resource abundance and resource curse in 35

countries through a period of 1980 to 2015 have been able to demonstrate that resource abundance by itself is not a curse, resource dependence is.

3.4 Economic Freedom

Economic freedom indices spring forth from some of the factors Adam Smith (1776) listed in his classical book 'Wealth of all Nations' which are responsible for inciting a nation's prosperity and wealth. Firstly, a larger government size is associated with increased government spending, investment, government-controlled enterprises, and high taxation, which dwindles financial incentives for innovation and investment. Thus, economic freedom and individual choice suffers at the expense of government decision-making. Adam Smith believed that the duties of the government should focus mainly on nation defense, universal education, public works, such as construction of infrastructural facilities, legal rights enforcement, and penalizing criminals.

The importance of having an excellent legal system and property rights cannot be overemphasized as this is a measure of how likely it is for private property to be confiscated or taken away unjustly. It is also a good means of evaluating the strength of the judiciary system, quantifying the level of corruption in the judiciary, and the ability of individuals and businesses to enforce contracts.

High volatility and expectations of future rise in price can stifle investments and savings. It encourages hoarding and '*black-marketing'* of natural resources. Hence, there is the need to have a sound money system in place, that is one which is not susceptible to an instant or immediate appreciation or depreciation in purchasing power over a long period

of time, often promoted by self-correcting channels which are deeply rooted in a laissez faire system. Sound money increases the people's confidence in making future plans and using economic freedom effectively.

Freedom to trade internationally has its advantages such as encouraging specialization by allowing countries to focus more on the production of goods in which they have comparative advantage. Another benefit of international free trade is that it leads to higher efficiency and optimal use of resources. With free trade, home producers are faced with competition. Hence, to meet up with the standards of the other international countries or competitors, they will be forced to put forth their best effort, thus increasing efficiency and innovation. Free trade reduces monopoly by eliminating tariffs, it also lowers costs of imported inputs, which leads to a reduction in production cost and overall improved economic growth.

Though regulations play a critical role in controlling and restricting people's behavior and maintaining a certain level of standard, excess regulations impede the ability to trade freely. Adam Smith (1776), an advocate of limited regulations argued that excess regulations limit freedom to trade and might slow down economic progress.

3.5 Hypotheses Development

The hypotheses in this study are based on macroeconomic theory. These hypotheses are formulated by developing existing evidence and then using reasoning to infer what is expected to happen in the context of interest. This is then validated by surveying previous literature which identifies and further corroborates the relationship between the

hypothesized variables. As a result of limited evidence, the hypotheses serve as a starting point which will then be further investigated with the use of data in a latter part of the study.

3.5.1 Natural resource dependence, economic growth and development

Auty (1997) and Woolcock et al. (2001) argued that being blessed with natural resources by itself is not a problem, however the form or type of natural resources is the determining factor when considering its effect on economic growth and development. Economies blessed with point-source resources such as minerals and oil are faced with a more concentrated revenue pattern (which encourages rent-seeking and unproductive activities) than countries with diffuse natural resources such as agricultural land and fisheries (Murshed, 2004). Another impact of natural resource dependence on the rate of development is that nations blessed with an abundance of natural resources reduce their investment on education, thus leading to a crowding-out effect on human capital at the expense of natural capital (Gylfason, 2001). An economy that favors natural capital at the expense of human capital is most likely on its way to doom or collapse since investing in human capital increases the knowledge and skills of the people, as evidenced by the following quote:

'The ultimate resource in economic development is people, it is people not capital or raw materials that develop an economy'-Peter Drucker (2011).

Natural resource dependence has also been associated with rent seeking activities, since a sudden natural resource jackpot or advantage has the possibility of encouraging investment in white-elephant projects, promotion of unfavorable policies, hindering freedom to trade and discouraging investment and efficient revenue management (van der Ploeg, 2011). All of these have been proven to impede economic growth and development.

Natural resource dependence goes along with booms and busts, that is fluctuations in the prices and supplies of raw materials in the world market, hence, precipitating volatility in the exchange rate and, as a result, unstable exchange rates that lead to uncertainty, which is detrimental to exports, trade, and foreign investment (Gylfason, 2004). In sum, the hypothesis below was tested:

H1A: The higher the economic dependence on natural resources, the slower the rate of economic growth and development

3.5.2 Natural resource dependence, manufacturing, and services dependence

One of the most prominent transmission channels of the resource curse is the Dutch disease, a situation whereby resource wealth or discovery can shrink the growth or reduce the relevance of other sectors such as manufacturing. Matsuyama (1992) and Sachs and Warner (1995) asserted that the manufacturing sector is one that stimulates positive externalities in the form of learning by doing, hence diverting attention to the natural resource sector only, this shrinks positive externalities in the manufacturing sector, hence negatively impacting economic growth. Gunduz and Kustepeli (2020) maintained that a

boom in the natural resources sector is most likely to cause transfer of resources from things such as labor and capital away from the technologically intensive manufacturing sector, hence leading to a shortage in the manufacturing sector. Looney (1989) confirmed this by asserting that an oil sector boom will make it more demanding to achieve complexity in the manufacturing sector. Gunduz and Kustepeli (2020), in their study involving 34 OECD countries in the period of 1990 to 2015, proved that a rise in total natural resources rents has an adverse effect on the performance of the manufacturing sector.

Corden and Neary (1982) provided more insight on the Dutch disease phenomenon, explaining the resource movement effect. Suppose oil supply is not perfectly elastic, an increase in the price of oil will shoot up labor and capital demand in the oil sector, hence leading to higher wages and a higher return on capital. This will encourage the movement or transfer of labor and capital from the manufacturing and service sectors to the oil sectors. The result of this is an increase in output and employment in the oil sector and a decrease in output and employment in the manufacturing and services sector. Therefore, the following hypotheses were proposed:

H1B1: The higher the economic dependence on natural resources, the smaller the GDP per capita growth's dependence on manufacturing.

H1B2: The higher the economic dependence on natural resources, the lower the GDP per capita growth's dependence on services.

3.5.3 Natural resource dependence and agriculture dependence

Timmer (1988) identifies agricultural transformation (shift from subsistence to commercial agriculture) as a genesis for economic development. Dorosh and Thurlow (2016), while examining the roles that different sub-sectors of the economy play on poverty reduction, discovered that, while mining's role is limited, agriculture is more significant in the reduction of poverty. Dorinet et al. (2019), while using panel estimates in their study, concluded that the relationship between extractive resources and agricultural productivity is negative in sub-saharan Africa. A country that depends more on natural resources for example, oil, will be fully involved in extractive activities, thus leading to increased pollution and loss of farmland and aquatic animals. For instance, in Nigeria, oil drilling was linked with decreased farmland productivity, negative effect on water quality, reduction in fish population as a result of oil spills, and decreased animal hunting as a result of noise (Okoli, 2006). This reduces the rate of agricultural dependence. Thus:

H1B3: The higher the economic dependence on natural resources, the smaller the GDP per capita growth's dependence on the agricultural sector

3.5.4 Economic freedom, economic growth and development

Gwartney et. al (2006), with a focus on investment and productivity, confirmed that economic freedom stimulates investment and economic growth of a country. However, Hartford and Klein (2005) argued that natural resource exports can indirectly harm institutions (governance and legal system inclusive) by withdrawing or taking out

incentives meant to rehabilitate and provide structured infrastructural facilities or set up an efficient tax bureaucracy, besides inciting a struggle to decide who takes charge of resource rents.

A helpful tool in this regard is the Governance Research Indicator Country Snapshot database formulated by Kaufmann et al. (2003). Iimi (2006), while using Botswana as a case study, identified the importance of institutional factors such as voice and accountability (proxied by the political process, civil liberties, and political rights), government effectiveness (a measure of the quality of public services and how competent civil servants are), elimination of unfriendly market policies like price controls, excessive regulatory burdens, and able anticorruption policies as being important in natural resource management and the attainment of associated economic growth. Thus, the hypothesis below was proposed:

H2A: The higher the economic freedom, the greater the rate of economic growth and development

3.5.5 Economic freedom and natural resources dependence

As noted earlier, resource abundance by itself is not a curse but over-dependence on this natural resource. Mehlum, et al. (2006) discovered that the higher the institutional quality, the lower the resource curse, that is resource curse exists because of poor institutions which are measured by low economic freedom. Corey (2009) confirmed this result in his study, which analyzes the effect that the interaction between resource dependence and institutions

have on economic development in the US states and concluded that states with a low Economic Freedom Index are more likely to experience unfavorable economic growth despite their resources. In sum, the hypothesis below was tested:

H2B1: The higher the economic freedom, the lower the GDP per capita growth's dependence on natural resources.

3.5.6 Economic freedom, dependence on manufacturing and agriculture

According to Krugman (1991), the means of production in a developing country is highly reliant on labor-intensive services, manufacturing, and agriculture. Producers of agricultural commodities as well as manufacturers often produce goods and services that are less than their capacity due to limited domestic demand. Hence, freedom to trade gives room for domestic producers to expand markets in a bid to satisfy international demand. Free trade agreements and limited regulations tend to remove obstacles to imports and exports. Hence, this will reduce the rate at which African countries depend on their manufacturing and agricultural sectors only. Thus, the following hypotheses were proposed:

H2B2: The higher the economic freedom, the lower the GDP per capita growth's dependence on the manufacturing sector

H2B4: The higher the economic freedom, the lower the GDP per capita growth's dependence on the agricultural sector

3.5.7 Economic freedom and service dependence

The more developed a country is, the greater is the share of the services sector in its economy, and the lower is the share of all other sectors, meaning that the growth rate of the services sector is greater than the growth of any of the other sectors.

Roberts and Olson (2013) in a Heritage Foundation special report analyzed the effect of economic freedom on the service sectors such as schools, health care, and even environmental quality. They asserted that higher economic freedom correlated with improved outcomes in schools such as higher literacy rates besides leading to better health outcomes such as lower-infant mortality rates, increase life expectancy, with economic freedom also boosting innovation and entrepreneurship, thus, leading to technological advancement.

Gohman et al. (2008) examined the effect that economic freedom has on entrepreneurship and employment level in the US service industries. Their results showed that while higher economic freedom led to increased growth and employment in business and personal services, this was contradictory in health, social, and legal services as higher economic freedom led to a decline in these service sectors. Thus, the following hypothesis was proposed:

H2B3: The higher the economic freedom, the greater the GDP per capita growth's dependence on services sector

3.5.8 Size of government, economic growth, and development

The role of government in the development of nations cannot be overemphasized. However, several authors have linked a bigger size of government with slower or less economic growth and development. Scully (1989) maintained that an increase in government share of the economy had an unfavorable impact on economic growth and resource allocation. Burton (1999) in his study argued that there was a positive relationship between government size and unemployment. Dar and AmirKhalkhali (2002), using a random coefficients model to analyze the variation in economic growth of 19 Organisation for Economic Co-operation and Development (OECD) countries, asserted that countries with larger government size experienced less productivity growth and lower capital productivity, hence, less economic growth. Dar and AmirKhalkhali (2002) also asserted that a smaller government improves efficiency because of less policy-prompted issues such as taxation burden. Again, this size of government is associated with a better disciplined market force, thus, stimulating resource use efficiency. In sum, the following hypothesis was tested:

H3A1: The greater the size of government, the smaller the rate of economic growth and development

3.5.9 Legal system, property rights, rate of economic growth and development

According to Trubek (1972), the earliest generation of law and development intellectuals relied on Weber's sociology and made a conclusion that new-age policy makers with an

interest in prolonging economic growth should bolster and advance the rule of law. Johnson et al. (1997) highlighted poor legal institutions as being an obstacle to economic growth and development. La Andrei et al. (1997) also identified a strong legal framework as being responsible for growth in equity and debt markets (financial market) which is essential for economic growth and development. A stronger property rights system increases incentives and people's confidence to work, save, and invest in the country. Furubotn and Pejovich (1972) stressed that exceptional intellectual property rights are capable of reducing uncertainty and leading to effective resource allocation. Williamson and Kerekes (2008) affirmed that there exists a high positive relationship between property rights and rate of investment, which is a determinant for economic growth and development. Thus, the hypothesis below was proposed:

H3A2: The more efficient the legal system and property rights are, the greater the rate of economic growth and development

3.5.10 Sound money, rate of economic growth and development

Mulligan Casey and Sala-i-martin (2000) asserted that financial technologies that protect or fight against inflation have a positive relationship with the amount of wealth a household is able to amass. Johan and Lous (2017), in their panel analysis of 21 OECD countries, documented that sound money decreases inequality. Several authors like Fischer (1993), Barro (1995), Gylfason and Herbertsson (2001), and Shamim and Golam (2005) have documented a negative relationship between inflation and economic growth. Fishcer

(1993) asserted that a persistent rise in the price of goods and services tends to reduce growth by lowering investment and productivity growth.

In sum, the hypothesis below was proposed:

H3A3: The more "sound" money is, the greater the economic growth and development

3.5.11 Freedom to trade internationally, rate of economic growth and development

Mohammad and Ramiar (2013), in their analysis of 17 Middle Eastern and East Asian countries, documented that international trade freedom has a positive effect on economic growth, as their result indicates that a unit increase in the trade index increases growth by 0.10%. Busse, Matthias, and Koeniger (2012) asserted that trade facilitates efficient resource allocation, besides enabling a country to take advantage of economies of scale and scope, it also leads to knowledge transfer and encourages competition in domestic and foreign markets, thus fostering efficiency in the production process and the creation of new products. Their study also indicated a positive relationship between trade and economic growth. The World Bank (2018) described international trade as a panacea for ending poverty. The World Bank (2018) described countries with international trade freedom as those with the tendency to experience more economic growth, usually more innovative, accumulate higher income, besides providing more opportunities for their citizens. Finally, this freedom benefits households with lower income as it makes goods and services more affordable to them. Therefore, the following hypothesis was developed:

H3A4: The higher the freedom to trade internationally, the greater the rate of economic growth and development

3.5.12 Regulatory burden, rate of economic growth and development

Botero et al. (2004) identified a negative relationship between labor regulation and labor force participation, thus increasing the rate of unemployment among young people. Adopting manufacturing and service industries data, Nicoletti and Scarpetta (2003) asserted that there was a positive relationship between entry liberalization and growth in all sectors, in other words, the lesser the barrier to entry of industry, the higher the productivity. Weightier or stricter regulatory burdens stunt economic growth and leads to an expansion of the informal sector, that is, the part of the government which is not subject to taxation or monitoring by any form of government (Loayza et al. 2005). Frontier Economics (2012) asserts that smaller product market regulation is positively related to competition, hence improving innovation and productivity. Also, lesser regulatory burdens are associated with efficiency in reallocation of resources. In sum, the hypothesis below was tested:

H3A5: The smaller the regulatory burden, the greater the economic growth and development

3.5.13 Sound money, dependence on natural resources, manufacturing, services and agriculture

Devadoss (1985) opined that inflation has increased the prices of both farm inputs and outputs, and, thus, has affected production decisions. Jankovic and Ferraro (2019) asserted that sound money makes societal efforts such as production (manufacturing), cooperation, accumulation of wealth, capital savings, and trade the only channel open for fundamental prosperity rather than wealth creation for some through the dilution of others.

According to Chaudhry et al. (2013), a rise in inflation affects the growth of the agriculture, services and manufacturing sectors differently. While a negative relationship was found between consumer price index inflation (CPI) and manufacturing sector growth, inflation showed a positive relationship with value-added growth of agricultural and services sector. Thus, the following hypothesis was developed:

H3B1: The more "sound" money is, the lesser the GDP per capita growth's dependence on natural resources, manufacturing, services and agricultural sector

3.5.14 Freedom to trade internationally and dependence on natural resources and agriculture

Leamer (1984) asserted that the relative abundance of oil leads to net exports of crude oil and that coal and mineral abundance leads to net exports of raw materials. Trefler (1995) was also able to find similar results with respect to trade in resource-intensive goods.

International trade freedom increases the demand and supply for variety of resources such as natural and agricultural, hence this facilitates economic diversification and reduces GDP

per capita growth's dependence on a single sector. Hence, the hypotheses below were developed:

H3B2: The higher the freedom to trade internationally, the lower the GDP per capita growth's dependence on natural resources sector
H3B5: The higher the freedom to trade internationally, the lower the GDP per capita growth's dependence on the agricultural sector

3.5.15 Freedom to trade internationally and dependence on the manufacturing sector

Free trade encourages competition which leads to innovation and efficiency in the production of goods and services at reduced prices. However, Gashgari (2016) maintained that international trade freedom removes obstacles to trade such as taxes and tariffs. He opined that free trade negatively affects local and infant industries as it subjects these industries to unfair competition against the foreign industries with advantage in terms of resources, market power and even experience. International freedom to trade has also been associated with loss of jobs and stunted growth in these infant and local industries. In sum, the hypothesis below was proposed:

H3B3: The higher the freedom to trade internationally, the lower the GDP per capita growth's dependence on the manufacturing sector

3.5.16 Freedom to trade internationally and dependence on the service sector

Deloitte (2018) opined that the contribution of services exports in the world's total goods increased from 17 percent in 1980 to over 24 percent by 2016, while its share in world GDP increased from 3.7 percent to 6.5 percent in that same period. According to Cali et al. (2008), trade in services increases economic growth in countries by contributing significantly to GDP and providing a source of foreign exchange, especially in the case of sub-Saharan African countries that have been isolated from the world's goods markets as a result of poor transportation facilities. Surugiu et. al (2015) argued that international trade has encouraged growth in several service sectors of the economy such as transportation and in Information and communication Technology (ICT). Hence, the following hypothesis was proposed:

H3B4: The higher the freedom to trade internationally, the higher the GDP per capita growth's dependence on services sector

4 Research Methodology

The research methodology examines the effect that natural resources have on economic growth and development of African countries. It emanates from the exploration of the above theoretical and empirical context. This chapter of the study comprises an overview of the study area, research approach, summary statistics, estimation techniques, and the data employed during this research to examine the impact that natural resources and institutions have on the economic growth and development of African countries while using time series data from 1960 to 2020.

4.1 Study Area

The study covers Africa, the second largest continent in the world which occupies about 20% of the landmass of the earth's surface and comprises of 54 independent countries with distinct culture, climate, government, languages, and history. It is the most tropical continent with a diverse climate and vegetation that ranges from equatorial rainforests, tropical deserts, savanna grassland, and Mediterranean climate. The wealth structure in Africa is mostly dominated by natural resources. About 30 percent of the world's mineral reserves dwell in Africa, while the continent also serves as home to about 8 percent of the world's natural gas, approximately 12 percent of the world's oil reserves, an estimated 40 percent of the world's gold, and up to 90 percent of its chromium and platinum (UNEP, 2000). Though Africa is generally noted to be rich in natural resources, these resources are not evenly distributed as countries like Nigeria, Angola, Sudan, and Botswana make up the

list of resource-rich African countries, other countries like Gambia, Mauritius, Lesotho, Seychelles, and Burundi are resource-poor countries.

4.2 Research Approach

Trochim (2006) lists the two major methods of reasoning as the inductive and deductive approaches. This research employs a mixed method, that is a fusion of deductive and inductive reasoning. While the deductive approach starts formulating a theory, developing hypotheses from the theory, and using the process of data collection to analyze and test the hypotheses, the inductive approach, on the other hand, involves a set of empirical observations, looking for patterns in the observations and then finally, formulating theories based on the patterns. This study tends to consist of mostly the deductive approach as it employs the use of quantitative analysis to provide answer to the question and hypotheses specified. Both approaches are often intertwined and fused to provide a more robust and comprehensive understanding of the research problem, as opposed to using only one approach. Deductive analysis is usually more associated with quantitative analysis while inductive analysis usually involves qualitative analysis (Gabriel, 2013). Qualitative and quantitative approaches should not be considered as non-flexible, separate categories, or dichotomies as they represent distinctive ends on a continuum (Newman and Benz, 1998).

4.3 Data sources, collection, and treatment

This study attempts to contribute to the existing literature on resource curse using empirical data to test the hypotheses. The study makes use of longitudinal data for African countries through a duration of about 60 years (1960-2020). Data on the Gross Domestic Product,

which is a commonly used proxy for economic growth and development, was sourced from World Bank (2020). Because the study was also interested in the trade-off between the different major sectors of the economies and the natural resource sector, data on these various sectors, which include manufacturing, agriculture and services sectors were also sourced through the World Bank (2021). Data on GDP, services, agriculture, and manufacturing were made available at a constant USD value of year 2010. However, natural resources rent data is disseminated by the World Bank (2021) as a share of GDP, which this study then converted into a constant 2010 USD value using the very same World Bank dataset. The growth rates (natural log) of these variables, including GDP were then computed at a per capita level. "Agriculture corresponds to International Standard Industrial Classification (ISIC) Divisions 1-5 and this combines forestry, hunting, and fishing, cultivation of crops and production of livestock". Manufacturing refers to industries belonging to ISIC divisions 15-37. "Services represents ISIC divisions 50-99. They include value added in wholesale and retail trade (including hotels and restaurants), transport, and government, financial, professional, and personal services such as education, health care, and real estate services". "Also included are imputed bank service charges, import duties, and any statistical differences noted by national compilers as well as disparities arising from rescaling". "It is important to note that these are value added, which is the net output of a sector after adding up all outputs and subtracting intermediate inputs". It is calculated by excluding deductions for depreciation of fabricated assets, exhaustion and degradation of natural resources. Total natural resources rents are the sum of oil, natural gas, coal (hard and soft), mineral, and forest rents.

To determine the effect of institutions, the Economic Freedom Index and related area scores of the World Data was obtained from the Frasier Institute. This index breaks down economic freedom into five major areas. Though some of the data from this source was missing (5-year intervals prior to year 2000), to cope with this challenge, data was mined by computing a linear gradient to estimate the missing values by using the first year known of the available years. It is important to note that the increment was a fixed amount and not a fixed percentage like in the case of a geometric gradient.

4.4 Economic Freedom of the World (variable)

There are several means by which institutional quality can be measured. For the purpose of this study, The Fraser's Institute Economic Freedom of the World Index (2020) will be adopted as a proxy to test for the importance of institutional quality on economic growth. The index seeks to estimate the level of economic freedom in a country by adopting a zero to ten scale, with ten being the highest and zero, lowest. The index includes data on 42 distinct indicators plus a gender legal rights adjustment (measures if women have the same level of economic freedom as men); which are synthesized into five major areas namely: size of government, legal system and property rights, sound money, freedom to trade internationally, and limited regulations (Frasier Institute, 2020).

4.5 Summary Statistics

The summary statistics section highlights our variables of interest and provides more insight and better understanding of the data. It includes our variable of interests for the time frame 1960 to 2020 for all African countries except Djibouti, South Sudan, Somalia, and Eritrea. The reason for the differences in observation is because data was not available for some of the variables.

Table 1: Summary statistics (per capita) for Africa

Variable	Obs.	Mean	Std. Dev.	Min	Max
GDP per capita	2,631	1947.399	2581.457	164.337	20532.950
Natural resource per capita	2,251	279.562	855.229	0.000	10298.280
Manufacturing per capita	1,597	295.112	457.985	5.839	4333.869
Services per capita	1,871	993.009	1353.496	40.090	10943.820
Agricultural per capita	2,055	232.772	126.840	49.381	894.870
Economic Freedom of the World (aggregate)	1,591	5.350	1.095	2.320	8.210
Size of Government	1,571	5.909	1.551	0.600	10.000
Legal System and Property Rights	1,756	3.896	1.089	1.690	6.760
Sound Money	1,692	6.140	1.818	0.000	9.680
Freedom to Trade Internationally	1,486	5.075	1.722	0.280	10.000
Regulatory Burden	1,630	5.747	1.120	1.058	8.540

According to table 1, the mean of natural resources per capita, manufacturing per capita, services per capita and agriculture per capita are 279.56, 295.11, 993.0 and 232.77 at constant 2010 US dollars, respectively. The data suggests that services is the major contributor to GDP while agriculture is the least contributor to GDP.

4.6 Estimation Techniques

The analysis employs Multiple Regression Analysis based on augmented Ordinary Least Squares Regression methods. To test for multicollinearity, the Variance Inflation Factor (VIF) was used. Since none of the values were greater than 5, there was no multicollinearity issues. The Breusch-Pagan and White tests were employed in testing for heteroskedasticity, thus leading to the rejection of the null hypothesis which claims the presence of homoskedasticity. To correct this, robust standard errors will be adopted. The Wooldridge test was used to test for autocorrelation in panel data. The result shows there is autocorrelation since the Wooldridge test rejects H_0 which states that there is no first-order autocorrelation. Thus, we have another reason to use robust errors.

The Hausman fixed random effect reflected a chi-square value of -71.05 which is less than zero, hence a model fitted on these data fails to meet the asymptotic assumptions of the Hausman test. The Breusch and Pagan Lagrangian multipliers were then used to test for random effects. The Breusch and Pagan Lagrangian multiplier test shows that the fixed effect is better because we reject H_0 that the difference in coefficients is not systematic. Based on all the above, this study employs Log-Log regression models with fixed effects and robust errors in its econometric analyses of longitudinal data from African countries. The results of this study are based on analysis conducted using STATA 14.2 version.

5 Econometric results and discussion

This section specifies the models and then tests the hypotheses using data from 1960 to 2020 to determine whether to reject or nor reject the stated hypotheses. It is important to note that for this research, GDP per capita's growth is used as a proxy for both economic growth and development. This study also refrains from making inferences related to comparisons between the magnitude of the estimated coefficients. Instead, it mostly focuses on interpreting the sign of the estimates given that, as is common in economic studies of similar nature, the data was not gathered from a controlled lab experiment (as often done in exact sciences) but rather from external sources that frequently include estimates for missing observations (e.g. the World Bank).

5.1 Model specification

For the purpose of this study, six models were specified. Three of these models have interaction terms. However, in general, the models take the multivariate linear regression form

$$Y_{it} = \beta_0 + Y_{it-1} + \beta_1 X_{1t} + \beta_2 X_{2t} + \cdots \beta_k X_{kt} + \beta_{k+1} X_{1t} X_{2t} + \beta_{k+2} X_{1t} X_{3t} + \cdots + e_t$$

Where Y represents the dependent variable in this case GDP per capita, and $X_1, X_2 \ldots X_k$ represents the independent and explanatory variables, which include natural resource, agriculture, service, and manufacturing sector output, other explanatory variables used in this model include the Economic Freedom of the World (EFW) index both at an aggregate level and also at a more granular level to check the effect of each Economic Freedom Index

area on the dependent variable. The term *e* represents the random disturbance or error term of the variables, β_0 represents the intercept or the constant term while *k* stands for the number of explanatory variables.

In simpler terms,

Y_{it} = log of GDP per capita at time t

β_0 = constant

Y_{it-1} = log of GDP per capita lagged one time period (year) at constant 2010 US dollars

$X_1 =$ log of natural resources output per capita at constant 2010 US dollars

$X_2 =$ log of manufacturing output per capita at constant 2010 US dollars

$X_3 =$ log of services output per capita at constant 2010 US dollars

$X_4 =$ log of agriculture output per capita at constant 2010 US dollars

$X_5 =$ Economic Freedom of the World Index (aggregate)

$X_6 =$ EFW area 1= Size of Government

$X_7 =$ EFW area 2 = Legal System and Property Rights

$X_8 =$ EFW area 3 = Sound Money

$X_9 =$ EFW area 4 = Freedom to Trade Internationally

$X_{10} =$ EFW area 5 = Regulatory Burdens (labor market, credit market and business)

$e_t =$ random disturbance or error term of the variables

Model 1A: NATIONAL ACCOUNTS IDENTITY

$$Y_{it} = \beta_0 + Y_{it-1} + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + e_t$$

To test the effect of natural resources, agriculture, manufacturing, and services on economic growth. This model will test hypothesis H1A

Model 1B: NATIONAL ACCOUNTS IDENTITY + INTERACTION EFFECTS

$$Y_{it} = \beta_0 + Y_{it-1} + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{1t} X_{2t} + \beta_6 X_{1t} X_{3t} + \beta_7 X_{1t} X_{4t} + e_t$$

Model 1B extends model 1A by checking for the interaction effects between natural resources and the other three sectors namely; agriculture, manufacturing, and services. This model will test hypotheses H1B1, H1B2 and H1B3

Model 2A: NATIONAL ACCOUNTS IDENTITY+ EFW

$$Y_{it} = \beta_0 + Y_{it-1} + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} + e_t$$

Model 2A tests the effect of natural resources, agriculture, manufacturing, services, and an aggregate EFW index on economic growth. This model will test hypothesis H2A

Model 2B: NATIONAL ACCOUNTS IDENTITY + EFW + INTERACTION EFFECTS

$$Y_{it} = \beta_0 + Y_{it-1} + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{5t} + \beta_6 X_{1t} X_{5t} + \beta_7 X_{2t} X_{5t} + \beta_8 X_{3t} X_{5t} + \beta_9 X_{4t} X_{5t} + e_t$$

Model 2B tests for the interaction between EFW and the National Accounts Identity, that is EFW and natural resources, EFW and agriculture, EFW and manufacturing and finally EFW and services sector. This model will test hypotheses H1B1, H2B2, H2B3 and H2B4.

Model 3A: NATIONAL ACCOUNTS IDENTITY + EFW DISTINCT

$$Y_{it} = \beta_0 + Y_{it-1} + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{6t} + \beta_6 X_{7t} + \beta_7 X_{8t} + \beta_8 X_{9t} + \beta_9 X_{10t} + e_t$$

Model 3A which is an extension of Model 2A includes testing the effect of natural resources, agriculture, manufacturing, services and distinct EFW index (that is size of the government, legal system, sound money, freedom to trade internationally, and regulatory burden individually) on economic growth. This model will test hypotheses H3A1, H3A2, H3A3, H3A4, and H3A5.

MODEL 3B = NATIONAL ACCOUNTS IDENTITY + SOUND MONEY AND FREEDOM TO TRADE INTERNATIONALLY + INTERACTION EFFECTS

$$Y_{it} = \beta_0 + Y_{it-1} + \beta_1 X_{1t} + \beta_2 X_{2t} + \beta_3 X_{3t} + \beta_4 X_{4t} + \beta_5 X_{6t} + \beta_6 X_{7t} + \beta_7 X_{8t} + \beta_8 X_{9t} + \beta_9 X_{10t} + \beta_{10} X_{1t} X_{8t} + \beta_{11} X_{2t} X_{8t} + \beta_{12} X_{3t} X_{8t} + \beta_{13} X_{4t} X_{8t} + \beta_{14} X_{1t} X_{9t} + \beta_{15} X_{2t} X_{9t} + \beta_{16} X_{3t} X_{9t} + \beta_{17} X_{4t} X_{9t} + e_t$$

Finally, the results from Model 3A suggests that only sound money and freedom to trade are significant. Hence, Model 3B went a step further to check for the interaction effects between natural resources, agriculture, manufacturing and services, respectively, on sound money and freedom to trade internationally. This model will test hypotheses H3B1, H3B2, H3B3 and H3B4

Table 2. Log-log Model Coefficients of GDP per capita for Africa

Variable	Model 1A	Model 1B	Model 2A	Model 2B
GDP per capita at t-1	0.781***(0.04)	0.755***(0.04)	0.805***(0.06)	0.755***(0.05)
Natural Resources per capita	0.012*(0.01)	0.133***(0.04)	0.011*(0.00)	0.098***(0.02)
Manufacturing per capita	0.048**(0.02)	0.119***(0.03)	0.035^{+} (0.02)	0.170***(0.03)
Services per capita	0.120***(0.02)	0.093***(0.02)	0.102**(0.04)	0.005(0.04)
Agriculture per capita	0.198***(0.08)	0.134***(0.04)	0.059***(0.02)	0.261*(0.10)
Institutions				
Economic Freedom Index (aggregate)			0.045**(0.01)	0.847*(0.33)
Interaction Effects				
Natural resources pc*Manufacturing pc		-0.013*(0.01)		
Natural resources pc*Services pc		0.006(0.01)		
Natural resources pc*Agriculture pc		-0.016*(0.01)		
Economic Freedom Index*Natural resources pc				-0.047***(0.01)
Economic Freedom Index*Manufacturing pc				-0.086***(0.02)
Economic Freedom Index*Services pc				0.071***(0.02)
Economic Freedom Index*Agriculture pc				-0.111*(0.05)
Observations	1419	1419	1061	1061
Countries	47	47	44	44
F (X, X)	2692.06	2786.25	1780.85	8826.78
Prob> F	0.00000	0.0000	0.0000	0.0000
R^2	0.9960	0.9955	0.9971	0.9969

Note: Significance levels - *** 99.9%, ** 99%, * 95%, $^{+}$90%; Constant has been omitted from above table for all models; All models are OLS with fixed effects per country and robust standard errors; Data from 1960 to 2020
Red text indicates no statistical significance at 90% confidence level and pc represents per capita

Table 3. Log-log Model Coefficients of GDP per Capita for Africa – continued

Variable	Model 3A	Model 3B
GDP per capita at t-1	0.799***(0.05)	0.753***(0.05)
Natural Resources per capita	0.011*(0.00)	0.036**(0.11)
Manufacturing per capita	0.032^{+} (0.02)	0.095***(0.02)
Services per capita	0.098**(0.03)	0.05(0.04)
Agriculture per capita	0.058**(0.02)	0.182**(0.06)
Institutions		
Size of government	-0.027(0.02)	-0.036*(0.02)
Legal and property rights	0.025(0.02)	0.025(0.02)
Sound money	0.014*(0.01)	0.284***(0.05)
Freedom to trade internationally	0.027*(0.01)	0.088(0.12)
Regulatory burdens	-0.016(0.03)	0.004(0.03)
Interaction Effects		
Sound money*Natural resources per capita		-0.003(0.00)
Sound money*Manufacturing per capita		-0.009(0.01)
Sound money*Services per capita		-0.013(0.01)
Sound money*Agriculture per capita		-0.031*(0.01)
Freedom to trade internationally*Natural resources pc		-0.010*(0.00)
Freedom to trade internationally *Manufacturing pc		-0.031**(0.01)
Freedom to trade internationally *Services per capita		0.053***(0.02)
Freedom to trade internationally *Agriculture pc		-0.032(0.04)
Observations	988	988
Countries	44	44
F (X, X)	2219.42	21440.56
Prob> F	0.00000	0.0000
R^2	0.9973	0.9970

Note: Significance levels - *** 99.9%, ** 99%, * 95%, $^{+}$90%; Constant has been omitted from above table for all models; All models are OLS with fixed effects per country and robust standard errors; Data from 1960 to 2020.
Red text indicates no statistical significance at 90% confidence level and pc represents per capita

5.2 Model 1A: National Accounts Identity

This model seeks to test hypothesis H1A. The P-value of the whole model is 0.0000 < 0.05, thus suggesting that there is an overall statistically significant relationship between GDP and the National Accounts Identity. For the individual relationship, the result implies that all four sectors, namely natural resources, agriculture, manufacturing, and services have a positive relationship with economic growth and development. This is because the coefficients for these four sectors are all positive and while natural resources is statistically significant at a 95% confidence level, manufacturing is statistically significant at a 99% confidence level, while agriculture and services are statistically significant at a 99.9% confidence level. The R-square value of 0.9960 is high and thus implies that about 99.6% of the variation in dependent variable is explained by the independent variables (national accounts identity). In sum, the statistical results from Model H1A rejects hypothesis H1A (which states that the higher the economic dependence on natural resources, the slower the rate of economic growth and development) at a 95% confidence level, given that it suggests a statistically significant positive relationship between natural resources and economic growth, thus, this result contradicts the resource curse theory.

5.3 Model 1B: National Accounts Identity+ interaction effects

This model attempts to identify relationship between natural resources and the other three sectors; manufacturing, agriculture, and services. It seeks to test hypothesis H1B1, H1B2, and H1B3, which are mainly from economic theory. The P-value of the whole model is

0.0000 < 0.05 and thus implies that there is an overall statistically significant relationship between GDP, national accounts identity and interaction effects between natural resources and the other three sectors of the economy mentioned. For natural resources and manufacturing, we are unable to reject hypothesis H1B1 (the higher the economic dependence on natural resources, the smaller the GDP per capita growth's dependence on manufacturing) at a 95% confidence level because of the negative sign indicating an inverse relationship between natural resources and manufacturing. There exists a crowding-out effect between natural resources and manufacturing. This validates the Dutch disease syndrome. As regards the synergy between natural resources and agriculture, we are unable to reject hypothesis H1B3 (the higher the economic dependence on natural resources, the smaller the GDP per capita growth's dependence on the agricultural sector) at a 95% confidence level because of the negative sign, thereby indicating an inverse relationship between natural resources and agriculture, which suggests a trade-off. Considering H1B2 (the higher the economic dependence on natural resources, the lower the GDP per capita growth's dependence on services), no conclusion can be made between the interaction between natural resources sector and the services sector since the t-statistic already indicates that the result is not statistically significant even at confidence level of 90%. The R-square value of 0.9955 is very high and this implies that about 99.55% of the variation in dependent variable is explained by the independent variables.

5.4 Model 2A: National Accounts Identity+ Economic Freedom of the World (EFW)

This model attempts to test hypothesis H2A (the higher the economic freedom, the greater the rate of economic growth and development) by identifying the effect that institutions, in this case, the Economic Freedom of the World (EFW) index has on economic growth. The P-value of the whole model is $0.0000 < 0.05$, which suggests that there is an overall statistically significant relationship between GDP, National Accounts Identity, and the aggregate Economic Freedom Index. We are unable to reject the null hypothesis because of the positive relationship between EFW and economic growth. EFW is also statistically significant at a 99% confidence level. The R-square value of 0.9971 is very high and this implies that about 99.71% of the variation in the dependent variable is explained by the independent variables.

Model 2A corroborates extant literature on economic growth and development (i.e., classical theory that perfectly competitive markets promote economic growth) because it indicates that higher levels of economic freedom tend to be associated with higher levels of growth in GDP per capita.

5.5 Model 2B: National Accounts Identity+ Economic Freedom of the World (EFW) + interaction effects

This model attempts to uniquely identify the synergy between economic freedom and the four sectors highlighted in this study namely natural resources, agriculture, manufacturing, and services. In simpler terms, the interaction between economic freedom of the world and

natural resources, between economic freedom of the world and agriculture, between economic freedom of the world and manufacturing, also between economic freedom of the world and services. The P-value of the whole model is 0.0000 < 0.05, which connotes that that there is an overall statistically significant relationship between GDP, national accounts identity, EFW and the interaction effects between EFW and every sector captured in the model. It seeks to test hypothesis H2B1 (the higher the economic freedom, the lower the GDP per capita growth's dependence on natural resources), H2B2 (the higher the economic freedom, the lower the GDP per capita growth's dependence on manufacturing), H2B3 (the higher the economic freedom, the greater the GDP per capita growth's dependence on the services sector) and H2B4 (the higher the economic freedom, the lower the GDP per capita growth's dependence on the agricultural sector), respectively. All these hypotheses are based on macroeconomic theory. We are unable to reject these four hypotheses because the signs are in concord with macroeconomic theory and due to the fact that the interaction effect results were statistically significant at a 99.9% confidence level, except for the synergy between natural resources and agriculture which was statistically significant at a 95% confidence level. The R-square value of 0.9969 is high and this implies that about 99.69% of the variation in dependent variable is explained by the independent variables.

Model 2B reveals further support for Model 2A because it suggests that higher levels of economic freedom tend to supplement the role of the services sector while diminishing the role of all other economic sectors. That is, it shows, as explained in extant literature, that an economy develops from being primarily dependent on agriculture and natural resources to experiencing industrialization, and then becoming more reliant on the services sector.

5.6 Model 3A: National Accounts Identity + Economic Freedom of the World (distinct)

This model is a more granular extension of model 2A. This model seeks to identify the relationship between each area of the Economic Freedom Index and economic development. The P-value of the whole model is $0.0000 < 0.05$, which implies that that there is an overall statistically significant relationship between GDP, national accounts identity and the individual five areas of the Economic Freedom Index. It attempts to test hypothesis H3A1 (the greater the size of government, the smaller the rate of economic growth and development), H3A2 (the more efficient the legal system and property rights are, the greater the rate of economic growth and development), H3A3 (the more sound money is, the greater the rate of economic growth and development), H3A4 (the higher the freedom to trade internationally, the greater the rate of economic growth and development) and H3A5 (the smaller the regulatory burden, the greater the rate of economic growth and development) .

Though all the signs validate macroeconomic theory, there is no conclusion about the relationship between the size of government and economic growth, legal system, property rights, and economic growth, or regulatory burdens and economic growth since the results are not statistically significant at a 90% confidence interval. However, for the relationship between sound money and economic growth, we are unable to reject the null hypothesis since the coefficient connotes a positive relationship between sound money and economic growth and development. The result is also statistically significant at a 95% confidence level. Also, for the relationship between freedom to trade internationally and economic

growth and development, we are unable to reject the null hypothesis at a 95% confidence level since the coefficient indicates a positive relationship between the level of international trade and economic development. In summary, Model 3A divides the Economic Freedom Index into specific areas and continues to show support for model 2A, specifically for the areas of "Sound Money" and "Free Trade". For the remaining areas, we cannot say if it supports model 2A or not since there is no statistical significance (but at least it does not suggest any contradiction because all signs are as expected in the literature, despite some not being statistically significant).

The R-square value of 0.9973 is high and this implies that about 99.73% of the variation in dependent variable is explained by the independent variables.

5.7 Model 3B: National Accounts Identity+ Sound money and Free trade + interaction effects

Based on Model 3A, which signifies that only sound money and freedom to trade internationally have valid results in relationship with economic growth and development, Model 3B goes a step further to determine the trade-off between the four sectors versus sound money and freedom to trade internationally, respectively. This model attempts to test hypothesis H3B1 (the more “sound” money is, the lesser the economic dependence on natural resources, manufacturing, services, and agricultural sectors) , H3B2 (the higher the freedom to trade internationally, the lower the GDP per capita growth’s dependence on natural resources sector), H3B3 (the higher the freedom to trade internationally, the lower the GDP per capita growth’s dependence on the manufacturing sector), H3B4 (the higher

the freedom to trade internationally, the higher the GDP per capita growth's dependence on the services sector), and H3B5 (the higher the freedom to trade internationally, the lower the GDP per capita growth's dependence on agricultural sector). The P-value of the whole model is $0.0000 < 0.05$, which implies that there is an overall statistically significant relationship between GDP, national accounts identity, sound money and freedom to trade internationally and the interaction effects between sound money, freedom to trade internationally and every sector captured in the model. There isn't a conclusion as regards the interaction between sound money and the dependence on these 3 sectors namely; natural resources, manufacturing and services since the results are not statistically significant at a 90% confidence level.

However, for the synergy between sound money and agriculture, we are unable to reject the hypothesis at a 95% confidence level because a negative coefficient between the two variables implies that the more "sound" the money is, the less the dependence on agriculture. However, the relationship between freedom to trade internationally and the 3 sectors namely; natural resources, manufacturing and services was consistent with macroeconomic theory, also, we are unable to reject the null hypothesis because the coefficient signs were valid and the interaction between freedom to trade internationally and natural resources was statistically significant at 95% confidence level, freedom to trade internationally and manufacturing was statistically significant at 99% confidence level, freedom to trade internationally and services was statistically significant at a 99.9% confidence level. Finally, there is no information about the synergy or possible trade-off between freedom to trade internationally and agriculture since the result was not

statistically significant even at a 90% confidence level. The R-square value of 0.9970 is very high and this implies that about 99.7% of the variation in dependent variable is explained by the independent variables. Model 3B shows significant interaction effects with the expected signs, further lending partial support to Models 3A and 2B (partial because some interaction effects are not significant).

6 Summary, conclusions, and policy recommendations

This study attempts to investigate the resource curse theory by examining the effect that natural resources have on economic growth. To achieve this, several hypotheses were developed. The study then tested the validity of the hypotheses through the development of models and analyzing data. Six models were constructed. The first model suggests that natural resources facilitate economic growth, which contradicts the resource curse paradox. Other sectors are also positively correlated with economic growth. However, a question that arises is whether the contribution of other sectors to economic growth will be greater if natural resources are not considered at all or if the growth of other sectors will more than compensate for a reduction in natural resources. However, Model 1B indicates a trade-off between natural resources and agriculture; it also suggests a trade-off between natural resources and manufacturing. This trade-off or crowding out effect supports the resource curse theory.

Institutions being a major determinant of economic growth was also included in the study. The Economic Freedom of the World Index was used as a proxy for institutions. The third model postulates that economic freedom acts as a lubricant to economic growth. This was supported by the fourth model, which suggests that a higher Economic Freedom Index value reduces the dependence on natural resources, agriculture, and manufacturing and increases the dependence on services. This was in accord with the hypotheses developed in the study. The fifth model (Model 3A) gives more insight about the results of the third model (Model 2A) by checking the effect of individual economic freedom areas on

economic growth. Of the five areas, only sound money and freedom to trade internationally were found to be statistically significant to economic growth. The final model then checks for the interaction between these two economic freedom areas and all the four sectors of the economy. The agriculture sector was the only sector that shows a statistically significant relationship in interaction with sound money. All the other sectors except agriculture indicate a significant relationship with international trade freedom.

A notable conclusion from the six models analyzed in the study suggests that there is no conclusive result in favor or against resource curse. The models imply mixed results indicating that natural resources have both a positive and negative effect, noticeable in its crowding-out effect with other sectors of the economy.

Due to the trade-off between natural resources sector and two other sectors namely agriculture and manufacturing (as shown in the Model 1B), the study recommends continued economic diversification as a panacea for economic growth in Africa. The drifting away from reliance on a single source of income to multiple income streams reduces volatility and protects the economy from unfavorable market booms and busts, in addition to minimizing risks and creating more opportunities for economic growth and development. Increased transparency and government accountability may also solve the resource curse problem by eliminating or reducing corrupt and rent seeking activities as these acts have been linked with fiscal evasion, high debt, disruption of market efficiency, inefficient allocation of resources, and reduced productivity. Though Model 1A suggests a positive relationship between natural resources and economic growth, however, most

African countries with abundant natural resources have been associated with reduced economic development. Hence, this study prescribes Hartwick's rule of sustainability which posits that resource rents be reinvested in the provision of capital goods and quality infrastructures such as health care and educational facilities, thus keeping the value of net investments equal to zero. Finally, since Model 2B indicates that economic growth increases with economic freedom, to achieve higher economic freedom, African countries should focus more on improving the key areas of the Economic Freedom Index by increasing international trade freedom, setting up good monetary policies, relaxing stringent and complex regulations, developing a sound legal system and property rights, as this improves investors' confidence and reduces the risk of appropriation.

7 Appendix

Table 4. Correlation Matrix

Variables	1	2	3	4	5	6	7	8	9	10	11
1. GDP per capita	1										
2. Natural resources per capita	0.6870***	1									
3. Manufacturing per capita	0.7628***	0.5633***	1								
4. Services per capita	0.9009***	0.2981***	0.6389***	1							
5. Agriculture per capita	0.3227***	0.1454***	0.3054***	0.2924***	1						
6. EFW (aggregate)	0.2239***	-0.1005***	0.1707***	0.4038***	0.2029***	1					
7. Size of government	-0.1015***	-0.2272***	-0.0631*	0.0491^{+}	0.0608*	0.6610***	1				
8. Legal and property rights	0.3039***	0.0076	0.1144***	0.3779***	0.2079***	0.5505***	0.0520*	1			
9. Sound money	0.1696***	- 0.0824***	0.1915***	0.2733***	0.1231***	0.7475***	0.2642***	0.3438***	1		
10. Freedom to trade internationally	0.2657***	0.0079	0.1903***	0.3984***	0.1123***	0.7850***	0.4490***	0.3409***	0.5322***	1	
11. Regulatory burdens	0.3332***	0.0104	0.2175***	0.4471***	0.3084***	0.7980***	0.3541***	0.6147***	0.5410***	0.5907***	1

GDP = gross domestic product, USD = US dollars. Significance levels - *** 99.9%, ** 99%, * 95%, $^{+}$90%. Variables 1 to 5 are in constant 2010 US dollars

From the correlation matrix above, it is evident that there is a very strong positive relationship between GDP and service per capita. Also, the correlation between natural resources per capita and GDP, and manufacturing per capita and GDP is strong and positive. Agriculture per capita and GDP per capita show a weaker positive relationship. These relationships are statistically significant at a 99.9% confidence level.

Table 5: Sample Results I

	GDP		Natural resources		Manufacturing		Services		Agriculture	
Country	**N**	**GDP per capita**	**N**	**Natural resources per capita**	**N**	**Manufacturing per capita**	**N**	**Services per capita**	**N**	**Agriculture per capita**
Algeria	60	3532.27	49	798.04	21	1760.09	21	1713.96	21	369.14
Angola	40	2887.69	39	806.79	18	163.14	18	1428.33	18	227.48
Benin	60	893.97	49	54.32	49	128.21	50	389.28	50	217.50
Botswana	60	3762.98	49	131.57	55	243.62	60	1776.73	60	160.47
Burkina Faso	60	452.06	49	49.28	50	61.72	50	207.30	50	136.56
Burundi	60	253.19	49	41.09	20	27.61	23	90.16	55	148.11
Cameroon	60	1236.08	49	96.53	55	182.62	55	696.75	55	168.67
Cape Verde	40	2113.43	39	12.21	29	174.53	40	1352.56	40	183.56
C.African Republic	60	500.74	49	46.67	11	76.95	11	144.92	11	136.89
Chad	60	631.48	49	99.09	13	10.34	13	288.47	13	437.71
Comoros	40	1346.12	39	17.62	N/A	N/A	40	753.15	40	402.46
Cote d'Ivoire	60	1584.00	49	80.17	11	158.48	12	663.94	12	320.37
Djibouti	1	1343.27	1	11.26	N/A	N/A	N/A	N/A	N/A	N/A
DR Congo	60	669.33	49	101.84	52	302.79	52	167.78	52	98.52
Egypt	60	1576.52	49	189.32	18	394.89	59	702.04	59	297.39
Equatorial Guinea	40	7698.61	35	2982.54	14	3094.53	14	4092.39	14	209.29
Eritrea	20	574.76	20	32.58	N/A	N/A	N/A	N/A	N/A	N/A
Ethiopia	39	279.71	38	43.61	39	13.68	39	102.39	39	125.50
Gabon	60	9922.01	49	2850.60	40	824.75	40	3194.53	40	458.44
Gambia	54	804.78	49	26.48	53	40.82	53	412.93	53	289.10
Ghana	60	1062.14	49	107.65	14	90.61	14	714.18	14	362.60
Guinea	34	648.54	33	112.00	14	81.43	34	305.98	34	108.66
Guinea-Bissau	50	572.49	49	100.02	14	65.40	20	235.28	20	248.90
Kenya	60	835.88	49	34.62	56	100.78	14	499.91	56	256.45
Lesotho	60	721.83	49	42.95	50	73.71	50	471.81	50	75.89
Liberia	20	529.68	19	129.94	20	12.85	20	212.66	20	176.44
Libya	21	8930.59	20	4402.45	N/A	N/A	N/A	N/A	N/A	N/A
Madagascar	60	602.41	49	25.15	N/A	N/A	25	244.79	25	139.24
Malawi	60	375.44	49	31.93	43	42.46	60	181.86	53	126.64
Mali	53	538.66	49	39.13	15	48.65	52	194.36	53	185.79
Mauritania	59	1659.18	49	231.78	34	164.78	56	454.54	59	461.26
Mauritius	44	5526.28	43	1.00	44	829.86	44	3274.04	44	293.73
Morocco	54	1917.07	49	38.34	53	346.62	40	1130.64	55	273.33
Mozambique	40	339.89	28	45.72	29	36.75	29	188.66	36	100.27
Namibia	40	4515.84	39	184.97	40	519.96	40	2541.01	40	455.64
Niger	60	603.89	49	32.15	30	39.44	30	181.57	30	155.67
Nigeria	60	1737.84	49	267.95	39	223.40	39	735.56	39	369.52
Rep. of the Congo	60	2539.73	49	922.62	42	130.73	60	813.57	60	141.73
Rwanda	60	442.50	49	32.83	21	46.69	55	210.75	55	113.01
ST and Principe	19	1081.67	18	34.82	19	87.64	19	721.23	19	122.45
Senegal	60	1211.13	49	33.32	13	216.05	40	625.75	60	212.69
Seychelles	60	7510.64	49	7.00	42	776.57	43	6333.36	42	350.67
Sierra Leone	60	417.21	49	59.46	30	10.34	19	145.78	56	162.64
South Africa	60	6342.14	49	398.03	60	871.87	60	3301.86	60	176.00
South Sudan	8	1137.47	8	440.00	8	30.62	8	492.44	8	72.69
Sudan	60	1037.76	49	78.32	N/A	N/A	55	464.64	55	418.47
Swaziland	50	2896.87	49	153.09	49	877.78	49	1545.16	49	483.32
Tanzania	32	649.92	31	45.53	28	49.52	28	266.19	28	169.98
Togo	60	580.25	49	70.09	44	44.66	55	435.59	55	183.11
Tunisia	55	2643.77	49	159.59	55	427.67	20	2187.93	55	261.66
Uganda	38	612.82	37	82.86	38	92.28	38	241.34	38	272.41
Zambia	60	1318.86	49	219.78	55	103.38	55	608.43	55	221.40
Zimbabwe	60	1219.44	49	75.39	50	103.24	50	446.27	50	166.33

Table 5: Sample Results II

	EFW (Aggregate)		Size of government		Legal system		Sound Money		Trade Freedom		Regulations	
Country	N	EFW	N	EFW area 1	N	EFW area 2	N	EFW area 3	N	EFW area 4	N	EFW area 5
Algeria	49	3.87	49	2.60	49	3.81	49	6.19	39	3.43	49	4.49
Angola	14	5.08	14	6.21	14	3.50	14	5.29	14	5.14	14	5.25
Benin	44	5.42	39	6.73	49	2.75	49	6.38	19	5.68	49	5.77
Botswana	44	6.60	49	5.69	49	6.26	49	7.42	44	6.48	44	7.37
Burkina Faso	14	5.89	14	5.52	14	4.16	14	6.87	14	5.90	14	7.02
Burundi	44	4.84	39	5.49	49	3.53	49	6.54	44	3.19	49	5.61
Cameroon	44	5.22	44	6.12	49	3.03	49	6.59	44	4.77	44	5.50
Cape Verde	9	6.97	9	6.80	9	6.25	9	8.07	9	6.74	9	7.01
Central African Republic	34	5.12	29	6.52	49	2.81	49	6.06	34	4.54	39	5.08
Chad	29	5.18	29	6.98	49	3.46	49	6.11	19	4.94	44	5.22
Comoros	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Cote d'Ivoire	44	5.52	49	6.29	49	3.27	49	6.33	39	5.76	44	6.07
Djibouti	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
DR Congo	49	3.74	44	5.35	49	2.19	49	3.65	49	3.71	49	4.20
Egypt	44	5.23	44	4.74	49	4.12	49	8.04	44	3.98	44	5.19
Equatorial Guinea	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Eritrea	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Ethiopia	14	5.34	14	5.61	14	4.46	14	5.40	14	4.96	14	6.27
Gabon	49	5.16	49	5.02	49	4.02	49	5.48	49	5.49	44	6.15
Gambia	9	7.11	9	7.03	9	4.93	9	8.89	9	7.70	9	6.98
Ghana	49	4.89	49	5.36	49	4.54	49	5.02	49	5.51	49	5.71
Guinea	6	5.38	6	4.41	6	3.33	6	7.51	6	4.85	6	6.82
Guinea-Bissau	29	4.84	34	6.01	49	2.82	44	4.02	19	6.14	29	4.86
Kenya	49	6.00	49	6.06	49	4.69	11	8.65	49	5.19	49	6.75
Lesotho	14	6.41	14	6.01	14	4.66	14	7.87	14	6.08	14	7.44
Liberia	5	6.64	5	7.16	5	4.36	5	8.91	5	6.30	5	6.49
Libya	6	4.94	6	4.55	6	3.74	6	6.46	6	3.74	6	6.21
Madagascar	49	5.10	39	6.70	49	3.17	48	6.38	49	4.33	49	4.96
Malawi	49	5.43	49	5.61	49	5.03	49	5.14	49	5.48	44	5.87
Mali	44	5.76	44	7.47	49	3.49	49	6.35	44	5.64	44	5.66
Mauritania	14	6.01	14	6.41	14	3.71	14	7.19	14	5.90	14	6.81
Mauritius	49	6.75	49	7.99	49	5.14	49	7.68	49	5.65	44	7.40
Morocco	49	5.68	49	6.00	49	4.23	49	6.76	49	5.87	49	5.61
Mozambique	16	5.71	16	5.80	16	4.04	16	7.09	16	6.05	16	5.56
Namibia	29	6.32	29	5.81	49	4.47	34	6.04	29	6.07	29	7.75
Niger	44	5.37	49	7.07	49	2.95	49	6.38	44	5.23	44	5.06
Nigeria	49	4.65	49	6.07	49	3.15	49	5.20	49	3.16	49	6.08
Rep. of Congo	34	4.73	34	4.80	49	3.34	49	5.61	29	5.03	44	5.14
Rwanda	39	5.45	39	5.21	49	4.05	49	6.30	29	5.28	49	6.18
ST and Principe	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Senegal	49	5.26	49	5.69	49	3.59	49	6.69	49	5.37	44	5.12
Seychelles	6	7.42	6	6.94	6	5.40	6	9.00	6	8.24	6	7.51
Sierra Leone	44	4.90	39	6.98	49	3.67	49	4.96	44	4.12	44	4.77
South Africa	49	6.12	49	6.69	49	3.96	49	6.86	49	6.69	49	6.56
South Sudan	N//A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A	N/A
Sudan	3	4.55	3	8.15	3	2.82	3	4.16	3	2.68	3	4.95
Swaziland	9	6.34	9	5.34	9	4.54	9	7.81	9	6.37	9	7.60
Tanzania	49	5.16	49	5.42	49	5.22	49	6.18	49	4.08	49	5.15
Togo	44	5.20	49	5.97	49	3.12	49	6.35	19	5.90	43	4.97
Tunisia	49	5.89	49	5.75	49	5.00	49	6.75	49	5.63	49	6.50
Uganda	44	5.55	34	6.78	49	3.80	44	5.13	44	4.91	49	6.30
Zambia	49	5.16	49	5.19	49	5.13	49	5.48	44	5.07	49	5.75
Zimbabwe	39	4.46	39	5.32	49	3.59	49	4.76	39	3.97	44	4.58

8 References

Adam S., (1776). An Inquiry into the Nature and Causes of the Wealth of Nations, McMaster University Archive for the History of Economic Thought.

Adu G. and Dramani J. (Oct 2018). Africa's Mineral Economies – Breaking Their Dependence on Mining NAI Policy Note No 6:2018

Amnesty International (2018). Niger Delta Negligence. https://www.amnesty.org/en/latest/news/2018/03/niger-delta-oil-spills-decoders/ - Accessed on 04/28/2021

Amnesty International (2018). Nigeria: Amnesty activists uncover serious negligence by oil giants Shell and Eni. https://www.amnesty.org/en/latest/news/2018/03/nigeria-amnesty-activists-uncover-serious-negligence-by-oil-giants-shell-and-eni/ -Accessed on 07/11/2021

Andrei and la porta et al (1997). Legal Determinants of External Finance. Journal of Finance.

Auty, R.M (1993). Sustaining development in Mineral Economies: the Resource Curse Thesis, Routledge, London

Auty, R.M (1997). Natural resources, the State and development Strategy, Journal of International development, 9: 651-63.

Auty, R.M (2001). Resource Abundance and Economic development.

Badeeb, Ramez A. and Lean, H. and Clark, J. (2017). "The evolution of the natural resource curse thesis: A critical literature survey," Resources Policy, Elsevier, vol. 51(C), pages 123-134

Barro R. (1995). "Inflation and Economic growth," NBER Working Papers 5326, National Bureau of Economic Research, Inc.

Benkhodja M.T (2014). Monetary policy and the Dutch disease effect in an oil exporting economy, International Economics, (138), 78–102

Blattman C, Hwang J and Williamson J.G (2007). Winners and losers in the commodity lottery: the impact of terms of trade growth and volatility in the periphery 1870-1939, Journal of development Economics

Botero and Andrei, Djankov, Simeon and Lopez-de-Silanes, et al. (2004). The Regulation of Labor. The Quarterly Journal of Economics. 119. 1339-1382

Brunnschweiler, Christa N. and Bulte, Erwin H., May (2008). "The resource curse revisited and revised: A tale of paradoxes and red herrings," Journal of Environmental Economics and Management, Elsevier, vol. 55(3), pages 248-264,.

Bulte, E.H., R. Damania and R.T. Deacon (2005). "Resource intensity, institutions, and development." World development 33(7): 1029-44. Center for Systematic Peace. 2009. "Polity IV Project

Burton A. (1999). The effect of government size on the unemployment rate. Public Choice 99, 395–401 (1999). https://doi.org/10.1023/A:1018349411246

Busse, M. and Koeniger, J., Trade and Economic growth (2012). A Re-Examination of the Empirical Evidence (February 23, 2012).

Cali M. et al. (2008). The contribution of services to development and the role of trade liberalization and regulation, Overseas Development Institute

Casey M. and Sala-i-Martin X. (2000). Extensive Margins and the Demand for Money at Low Interest Rates, Journal of Political Economy, 108, (5), 961-991

Chaudhry, I. S., Ayyoub, M., and Imran, F. (2013). Does inflation matter for sectoral growth in Pakistan? Pakistan Economic and Social Review, 51(1), 71–92

Collier P. and Hoeffler A. (2002a). 'Greed and Grievance in Civil War', Oxford University

Cooke J. (2016). Tracing the Roots of Nigeria's Agricultural Decline. | Center for Strategic and International Studies.
https://www.csis.org/analysis/tracing-roots-nigerias-agricultural-decline -Accessed on 05/13/2021

Corden, W. M. and Neary, J. P. (1982). "Booming Sector and De-industrialisation in a Small Open Economy", Economic Journal 92 (December), 825-48

Corey, J.N., "Three essays on resources, institutions, and development across U.S. states" (2009). Graduate Theses, Dissertations, and Problem Reports. 2833.

Dar A. and AmirKhalkhali, S. (2002). Government size, factor accumulation, and Economic growth: evidence from OECD countries, Journal of Policy Modeling, 24, (7-8), 679-692

Deloittte (2018). The services powerhouse: Increasingly vital to world economic growth

Devadoss S. (1985). The impacts of monetary policy on US agriculture, Iowa State University

Dorinet, E., and Jouvet, P. (2019). The Impact of Extractive Resources on Agriculture Modernisation and Structural Transformation in Sub-Saharan Africa.

Dorosh, P. and Thurlow,J. (2016). Beyond Agriculture Versus Non-Agriculture: Decomposing Sectoral Growth–Poverty Linkages in Five African Countries. World development.

Drucker P.F (2011). "Landmarks of Tomorrow: A Report on the New", p.180, Transaction Publishers

Eifert B., Alan G. and Nils T. (2003). The Political Economy of Fiscal Policy and Economic Management in Oil-Exporting Countries

Felix T. (2019). China, cobalt and the Congo: Why Xi Jinping is winning the 'batteries arms race'
https://www.nsenergybusiness.com/features/china-cobalt-congo-batteries/ -Accessed on 07/23/2021

Fischer S. (1993). The role of macroeconomic factors in growth, Journal of Monetary Economics, 32, (3), 485-512

Frasier Institute, Economic Freedom of the World (2020) Annual Report https://www.fraserinstitute.org/studies/economic-freedom-of-the-world-2020-annual-report - Accessed on 07/27/2021

Furubotn E.G and Pejovich S., (1972). Property Rights and Economic Theory: A Survey of Recent Literature, Journal of Economic Literature, 10, (4), 1137-62

Gabriel D. (2013). Inductive and deductive approaches to research https://deborahgabriel.com/2013/03/17/inductive-and-deductive-approaches-to-research/ - Accessed on 04/18/2021

Gashgari, S. (2016). The Effects of Free Trade on Domestic and Infant Industries. International Journal of Scientific and Engineering Research. 7. 666-668.

Gelb, A.H. (1988). Oil Windfalls: Blessing or Curse? Oxford University Press, Oxford.

Go, D., Nikitin, D., and Wang, X. (2007). Poverty and Inequality in Sub-Saharan Africa: Literature Survey and Empirical Assessment. Annals of Economics and Finance, 304, 251–304.

Gohmann, S. and Hobbs B. and Mccrickard M. (2008). Economic Freedom and Service Industry Growth in the United States. Entrepreneurship Theory and Practice. 32. 855 - 874. 10.1111/j.1540-6520.2008.00259.x

Gunduz, S, Kustepeli, Y. (2020). The Impact of Natural Resource Abundance on Manufacturing Exports from a Technology Intensity Perspective . Ege Academic Review, 20 (3) , 221-230 . DOI: 10.21121/eab.795981

Gwartney, James and Holcombe, Randall and Lawson, Robert. (2006). Institutions and the Impact of Investment on Growth. Kyklos. 59. 255-273. 10.1111/j.1467-6435.2006.00327.x.

Gylfason T. and Herbertsson T. (2001). Does inflation matter for growth?, Japan and the World Economy, 13, (4), 405-428

Gylfason, T. (2001). Natural resources and Economic growth: What is the Connection? Cesifo Working Paper No. 530, Munich: Institute for Economic Research.

Gylfason, Thorvaldur (2004), Natural resources and Economic growth: From Dependence to Diversification

Harford, T. and Klein, M. (2005) Aid and the Resource Curse: How Can Aid Be Designed to Preserve Institutions? Viewpoint. World Bank, Washington, DC. © World Bank. https://openknowledge.worldbank.org/handle/10986/11223 License: CC BY 3.0 IGO

Hartwick, John M, (1977). "Intergenerational Equity and the Investing of Rents from Exhaustible Resources," American Economic Review, American Economic Association, vol. 67(5), pages 972-974,

Human Development Report (2020). The Next Frontier: Human Development and the Anthropocene. Briefing note for countries on the 2020 Human Development Report for Nigeria

Humphreys, M. (2005). Natural resources, Conflict and Conflict Resolution, Journal of Conflict Resolution, Vol. 49. No. 4, Sage Publications

Iimi, A. (2006). Did Botswana Escape from the Resource Curse? IMF Working Paper WP/06/138. International Monetary Fund.

Ikemeh, R.A. (2015). Assessing the Population Status of the Critically Endangered Niger Delta Red Colobus (Piliocolobus epieni). Primate Conservation, 2015(29): 87-96.

Inge Amundsen (2014). Drowning in Oil: Angola's Institutions and the "Resource Curse" Comparative Politics Vol. 46, No. 2 (January 2014), pp. 169-189 (21 pages)

INSEE (2021). Natural resources.
https://www.insee.fr/en/metadonnees/definition/c2198. -Accessed on 06/13/2021

Isham J., Michael W. , Lant P., Gwen B. (2005). "The Varieties of Resource Experience: Natural Resource Export Structures and the Political Economy of Economic growth," World Bank Economic Review, World Bank Group, vol. 19(2), pages 141-17

Jankovic and Ferraro (2019). On Sound Money. Galaxy Digital Research https://medium.com/galaxy-digital-research/on-sound-money-afc0619697b3 -Accessed on 06/12/2021

Jhingan M.L (1997). The Economics of Development and Planning. Pages 4-5

Johan G and Lous, B. (2018). Economic Freedom, Income Inequality and Life Satisfaction in OECD Countries. Journal of Happiness Studies. 19. 10.1007/s10902-017-9905-7.

Johnson S., Daniel K., and Pablo Z.L (May 1998). "Regulatory Discretion and the Unofficial Economy." American Economic Review 88 387-392

Kaufmann D, Aart Kraay and Massimo Mastruzzi, (2003). Governance Matters III: Governance Indicators for 1996-2002, Macroeconomics, University Library of Munich, Germany

Krugman (1991). Increasing Returns and Economic Geography, Journal of Political Economy, 99, (3), 483-99

Lal.D and Myint, H (1996). The political economy of poverty, equity and growth: A comparative study. Oxford: Clarendon Press

Leamer, Edward E. (1984). Sources of International Comparative Advantage: Theory and Evidence. Cambridge: MIT Press.

Leite, C., and Weidmann, J. (1999). Does mother nature corrupt? – natural resources, corruption, and Economic growth.

Loayza, N., Oviedo A. and Servén, L. (2004). Regulation and Macroeconomic Performance.

Looney, R.E. (1989). Oil Revenues and Viable development: Impact of the Dutch Disease on Saudi Arabian Diversification Efforts. American Arab Affairs. 27: 29-35.

Matsuyama, K. (1992). "Agricultural Productivity, Comparative Advantage, and Economic growth." Journal of Economic Theory 58

Mehlum H., Karl O. and Ragnar T., (2006). Institutions and the Resource Curse, Economic Journal, 116, (508), 1-20

Mohammad and Ramiar (2013). International Journal of Economics and Financial Issues Vol. 3, No. 2, 2013, pp.376-385ISSN: 2146-4138, The Effect of Trade Openness and Economic Freedom on Economic growth: the Case of Middle East and East Asian Countries

Morgan, M. J. (2009). "DR Congo's $24 trillion fortune". African Business.

Muhammad Shahbaz et al. (2019). An empirical note on comparison between resource abundance and resource dependence in resource abundant countries, Resources Policy, Volume 60, pages 47 to 55

Mulligan, C.B., Sala-I-Martin, X. Measuring Aggregate Human Capital. Journal of Economic growth 5, 215–252 (2000). https://doi.org/10.1023/A:1009893417085

Murshed M. (2004). When does natural resource abundance lead to a resource curse?

Natural Resource Governance Institute (2015). The Resource Curse: The Political and Economic Challenges of Natural Resource Wealth.

Newman, I., and Benz, C. R. (1998). Qualitative-quantitative research methodology: Exploring the interactive continuum. Carbondale: Southern Illinois University Press.

Nicoletti, G. and Scarpetta, S. (2003). "Regulation, productivity, and growth : OECD evidence," Policy Research Working Paper Series 2944, The World Bank.

OECD (2005). Glossary of Statistical Terms - Natural resources Definition. https://stats.oecd.org/glossary/detail.asp?ID=1740 – Accessed on 06/15/2021

Okoli CG. (2006). Rural households' perception of the impact of crude iol exploration in Ogba/Egbema/Ndoni local government area of rivers state, Nigeria. Journal of Agriculture and Social Research (JASR)

Palley T. (2003). Lifting the Natural Resource Curse Published in the Foreign Service Journal, 80 (54 – 61)

Rabah Arezki and Frederick (Rick) van der Ploeg, (2007). Can the Natural Resource Curse Be Turned into a Blessing? The Role of Trade Policies and Institutions, No 6225, CEPR Discussion Papers, C.E.P.R. Discussion Papers

Roberts J. and Olson R. (2013). How Economic Freedom Promotes Better Health Care, Education, and Environmental Quality. The Heritage Foundation.

Ross Michael L. (2015). What have we learnt about the resource curse?

Rostow, Walter (1961). The Stages of Economic growth: A Non-Communist Manifesto (Cambridge: Cambridge University Press).

Sachs, J. D. and Warner, A. M. (1995). Natural Resource Abundance and Economic growth. National Bureau of Economic Research Working Paper. 5398: 1-47.

Sala-i-Martin, Arvind Subramanian (2013). Addressing the Natural Resource Curse: An Illustration from Nigeria, Journal of African Economies, Volume 22, Issue 4, August 2013, Pages 570–615

Samuelson, P.A., and Nordhaus, W.D (2000). Ekonomija Zagreb: MATE

Scully Gerald, (1989). The size of the state, Economic growth and the efficient utilization of national resources, Public Choice, 63, (2), 149-164

Shamim Ahmed and M. Golam Mortaza, (2010). "Inflation and Economic growth in Bangladesh: 1981-2005," Working Papers id:3033, e SocialSciences.

Statista (2020). Agriculture in Nigeria- statistics and facts. https://www.statista.com/topics/6729/agriculture-in-nigeria/ - accessed 0n 05/30/2021

Surugiu et al. (2015). International Trade, Globalization and Economic Interdependence between European Countries: Implications for Businesses and Marketing Framework, Procedia Economics and Finance, Volume 32, (2015). 131 – 138

Timmer, C. (1988). The agricultural transformation. Handbook of development Economics. Vol. 1. vol. I.

Torvik, R. (2002). Natural resources, rent seeking and welfare. Journal of development Economics,67, 455–470

Trefler, D. (1995). The Case of the Missing Trade and Other Mysteries. The American Economic Review, 85(5), 1029-1046

Trochim,W.M.K.(2006). Deductive and Inductive Thinking, available at: www.socialresearchmethods.net/kb/dedind.php

Trubek D. (1972). Max Weber on Law and the Rise of Capitalism.

United Nations Environmental Program (2020). Our Work in Africa https://www.unep.org/regions/africa/our-work-africa - accessed on 06/25/2021

U.S. Energy Information Administration (2020). Independent Statistics and Analysis International. U.S. Energy Information Administration (EIA). https://www.eia.gov/international/analysis/country/NGA.-accessed on 07/12/2021

Usman, B.A. and Adefalu, L.L. (2010). Nigerian Forestry, Wildlife and Protected Areas: Status Report. Biodiversity, 11, 44-52.

Van der Ploeg, Frederick. (2011). "Natural resources: Curse or Blessing?" Journal of Economic Literature, 49 (2): 366-420.

Williamson, C. and Kerekes, C. (2011). Securing Private Property: Formal Versus Informal Institutions. Journal of Law and Economics. 54. 10.1086/658493.

Woolcock, Michael, Lant Pritchett and Jonathan Isham (2001). The Social Foundations of Poor Economic growth in Resource-Rich Countries in Richard M Auty (ed.) Resource Abundance and Economic development, Oxford, UK: Oxford University Press, pp 76-92.

World Bank. (2018). Stronger Open Trade Policies Enable Economic growth for All. https://www.worldbank.org/en/results/2018/04/03/stronger-open-trade-policies-enables-economic-growth-for-all - accessed on 07/06/2021

World Bank (2021). The World Bank in DRC. https://www.worldbank.org/en/country/drc/overview -Accessed on 06/19/2021

World Trade Organization (2010). Trade in Natural resources page 46. World Trade Report