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MINERAL WEALTH VERSUS RESOURCE CURSE – THE STAGE IS SET

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ABSTRACT

The debate regarding the impact of resource wealth being a curse rather than a benefit has been a subject of debate since the 1950's. Only since Sachs and Warner, (1995) the ground breaking study which confirmed a negative relationship between resource abundance and economic growth for a selected set of countries there has been a narrative termed the 'natural resources hypothesis'. This hypothesis asserts that countries with natural resource abundance tend to grow at a slow economic rate than countries with less resource abundance. Africa, being the most resource abundant continent compared to all other continents should be the best illustrator of the hypothesis because of vast mineral wealth coupled with the high level of poverty on the continent. This study seeks to determine if African citizens are on average deemed better or worse off given the abundant natural resources endowed in most African countries in relation to quality of life and income inequality as a measurement tool. The study further examines the effect of resource abundance in African countries, using income inequality as an addition variable above the economic growth.

Using a panel data fixed effect estimation model for African countries and Middle East countries from 1970 to 2016, the study finds the existence of a U-shaped relationship between resource rent and income inequality, which supports the literature regarding the Kuznets curve. The study also found that rising consumer price inflation significantly worsens average income inequality within an African country. In addition, a high degree of trade openness significantly reduces income inequality within an African country, if all else is held constant.

It is thus concluded that for African countries based on the population level, inflation level, degree of trade openness, and GDP share of domestic savings, accumulation of more coal rents share is expected to worsen average income inequality, while more mineral resource rents share reduces income inequality. The study recommends that African countries should find ways to measure inequality in their respective countries which would better illustrate the general relationship between mineral wealth and income inequality. Equally valuable would be the investment in research such as studies and reports which that would track the distribution of income over time in countries undergoing a mineral boom.

CHAPTER 1 – INTRODUCTION

1.1 Background

The curse of natural resources which the observation that countries rich in natural resources tend to perform worse off than their counterparties with less natural resources has been empirically shown and analysed in a number of recent studies. (Sachs & Warner, 2001). These studies, which include Auty (1993), Gelb (1988), Sachs and Warner (1995, 1999), and Gylfason, Herbertson, & Zoega (1999) among others, have emerged late in the 20th century as evidence of the poor growth experience of resource-rich countries in the post-World-War II period. (Sachs & Warner, 2001).

"It has been observed for some decades that the possession of oil, natural gas, or other valuable mineral deposits and natural resources do not necessarily confer economic success", as the relationship between resources and economic growth is found to be negative. (Frankel, 2010, p. 3.). The resource-rich African continent is a great illustrator of this hypothesis as "many African countries, such as Angola, Nigeria, Sudan, and the Congo are rich in oil, diamonds, or other minerals, and yet their people continue to experience low per capita income and low quality of life" (Frankel, 2010, p. 3).

Possessing diamonds has arguably been disastrous for the development of countries like Sierra Leone, Liberia, and the Democratic Republic of Congo, compared to countries like Australia, South Africa, or Botswana whose success depends on diamond deposits Boschini, Petterson and Roine (2007). Frankel (2010) thus questions how the "abundance of hydrocarbon deposits or other mineral and agricultural products could be a curse." (p. 4). Given that some African countries have defied or rather avoided the resource curse while the majority have endured it, this study seeks to investigate the relationship between natural resources and income inequality in resource-rich African countries.

Simply put, are citizens of resource-rich countries on the African continent worse or better off, in so far as it relates to income inequality? "That mineral wealth does not in itself confer good economic performance is a striking enough phenomenon, without exaggerating the negative effects" according to Frankel (2010). (p. 4). One of the casual observations from empirical support confirms that "extremely resource-abundant countries such as the Oil States in the Gulf,

Nigeria, Mexico, and Venezuela have not experienced sustained rapid economic growth" (Sachs & Warner, 2001, p 828). The finding from "repeated regressions using growth data from the post-war period is that high resource intensity tends to correlate with slow growth", but how is this effect explained if we examine income inequality as a variable (Sachs & Warner, 2001, p. 828).

The logical deduction drawn from the resource curse hypothesis, in as far as African resource-rich countries are concerned, could be that they are better off without the resources. This study contends that testing economic inequality against the resource curse literature could result in further insights on the impact of natural resource wealth on African resource-rich countries. Former Zambian President Kenneth Kaunda has said, "We are in part to blame, but this is the curse of being born with a copper spoon in our mouth" (Sarraf & Jiwanji, 2001, p. 3). This infers that even African leaders believe in the hypothesis espoused by the 'resource curse' narrative, without considering whether people are better off or not.

Wright, (2001) quotes from words written by Adam Smith in as early as 1776 where Smith states, "Projects of mining, instead of replacing the capital employed in them, together with the ordinary profits of stock, commonly absorb both capital and stock. They are the projects, therefore, to which of all others a prudent law-giver, who desired to increase the capital of his nation, would least chuse to give any extraordinary encouragement" (Wright, 2001, p.1). Smith's statement could be interpreted as signaling that resource inspired activity should be considered with caution.

This study seeks to further examine this view. It sets out to examine if the low levels of economic growth synonymous with resource wealth translate to countries being worse off, with inequality as a measurement variable.

1.2 Research Problem

To examine the effect of resource abundance in African countries, another variable above the economic growth variable, as in the resource curse hypothesis literature, is used, and the relationship between resource wealth and income inequality is tested. The African continent and other resource-rich developing nations have been characterised by their underperformance in economic development measured by Gross Domestic Product. A considerable amount

literature investigate “the effects of income inequality on macroeconomic performance, as reflected in rates of economic growth and investment” using empirical data from the vast numbers of countries as their population (Barro, 2000).

Current research related to the natural resource curse investigates the relationship between resource wealth and a variety of variables led by the economic growth, but none seek to determine the effects of income inequality on poorer nations and falls short of addressing whether developing states are worse or better off as a direct result of the resource abundance. Current academic research has to date not directly interrogated the true impact of resource wealth on developing states, leaving the matter unresolved.

There are a host of more recent studies since the studies of Sachs and Warner (1995), who further explicated the relationship between resource wealth and economic growth, considering economic inequality to be examinable (Barro, 2000; Forbes, 2000; Arezki & Van Der Ploeg, 2011). Apart from Ross (2007), who tried to discover how mineral wealth can affect horizontal and vertical inequality, this research study has not encountered any other researcher who specifically set out to understand the relationship between resource wealth and inequality. This study, however, addresses this gap in research by analysing and evaluating the relationship between natural resource wealth and inequality for resource-endowed developing African countries and also examines if these countries are better or worse as a result of their resource wealth.

1.3 Research Questions and Scope

In light of the discussions above, the objective of this study is to investigate the relationship between resource wealth and inequality as compared to the resource curse hypothesis.

As such, the study will set out to answer the following questions and their respective hypotheses:

1. Do African countries suffer from the resource curse?

   Hypothesis 1:

   $\boldsymbol{H0}$: There is a negative relationship between resource wealth and economic growth.

$\boldsymbol{H1}$: There is no negative relationship between resource wealth and economic growth.

2. What is the relationship between resource wealth and inequality using African countries, and what do the results infer when compared to the resource curse hypothesis?

Hypothesis 2:

$\boldsymbol{H0}$: There is no causal relationship between resource wealth and inequality.
$\boldsymbol{H1}$: There is causal relationship between resource wealth and inequality.

1.4 Organisation of the Study

This study is structured as five chapters that proceed as follows. The next chapter, Chapter 2, is an extensive review of the literature with a theoretical framework and limitations of the existing literature. Chapter 3 explores the analytical framework of the methodology of the research this study has undertaken. Chapter 4 discusses the findings of the statistical analyses, where the relationship between resource endowment and income inequality is examined by the study. The chapter further analyses these findings with a view to deducing an inference from the literature regarding the natural resource curse. Finally, Chapter 5 concludes the study with a summary of the key findings, discussions on the theoretical and empirical significance of the findings in relation to literature, and suggestions on avenues for future research.

CHAPTER 2 – LITERATURE REVIEW

2.1 Introduction

This chapter presents and discusses the reviews academic literature related to the basis of this study. It tracks development and the evolution of the narrative related to the resource curse hypothesis as articulated by a variety of academic studies. Section 2.2 outlines the theoretical framework, section 2.3 presents the empirical studies review. The section on the pastliterature on different variables of the natural resource hypothesis (2.4), is divided into four sub-sections: Section 2.4.1 presents the variables for education and development; section 2.4.2 presents variables adjusted to periods of study and nominal measure; section 2.4.3 presents the variables of institutional quality and capital; section 2.4.4 presents reviews on the variable of dependence on natural resources.

Section 2.5. presents review based on institutional quality, section 2.6 presents reviews of literature based on different commodities. The chapter goes on further to review African diversification cases (section 2.7) before it presents reviews on the studies which support the non-existence of the natural resource curse based on limited evidence to conclusively support the existence of the resource curse in section 2.8. Furthermore, section 2.10 presents the theoretical approach to assessing the determinants of inequality involving the Kuznets curve, which is divided into 3 sub-sections: The shift from agriculture to industry affects inequality (section 2.10.1); the impact of technology on equality (section 2.10.2) as well as tools to measure inequality (section 2.10.3). The chapter concludes by discussing the economic growth as a variable in the resource curse narrative.

2.2 Theoretical Framework

Countries that have abundant natural resources lag behind resource-poor countries in terms of their growth rates. This counter-intuitive relationship is known in the literature as the resource curse hypothesis. (Alofaysan, 2017). The term was first used by Auty (1993) to describe how countries rich in natural resources seemed unable to use the wealth to boost their economies and thus increase their economic growth (Alofaysan, 2017). Sachs and Warner (1995) investigated the relationship by examining the effects of natural resources on economic growth. They measured national resources, using the ratio of primary exports to

Gross National Product (GNP) as proxy, producing findings which suggested negative correlation between natural resource exports and per capita GDP growth (Alofaysan, 2017). In support of the resource curse, Sachs and Warner (1995) also discovered that a high ratio of natural resource exports causes low growth rates due to the subsequent period of their study being 1971-1989.

The "natural resource curse is not confined to individual anecdotes or case studies but was born from statistical tests of the determinants of economic performance across a comprehensive sample of countries" (Frankel, 2010, p. 11). Sachs and Warner (as cited by Frankel, 2010) pioneered the "econometric literature, finding that economic dependence on oil and mineral is correlated with slow economic growth, controlling structural attributes of the country." (p. 11). Sachs and Warner (as cited by Frankel, 2010) summarised and expanded earlier studies by "showing evidence that countries with great natural resource wealth tend to grow slower than resource-poor countries" (p. 11.) Furthermore, in the study Frankel (2010) establishes that Sachs and Warner find that their results are "not easily explained by other variables or by alternative ways to measure resource abundance." (p.11). The study also finds that there is "little direct evidence of geographical or climate variables explaining the curse, or of a bias in their estimates from some other unobserved growth deterrent" (Frankel, 2010, p. 11).

This study also investigates the relationship between natural resources and non-resource economic activity in resource-rich countries. This relationship has been investigated through the literature of the resource curse which was first noted by Sachs and Warner (1995) who showed a significantly negative relationship between natural resource dependence and economic growth. (Alsharif, 2017). Despite the developing literature in that area, the empirical tests of their study suffered from endogeneity. The aim of this study, therefore, is to further explore the resource curse hypothesis and provide new evidence regarding the impact of natural resources on the level of income inequality and the rate of economic growth by using a specific group of African countries as a sample. In addition to the sample of African countries, Middle East and non-African countries are used as a control measure to reduce bias.

The study examines the relationship between the natural resource endowment and economic growth for African countries to introduce the natural resource hypothesis. Then the study seeks to test this hypothesis using analytical tools to determine whether African countries would be better or worse off in the long run. Thus, the study uses inequality as a measurement tool for economic growth. Thus, the aim of this study is to further explore the resource curse hypothesis and provide new evidence regarding the impact of natural resources on the level of income inequality and the rate of economic growth, using alternative approaches.

The studies undertaken into the evolution of the resource curse hypothesis lack a "universally accepted theory of the natural resources curse", just as there is a lack of a "universally accepted theory of economic growth in general" (Sachs & Warner, 2001, p. 833). The resource curse has been found to harm growth, as it crowds out activity which is usually a driver for growth (Sachs & Warner, 2001, p. 833). According to Sachs and Warner (2001), who seek the complete answer to the cause of the natural resources curse and to what ultimately drives growth, some form of relationship between resource wealth and growth seems to exist.

2.3 Empirical Studies

The curse of natural resources, he observation that countries rich in natural resources tend to perform badly, has been shown empirically and analysed in a number of recent studies. These studies, including a sizable amount of academic research, have investigated the resource curse hypothesis from literature based on data from the cross-sectional specifications of Sachs and Warner (1997) in which they use the same indicator to measure natural resources. Notwithstanding the studies and observations, according to Alofaysan (2017), there are no consensus views on the resource curse, and the literature also has not yet reached a consensus on whether natural resources are a curse for the economy.

The findings of Sachs and Warner in their initial investigation of the theory have opened the door for numerous findings of different studies related to the relationship between natural resources and economic growth. Numerous studies have concerned themselves with this relationship, applying different sets of variables to different country samples (Alofaysan, 2017). These studies, which include Auty (1990), Gelb (1988), Sachs and Warner (1995, 1999), and Gylfason et al. (1999), among others, have emerged late in the 20th century. (Sachs & Warner, 2001). According to Alofaysan (2017), some of these studies confirm the resource curse (Gylfason et al., 1999; Rodriguez and Sachs, 1999), whereas others question its validity

(Alexeev & Conrad, 2009;; Van der Ploeg & Poelhekke, 2010).

2.4 Past Literature on Different Variables of the Resource Curse Hypothesis

In the past, numerous researchers undertook different studies to determine the effect of different variables on the resource curse hypothesis.

2.4.1 The variable of education and development

Gylfason et al, (1999) and Gylfason (2001) considered the variables of education and development. Education is deemed a variable important to growth, and "resource abundance could crowd out entrepreneurial activity or innovation unless the wages in the natural resource sector rise to a level high enough to encourage potential innovators and entrepreneurs to work in the resource sector" (Sachs & Warner, 2001, p. 835). The argument is further developed that natural resources in these countries are concentrated with the influence of government officials, proximity to influence over natural resources encourages "rent-seeking and corruption rather than pro-growth activities" (Sachs & Warner, 2001, p. 835). Another study points out that political progress gets captured in resource abundant economies, which in some way contributes to the crowding out of potential innovators and entrepreneurs, resulting in lower activity levels and, in turn, lower growth (Auty, 2001).

Doppelhofer, Miller and Sala-i-Martin (2000) tested the robustness of each variable used in the studies of Sachs and Warner by computing the probability that the variable belongs to the true regression when different control variables are entered. They found strong evidence of the resource curse in their study. Sachs & Warner (as cited by Alofaysan, 2017) "classify the natural resource curse as one of the most robust relationships" in the economic growth literature. (p. 8)

2.4.2 Variables adjusted to periods of study and nominal measure

Other studies have altered the period of study to test the resource curse hypothesis. Norrbin, Pipatchaipoom and Bors (2008) extended the period of study to re-examine the hypothesis. They discovered that over an extended period the negative relationship between natural resources and growth is robust and that the resource curse appears sensitive to the sample of countries in the regression, in which eliminating a single country reduces the significance of the result (Alofaysan, 2017).

Similarly, Bruckner (2010) shows that using a measure adjusted to the purchasing power parity yields an economically larger negative relationship between per capita GDP growth and natural resource dependence than the nominal measure. He goes on to argues that the "commonly used nominal measure of natural resource dependence – the share of exports of primary products in GNP – understates, in growth regressions, the negative link between natural resource dependence and per capita GDP growth" (Bruckner, 2010, p. 1).

2.4.3 The variables of institutional quality and capital

Papyrakis and Gerlagh (2004) empirically examine the direct and indirect effects of natural resources on economic growth. They identify potential channels of transmission for the resource curse by regressing some explanatory variables, such as institutional quality and human capital on natural resource dependence. They conclude that the negative indirect effects of natural resources on growth outweigh the positive direct effects (Alofaysan, 2017). On the other hand, Mehlum, Moene and Torvik (2006) provide strong evidence that institutions are crucial to the resource curse, a finding that contrasts with the claim of Sachs and Warner that institutions do not play a role in the resource curse.

The study of Mehlum, Moene and Torvik, (2006) illustrates that natural resources increase GDP growth in countries with more production-friendly institutions but reduce GDP growth in countries with counter-productive institutions. Institutions as an explanatory variable was further examined by Boschini, Pettersson, and Roine (2007) who investigated the natural resource effect on economic development and the dependence between institutional settings and the resources of a country. They found that "resource abundance is negative for economic development only if the country lacks the proper institutions for dealing with the potential conflicts and rent-seeking behaviour which the resources may otherwise bring on."

(Boschini et al., 2007, p. 599). This argument is a healthy point of departure from the practice of measuring the resource curse with economic growth a central yardstick.

2.4.4 The variable of dependence on natural resources

Brunnschweiler and Bulte (2008) argue that the widely used measure of natural resource abundance in the literature, the natural resource exports as a share of GDP, is a misleading index. They contend that the index is correlated to dependence on, rather than abundance of, natural resources. Their findings cast doubt on the ability of natural resource exports as a share of GDP to be used as a suitable proxy. They provide evidence that strong dependence on resources slows economic growth (Alofaysan, 2017). Ding and Field (2005) propose two different measures of natural resources: firstly, natural resources capital per capita as a measure of resource abundance, and secondly, the proportion of total capital that is accounted for by resources capital as a measure of resource dependence. They find evidence that strong dependence on natural resources has a negative effect on the growth rates of GDP, whereas natural resource abundance positively promotes GDP growth (Alofaysan, 2017).

Examining oil endowments and other natural resources on long-term growth, (Alexeev & Conrad, 2009, 2011) treat institutions as endogenous and show that records of negative effects of natural resource wealth on institutions are likely to be spurious because of the positive link between GDP and natural resources. They propose to instrument initial GDP using geographical variables to address this issue (Alofaysan, 2017). Thus, the claims of the negative effect of oil and mineral wealth on countries' institutions are called into question (Alexeev & Conrad, 2009).

2.5 Institutional Quality

Boschini et al. (2007) offer two explanation streams for the relationship between resource abundance and economic growth, one being economic, and the other political (Alofaysan, 2017). The economic factor outlines the Dutch Disease (See sub-section 2.9), whereas Matsuyama (1992) finds that "the larger the natural resource sector, the smaller the positive externalities to enable growth" (Boschini et al, 2007, p. 596). The political factor is

supported by works of Ross (2001) who finds that resource abundance increases incentives to engage in non-productive activities, such as procuring rent from rent-seeking activities. Both factors, however, highlight the imperative need for a good institutional framework. Where good institutional frameworks exist, the abundance of natural resources would translate into a broader spectrum of economic enrichment, assessed not only by GDP per capita, but also by more appropriate indicators, looking to determine whether the living standards in various countries are improving, directly or indirectly, from resource wealth (Alofaysan, 2017).

Positive wealth shocks from the natural resource sector (along with consumer preferences that translate this into higher demand for non-traded goods) create excess demand for non-traded products and drive up non-traded prices, including particularly non-traded input costs and wages. The ripple effect of the excess demands is that the input costs of the non-traded products are not carried over to the final pricing of such products as they are sold for prices which lead to lower returns on the international market. The impact of the lower return, from the pricing model hamper the growth processes in certain sectors such as manufacturing, leading to an inevitable decline in the sector. (Sachs & Warner, 2001).

2.6 Different Commodities

Geography influences the natural resources of various countries, which also affects the relationship between different natural resources and economic growth. Some studies have examined the resource curse hypothesis in relation to the respective resources of a country, claiming that not all resources have the same impact on economic growth. Oil and mineral resources, for example, are more negatively related to growth than agricultural resources. (Gylfason, 2001)(Murshed, 2004). Another study has challenged these findings and showed evidence that oil production, rent, or reserves have a strong positive impact on income and economic growth (Cavalcanti, Mohaddes & Raissi, 2011).

In his study, Alsharif (2017, p. 42) suggests that “oil and gas rents have a significant impact on export concentration, whereas other renewable resources tend to increase export diversification and employment”. His study further identifies a distinction between the impact of natural resources and the development stage of a country. He thereby concludes that there is a significant positive

impact of natural resources on diversification among developed countries, while developing countries concentrate more on exports, employment, and value-added growth levels.

Other studies have offered options other than variable diversity as explanations for the resource curse. Using a relatively new index of transparency with extensive coverage, both across countries and time, Williams (2011) suggests a strong and robust negative causal association running from (point) resource export revenues to transparency. His study further suggests a negative association between minerals and fuel resource export revenue and transparency, where lack of transparency negatively affects economic growth.

On the other hand, Lane and Tornell (1996, 1999) and Collier and Hoeffler (2004) offer a different explanation for the resource curse; they conclude that the resource curse is based on rent-seeking theories. Their respective studies state that natural resources abundance generates an incentive for governments to engage in non-productive activities and to provide fewer public goods than the optimum. (Alofaysan, 2017).

Other studies by Behbudi, Mamipour and Karami (2010) conclude that human capital could be the main factor behind the slow growth of resource-rich countries because such countries neglect to develop their human resources. These researchers explore the relationship among human capital, resource abundance, and economic growth to explain the hypothesis. (Alofaysan, 2017).

2.7 African Cases of Specification Versus Diversification

The actions or inactions of government influence the impact of resource booms on the levels of inequality. For example, “Norway is conspicuous as an oil-producer that is at the top of the international league tables for governance and economic performance”. (Frankel, 2010, p. 12). However, in Africa, “Botswana and the Congo are abundant in diamonds, yet Botswana is the best performer in terms of democracy, stability, and rapid growth of income, while the Congo is among the very worst”. (Frankel, 2010, p. 12). Therefore, it can be concluded that governments in less-developing states tend to be less bound by the rule of law, have less institutional stability, and are more susceptible to rent-seeking and corruption than in the advanced industrialised states. (Ross, 2007).

Many of the poorest and most troubled states in the developing world are rich in natural resources. According to Ross (2001) "there is a growing body of evidence that resource wealth itself may harm a country's prospects for development." (p. 328). Most of these resource rich yet poor countries are on the African continent, and because of the levels of poverty in Africa, it is vital for governments to understand the impact of resource wealth and the manner in which the proceeds of the resource exports could be used to change the economy. Mineral booms tend to exacerbate regional inequalities under certain conditions: when the extractive region is initially wealthy and when growth in the mineral sector outpaces growth in other sectors (Ross, 2007). If the region is poor, mineral wealth can aid in closing the gap and reducing inequality in contrast to the rest of the globe.

Gylfason (2001) argues that "natural resources could be good for growth, if well managed and used to diversify the economy" (Alsharif, 2017, p. 22). Regarding exports Alsharif, (2017, p. 22) finds that "diversification may help countries to upgrade their resource-based sectors, as they move away from unprocessed primary exports to more complex products and services". However, Cadot et al. (2011) argue that "diversification should not be taken as a policy objective for two reasons" (Alsharif, 2017, p. 21): First, the importance of specialisation, not diversification should be emphasised, following Ricardian theories that also stress the importance of specialisation. Second, the Heckscher-Ohlin model, used to evaluate trade and, more specifically, the equilibrium of trade between two countries that have varying specialties and natural resources, "implies that export patterns are largely determined by endowments, drawing attention to factor accumulation, not diversification" .(Alsharif, 2017, p. 22).

However, according to Papageorgiou and Spatafora (2012), "policymakers in developing and resource-rich countries are constantly preoccupiedwith diversification, as they believe it is the path towards higher development" (Alsharif, 2017, p. 22). Alsharif (2017) also examines that

> *"Gylfason (2011) argues that economic diversification could stimulate growth by attracting new economic activity that avoids excessive reliance on primary production in natural- resource-based industries, thus facilitating the transfer of labour from low-paying jobs in low- skill intensive farming and agriculture to more lucrative jobs in high-skill intensive occupations, such as manufacturing". (p. 22)*

According to Alsharif, (2017), p. 22) "a higher resource dependency makes diversification more

more difficult, but resource-rich countries want to diversify for a number of reasons established from the Gelb and Grasmann, (2010) findings: First, “export diversification is associated with higher long-term growth”, as engaging “in manufacturing enables dynamic learning-by-doing, which raises productivity and income”. Second, “diversification exposes producers to a wider range of information about foreign markets and may open the way to other sectors”. (Alsharif, 2017, p. 22).

2.8 No Evidence of the Resource Curse

In the literature, there is no consensus on the natural resource curse hypothesis. While studies reviewed thus far support the existence of the resource curse and offer different variables as explanations for the relationship between natural resource abundance and economic growth, some studies have found no evidence of the curse. According to Frankel (2010, p. 12), among the “statistical studies, Delacroix (1977), Davis (1995), and Herb (2005) all find no evidence of the natural resource curse”.

Unlike most scholars who confirm the negative effects of resources on economic growth on cross-sectional data, other scholars, such as Manzano and Rigobon (2001) test the relationship between natural resources and growth using panel data, which shows no evidence for the resource curse. Their studies show that the negative effect of resources on growth could be attributed to the fact that primary exports as a fraction of GNP, which is the most common measure of resources in the literature, is correlated with unobservable characteristics.

In his study, Maloney (2002) found that numerous resource-rich economies have been far more dynamic than those in Latin America, and there is little long-term evidence that natural resource abundant countries generally underperform. He concluded that there are two factors that distinguish Latin America from the more successful experiences of Scandinavia or Australia. Firstly, deficient national learning or innovative capacity arising from low investment in human capital and scientific infrastructure led to weak ability to innovate or even take advantage of technological advances abroad. Secondly, the period of inward-looking industrialisation created a sector whose growth depended on artificial monopoly rents rather

than the quasi-rents arising from technological adoption, which undermined resource-intensive sectors that had the potential for dynamic economic growth (Maloney, 2002).

In addition, Alexeev and Conrad (as cited by Frankel, 2010) discovered that oil and mineral wealth have positive effects on income per capita, when controlling several variables, particularly in East Asia and Latin America. In the analysis of the Alexeev and Conrad study (as cited by Frankel, 2010,) found that the reason "different studies have different results is that oil wealth may raise the level of per capita income while reducing or failing to raise the growth rate of income". (p.12)

What is observed in the review of the studies that do not support the existence of the natural resource curse is the question of the proxy for natural resource abundance. In some cases, "natural resource wealth is measured by true endowments, or rather by exports" (Frankel, 2010, p.12). In his survey analysis study of the natural resource curse, Frankel (2010) arrives at an approach over which sceptics "argue that natural resource exports are highly endogenous in several ways". (p. 12). Frankel (2010) further advances the narrative that on "the one hand, basic trade theory readily predicts that a country may show a high mineral share in exports, not necessarily because it has a higher endowment of minerals than other countries (absolute advantage) but because it does not have the ability to export manufactured goods (comparative advantage)". (p. 12). The finding of the study offers "a strong explanation for negative statistical correlations between mineral exports and economic development, an explanation that would invalidate the common inference that minerals are bad for growth" (Frankel, 2010, p. 12).

> *"Cases of countries that were able to develop efficiently their resource endowments as part of strong economy-wide growth include: the United States during its pre-war industrialisation period, Venezuela from the 1920s to the 1970s, Australia since the 1960s, Norway since its oil discoveries of 1969, Chile since adoption of a new mining code in 1983, Peru since a privatisation programme in 1992, and Brazil since the lifting of restrictions on foreign mining participation in 1995" (Frankel, 2010, p.13).*

These cases that Frankel outlined are examples wherein institutions and industries have a complementary relationship with the development ofmineral resources.

On the other hand, examples of countries that were "equally well-endowed geologically but failed to develop their natural resources efficiently were Chile and Australia before World War

I and Venezuela since the 1980's" (Frankel, 2010, p. 13). As a result, it is not a given conclusion that countries with oil wealth will perform worse than those without it. From the finding in support of the natural resource curse, a logical deduction would be that a "country with oil or other natural resources would be better off destroying them or refraining from developing them", which contests resource wealth as an agent to growth and development. (Frankel, 2010, p. 13)

Frankel (2010) also finds that resource-rich countries can succeed. As a case study, Botswana best illustrates that resource abundance can be positively related to growth. At its independence in 1966, Botswana was among the 25 poorest countries in the world (Sarraf & Jiwanji, 2001). The diamond and copper-nickel wealthy nation developed itself using the mineral sector as a dominant part of the economy. According to Sarraf and Jiwanji (2001), Botswana went from being a lower-middle income country in 1989 to an upper-middle income economy by the end of 1998. Additionally, between 1966 and 1989, Botswana was the fastest growing global economy with Gross Domestic Product (GDP) growth at an average of 13.9% per annum between 1965 and 1980, at an average of 11.3% between 1980 and 1989, and at an average of 4.75% between 1990 and 1998 (The World Bank, 1998, 1991, 2001).

Some research has provided little agreement on why the relationship exists, while various authors have contributed to the subject matter. Most of the research relies on "resource-rich African countries and their growth performance but do not make provision for the different socio, political, and institutional quality factors that these African countries experience" (Boschini, Pettersson & Roine, 2007). The current literature is seemingly light on its examination of the relationship between resource abundance and inequality using comparable indicators amongst African countries.

A study by Sachs and Warner (2001) showed that resource-intensive economies tended to have high price levels regarding the relationship between economic growth, resource wealth, and inequality, which aroused curiosity as part of this study. What is examined in this study is the relationship between inequality and resource abundance. The method of study carried out by Goderis and Malone (2011) lays an interesting foundation for researchers seeking to examine the relationship between the resource curse and inequality. In their study, they define "a natural measure of non-resource income inequality, based on the factor distribution of income, and

they relate this measure to the Gini coefficient of non-resource income inequality in the economy" (Goderis & Malone, 2011, p. 392).

The study goes on to concentrate on the ratio of the total wage income earned by skilled workers to the total wage income earned by unskilled workers. Goderis and Malone (2011) find that structural measure of non-resource inequality produces output, which is "a multiple of the value share of unskilled labour-producing output and that the relative factor of returns are key drivers of inequality of the personal income distribution". They admit that their findings are consistent with the studies of Daudey and Garcıa-Pe˜nalosa (2007).

Natural resource booms have an impact on income inequality in the short-run and the long-run, as the resource boom affects the transitions of the economy over a period of time. (Torvik, 2001) considers productivity growth in a specific factors model without explicit consideration of the role of skilled versus unskilled labour. Furthermore, Torvik (2001) makes it possible to study" the level of inequality in the balanced growth steady state in response to resource booms" (Goderis & Malone, 2011).

2.9 Dutch Disease

The literature on the relationship between natural resources and non-resource economic activity focuses on the concept of the Dutch Disease, originally named by the *Economist* magazine on 26 November 1977 and inspired by repercussions of "natural gas discoveries by the Netherlands in the late 1950s" (Frankel, 2010, p. 19). The disease existed when an increase in natural resource revenue led to an appreciation of the real exchange rate, which increased the cost of other industries' exports in foreign currency and caused a decline in the manufacturing sector, the most conducive sector to growth. (Alofaysan, 2017; Corden & Neary, 1982). Corden and Neary (as cited by Taguchi & Khinsamone, 2018) described the Dutch disease model "as the resource reallocation from tradable sector to non-tradable sector caused by positive shocks from the natural resource sector." (p. 251).

In his analysis of the impacts of the Dutch Disease on Asian economies, Usui (as cited by Taguchi and Khinsamone, 2018) argued that the Dutch Disease could be avoided due to policy adjustments, such as the currency devaluation in 1978 and the subsequent accumulation of budget surpluses". (p. 252). Pangestu (2010), on the other hand, emphasised "the existence of the Dutch

Disease in Indonesia during that period by demonstrating that the currency devaluation in 1978 only provided temporary relief to the non-oil-traded-goods sector" (Taguchi & Khinsamone, 2018, p. 252). Taguchi & Khinsamone's study also discovered that the resultant lack of manufacturing activities on an economy might make the economy stay at a resource-rich status.

The African government, as the case of Nigeria, seldom took charge of the effects of the Dutch Disease. Thus, the economy suffered because of government's failure to act in the early 1960s and 1970s when an increase in Nigerian exports led to the strengthening of the exchange rate (Ross, 2007). The higher exchange rate made it largely unviable for local firms in certain sectors to be competitive on a global basis (Ross, 2007). A sharp rise in Nigeria's petroleum exports in the 1960s and early 1970s led to an appreciation of the exchange rate, and instead of devaluating the currency, fearing the inflation, the Nigerian government kept it overvalued (Ross, 2007). As the oil sector becomes more profitable as a direct consequence of the sharp rise in petroleum exports, this comes at the expense of other domestic sectors such as agriculture and manufacturing, as these sector decline. (Ross, 2007)

During the same period, in the 1960s and 1970s, the Indonesian government acted to protect its economy by adopting programmes directed towards the poor. They took measures to enhance agricultural production and devalued the exchange rate, thus ensuring its exports remained competitive and shielded the poor, which the Nigerian government did not do (Ross, 2007). The actions of the Indonesians led to the country's Gini coefficient remaining low and stable between 1970 and 2000, while Nigerian's Gini coefficient was significantly higher.

2.10 The Evolution of Inequality

The main "theoretical approach to assessing the determinants of inequality involves some version of the Kuznets (1955) curve, developed further by Robinson (1976) who focused on the movements of persons from agriculture to industry". (Barro, 2000, p. 8). In this model, the "agricultural and rural sector initially constitutes the bulk of the economy", featuring lower capita income and "relatively little inequality within the sector". (Barro, 2000, p. 8). Barro, (2000), p. 8) further states that "the industrial and urban sector starts out small, has higher per capita income, and a relatively high degree of inequality within the sector".

2.10.1 The shift from agriculture to industry affects inequality

"Economic development involves, in part, a shift of persons" and resources "from agriculture to industry". (Barro, 2000, p. 8). The industry migration leads to increases in the per capita income, as growth in the new industries requires more people to employ. According to Barro (2000), the rise in employment changes the country's overall degree of inequality.

At the early stages of development, which is after the resource boom for resource abundant countries Barro, (2000) records that a positive relationship exists between product per capita and inequality. As things progress, and as entry-level employees move from the agricultural sector to the industrial sector, they also move up in the income earner's list. According to Barro's findings, as workers move into industries at the expense of agricultural work, the agricultural sector diminishes. As a result, the decreasing size of the agricultural labour force increases relative wages in that sector and combined with the substitution for more people because of the growth of new industries, indexes of overall inequality reduce. (Barro, 2000).

Therefore, the relationship between the level of per capita product and extent of inequality is positive at the later stages of the development cycle (Barro, 2000). Barro (2000) further elaborates that the "full relationship between an indicator of inequality, such as a Gini coefficient and the level of per capita product, is described by an inverted-U, which is the curve named after Kuznets." (p. 9). The description of the relationship between the short-run and long-run periods, coupled with the impact on inequality on the same periods, would be amplified during resource booms.

2.10.2 The impact of technology on equality

Barro (2000) quotes another variable that has an impact on inequality is technology; many technological innovations initially tend to raise inequality. As more people move into a sector, "inequality tends to rise along with expanding per capita product." (Barro, 2000, p. 9). Subsequently, as more people take advantage of the superior techniques," inequality tends to fall as in the case of the move from the agricultural to industrial sector" (Barro, 2000, p. 9). To justify this effect, the

poor sector may be the user of an old technology, whereas the rich sector employs more recent and advanced techniques (Aghion & Howitt, 1997; Galor & Tsiddon, 1997; Helpman, 1997).

2.10.3 Tools to measure inequality

While the Kuznets curve has been widely regarded as a good tool to explain inequality as economies develop, there are studies that suggest that the relationships the Kuznets curve outlines have weakened. Anand and Kanbur (as cited in Barro, 2000) in their study argue "that the Kuznets curve works better across countries at a point in time than for the evolution of inequality over time." (p. 9). Barro (2000) also finds that this "curve explains relatively little of the variations in inequality across countries over time." (p. 10). Thus, the use of the Kuznets curve has become an out-of-date tool of explaining inequality.

A more commonly used measure of income inequality is the GINI coefficient, which "comes from the Lorenz curve, which graphs cumulated income shares versus cumulated population shares, when the population is ordered from low to high per capita incomes" .(Barro, 2000, p. 14). Computed as "twice the area between the 45-degree line that extends north-eastward from the origin and the Lorenz curve", the Gini, according to Theil (1967), shows a "weighted average of all absolute differences between per capita incomes where the weights are the products of the corresponding population shares". (Barro, 2000, p. 14-15).

2.11 Economic Growth

Persson and Tabellini (1991) suggest that inequality is harmful to growth and that "in a society where distributional conflict is more important, political decisions produce economic policies that allow private individuals to appropriate less of the returns to growth promoting activities, such as accumulation of capital and productive knowledge". (p. 1). Furthermore, they find that there are statistically significant negative relations between inequality and growth (Persson & Tabellini, 1991).

In assessing the inequality as per the Kuznet-curve theory, Persson and Tabellini (1991) find that there is "a strong negative relation between income inequality at the start of the growth period". The study further identifies that economic growth is largely determined by accumulating knowledge of production, with incentives for such production "hinged on the

ability of individual to private appropriate the fruits of their efforts". Which are dependent on tax policies and adopted regulatory policies (Persson & Tabellini, 1991, p. 1). Policy deliberation, left to politicians, results in policies which lead to less gross because of less private appropriation and accumulation.

This studies literature review begins with evidence that the 'resource curse hypothesis' lack a universally accepted theory as it seeks to define the hypothesis. This study then proceeds to examine different variables, such as education which is seem as an important variable to economic growth. The influence of government officials and their proximity to decision making and policy is reflected in the rent-seeking and corruptive practices is also touted as a viable consideration in the examination of the resource curse narrative. This studys review of literature also offered arguments for the use of other variable to measure the impact of the resource curse over and above the use of economic growth as a measurement tool.

The relationship between natural resource abundance and economic growth is further explained in the studies literature review as a result of political (rent-seeking activities) and economic reasons (Dutch disease). Furthermore, different commodities classes, from different geographical locations seems to illicit a varying impact on economic growth and income. This certainly emphasised the need for differentiation in the examination of the resource curse narrative especially on the African continent given the various resources on the continent. The resource concentration impacts exported diversification and even employment patterns. A constant theme in the literature review was that the decision-making ability or indecisiveness of countries during resource booms, aided by good institutions was a crucial consideration based on how government responded to resources booms. There are also school of thought who find that there is no evidence of the existence of the resource curse.

CHAPTER 3 – METHODOLOGY

3.1 Introduction

This chapter presents and stipulates the method of research this study seeks to undertake. The section on the research design (3.2), presents the plan for the study and how the research activities will be undertaken. Section 3.4 presents the data source, period, and sample; section 3.5 presents the population of the study. Section 3.6 presents the analytical framework with a sub-section 3.6.2 presenting the regression equations for the economic growth and income inequality analysis. Furthermore, section 3.7 presents a list of variables used in the regression analysis. The chapter concludes by discussing the estimation techniques used in the regression analysis.

3.2 Research Design

McMillian and Schumacher (2001) state that research design is a plan for a study that sets out the activities to be undertaken, such as data collection procedures and sampling strategy to provide answers to the research questions. The academic research undertaken by this study was carried using the quantitative method of data collection. According to Jonker and Pennink (2010), quantitative research is often regarded as purely scientific, justifiable, precise, and fact-based in exact figures. Anyone who conducts quantitative research wants to know the degree to which something (a phenomenon or a specific kind of behaviour) occurs or not, and if it does, to what degree (Jonker & Pennink, 2010). This study seeks to explore the effects of the resource curse hypothesis on a listed panel of African countries and to analyse the impact of the resource curse with inequality as an independent variable. The research process undertaken can be described as an empirical cycle focused on deduction according to Jonker and Pennink (2010).

This study uses a panel data fixed effect estimation model for African countries and Middle East countries from 1970 to 2016. This period was selected so that the research would more recent, covering time periods first included in the Sachs and Warner (1995) study and extending the periods until as recent as possible given the availability of data. The data is drawn from the

World Bank World Development Indicators (WDI) and the Association for the Study of Peak Oil and Gas (ASPO). The measures of natural resource rents, refer to the wealth generated from the resource sector that represents the difference between the value and the cost of resource production. Following Alofaysan (2017), the resource rents are measured as shares of GDP from different types of resources, such as coal, minerals, natural gas, and oil.

In this study first, the analysis uses the panel data to examine the resource curse hypothesis and its impact of African countries on natural resource endowment. It tests the relationship between resource wealth and rates of economic growth for the panels of countries selected. Second, which is the main element of this research, income inequality as an instrumental variable is used to test the resource curse hypothesis amongst African resource-rich nations. As part of the second test, this study seeks to explore an area of research that might aid the academic conversation in relation to the resource curse hypothesis.

As a control measure for the examination to be undertaken by this study, we test for multicollinearity among the independent variable, using a VIF test to check the degrees of correlation amongst the variables. “Resource-rich countries differ in their dependence on natural resource rents, and other features are likely to influence the effect of resources, such as level of development and region” (Alsharif, 2017, p. 36). We also set out to determine if heterogeneity is affected by the diversification given the two major resource classes on the African continent are minerals or oil resources.

3.4 Data Source, Period, and Sample

Data involves all the information the researcher collects during research (Jonker & Pennink, 2010). This study analysed existing numerical data, using various estimation techniques. Secondary data refers to the statistical material, which is not created by the researcher but obtained from someone else's records. For this study, the most appropriate data came from the secondary data as the source of information.

This analysis collected data by carrying out searches of relevant studies in Wiley journals, Google Scholar, and World Bank databases. Similar combinations of keywords by Havranek, Horvath and Zeynalov (2016) were used. For example, ‘‘natural resource + economic growth,” ‘‘natural resource + inequality,” and ‘‘Dutch Disease”. For the natural resource hypothesis and

its relationship with economic growth, available information from credible sources was also used, such as the World Bank national accounts data, and OECD National Accounts data files, as primary sources for the comparison of country-specific financial and economic indicators. The basic period of comparison will be indexed on annualised periods to render comparable research.

In the collection for country-specific indicators, relevant data from World Bank Development Indicators was obtained, as well as Association for the Study of Peak Oil and Gas. For the analysis on the impact of inequality on economic growth, this study will also use secondary data from the African Development Indicators database compiled by the World Bank. The general sample period will be annualised.

3.5 Population

The size of the sample is determined by the optimum number necessary to enable valid inferences to be made about the population (Marshall, 2018). The study will use resources-endowed African states as the population. As not all African states are suitable for this study, the approach will be to use a selection of the countries which will represent demographic representation of the resource-rich African countries, resource-poor African countries, and African countries with resource contribution around the median mark of resource wealth. The study has limited information from African countries, which would not have been useful to the regression analysis. As a result, the researcher obtained data relating to Middle Eastern countries, which was used as a random selection to minimise the bias. In Figure 7 (**See Appendix 1: List of Figures**), the names of the countries used in the study are listed.

3.6 Analytical Framework

3.6.1 Regression equation

The quantitative study concerning economic rates and resource endowment is carried out using the time series model. The quantitative study regarding the effect of inequality on economic growth in resource-endowed countries is a combination of the panel estimation and timeseries design. Panel estimators control the differences in time-invariant, unobservable country

characteristics, removing bias results from the correlation of the characteristics and the explanatory variables (Forbes, 2000).

The first regression model in this study is as follows:

$$growth_{i,t} = \beta_0 + \beta_1 ResourceRent^{8} + \sum_{i,t} X_{i,t} + \delta_i + u_{i,t} \quad (1)$$

where i and t represents country and year respectively; $growth$ is the average annual GDB growth rate; ResouceRent is the Total natural resource rent as percentage of GDP; and$X$ represents a vector potential covariates of growth; δ − represents the country fixed effects; u *−is an error term capturing all other omitted factors, with* $E(u)=0$ $\forall$ i *and* t.

The identification strategy for the first regression model is depicted as follows:

$CovResourceRent_{it}, u_{1,it} | X_{1,it}', \delta_{1,i}=0$

$CovResourceRent_{it}, u_{1,it} | X_{1,it}', \delta_{1,i}=EResourceRent_{it} * u_{1,it} X_{1,it}', \delta_{1,i}=0$

The second regression model in this study is derived from Forbes (2000), applied specifically to resource-rich African countries. As a proxy for inequality in this study, the Gini coefficient is used. The regression model is as follows:

$$Gini_{i,t} = \theta_0 + \theta_1 ResourceRent_{i,t} + +\theta_8 ResourceRent^{8} + \theta_9 lnlnincome_{i,t} + \theta_{10} lnlnincome^{8}_{i,t} + \sum_{i,t} K_{i,t} + \eta_i + \phi_t + u_{i,t} \quad (2)$$

Where $Gini_{j,k}$ is the Gini coefficient of a (net) country i in year t and Resource rents refers to our fiscal measure of natural resource richness.

$X2,it'$ is a vector meant to capture correlation of income inequality; $\delta 2,i$ *and* $\lambda 2,\tau$ denote the country and year effects respectively. $u2,it$ is the error term

3.7 Definition of Variables

This study uses a list of selected variables (defined in the table below), which were used in the regression analysis and the descriptive statistics:

Table A: List of variables used in regression analysis

Gini Coefficient	Gini coefficient of income inequality (net of taxes and transfers). Index ranging between 0 and 100, with larger values corresponding to more unequal income distributions. This study uses the Log (Gini) Source: Solt (2009) SWIID data
Income	Contemporaneous, 1-year and 5-year lagged real GDP per capita (constant 2010 US dollars) Source: World Bank (2018)
Log Income	Natural Logarithm of Income Variable Source: World Bank (2018)
Natural Resource Rents	Contemporaneous, 1-year and 5-year of the share of Total Natural Resource Rents in GDP Source: World Bank (2018)
Log (Oil Wealth per Capita)	Logarithm of oil reserves per capita/100 (zeroes were replaced by minimum positive value). Retains interval ratio differences. Source: Association for the Study of Peak Oil and Gas (ASPO) via Cotet & Tsui (2013)
Log (population)	Log of total population age between 15 and 64. Source: World Bank (2018)
Democracy	Democracy – democracy index obtained from polity2 index Source: Polity IV via Cotet & Tsui (2013)
Economic growth	The growth variable will be based on log GDP as a proxy where : $growth_{*,} = log\left(\frac{c_{gh\ jk}^{def}}{c_{gh\ jk\mathbf{l}m}^{def}}\right)$ EA denotes the Economically Active aged between 16 and 64, for the openness variable, we made the assumption that those with missing values had zero imports and exports.

3.8 Estimation Techniques

This study carried out statistical research, using the following estimation techniques:

1. Pooled OLS Model: In this study, no assumption on individual country differences were made. There was also a test for autocorrelation and homoscedasticity.

$$yit=\delta+xit'\beta+uit$$

$$\beta pooled=X'X-1X'y$$

$$Euit=0, Euituit'=\sigma 2I, rankX=K+1<NT, EuX=0$$

2. Two-way Effects Model: This allows intercept to vary over i and t

$$yit=\delta i+\lambda\tau+xit'\beta+\varepsilon it$$

3. Individual-Specific Effects Model. In this model, four short panel time-effects are included as dummies in xit'

$$yit=\delta i+xit'\beta+\varepsilon it$$

4. Random coefficients model allows slopes to vary over i

$$yit=\delta i+xit'\beta i+\varepsilon it$$

This study further considered Fixed Effects versus Random Effects. It seeks to correlate between δi and xit. Fixed effects explore the relationship between Natural Resource Rents and economic growth within a country. This study also considered that each country has its own individual characteristics, which may or may not influence natural resource wealth. In some countries, the political system could affect the extraction of natural source wealth based on the rule of law or implementation of legislation policy. Furthermore, when using fixed effects, this study assumes that some factors within a country may have an impact or a bias on the oil wealth or conflict variable, so control for this possibility is needed. This is done by assuming that the countries' fixed error term and natural resource rent predictor variable are correlated. Fixed effects removes the effect of those time-invariant characteristics, so the net effect of the predictors on the outcome economic growth variable can be assessed.

Another important assumption of the fixed effects model is that time-invariant characteristics are unique to a specific country and should not be correlated with other countries' characteristics. Thus, each country's error term and the constant, which captures individual characteristics, should not be correlated with other countries. Should the error terms be correlated, then fixed effects would not be suitable, as the inference may not be correct. As a result, this study would need to model the relationship, most likely using random effects. In such a case, the Hausman test can be used to assess if random effects are more appropriate

CHAPTER 4 – DISCUSSION OF FINDINGS

4.1 Introduction

This chapter presents and discusses the findings from the regression analysis of the study on which the conclusion and recommendations are based. The section on the regression analysis (4.3), presenting the non-parametric regression model, is divided into five sub-sections: Section 4.3.1 presents the disaggregated commodity impact check; section 4.3.2 presents the oil wealth and income represented by GDP per capita; section 4.3.3 presents the impact of wealth on economic growth and examines if the resource curse is real; section 4.3.4 presents the relationship between income inequality and the natural resource curse; and section 4.3.5 presents the country's fixed effects for natural resources and income inequality.

Furthermore, section 4.4 presents the outcome of various tests for multicollinearity before addressing the validity and reliability of the analytical techniques. The chapter concludes by discussing the limitations observed in the chapter's findings.

4.2 Descriptive Statistics

Table 1 below present the descriptive statistics of the variables used for this study. The descriptive statistics of both the Non-African and African countries are outside the squared brackets in the Table 1 below. The descriptive statistics of both African and Non-African countries are outside the squared brackets in the table below, whereas descriptive statistics for the sample of only African countries are inside the squared brackets.

Table 1: List of select variables used in regression analysis and descriptive statistics

	Africa			All Sample		
Variable Name	**Mean**	**Std Dev**	**Min/Max**	**Mean**	**Std Dev**	**Min/Max**
Gini	44.37	6.797	30.4/63.3	43.14	7.106	27.3/ 63.3
Income (US$)	1624.64	1908.69	182.71/16413.54	3568.32	8276.1	182.71/72670.96
Log Income	6.91	0.931	5.21/9.71	7.23	1.209	5.21/ 11.20
Natural Resource Rents	10.45	10.592	0/63.55	10.55	11.376	0/63.55
Log (Oil Wealth per Capita)	0.02	0.04344	-2.391891892	0.0141	0.04398	-1.94505
Log (population)	15.392	1.373	10.96/ 8.25	15.369	1.379	10.96/ 18.25
Democracy	0.00215	0.00171	.0005/.0085	0.00524	0.00391	0/0.1

4.3 Multicollinearity

In order to isolate the relationships between independent variables, which is a core objective of a regression analysis, this study tested for multicollinearity using the VIF test method. The outcomes of this analysis are as follows:

Output 1 Panel B: African countries - Column (7).

Variable	VIF	1/VIF
resourcere~s	9.88	0.101174
resrentSQU~D	9.6	0.104194
openness	2.8	0.357095
logpop	2.6	0.384743
logGDP70	1.71	0.585197
gross_save	1.42	0.706163
cpiinflation	1.09	0.921477
Mean VIF	4.16	

For Output 1, Panel B: African countries (above), VIF tests as part of a multicollinearity test were carried out. In the test for column (7), the mean VIF is 4.16, where the resource rent VIF result is 9.88, and resource rents squared is 9.60, which are both below the 10.0 mark, the rule of thumb.

Output 2 Panel B: Non-African countries-Column (5).

Variable	VIF	1/VIF
logpop	39.17	0.025527
resource~s	6.58	0.152055
Iyea~1997	6.49	0.154132
resrentS~D	5.83	0.171452
openness	1.29	0.775518
gross_save	1.22	0.821209
cpiinfla~n	1.04	0.964698
Mean VIF	6.98	

For Output 2, Panel B: Non-African countries (above), VIF tests as part of multicollinearity test were also carried out. In the test for column (5), the mean VIF is 6.98, where the resource rent

VIF result is 6.58. A sensitivity analysis VIF was then created, dropping the population as a variable, which resulted in a mean VIF of 2.63, where the VIF result is 6.54. For this VIF, there were 1384 observations with the R-squared value at 0.103. These results indicate that inflation stifles growth rates within African countries, while a high degree of open trade accelerates annual growth rates. This table concludes from the VIF test results that natural resource effect on annual growth rates is not robust, as is evident of the fixed effect estimator.

Output 5 Panel B: African countries -Column (7).

Variable	VIF	1/VIF
income_sq	139.11	0.007189
income	134.18	0.007453
logpop	42.05	0.023782
resource~s	7.12	0.140490
yea~1983	4.89	0.204467
resource~q	**6.10**	0.164015
openness	1.45	0.688474
gross_save	1.44	0.696627
cpiinfla~n	1.24	0.807647
Mean VIF	28.64	

For Output 5, Panel B: African countries (above), the VIF values for resource rent and resource rents square are 7.12 and 6.10 respectively, with the rule of thumb of values less than 10. Assuming all other OLS assumptions are met, the results infer that the estimates suggesting a non- monotonic relationship between resource rents and income inequality are reasonable. The VIF values for income and population are greater than 10, which signals signs of multicollinearity in relation to those two variables. The study then carried out VIF sensitivity checks, dropping the variables of population, income squared, and years 2015 and 2016 dummies. The sensitivity check has a mean VIF of 2.62, while resource rents and resource rents squared have VIF values of 6.81 and 5.96 respectively.

All the VIF values are less than 10, with resource rents and resource rents squared being 6.81 and 5.96 respectively. Thus, dropping the higher degree correlated variables of population, income squared, and years 2015 and 2016, improved the significance and the point estimates. The underlying conclusion of a significant U-shaped relationship between resource rents and income inequality is maintained. Thus, in rich natural resource African countries, more resource rent accumulation is likely pocketed by the elite and less by the poor, worsening, on average, income inequality within the countries.

From the VIF test carried out, it is observed that at a 10% level of significance, the rise in consumer price inflation is predicted to significantly worsen average income inequality within African countries. At the 5% significance level, a high degree of trade openness is predicted to significantly reduce income inequality within an African country, if all else is constant. This would support those advocating policies for high-degree trade openness rather than protecting those in Africa in the fight of alleviating high-income inequality.

At the 10% significance level, higher gross domestic savings share in GDP is predicted to significantly reduce income inequality. This continues the theme of encouraging African countries to prioritise improving the domestic savings share *vis-à-vis* debt-driven economic growth and curtailing income inequality. In summary, addressing overall issues of multicollinearity, not just for interest, enabled better insight into the significant impacts of inflation, trade openness, and gross domestic savings, after controlling for the level of tax on international trade.

4.4 Regression Results

Using the regression estimates for equation 1, this study carried out a pooled OLS estimation test which concluded using the Wald test for joint significance (or regression usefulness) that suggestions of joint significance existed. The p-value of the Breusch-Pagan Lagrange multiplier (LM) test is less than 5%, thus the null hypothesis that the pooled OLS is appropriate rejected. In other words, there is significant evidence of differences across countries, although limited by the small goodness of fit measures (R-squared between 0.1% and 8.7%), the test appeared to exhibit some worthwhile theoretical links. The pooled OLS estimator exhibited, a negative coefficient on linear resource rents tentatively suggests that, all else held constant, more total natural resource rents accumulated by an average country are predicted to stifle average annual growth.

The negative and less-than-one coefficient indicates that relatively poor countries entering the 1970–2016 transitional period are predicted to grow faster on average than the relatively richer countries if all else is held constant in the same conditional, steady state. If this test is valid, the conjecture made by Collier and Hoeffler (2004) that natural resources have a non-monotonic effect on economic growth, may be plausible for African countries. An inverted U-shaped relationship indicates that initially, low- resource-endowed countries experience high growth rates with additional resource rents acquired, while the richer resource countries experience stunted economic growth rates with more rents accumulated. However, as the estimates of the random effects model) indicate, the relationship is not a robust one, most likely due to omitted variable or endogeneity bias not dealt with. The p-value of the Breusch-Pagan Lagrange multiplier (LM) test is large, thus the null hypothesis that the pooled OLS is appropriate cannot be rejected. This indicates there is no significant evidence of differences across the sampled Middle East countries

This study further analyses the following six middle eastern countries: Iran, Iraq, Israel, Malta, Oman, and Saudi Arabia and observes that there is a heavy oil dependence amongst these countries, resulting in some sample selection bias. Nonetheless, the finding seems to generally support the view that natural resources have been both a blessing and a curse for the middle eastern region. This could be explained, but the political realities of these countries are such that they have dictators investing in repressive mechanisms rather than in the key determinants of economic growth.

The recent spate of impressive growth rates experienced by two seemingly outliers to the natural curse hypothesis in the Middle East, Oman, and the United Arab Emirates has raised questions about the validity of such economic growth rates. Kurecic and Kokotovic (2017) question the validity of these impressive rates of growth in Oman. Furthermore, the doubt cast validity of the claim that Oman has a negative saving rate. As a test to ensure that African countries do not encounter the same question relating to the integrity of reporting, this study undertakes a disaggregated commodity impact check to rest the natural resource curse hypothesis.

In the Hausman Wald test (see Table 1.1) we carried out we found that openness, savings and inflation significant at the 5% level with more openness and more domestic savings boosting growth rate, while higher inflation stifles growth rate. These are illustrated by the conclusion of the summary of the test carried out below.

Table 1.1: Hausmann Wald Test Observation

(LSDV-Fixed Effects)	**Test Stats**	**Decisions**
Country Effects F- value	17288.33***	Country effects significant
Year Effects F-value	102.07***	Year effects significant
Breusch and Pagan Lagrangian multiplier test for random effects		
Robust Hausman	10.77***	Reject Pooled OLS estimator in favor of Random Effects estimator
Sargan-Hansen statistic (p-value)	<0.001	Reject Random Effects estimator in favor of Fixed Effects estimator
CONCLUSION	The Fixed Effects Estimator used is appropriate as estimated using the two-way LSDV estimator	

As part of the study we modelled various tests which suggested that using the 2-way fixed model was appropriate, paying particular attention to country effects and year effects.

One of the models we carried out seemed to suggest that when we control for share of taxes only country fixed effects should be controlled. Hence we choose the model variation without tax which we found to be appropriate for our study.

Table 2. Panel A: Based on the expected Beta convergence estimates, that is a negative coefficient on initial income and as argued in Barro, (2000) the Solow model predicts that convergence is achieved when, where overshooting (and leap frogging) are considered as not plausible. Thus for ALL countries we would take the pooled OLS models in column 1 and 2, and the fixed effects model in column 6 as the ones conforming to expected Beta convergence and thus used for contrasts. Column (2) suggests that All else held constant a 10% increase in Value of Oil Reserves is predicted to decrease economic growth by approximately 0.254% on average and is statistically significant at the 5% level. Controlling for year and country fixed effects and the level of democracy the negative effect is marginally significant at the 10% level of testing.

After controlling for year and country fixed effects the negative relationship between Natural Resource Rents and economic growth rates for All countries in Table 2, we found with the biased pooled OLS estimator is no longer significant in any of the specifications. This lends support to the literature that finds the Natural Resource curse hypothesis to be not robust. The Sargan-Hansen statistic of the robust hausman test offers support for the fixed effect Estimation. From Table 2 PANEL A: All countries, column (7), ceteris paribus, growth in the country population, lowering of consumer prices, a higher degree of trade openness and a rise in domestic share of savings are predicted to drive up economic growth rates.

TABLE 2: TOTAL RESOURCE RENTS AND ECONOMIC GROWTH (**WDI** DATA SET: 1970–2016)								
	LSDV-Fixed Effects	LSDV-Fixed Effects	LSDV-Fixed Effects	LSDV-Fixed Effects	LSDV-Fixed Effects	GLS Random Effects (RE)	LSDV-Fixed Effects	GLS RE:**Trade**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent Variable: Growth=log GDP per EA(t)/GDP per EA (t-1))							
PANEL A: ALL COUNTRIES								
Resource Rents	0.000474	0.000664	0.000543	0.000563	-0.000846	-0.000846	0.000440	0.000440
	(0.000389)	(0.000784)	(0.000746)	(0.000752)	(0.000767)	(0.00102)	(0.000979)	(0.00104)
Resource Rents Squared		-3.16e-06	-1.63e-05	-1.66e-05	8.44e-06	8.44e-06	-5.04e-06	-5.04e-06
		(1.50e-05)	(1.38e-05)	(1.46e-05)	(1.41e-05)	(1.52e-05)	(1.46e-05)	(1.16e-05)
Initial income log [GDPEA70]			0.0146	0.0199	-0.131***	-0.131**	-0.319***	-0.319***
			(0.0154)	(0.0323)	(0.0499)	(0.0563)	(0.0646)	(0.0634)
Log (population)				-0.00412	0.0469*	0.0469	0.114***	0.114***
				(0.0221)	(0.0273)	(0.0380)	(0.0423)	(0.0425)
Consumer Price Inflation					-3.13e-06	-3.13e-06***	-2.41e-06	-2.41e-06***
					(2.28e-05)	(3.30e-07)	(2.71e-05)	(5.93e-07)
Openness (Exports + Imports)/GDP)					0.000374***	0.000374**	0.000163*	0.000163
					(8.99e-05)	(0.000153)	(8.92e-05)	(0.000121)
Gross Domestic Savings (% of GDP)					0.000628**	0.000628*	0.000606**	0.000606*
					(0.000301)	(0.000327)	(0.000289)	(0.000368)
Taxes on International Trade (% of Revenue)							-6.79e-07	-6.79e-07
							(0.000301)	(0.000378)
Constant	0.0473***	0.0460***	-0.0687	-0.0448	0.303	0.303	0.703***	0.703***
	(0.0159)	(0.0161)	(0.118)	(0.179)	(0.275)	(0.234)	(0.264)	(0.258)
Number of Countries	***65***	***65***	***43***	***43***	***43***	***43***	***35***	***35***
Observations	2,653	2,653	2,003	2,003	1,606	1,606	589	***589***
R-squared	0.117	0.117	0.127	0.127	0.169		0.364	

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. LSDV standard errors are calculated by bootstrapping (200 repetitions)

- Time dummies are jointly significant and Country dummies are jointly significant. **LSDV-** denotes Least Squares Dummy Variable Estimator

In Table 2, PANEL B: African countries, it is found that after controlling for population level and year and country fixed effects, the inverted U-shaped relationship between natural resource rents and economic growth rates for African countries is statistically strong, as depicted in column (4). The Wald test for joint significance of the linear and quadratic terms of the resource rents is very small for all regression models, suggesting that the natural resource curse hypothesis would have an impact on the low-resource countries, while resources are a blessing for the rich-resource countries. This suggests that low-resource-endowed African countries experience high growth rates with additional resource rents acquired, while the richer resourced African countries experience stunted economic growth rates with more rents accumulated. But when it is controlled for the level of inflation, the degree of trade openness, and the domestic savings and taxes on trade, it is found that the relationship is not robust.

TABLE 2: TOTAL RESOURCE RENTS AND ECONOMIC GROWTH (**WDI** DATA SET: 1970–2016)

	LSDV-Fixed Effects	LSDV-Fixed Effects	LSDV-Fixed Effects	LSDV-Fixed Effects	LSDV-Fixed Effects	GLS Random Effects(RE)	LSDV-Fixed Effects	GLS RE:**Trade**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
	Dependent Variable: Growth=log (GDP per EA(t)/GDP per EA (t-1))							
PANEL B: AFRICAN COUNTRIES								
Resource Rents	0.000269	0.000859	0.00174**	0.00170**	0.000467	0.000467	0.000787	0.000787
	(0.000475)	(0.000830)	(0.000767)	(0.000678)	(0.000762)	(0.000770)	(0.00119)	(0.00118)
Resource Rents Squared		-1.01e-05	-4.30e-05***	-4.21e-05***	-1.52e-05	-1.52e-05	1.98e-06	1.98e-06
		(1.91e-05)	(1.55e-05)	(1.46e-05)	(1.55e-05)	(1.49e-05)	(1.86e-05)	(1.44e-05)
Initial income log [GDPEA70]			0.0100	-0.0179	-0.136***	-0.136***	-0.252***	-0.252***
			(0.0165)	(0.0405)	(0.0513)	(0.0464)	(0.0762)	(0.0892)
Log (population)				0.0217	0.0551*	0.0551*	0.0747	0.0747
				(0.0302)	(0.0290)	(0.0297)	(0.0541)	(0.0616)
Consumer Price Inflation					-3.22e-06	-3.22e-06***	-1.95e-06	-1.95e-06***
					(2.66e-05)	(3.61e-07)	(2.27e-05)	(6.50e-07)
Openness (Exports + Imports)/GDP)					0.000412***	0.000412**	8.65e-05	8.65e-05
					(9.18e-05)	(0.000171)	(0.000103)	(0.000107)
Gross Domestic Savings (% of GDP)					0.000471	0.000471*	0.000240	0.000240
					(0.000292)	(0.000273)	(0.000240)	(0.000292)
Taxes on International Trade (% of Revenue)							-0.000164	-0.000164
							(0.000288)	(0.000389)
Constant	0.0378***	0.0333**	-0.0510	-0.174	0.190	0.190	0.762**	0.762**
	(0.0129)	(0.0154)	(0.127)	(0.223)	(0.285)	(0.167)	(0.318)	(0.336)
Number of Countries					***37***	***37***	***30***	***30***
Observations	2,156	2,156	1,737	1,737	1,384	1,384	454	***454***
R-squared	0.119	0.119	0.141	0.142	0.165		0.407	

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. LSDV standard errors are calculated by bootstrapping (**200** repetitions)

- Time dummies are jointly significant and Country dummies are jointly significant. **LSDV**- denotes Least Squares Dummy Variable Estimator

In Table 2, PANEL C: Non-African countries, it is found that after controlling for population, inflation, trade openness, savings level, and year and country fixed effects, the U-shaped relationship between natural resource rents and economic growth rates for African countries is statistically strong, as depicted in column (5). The Sargan-Hensen statistic of the robust hausman test offers support for the Fixed Effects Estimation. From column (7) cateris paribus, the growth in the country population, lowering the consumer prices, a higher degree of trade openness and a rise in domestic share of saving are predicted to drive up economic growth rate, also supporting the literature that resource curse hypothesis is not robust.

TABLE 2: TOTAL RESOURCE RENTS AND ECONOMIC GROWTH (**WDI** DATA SET: 1970–2016)								
	LSDV-Fixed Effects	LSDV-Fixed Effects	LSDV-Fixed Effects	LSDV-Fixed Effects	LSDV-Fixed Effects	GLS Random Effects(RE)	LSDV-Fixed Effects	GLS RE:**Trade**
	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
Dependent Variable: Growth=log(GDP per EA(t)/GDP per EA (t-1))								
PANEL C: NON-AFRICAN COUNTRIES (MOSTLY MIDDLE EAST COUNTRIES)								
Resource Rents	0.00156*	0.00161	-0.00309	-0.00292	-0.00555**	-0.00555*	-5.22e-05	-5.22e-05
	(0.000835)	(0.00266)	(0.00194)	(0.00211)	(0.00218)	(0.00310)	(0.00398)	(0.00204)
Resource Rents Squared		-8.19e-07	5.92e-05**	5.73e-05**	8.14e-05**	8.14e-05***	-0.000114	-0.000114***
		(3.29e-05)	(2.60e-05)	(2.81e-05)	(3.55e-05)	(2.60e-05)	(8.47e-05)	(3.19e-05)
Initial income log [GDPEA70]			0.000914	-0.00891	0.0765	-0.0914	3.028***	-0.354**
			(0.0215)	(0.0381)	(0.0595)	(0.121)	(0.781)	(0.168)
Log (population)				-0.00863	0.0673	0.0673	0.242***	0.242**
				(0.0317)	(0.0613)	(0.0771)	(0.0633)	(0.113)
Consumer Price Inflation					0.000260	0.000260	9.84e-05	9.84e-05**
					(0.000263)	(0.000169)	(0.000277)	(4.75e-05)
Openness (Exports + Imports)/GDP					1.65e-05	1.65e-05	0.000447	0.000447
					(0.000285)	(0.000317)	(0.000492)	(0.000462)
Gross Domestic Savings (% of GDP)					0.00187**	0.00187***	0.00352***	0.00352***
					(0.000808)	(0.000692)	(0.00105)	(0.000514)
Taxes on International Trade (% of Revenue)							-0.000936	-0.000936
							(0.00109)	(0.000808)
Number of Countries					***6***	***6***	***5***	***5***
Observations	497	497	266	266	222	222	135	***135***
R-squared	0.240	0.240	0.289	0.289	0.410		0.543	

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. LSDV standard errors are calculated by bootstrapping (**200** repetitions)

- Time dummies are jointly significant and Country dummies are jointly significant. **LSDV**- denotes Least Squares Dummy Variable Estimator

4.4.1 Disaggregated commodity impact check

To assess the impacts of resource rents along disaggregated commodity lines, the analysis was undertaken using the following rents: coal rents, mineral rents, oil rents, forest rents, and natural rents. The results presented in Table 3 controlled for population, inflation, trade openness, savings level, and year and country fixed effects. The model was estimated for all three sample classifications using the pooled OLS, random effects and fixed effects techniques. The African countries frame, which comprises of at least 72% of the ALL sample data, indicates that more forest rents stifle growth. The coefficient for coal was observed to be positive for African countries but negative for Non-Africa countries. The estimated coefficients, although marginal indicates that coal rents stimulate economic growth among African countries. This conclusion

seems to suggest that forest resources suffer from the resource curse. This could be an interaction with other resource industries, manifesting in the form of the Dutch Disease. On the other hand, based on pooled and random effects models, coal rents seem to be a blessing to boosting economic growth in average African countries. For Middle East (or Non-African) countries, mineral rents and forest boost economic growth, while natural gas rents and coal rents seem to stunt average economic growth rates.

TABLE 3: EFFECTS OF NATURAL RESOURCE RENTS ON ECONOMIC GROWTH: RESOURCE CLASS IMPACTS

	ALL COUNTRIES			AFRICAN COUNTRIES			NON-AFRICAN COUNTRIES		
	(1)	(2)	(3)	(1)	(2)	(3)	(1)	(2)	(3)
Dep. Variable: *Economic Growth*	**Pooled OLS**	**Random Effects**	**Fixed Effects**	**Pooled OLS**	**Random Effects**	**Fixed Effects**	**Pooled OLS**	**Random Effects**	**Fixed Effects**
Natural Resource:									
Coal Rents	0.00126	0.00343	0.00354	0.00489*	0.00479*	0.00146	-2.192***	-1.505	-0.869
	(0.00274)	(0.00372)	(0.00439)	(0.00255)	(0.00279)	(0.00379)	(0.226)	(0.967)	(1.661)
Mineral Rents	0.000325	0.000584	0.000780	0.000443	0.000275	0.000698	0.0627***	0.0524*	0.0312
	(0.000500)	(0.000641)	(0.000540)	(0.000486)	(0.000500)	(0.000623)	(0.0154)	(0.0277)	(0.0438)
Oil Rents	-2.88e-05	0.000135	0.000176	9.11e-05	0.000182	0.000405	-0.000493	-0.000109	1.30e-05
	(0.000371)	(0.000358)	(0.000475)	(0.000291)	(0.000313)	(0.000526)	(0.000689)	(0.000573)	(0.00118)
Forest and Agric Rents	-0.00136***	-0.00149***	-0.00185*	-0.00134***	-0.00156***	-0.00208**	0.0722**	0.0580	0.0862
	(0.000391)	(0.000553)	(0.00100)	(0.000384)	(0.000366)	(0.000999)	(0.0203)	(0.0530)	(0.433)
Natural Gas Rents	-0.00359	-0.00203	0.000645	0.00218	0.00142	-0.00246	-0.0226***	-0.0200***	-0.00974
	(0.00348)	(0.00376)	(0.00536)	(0.00277)	(0.00229)	(0.00566)	(0.00399)	(0.00336)	(0.0160)
Initial income log [GDPEA70]	-0.00892**	-0.0110***	-0.120**	-0.0142***	-0.0132***	-0.0585	-0.0234***	-0.0187***	0.0789
	(0.00367)	(0.00369)	(0.0543)	(0.00330)	(0.00341)	(0.0523)	(0.00356)	(0.00356)	(0.0582)
Log (population)	0.00318*	0.00188	0.0392	0.00325	0.00148	0.00292	-0.00802	-0.00956**	0.0911
	(0.00168)	(0.00230)	(0.0273)	(0.00204)	(0.00207)	(0.0311)	(0.00413)	(0.00399)	(0.0555)
Consumer Price Inflation	-4.32e-06***	-3.05e-06***	-2.74e-06	-4.16e-06***	-3.29e-06***	-2.69e-06	4.61e-05	0.000294*	0.000184
	(3.28e-07)	(4.00e-07)	(2.29e-05)	(3.03e-07)	(4.07e-07)	(2.73e-05)	(6.92e-05)	(0.000157)	(0.000175)
Openness (Exports + Imports)/GDP	0.000309***	0.000274***	0.000349***	0.000342***	0.000261***	0.000398***	-0.000116	-8.65e-05	0.000231
	(7.16e-05)	(0.000105)	(9.41e-05)	(8.19e-05)	(9.38e-05)	(9.40e-05)	(0.000116)	(0.000136)	(0.000282)
Gross Domestic Savings (% of GDP)	0.000212	0.000176	0.000418	0.000167	6.65e-05	0.000250	0.00155**	0.000991***	0.00205**
	(0.000275)	(0.000288)	(0.000375)	(0.000257)	(0.000242)	(0.000395)	(0.000507)	(0.000277)	(0.000822)
Constant	0.00366	0.0639	0.318	0.0342	0.0695	0.396	0.329***	0.334***	-2.262
	(0.0341)	(0.0471)	(0.278)	(0.0338)	(0.0450)	(0.287)	(0.0660)	(0.0795)	(1.414)
Observations	1,447	1,447	1,447	1,229	1,229	1,229	218	218	218
R-squared	0.070		0.192	0.080		0.190	0.173		0.386

Note: *** p<0.01, ** p<0.05, * p<0.1. Standard errors in parentheses. LSDV standard errors are calculated by bootstrapping (200 repetitions)

Time dummies included in Random Effects Estimator. LSDV- denotes Least Squares Dummy Variable Estimator and controls for time and country fixed effects.

4.4.2 Oil wealth and income

This study sought to further analyse the relationship between resource abundance, represented by oil wealth, and income represented by GDP per capita. Given the limited data on African natural resource information, it was found that oil wealth had more information available for a wider range of African countries. As oil wealth represented a large share of the natural resources on the continent, it was a viable variable for research consideration. This study has thus carried out statistical analysis, using oil wealth in its hypothesis to test the relationship of growth to the resource curse and to income inequality. Oil wealth data obtained from WDI and ASPO data was used.

On the horizontal axis of Figure 3 (**See Appendix 1: List of Figures**), average oil wealth represents the mean of log value of oil reserves from the period 1929 to 2008 for the same countries used in the regressions reported in Table 2. On the vertical axis, the average income is computed as the mean of log GDP per capita over the same sample of countries and years using the ASPO data. For both the oil African and non-African countries, the association is positive and statistically significant.

4.4.3 Oil wealth impact on economic growth: Is the natural resource curse real?

Table 4, PANEL A: All countries, is based on the expected Beta convergence estimates, which is a negative coefficient on initial income. As argued by the Solow growth model, it also predicts that convergence is achieved when $0<\beta<1$ and where overshooting ($\beta>1$) and leap frogging ($\beta=1$) are not plausible. Thus, for all countries we would take the pooled OLS models in column (1) and (2) and the fixed effects model in column (6), the ones conforming to expected Beta convergence, and use them for contrasts. Column (2) suggests that, all else held constant, a 10% increase in the value of oil reserves is predicted, which would decrease economic growth by approximately 0.254% on average and is statistically significant at the 5% level. When year and country fixed effects and the level of democracy are controlled, the negative effect is marginally significant at the 10% level of testing in which it is lessened.

TABLE 4: OIL WEALTH AND ECONOMIC GROWTH (ASPO DATA SET: 1970–2008)

	Pooled OLS	Pooled OLS	FIXED EFFECTS OLS	FIXED EFFECTS OLS	FIXED EFFECTS OLS	FIXED EFFECTS OLS	FIXED EFFECTS OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent Variable: log (GDP per capita/GDP per capita 1970)						
PANEL A: ALL COUNTRIES							
Log GDP70	-0.305***	-0.116***	-1.237***	-1.226***	-1.221***	-0.257***	-1.222***
	(0.0276)	(0.0180)	(0.0437)	(0.0414)	(0.0400)	(0.0281)	(0.0400)
logvaloilres		-0.0254***	-0.00687**	-0.00689**	-0.00484*	-0.00484*	-0.00489*
		(0.00309)	(0.00285)	(0.00268)	(0.00266)	(0.00268)	(0.00267)
democracy						-0.000880	
						(0.0333)	
Ldemocracy							-0.0138
							(0.0333)
Constant	-0.00629***	-0.00235***	-0.00261***	-0.00193***	-0.00151***	-0.000804***	-0.00149***
	(0.000559)	(0.000387)	(0.000361)	(0.000639)	(0.000282)	(0.000282)	(0.000272)
FIXED EFFECTS	NO	NO	YES	YES	YES	YES	YES
TIME EFFECTS	NO	NO	NO	YES	YES	YES	YES
Observations	1,992	1,718	1,718	1,718	1,718	1,707	1,708
R-squared	0.279	0.178	0.826	0.841	0.839	0.695	0.747

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

In Table 4, PANEL B: African countries, column (4) shows the expected Beta convergence estimate, and after controlling for country and year fixed effects, a 10% rise in the value of oil reserves is predicted to decrease economic growth by approximately 0.0603% on average and is marginally significant at the 10% level. Although still negative, the effect is not statistically significant when the level of democracy is controlled within that African country. This result appears to support the strand of empirical evidence, which conjectures that the quality of political institutions explains some of the conditional natural resource curse phenomena (the so-called weak state mechanism hypothesis). Therefore, it could be argued that it is not that natural resources are a curse in Africa but that the quality of the democracy and the corruption is contributing to the mismanagement and embezzlement of the value of oil reserves.

TABLE 4: OIL WEALTH AND ECONOMIC GROWTH (ASPO DATA SET: 1970-2008): AFRICAN CO

	Pooled OLS	Pooled OLS	FIXED EFFECTS OLS	FIXED EFFECTS OLS	FIXED EFFECTS OLS	FIXED EFFECTS OLS	FIXED EFFECTS OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent Variable: log (GDP per capita/GDP per capita 1970)						
PANEL B: AFRICAN COUNTRIES							
logGDP70	-0.231***	-0.238***	-0.224***	-0.240***	-0.242***	-0.243***	-0.243***
	(0.0450)	(0.0568)	(0.0320)	(0.0381)	(0.0361)	(0.0359)	(0.0358)
logvaloilres		0.0109	-0.0203***	-0.00603*	-0.00443	-0.00431	-0.00442
		(0.0108)	(0.00312)	(0.00360)	(0.00270)	(0.00266)	(0.00271)
democracy						-0.0415	
						(0.0675)	
Ldemocracy							-0.0612
							(0.0670)
Constant	-0.00774***	-0.00772***	-0.00570***	-0.00290**	-0.00325***	-0.00323***	-0.00323***
	(0.000864)	(0.00120)	(0.000998)	(0.00143)	(0.000740)	(0.000737)	(0.000737)
FIXED EFFECTS	NO	NO	YES	YES	YES	YES	YES
TIME EFFECTS	NO	NO	NO	YES	YES	YES	YES
Observations	395	345	345	345	345	340	340
R-squared	0.270	0.263	0.856	0.939	0.933	0.803	0.803

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

In Table 4, PANEL C: Non-African countries, columns (2) and (6) suggest that in controlling the level of democracy and fixed effects, the effect is not statistically significant. Thus, the pooled OLS estimator in column (2) seems to be biased in the downward estimates due to not controlling for unobserved country heterogeneity.

TABLE 4: OIL WEALTH AND ECONOMIC GROWTH (ASPO DATASET: 1970-2008): NON-AFRICAN COUNTRIES

	Pooled OLS	Pooled OLS	FIXED EFFECTS OLS	FIXED EFFECTS OLS	FIXED EFFECTS OLS	FIXED EFFECTS OLS	FIXED EFFECTS OLS
	(1)	(2)	(3)	(4)	(5)	(6)	(7)
	Dependent Variable: log (GDP per capita/GDP per capita 1970)						
PANEL C: NON-AFRICAN COUNTRIES							
logGDP70	-0.319***	-0.0852***	-1.237***	-1.238***	-1.234***	-0.272***	-1.235***
	(0.0320)	(0.0157)	(0.0437)	(0.0416)	(0.0417)	(0.0261)	(0.0420)
logvaloilres		-0.0299***	0.00130	0.000346	0.00200	0.00184	0.00175
		(0.00273)	(0.00332)	(0.00329)	(0.00338)	(0.00339)	(0.00338)
democracy						-0.0286	
						(0.0365)	
Ldemocracy							-0.0432
							(0.0365)
Constant	-0.00589***	-0.00105***	-0.00253***	-0.00249***	-0.00200***	-0.00124***	-0.00192***
	(0.000656)	(0.000335)	(0.000314)	(0.000671)	(0.000290)	(0.000284)	(0.000273)
FIXED EFFECTS	NO	NO	YES	YES	YES	YES	YES
TIME EFFECTS	NO	NO	NO	YES	YES	YES	YES
Observations	1,597	1,373	1,373	1,373	1,373	1,367	1,368
R-squared	0.285	0.176	0.789	0.794	0.792	0.670	0.748

Robust standard errors in parentheses

*** p<0.01, ** p<0.05, * p<0.1

Table 5, PANEL A: All countries, suggests that the pooled OLS regressions for all countries in the sample (72% of whom are African countries) supports the Kuznets curve hypothesis that an inverse U-shaped relationship is present between net income inequality and the level of economic development. The statistical evidence is strong in column (8) in which the level of population, price stability, trade openness, domestic savings, and taxes on international trade are controlled for. Furthermore, the linear and quadratic terms on natural resources are not statistically significant, suggesting a non-robust relationship amongst all countries. The negative quadratic coefficient suggests that natural resources relate to lower inequality for the very high levels of natural resource dependence, while income inequality is high in poor natural resource countries. But this relationship is not statistically significant.

TABLE 5: EFFECTS OF NATURAL RESOURCES ON NET INCOME INEQUALITY **(POOLED OLS BASELINE)**

Dependent Variable(log)	Gini(1)	Gini(2)	Gini(3)	Gini(4)	Gini(5)	Gini(6)	Gini(7)	Gini(8)
PANEL A: ALL COUNTRIES								
Income (t)	-0.0154	0.352*	0.373*	0.416**	0.428**	0.473**	0.413*	0.758***
	(0.0232)	(0.196)	(0.199)	(0.197)	(0.200)	(0.212)	(0.218)	(0.234)
Income Squared (t)		-0.0221*	-0.0231*	-0.0258**	-0.0262**	-0.0282**	-0.0253**	-0.0430***
		(0.0119)	(0.0119)	(0.0118)	(0.0119)	(0.0124)	(0.0124)	(0.0129)
Resource Rents (t)	-0.00177	-0.00130	0.00124	0.00299	0.00276	0.00271	0.00191	0.00650
	(0.00132)	(0.00131)	(0.00391)	(0.00373)	(0.00371)	(0.00375)	(0.00348)	(0.00466)
Resource Rents Squared (t)			-5.86e-05	-8.81e-05	-8.03e-05	-6.58e-05	-5.03e-05	-5.29e-05
			(7.86e-05)	(7.45e-05)	(7.37e-05)	(7.39e-05)	(6.87e-05)	(8.59e-05)
log(population)				-0.0141	-0.0108	-0.0209	-0.0303	-0.0269
				(0.0190)	(0.0192)	(0.0218)	(0.0205)	(0.0259)
Consumer Price Inflation					-2.79e-05	-0.000177	-0.000348	-0.000430
					(0.000550)	(0.000520)	(0.000503)	(0.000460)
Openness (Exports + Imports)/GDP)						-0.000787	-0.000986	-0.00164***
						(0.000676)	(0.000691)	(0.000604)
Gross Domestic Savings (% of GDP)							0.00108	-0.000591
							(0.00136)	(0.00135)
Taxes on International Trade (% of Revenue)								0.00287*
								(0.00167)
Constant	3.891***	2.395***	2.284***	2.313***	2.190***	2.175***	2.613***	0.945
	(0.164)	(0.797)	(0.823)	(0.797)	(0.824)	(0.797)	(0.833)	(0.993)
Observations	1,315	1,315	1,315	1,315	1,181	1,181	1,101	519
R-squared	0.024	0.074	0.078	0.090	0.087	0.114	0.131	0.260

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Table 5, PANEL B: African countries, suggests that the pooled OLS regressions for African countries in the sample do not support the Kuznets curve hypothesis of an inverse U-shaped relationship between net income inequality and the level of economic development. Columns (1) and (2) indicate statistical evidence of a negative relationship between natural resource rents and net income inequality. After controlling for level of population, price stability, trade openness, domestic savings, and taxes on international trade, this relationship is not robust for the African countries using the pooled OLS estimator.

TABLE 5: EFFECTS OF NATURAL RESOURCES ON NET INCOME INEQUALITY **(POOLED OLS BASELINE)**

Dependent Variable(log)	Gini(1)	Gini(2)	Gini(3)	Gini(4)	Gini(5)	Gini(6)	Gini(7)	Gini(8)
PANEL B: AFRICAN COUNTRIES								
Income (t)	0.0476	-0.298	-0.306	-0.242	-0.253	-0.253	-0.459	-0.226
	(0.0287)	(0.390)	(0.396)	(0.430)	(0.434)	(0.435)	(0.430)	(0.444)
Income Squared (t)		0.0223	0.0227	0.0186	0.0195	0.0195	0.0327	0.0223
		(0.0257)	(0.0260)	(0.0284)	(0.0287)	(0.0285)	(0.0282)	(0.0285)
Resource Rents (t)	-0.00217*	-0.00236*	-0.00351	-0.00163	-0.00154	-0.00151	-0.00203	0.00209
	(0.00123)	(0.00131)	(0.00494)	(0.00461)	(0.00453)	(0.00469)	(0.00420)	(0.00750)
Resource Rents Squared (t)			2.54e-05 (9.20e-05)	-6.10e-06 (8.63e-05)	-8.40e-06 (8.40e-05)	-8.08e-06 (8.28e-05)	1.46e-05 (7.47e-05)	8.86e-06 (0.000129)
Log (population)				-0.0152	-0.0124	-0.0128	-0.0154	-0.0169
				(0.0176)	(0.0180)	(0.0196)	(0.0155)	(0.0237)
Consumer Price Inflation					0.000671	0.000663	0.000267	0.000978**
					(0.000600)	(0.000580)	(0.000655)	(0.000364)
Openness (Exports + Imports)/GDP)						-4.28e-05	-0.000342	-0.00197**
						(0.000738)	(0.000746)	(0.000853)
Gross Domestic Savings (% of GDP)							-0.000276	-0.00234
							(0.00145)	(0.00170)
Taxes on International Trade (% of Revenue)								0.00220
								(0.00152)
Constant	3.445***	4.769***	4.816***	4.784***	4.762***	4.766***	5.622***	4.526***
	(0.206)	(1.471)	(1.504)	(1.558)	(1.570)	(1.557)	(1.579)	(1.563)
Observations	1,107	1,107	1,107	1,107	988	988	908	408
R-squared	0.119	0.135	0.135	0.152	0.152	0.152	0.177	0.288

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

Table 5, PANEL C: Non-African counties suggests that the pooled OLS regressions for non-African or Middle East countries also do not support the Kuznets curve hypothesis of a robust inverse U-shaped relationship between net income inequality and the level of economic development. Columns (3), (4), (5), and (6) suggest possible statistical evidence of an inverse U-shaped relationship between natural resource rents and net income inequality. For the poor-resource countries, more rents accumulated from resources widen income inequality (as indicated by the rise in the Gini coefficient), while resource-rich countries narrow the income inequality gap, with more accumulation of natural resource rents. After controlling for level of

population, price stability, trade openness, domestic savings, and taxes on international trade, this relationship is not statistically significant using the pooled OLS estimator.

TABLE 5: EFFECTS OF NATURAL RESOURCES ON NET INCOME INEQUALITY **(POOLED OLS BASELINE)**

Dependent Variable(log)	Gini(1)	Gini(2)	Gini(3)	Gini(4)	Gini(5)	Gini(6)	Gini(7)	Gini(8)
PANEL C: NON-AFRICAN COUNTRIES (OR SELECT MIDDLE EAST COUNTRIES)								
Income (t)	-0.0190	0.394	0.583	0.0360	-0.0732	0.548	0.583	-0.303
	(0.0225)	(0.700)	(0.410)	(0.474)	(0.503)	(0.379)	(0.395)	(0.900)
Income Squared (t)		-0.0217	-0.0312	-0.00136	0.00468	-0.0288	-0.0320	0.0182
		(0.0369)	(0.0214)	(0.0250)	(0.0266)	(0.0198)	(0.0204)	(0.0460)
Resource Rents (t)	0.00233	0.00289	**0.0146*****	0.00720	0.00695	**0.0102*****	**0.00762***	0.00767
	(0.00205)	(0.00266)	(0.00292)	(0.00432)	(0.00415)	(0.00281)	(0.00352)	(0.00582)
Resource Rents Squared (t)			**-0.000302*****	**-0.000179****	**-0.000175****	**-0.000222*****	**-0.000200*****	-8.29e-05
			(5.26e-05)	(6.83e-05)	(6.54e-05)	(4.17e-05)	(4.47e-05)	(0.000122)
log(population)				0.0523*	0.0586*	-0.00540	-0.0176	0.0643
				(0.0285)	(0.0276)	(0.0191)	(0.0232)	(0.0424)
Consumer Price Inflation					-0.000522***	-0.000728***	-0.000720***	-0.000409
					(0.000158)	(0.000186)	(0.000170)	(0.000234)
Openness (Exports + Imports)/GDP)						-0.00137***	-0.00158***	-0.000160
						(0.000418)	(0.000438)	(0.000870)
Gross Domestic Savings (% of GDP)							0.00177	-0.00109
							(0.00138)	(0.00169)
Taxes on International Trade (% of Revenue)								0.00988**
								(0.00371)
Constant	3.745***	1.799	0.852	2.560	2.954	1.201	1.355	3.762
	(0.198)	(3.269)	(1.937)	(2.039)	(2.165)	(1.605)	(1.702)	(3.780)
Observations	208	208	208	208	193	193	193	111
R-squared	0.101	0.130	0.345	0.481	0.530	0.640	0.652	0.849

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

4.4.4 Natural resources and income inequality: Controlling for year and country fixed effects

Table 6, PANEL A: All countries, suggests that after controlling for year and country fixed effects, a U-shaped relationship is present between net income inequality and the level of economic development. Resource rents have a statistically significant and strong U-shaped relationship with income inequality. Therefore, for countries with low natural resources, more rents lower income inequality, while for resource-rich countries, more accumulation of natural

resource rents relates to greater income inequality. This result suggests that the resource curse strikes at a certain level of natural resource endowment. In column (8) larger taxes imposed on international trade are predicted, on average, to widen income inequality.

TABLE 6: EFFECTS OF NATURAL RESOURCES ON NET INCOME INEQUALITY **(POOLED OLS BASELINE): NATURAL RESOURCE CATEGORIES**

Dependent Variable (log)	Gini(1)	Gini(2)	Gini(3)	Gini(4)	Gini(5)	Gini(6)	Gini(7)	Gini(8)
PANEL A: ALL COUNTRIES								
Income (t)	-0.0369	0.347	0.347	**0.373***	**0.375***	**0.466***	**0.487****	**0.565***
	(0.0282)	(0.225)	(0.225)	(0.211)	(0.214)	(0.235)	(0.237)	(0.287)
Income Squared (t)		**-0.0222***	**-0.0222***	**-0.0243***	**-0.0243***	**-0.0286***	**-0.0302***	**-0.0328****
		(0.0131)	(0.0131)	(0.0123)	(0.0124)	(0.0134)	(0.0134)	(0.0159)
Coal Rents	**0.0978*****	**0.0923*****	**0.0923*****	**0.102*****	**0.113*****	**0.109*****	**0.111*****	**0.104*****
	(0.0181)	(0.0165)	(0.0165)	(0.0169)	(0.0180)	(0.0187)	(0.0173)	(0.0161)
Mineral Rents	0.000290	-0.000303	-0.000303	-0.000498	-0.000623	0.000306	-0.00176	0.00800
	(0.00380)	(0.00355)	(0.00355)	(0.00378)	(0.00360)	(0.00365)	(0.00275)	(0.00501)
Oil Rents	-0.000761	-0.00126	-0.00126	-0.000462	-0.000286	8.62e-05	-0.000344	**0.00469*****
	(0.00166)	(0.00165)	(0.00165)	(0.00156)	(0.00155)	(0.00164)	(0.00181)	(0.00171)
Forest Rents	**-0.00561****	-0.00122	-0.00122	-0.00127	-0.00107	0.000753	0.00365	0.00359
	(0.00264)	(0.00277)	(0.00277)	(0.00267)	(0.00273)	(0.00303)	(0.00378)	(0.00491)
Natural Gas Rents	-0.0108	0.00379	0.00379	0.0115	0.0114	0.00776	0.000138	-0.0235
	(0.0247)	(0.0308)	(0.0308)	(0.0284)	(0.0285)	(0.0274)	(0.0274)	(0.0369)
Constant	4.055***	2.419**	2.419**	2.638***	2.588***	2.339**	2.432***	1.904*
	(0.215)	(0.951)	(0.951)	(0.880)	(0.909)	(0.901)	(0.897)	(1.118)
CONTROLS			**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Observations	1,256	1,256	1,256	1,256	1,144	1,144	1,064	518
R-squared	0.183	0.214	0.214	0.236	0.254	0.282	0.347	0.512

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

In Table 6, PANEL B: African countries, column (7) suggests that after controlling for population levels and inflation, the degree of trade openness and savings share a U-shaped relationship between natural resources and income inequality, driven by the African countries' dynamics. Surprisingly, income inequality and the level of economic development do not have a robust relationship for African countries. In column (8), controlling for taxes suggests that the natural resources rents do not statistically affect income inequality, but rather the gross savings

share of GDP explain the income inequality changes. Therefore, a rise in the GDP savings share for the given level of international trade tax revenue share will
lower the income inequality in the country for any given level of natural resource rents.

TABLE 6: EFFECTS OF NATURAL RESOURCES ON NET INCOME INEQUALITY **(POOLED OLS BASELINE): NATURAL RESOURCE CATEGORIES**

DependentVariable(log)	Gini(1)	Gini(2)	Gini(3)	Gini(4)	Gini(5)	Gini(6)	Gini(7)	Gini(8)
PANEL B: AFRICAN COUNTRIES								
Income (t)	0.0418	-0.0594	-0.0594	0.0107	0.112	0.107	0.0164	-0.0412
	(0.0382)	(0.353)	(0.353)	(0.365)	(0.372)	(0.385)	(0.355)	(0.431)
Income Squared (t)		0.00636	0.00636	0.00119	-0.00547	-0.00537	0.000415	0.00690
		(0.0233)	(0.0233)	(0.0243)	(0.0249)	(0.0252)	(0.0234)	(0.0275)
Coal Rents	**0.0583*** **	**0.0566** **	**0.0566** **	**0.0693** **	**0.0819** **	**0.0825*** **	**0.0844*** **	**0.0681** **
	(0.0213)	(0.0245)	(0.0245)	(0.0264)	(0.0315)	(0.0307)	(0.0304)	(0.0311)
Mineral Rents	-0.00140	-0.00126	-0.00126	-0.00140	-0.00161	-0.00173	-0.00299	0.00859
	(0.00340)	(0.00333)	(0.00333)	(0.00355)	(0.00331)	(0.00340)	(0.00255)	(0.00534)
Oil Rents	-0.00143	-0.00137	-0.00137	-0.000610	-0.000511	-0.000579	0.000102	0.00366
	(0.00151)	(0.00147)	(0.00147)	(0.00142)	(0.00139)	(0.00151)	(0.00162)	(0.00223)
Forest Rents	-0.00231	-0.00288	-0.00288	-0.00290	-0.00251	-0.00270	-0.00174	-0.00394
	(0.00267)	(0.00224)	(0.00224)	(0.00216)	(0.00213)	(0.00239)	(0.00247)	(0.00487)
Natural Gas Rents	**-0.0837** **	**-0.0840** **	**-0.0840** **	-0.0649	-0.0620	-0.0618	-0.0576	-0.0522
	(0.0366)	(0.0370)	(0.0370)	(0.0408)	(0.0388)	(0.0381)	(0.0396)	(0.0402)
Constant	**3.479*** **	**3.879*** **	**3.879*** **	**3.926*** **	**3.519** **	**3.528** **	**3.999*** **	**4.111** **
	(0.284)	(1.339)	(1.339)	(1.345)	(1.342)	(1.370)	(1.316)	(1.529)
CONTROLS			**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Observations	1,050	1,050	1,050	1,050	952	952	872	407
R-squared	0.258	0.259	0.259	0.281	0.297	0.297	0.344	0.474

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

In Table 6, PANEL C: Non-African countries, columns (1) to (7) indicate that naturalresource rents are related to lower income inequality for the sampled Middle East countries. In column (8), after controlling for tax revenue share on international trade, the relationship is not statistically significant. Furthermore, population increases, higher prices and lower gross domestic savings will exacerbate the income inequality gap.

TABLE 6: EFFECTS OF NATURAL RESOURCES ON NET INCOME INEQUALITY **(POOLED OLS BASELINE): NATURAL RESOURCE CATEGORIES**								
Dependent Variable (log)	Gini(1)	Gini(2)	Gini(3)	Gini(4)	Gini(5)	Gini(6)	Gini(7)	Gini(8)
PANEL C. NON-AFRICAN COUNTRIES (MIDDLE EAST COUNTRIES)								
Income (t)	-0.0300	-0.161	-0.161	-0.339	-0.543	-0.100	-0.0727	-1.262
	(0.0209)	(0.434)	(0.434)	(0.420)	(0.434)	(0.356)	(0.360)	(0.819)
Income Squared (t)		0.00694	0.00694	0.0174	0.0285	0.00456	0.00229	0.0659
		(0.0228)	(0.0228)	(0.0222)	(0.0229)	(0.0186)	(0.0190)	(0.0424)
Coal Rents	**8.180*** **	**8.629*** **	**8.629*** **	**5.970*** **	**6.488*** **	**6.724*** **	**6.707*** **	1.792
	(0.951)	(1.799)	(1.799)	(1.610)	(1.453)	(1.593)	(1.407)	(0.988)
Mineral Rents	-0.0121	-0.0108	-0.0108	-0.0169	-0.0126	-0.00382	-0.00326	-0.00308
	(0.0132)	(0.0151)	(0.0151)	(0.0167)	(0.0156)	(0.0131)	(0.0129)	(0.00572)
Oil Rents	-0.000266	-0.000417	-0.000417	-0.00191	-0.00187	-0.000875	-0.00182	0.00247
	(0.00128)	(0.00125)	(0.00125)	(0.00149)	(0.00136)	(0.00134)	(0.00153)	(0.00133)
Forest Rents	**0.391*** **	**0.388*** **	**0.388*** **	**0.321*** **	**0.332*** **	**0.325*** **	**0.303*** **	**1.004*** **
	(0.0668)	(0.0601)	(0.0601)	(0.0416)	(0.0481)	(0.0567)	(0.0548)	(0.107)
Natural Gas Rents	**0.0342** **	**0.0319** **	**0.0319** **	**0.0289** *	**0.0241** *	**0.0251** **	**0.0204** *	-0.00221
	(0.0136)	(0.0101)	(0.0101)	(0.0131)	(0.0114)	(0.00919)	(0.0104)	(0.0305)
Constant	**3.824*** **	**4.435** *	**4.435** *	**4.523** **	**5.373** **	**4.237** **	**4.330** **	**8.701** **
	(0.179)	(2.027)	(2.027)	(1.879)	(1.930)	(1.565)	(1.515)	(3.634)
CONTROLS			**YES**	**YES**	**YES**	**YES**	**YES**	**YES**
Observations	206	206	206	206	192	192	192	111
R-squared	0.510	0.512	0.512	0.612	0.664	0.745	0.750	0.926
Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses								

Generally, Table 7, PANEL A: All countries, suggests that for the sample countries, mineral and oil rents are related to lower income inequality levels, after controlling for year and country fixed effects. In Table 7, PANEL B: African countries columns (6), (7), and (8) indicate that in Africa more coal rents worsen income inequality, while mineral rents are related with the lowering of income inequality. In Table 7, PANEL C: Non-African countries, the statistically significant coefficients in columns (1) to (6) suggest that for Middle East countries, coal rents, mineral rents, and oil rents lower income inequality, while forest rents are associated with wider income inequalities.

TABLE 7: EFFECTS OF NATURAL RESOURCES ON NET INCOME INEQUALITY **(FIXED EFFECTS)**

Dependent Variable(log)	Gini(1)	Gini(2)	Gini(3)	Gini(4)	Gini(5)	Gini(6)	Gini(7)	Gini(8)
PANEL A: ALL COUNTRIES								
Income (t)	**0.0719****	**-0.288***	**-0.299***	**-0.289***	**-0.344***	**-0.343***	**-0.320**	**-0.412**
	(0.0288)	(0.160)	(0.159)	(0.171)	(0.176)	(0.178)	(0.225)	(0.305)
Income Squared (t)		**0.0231****	**0.0237****	**0.0230****	**0.0256****	**0.0255****	**0.0241***	**0.0327***
		(0.0105)	(0.0105)	(0.0113)	(0.0116)	(0.0117)	(0.0142)	(0.0176)
Resource Rents (t)	**-0.00120****	**-0.00132*****	**-0.00257*****	**-0.00256*****	**-0.00313*****	**-0.00309*****	**-0.00362*****	**-0.00318*****
	(0.000481)	(0.000469)	(0.000968)	(0.000953)	(0.000928)	(0.000909)	(0.000796)	(0.00118)
Resource Rents Squared (t)			**2.57e-05***	**2.56e-05***	**3.40e-05****	**3.36e-05****	**4.24e-05*****	**4.43e-05*****
			(1.39e-05)	(1.38e-05)	(1.35e-05)	(1.33e-05)	(1.13e-05)	(1.50e-05)
log(population)				-0.0120	-0.0424	-0.0432	-0.0486	0.0510
				(0.0469)	(0.0555)	(0.0565)	(0.0616)	(0.0598)
Consumer Price Inflation					-7.32e-05	-7.37e-05	-6.67e-05	6.52e-05
					(8.83e-05)	(8.83e-05)	(9.48e-05)	(0.000113)
Openness (Exports + Imports)/GDP						-2.93e-05	-1.17e-06	-0.000201
						(0.000106)	(0.000137)	(0.000162)
Gross Domestic Savings (% of GDP)							-0.000283	-0.000865
							(0.000489)	(0.000527)
Taxes on International Trade (% of Revenue)								**0.00160****
								(0.000707)
Constant	2.959***	4.340***	4.398***	4.552***	5.325***	5.334***	5.337***	3.811**
	(0.254)	(0.615)	(0.617)	(0.827)	(0.935)	(0.939)	(1.113)	(1.816)
Observations	1,315	1,315	1,315	1,315	1,181	1,181	1,101	519
R-squared	0.959	0.961	0.962	0.962	0.963	0.963	0.960	0.983

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

TABLE 7: Effects of Natural Resources on Net Income Inequality **(FIXED EFFECTS)**

Dependent Variable(log)	Gini(1)	Gini(2)	Gini(3)	Gini(4)	Gini(5)	Gini(6)	Gini(7)	Gini(8)
PANEL B: AFRICAN COUNTRIES								
Income (t)	**0.0479***	-0.0879	-0.104	-0.0262	0.000216	0.0202	0.168	0.390
	(0.0280)	(0.174)	(0.179)	(0.212)	(0.280)	(0.292)	(0.394)	(0.329)
Income Squared (t)		0.00911	0.0100	0.00494	0.00167	0.000253	-0.00924	-0.0199
		(0.0122)	(0.0126)	(0.0148)	(0.0192)	(0.0201)	(0.0263)	(0.0196)
Resource Rents (t)	**-0.00109***	**-0.00114***	**-0.00203**	**-0.00187**	**-0.00223***	**-0.00208***	**-0.00286*****	**-0.00200**
	(0.000580)	(0.000582)	(0.00126)	(0.00117)	(0.00117)	(0.00115)	(0.00104)	(0.00141)
Resource Rents Squared (t)			**1.80e-05** (1.76e-05)	**1.62e-05** (1.68e-05)	**2.20e-05** (1.65e-05)	**2.00e-05** (1.64e-05)	**2.90e-05*** (1.47e-05)	**2.49e-05** (1.79e-05)
log(population)				-0.0655	**-0.179***	**-0.184***	**-0.233****	0.0176
				(0.0863)	(0.0985)	(0.0998)	(0.104)	(0.117)
Consumer Price Inflation					-1.51e-05 (8.43e-05)	-2.28e-05 (8.75e-05)	3.57e-05 (9.73e-05)	0.000238 (0.000154)
Openness (Exports + Imports)/GDP)						-9.30e-05 (0.000140)	2.64e-06 (0.000166)	-0.000268 (0.000173)
Gross Domestic Savings (% of GDP)							-9.80e-06 (0.000371)	**-0.000728*** (0.000400)
Taxes on International Trade (% of Revenue)								**0.00119***** (0.000418)
Constant	**3.161*****	**3.655*****	**3.726*****	**4.480*****	**6.284*****	**6.304*****	**6.516*****	1.375
	(0.251)	(0.614)	(0.642)	(1.265)	(1.386)	(1.383)	(1.514)	(2.533)
Observations	1,107	1,107	1,107	1,107	988	988	908	408
R-squared	0.956	0.956	0.956	0.957	0.960	0.961	0.956	0.987

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

TABLE 7: EFFECTS OF NATURAL RESOURCES ON NET INCOME INEQUALITY **(FIXED EFFECTS)**								
Dependent Variable(log)	Gini(1)	Gini(2)	Gini(3)	Gini(4)	Gini(5)	Gini(6)	Gini(7)	Gini(8)
PANEL C: NON-AFRICAN COUNTRIES (MIDDLE EAST COUNTRIES)								
Income (t)	**0.249***	**-2.729*****	**-2.625*****	**-2.925*****	**-2.873*****	**-2.874*****	**-2.876*****	-1.863
	(0.118)	(0.439)	(0.487)	(0.518)	(0.563)	(0.562)	(0.555)	(1.250)
Income Squared (t)		**0.155*****	**0.150*****	**0.168*****	**0.165*****	**0.165*****	**0.165*****	0.114
		(0.0238)	(0.0264)	(0.0274)	(0.0303)	(0.0302)	(0.0297)	(0.0646)
Resource Rents (t)	**-0.00405*****	**-0.00138****	**-0.00331***	**-0.00225**	**-0.00271***	**-0.00258***	**-0.00260***	-0.000277
	(0.00117)	(0.000546)	(0.00149)	(0.00153)	(0.00148)	(0.00136)	(0.00140)	(0.00321)
Resource Rents Squared (t)			3.63e-05 (2.69e-05)	1.72e-05	2.49e-05	2.46e-05	2.45e-05	-1.17e-06
				(2.38e-05)	(2.30e-05)	(2.30e-05)	(2.23e-05)	(7.07e-05)
log(population)				0.0982***	**0.0959*****	**0.0913****	**0.0913****	**0.0720***
				(0.0238)	(0.0302)	(0.0304)	(0.0308)	(0.0338)
Consumer Price Inflation					4.11e-06	8.63e-06	9.06e-06	**0.000124*****
					(0.000137)	(0.000135)	(0.000126)	(1.77e-05)
Openness (Exports + Imports)/GDP)						-0.000148	-0.000150	-0.000166
						(0.000108)	(0.000124)	(0.000180)
Gross Domestic Savings (% of GDP)							2.76e-05	**-0.00251****
							(0.000728)	(0.00102)
Taxes on International Trade (% of Revenue)								0.000900
								(0.00117)
Constant	**1.478**	**15.76*****	**15.27*****	**14.86*****	**14.63*****	**14.73*****	**14.73*****	10.06
	(1.122)	(2.032)	(2.260)	(2.278)	(2.376)	(2.323)	(2.312)	(5.722)
Observations	208	208	208	208	193	193	193	111
R-squared	0.940	0.976	0.976	0.982	0.984	0.984	0.984	0.992

Note: *** p<0.01, ** p<0.05, * p<0.1. Robust standard errors in parentheses

4.5 Limitation of the Findings

The problems of endogeneity bias, be it simultaneity, measurement error, or omitted variables (such as corruption levels, which impacts natural resource rents and economic growth or income inequality) were not exhaustibly addressed, which can lead to upward or downward bias of estimators, including classical inference weaknesses.

Regarding income inequality and the natural resource curse regression model, the omitted variable biases and other forms of endogeneity can either under or overestimate the natural resource rents effects. This would most likely occur should the natural resource rents be correlated with unobserved characteristics that have not been controlled for or dealt with.

CHAPTER 5 – CONCLUSION AND RECOMMENDATIONS

5.1 Introduction

As the study has carried out various regression model analyses with various outcomes, this chapter summarises the key findings, discusses empirical significance of the findings in relation to literature, and in conclusion suggests avenues for future research.

5.2 Summary Discussion of Findings

This study sets out to examine if the relationship between resource abundance and income inequality amongst a panel of African countries is negative as in the case between resource abundance and economic growth of the resource curse hypothesis literature. The study is carried out with the objective of testing whether economic inequality would be a more appropriate measure of the performance of resource-rich nations, as lower or higher levels of growth have untested inference on inequality.

The study found the existence of a U-shaped relationship between resource rent and income inequality, which supports the literature regarding the Kuznets curve. The study also found that rising consumer price inflation significantly worsens average income inequality within an African country. In addition, a high degree of trade openness significantly reduces income inequality within an African country, if all else is held constant. This advocates for policies advancing a high degree of trade openness rather than protectionism in Africa in the fight to alleviate high income inequality.

Furthermore, higher gross domestic savings share in GDP is predicted to significantly reduce income inequality. This continues the theme of encouraging African countries to prioritise improving the domestic savings share *vis-à-vis* debt-driven economic growth and curtailing income inequality.

Therefore, for African countries based on the population level, inflation level, degree of trade openness, and GDP share of domestic savings, accumulation of more coal rents share is expected to worsen average income inequality, while more mineral resource rents share reduces income inequality.

With regards to the first objective of the thesis pertaining to the natural resource curse and economic growth in Africa, the evidence is mixed and is dependent on the econometric model used and the controls included. As this study accounted for economic business cycles and country fixed effects, it was observed that there is some evidence of the natural resource curse having an impact on natural resource-rich African countries, which can be explained by the level of inflation, degree of trade openness, domestic GDP saving share, and the international tax revenue share. On the African natural resource analysis, there is some strong evidence of the natural resource curse permeating through the forest rents. High forest rents are associated with low average annual growth rates. When the study accounted for year and country fixed effects, it was observed that trade openness robustly elevates economic growth in Africa, while the gross domestic savings rate robustly drives growth in the sampled Middle East countries. This echoes the sentiments that in the Middle East, diversification into other industries, investment in human capital and technology, and encouragement of real savings would assist the countries to escape the natural resource curse.

5.3 Policy Recommendations of the Findings

At a minimum, African countries facing mineral booms should focus their attention on the problem of income inequality and pay special attention to the ability of workers to move from the trading sector, typically agriculture and manufacturing, to the non-trading sector, generally services African governments should also adopt policies that can help prevent the economy from growing overly dependent on a single commodity post a mineral boom, and should rather post in places a variety of measures and policies which would encourage competition and productivity in the sectors which are usually unprotected, namely the manufacturing and agricultural sectors (Ross, 2007).

African governments must continue to try and diversify the risk of path dependency on coal-powered energy, as coal rents seem to be associated with worsening income inequality. They should keep investing the mineral rents in productive human capital and social empowerment programmes. This analysis opines that for Africans to develop sound natural resource credit management systems, it would be key to improve the quality of political institutions. That is, to incentivise or encourage good governance schemes, curtail the levels of systematic corruption embattling most of the business and political spectrum, and enforce the rule of law

justly to stifle embezzlement of natural resource rents. Such measures could be key in circumventing the natural resource curse and spurring economic growth.

The "Alaska-type direct distribution plan has not been tried in a developing state where institutions tend to be weak", which is mostly the case in African countries (Ross, 2007). If implemented successfully, "it would allocate mineral revenues in an admirably equitable way", enabling government to control income inequality as they focus on income redistributive policies (Ross, 2007). The downside is that if the plan is unsuccessfully implemented, the plan would result in rent-seeking and corruptive crowding-out tendencies.

This study supports the findings by Ross, (2007) that "a less risky approach would be to adopt policies that narrow the income gap between the extractive region and the rest of the country". The divide between the income levels in countries which heavy reliance on the extractive industries as a result of mineral resource abundance, should be managed with policies targeting the reduction of the gap between income levels.

5.4 Avenues for Future Research

Data on income inequality is almost non-existent for mineral-rich countries on the African continent. Future research should focus primarily on exploring methods to gather data which is reflect a true reflection of the level of inequality in African countries. This research would be an invaluable contribution to the furthering the understanding and measurement of the relationship between natural resource endowment and income amongst mineral rich developing states. What should be a complimentary future area of research should be the manner in which income inequality exists in resource rich developing countries, which should be investigated looking at the income distribution patterns among these countries particularly during the periods post increase economic activity driven by mineral resources. Ross (2007) echoes the sentiment of this study in relation to future avenues of research as he finds that to fully understand the nature of the relationship between resource wealth and income inequality data collection is vital. Further investigation of this relationship which has been an explored area of modern finance given the lack of data from mineral resource rich countries it certainly required. The collection of data on income inequality and its impact from mineral resource booms will certainly advance the academic field of study relating to the natural resource hypothesis.

REFERENCES

Alexeev, M., & Conrad, R. (2009). The elusive curse of oil. *The Review of Economics and Statistics*, *91*(3), 586-598.

Alofaysan, H. B (2017). *Essays on natural resources, inequality and political stability*. (PhD Thesis) Economics Division, School of Business, University of Leicester. Retrieved from https://lra.le.ac.uk/bitstream/2381/40759/1/2017AlofaysanHBPhD.pdf

Alsharif, N. (2017). *Three essays on growth and economic diversification in resource-rich countries*. (PhD Thesis) University of Sussex. Retrieved from http://sro.sussex.ac.uk/id/eprint/70478/1/Alsharif%2C%20Nouf%20Nassir.pdf

Anand, S., & Kanbur. (1993). The Kuznets process and the inequality-development relationship. *Journal of Development Economics*, *40,* 25–52.

Arezki, R., & Van Der Ploeg, F. (2011). Do natural resources depress income per capita? *Review of Development Economics, 15*(3), 504–521. https://doi.org/10.1111/j.1467-9361.2011.00623.x

Auty, R. M. (2001). The political economy of resource-driven growth. *European Economic Review*, *45*(4-6), 839-846.

Barro, R. (2000). Inequality and growth in a panel of countries. *Journal of Economic Growth*, *32*, 5–32. https://doi.org/10.1016/j.jhealeco.2006.07.003

Behbudi, D., Mamipour, S., & Karami, A. (2010). Natural resource abundance, human capital and economic growth in the petroleum exporting countries. *Journal of Economic Development*, *35*(3), 81-102.

Boschini, A. D., Pettersson, J., & Roine, J. (2007). Resource curse or not: A question of appropriability. *Scandinavian Journal of Economics*, *109*(3), 593–617. https://doi.org/10.1111/j.1467-9442.2007.00509.x

Bruckner, M. (2010). Natural resource dependence, non-tradables, and economic growth. *Journal of Comparative Economics*, *38*(4), 461–471. Retrieved from https://doi.org/10.1016/j.jce.2010.06.002

Brunnschweiler, C. N., & Bulte, E. H. (2008). The resource curse revisited and revised: A tale of paradoxes and red herrings. *Journal of Environmental Economics and Management, 55*, 248–264. https://doi.org/10.1016/j.jeem.2007.08.004

Cavalcanti, T. V. de V, Mohaddes, K., & Raissi, M. (2011). Growth, development and natural resources: New evidence using a heterogeneous panel analysis. *Quarterly Review of Economics and Finance*, *51*(4), 305–318. https://doi.org/10.1016/j.qref.2011.07.007

Collier, P., & Hoeffler, A. (2004). Greed and grievance in civil war. *Oxford Economic Papers*, *56*(4), 563–595.

Corden, M., & Neary, P. (1982). Booming sector and de-industrialisation in a small open economy. *Royal Economic Society*, *92*(368), 825–848. Retrieved from www.jstor.org/stable/2232670

Cotet, A., & Tsui, K. (2013). Oil and conflict: What does the cross country evidence really show? *American Economic Journal: Macroeconomic*, *5*(1), 49–80. https://doi.org/10.1257/mac.5.1.49

Ding, N., & Field, B. C. (2005). Natural resource abundance and economic growths. *Land Economics, 81*(4), 496-502.

Doppelhofer, G., Miller, R., & Sala-i-Martin, X. (2000). *Determinants of long-term growth: A Bayesian averaging of classical estimates (BACE) approach*. (NBER Working Paper w7750) National Bureau for Economic Research, Cambridge, Massachusetts. Retrieved from https://www.nber.org/papers/w7750

Engerman, S., & Sokoloff, K. (1997). Factor endowments, institutions, and differential paths of growth among new world economies: A view from economic historians of the United States. In S. H. Haber (Ed.), *How Latin America fell behind* (pp. 260-304). Stanford, CA: Stanford University Press.

Forbes, K. J. (2000). A reassessment of the relationship between inequality and growth. *American Economic Association*, *90*(4), 869–887.

Frankel, J. A. (2010). *The natural resource curse: A survey*. (NBER Working Paper 15836) National Bureau for Economic Research, Cambridge, MA. Retrieved from http://www.nber.org/papers/w15836

Gelb, A., & Grasmann, S. (2010). *How should oil exporters spend their rents?* (Working Paper No. 221) Center for Global Development, Washington, DC. Retrieved from http://ssrn.com/abstract=1660570

Goderis, B., & Malone, S. W. (2011). Natural resource booms and inequality: Theory and evidence. *Scandinavian Journal of Economics*, *113*(2), 388–417. https://doi.org/10.1111/j.1467-9442.2011.01659.x

Gylfason, T. (2001). Natural resources, education , and economic development. *European Economic Review, 45*, 847–859.

Gylfason, T., Herbertsson, T. T., & Zoega, G. (1999). A mixed blessing: Natural resources and economic growth. *Macroeconomic Dynamics*, *3*(2), 204-225.

Havranek, T., Horvath, R., & Zeynalov, A. (2016). Natural resources and economic growth: A meta-analysis. *World Development*, *88*(609642), 134–151. https://doi.org/10.1016/j.worlddev.2016.07.016

Jonker, J., & Pennink, B. (2010). *The essence of research methodology*. Heidelberg,

Germany: Springer.

Kurecic, P., & Kokotovic, F. (2017). Examining the "Natural resource curse" and the impact of various forms of capital in small tourism and natural resource-dependent economies. *Economies, 5*(6)*,* 1-24. https://doi.org/10.3390/economies5010006

Maloney, W. F. (2002). *Innovation and growth in resource rich countries*. (Working Papers No. 148) Central Bank of Chile. Retrieved from http://si2.bcentral.cl/public/pdf/documentos-trabajo/pdf/dtbc148.pdf

Manzano, O., & Rigobon, R. (2001). *Resource curse or debt overhang*? (NBER Working Paper w8390) National Bureau for Economic Research, Cambridge, MA. Retrieved from http://www.nber.org/papers/w8390

Marshall, M. N. (2018). Sampling for qualitative research. *Family Practice, 13*(6), 522–525.

Matsuyama, K. (1992). Agricultural productivity, comparative advantage, and economic growth. *Journal of Economic Theory*, *58*(2), 317–334. https://doi.org/10.1016/0022-0531(92)90057-O

McMillan, J. H., & Schumacher, S. (2001). *Research in education: A conceptual introduction* (5th ed.). New York, NY: Longman.

Mehlum, H., Moene, K., & Torvik, R. (2006). Institutions and the resource curse. *The Economic Journal*, *116*(508), 1–20.

Murshed, S. M. (2004). *When does natural resource abundance lead to a resource curse?* (EEP Discussion Paper 04-01). Environmental Economics Programme, International Institute for Environment and Development, London. Retrieved from https://ageconsearch.umn.edu/record/24137/files/dp040001.pdf

Norrbin, S. C., Pipatchaipoom, O., & Bors, L. (2008). How robust is the natural resource curse? *International Economic Journal, 22*(2), 187-200. https://doi.org/10.1080/10168730802079722

Pangestu, M. (2010). *The challenges for trade policy in a dynamic world and regional setting: An Indonesian perspective*. Richard Snape Lecture, Productivity Commission Melbourne, November 22. Retrieved from https://www.pc.gov.au/news-media/lectures/pangestu/2010-pangestu.pdf

Papyrakis, E., & Gerlagh, R. (2004). The resource curse hypothesis and its transmission channels. *Journal of Comparative Economics*, *32*(1), 181–193. https://doi.org/10.1016/j.jce.2003.11.002

Persson, T., & Tabellini, G. (1994). *Is inequality harmful for growth? Theory and evidence.* (NBER Working Paper w3599) National Bureau for Economic Research, Cambridge, MA. Retrieved from https://www.nber.org/papers/w3599

Robinson, S. (1976). A note on the U hypothesis relating income inequality and economic development. *American Economic Association*, *66*(3), 437–440.

Rodriguez, F., & Sachs, J. D. (1999). Why do resource-abundant economies grow more slowly? *Journal of Economic Growth*, *4*(3), 277–303.

Ross, M. L. (2001). Does oil hinder democracy? *World Politics*, *53*(3), 325–361. https://doi.org/10.1353/wp.2001.0011

Ross, M. L. (2007). *How mineral- rich states can reduce inequality?* New York, NY: Columbia University Press.

Sachs, J., & Warner, A. (1995). *Natural resource abundance and economic growth*. (NBER Working Paper w5398) National Bureau for Economic Research, Cambridge, MA. Retrieved from Retrieved from https://www.nber.org/papers/w5398.pdf

Sachs, J., & Warner, A. M. (1997). Sources of slow growth in African economies. *Journal of African Economies*, *6*(3), 335–376.

Sachs, J., & Warner, A. M. (2001). The curse of natural resources. *European Economic Review*, *45*(4-6), 827–838.

Sarraf, M., & Jiwanji, M. (2001). *Beating the resource curse: The case of Botswana*. (Environment Department Papers 24753) Environment Economic Series, World Bank. Retrieved from https://openknowledge.worldbank.org/bitstream/handle/10986/18304/multi0page.pdf?sequence=1

Solt, F. (2009). Standardizing the world income inequality database. *Social Science Quarterly*, *90*(2), 231–242. Retrieved from https://doi.org/10.1111/j.1540-6237.2009.00614.x

Taguchi, H., & Khinsamone, S. (2018). Analysis of the "Dutch Disease" effect on the selected resource-rich ASEAN economies. *Asia & the Pacific Policy Studies, 5*(2), 249–263. https://doi.org/10.1002/app5.233

The World Bank. (1991). *World development report*: The challenge of development. Washington, DC. The International Bank for Reconstruction and Development. Retrieved from https://openknowledge.worldbank.org/handle/10986/5974

The World Bank. (1998). *World Development Indicators*. Washington, DC. The International Bank for Reconstruction and Development. Retrieved from http://documents.worldbank.org/curated/en/745241468135933997/World-development-indicators-1998

The World Bank. (2001). *World Development Indicators*. Washington, DC. The International Bank for Reconstruction and Development. Retrieved from

http://documents.worldbank.org/curated/en/988701468781815855/World-development-indicators-2001

Torvik, R. (2001). Learning by doing and the Dutch disease. *European Economic Review, 45*(5), 285–306.

Williams, A. (2011). Shining a light on the resource curse: An empirical analysis of the relationship between natural resources, transparency, and economic growth. *World Development*, *39*(4), 490–505. https://doi.org/10.1016/j.worlddev.2010.08.015

Wright, G. (2001). *Resource-based growth then and now*. Paper prepared for the World Bank Project "Patterns of Integration in the Global Economy". Retrieved from http://www-siepr.stanford.edu/conferences/HSTeachers_2001/resource-based-growth.pdf

APPENDICES

Appendix 1 – List of Figures

Figure 1: Africa total resource rents and income per capita: Cross-sectional relationship

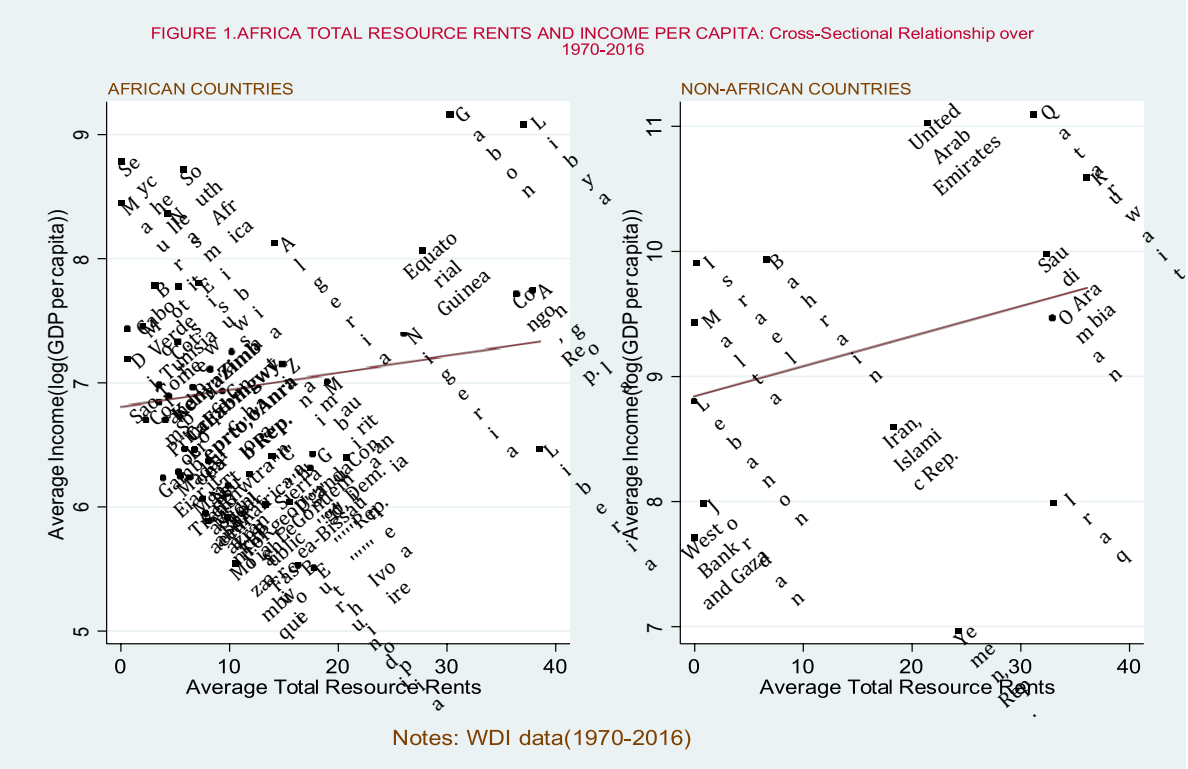

Figure 2: Resource rents and income per capita: Nonparametric progression

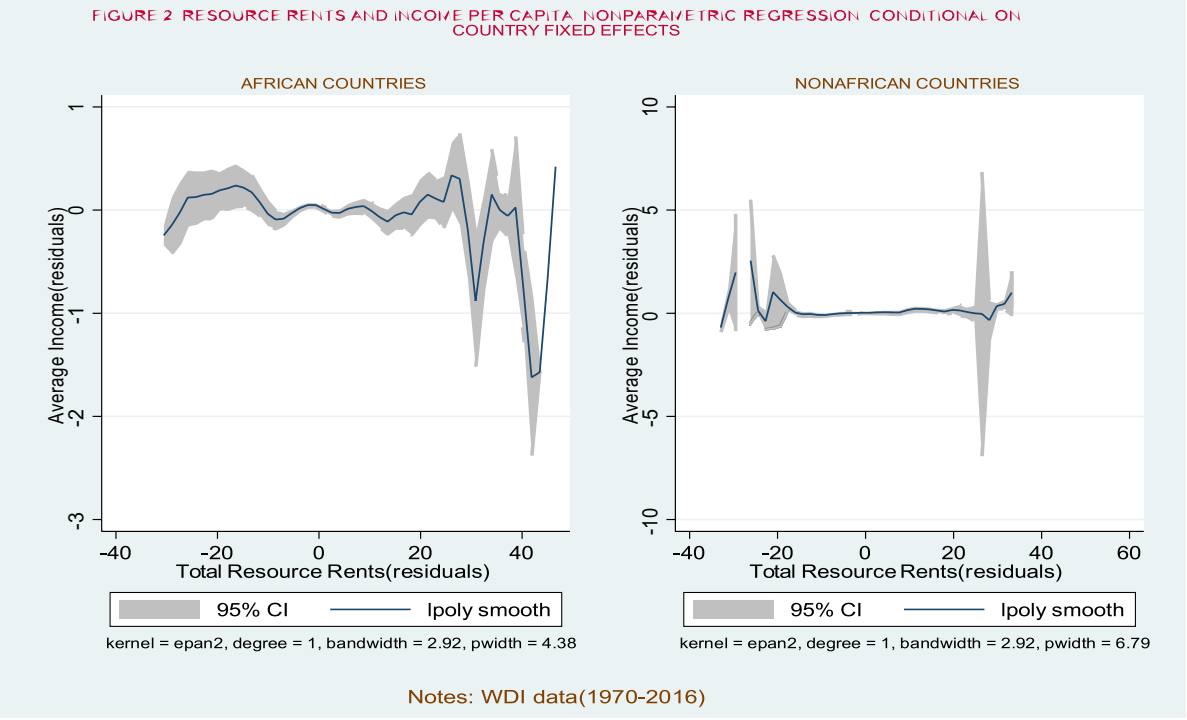

Figure 3: Oil wealth and income per capita: Cross-sectional relationship

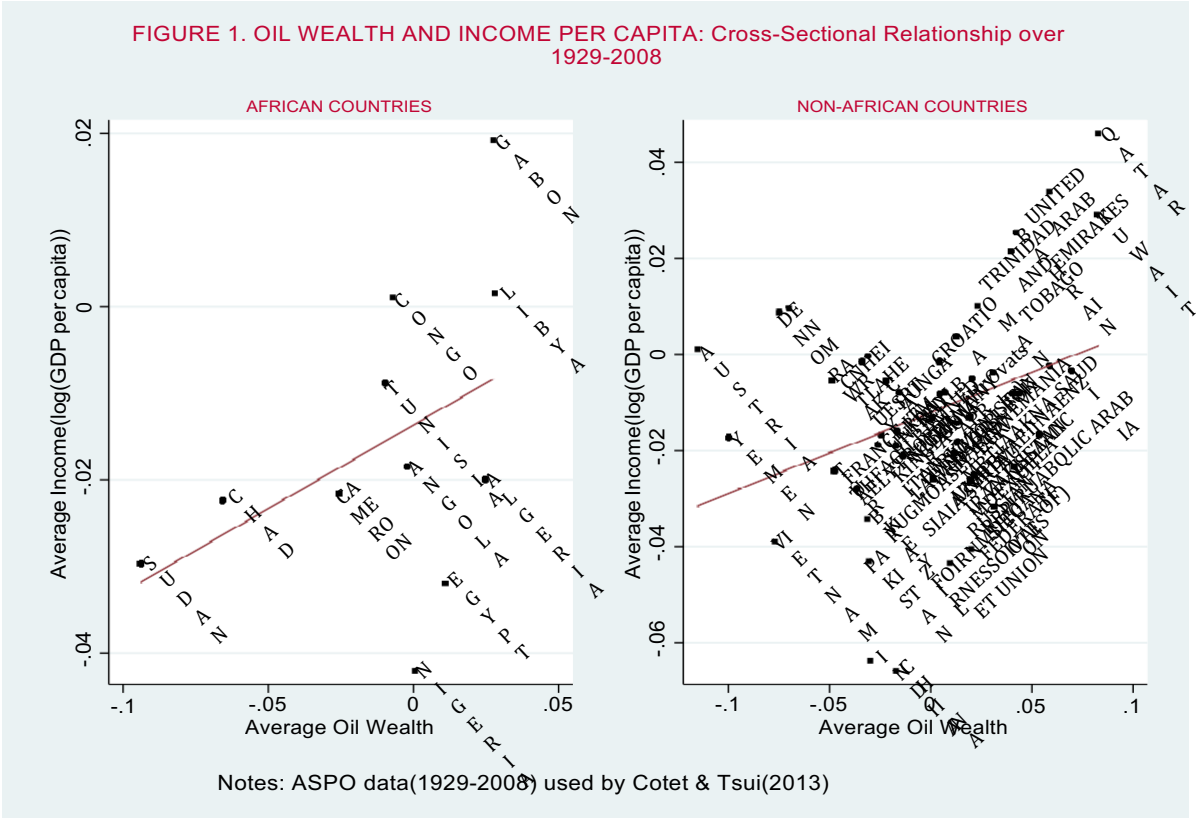

Figure 4: Total resource rents and net income inequality: Cross-sectional relationship

Figure 5: Resource rents and net income inequality: Nonparametric regression

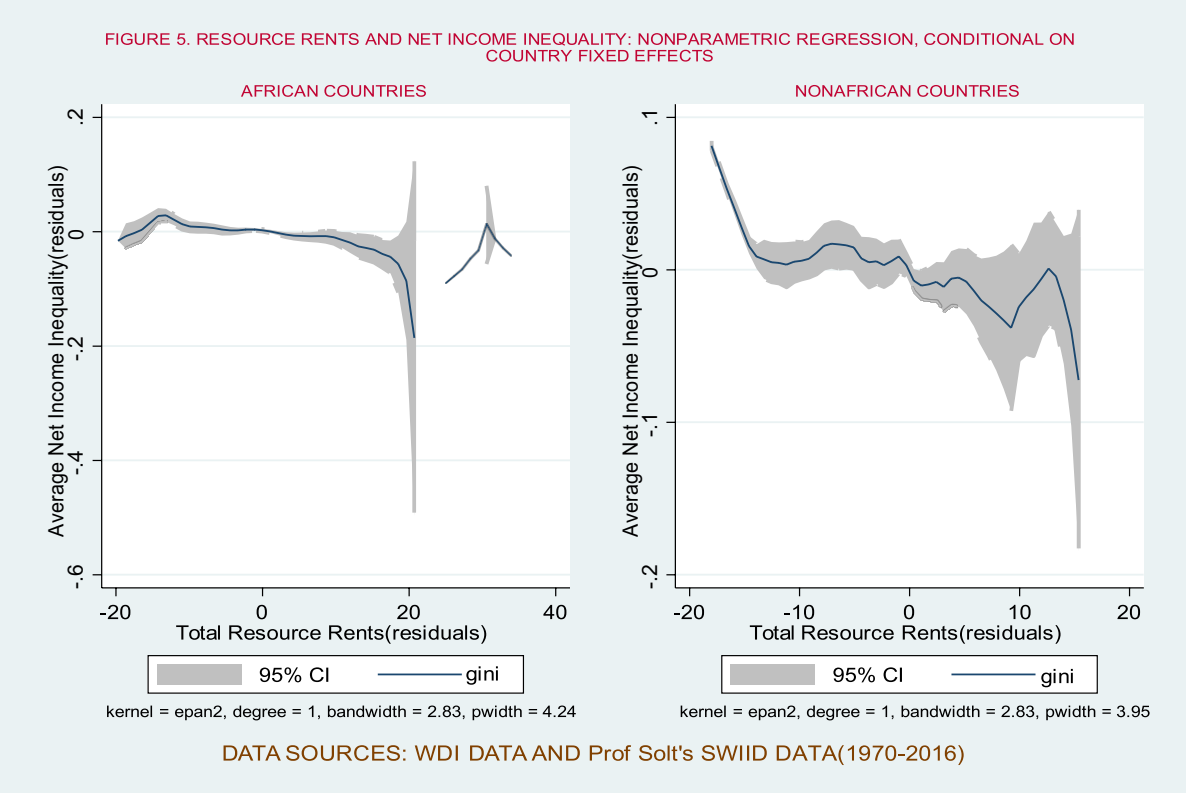

Figure 6: Correlation Matrix using ASPO Data

Figure 7.1: PANEL A. Correlation Matrix for ASPO DATA (ALL COUNTRIES)

Variable	Gini	Log(Gini)	Log(Inc)	Log(Oil Wealth)	Log(Pop. Density)	Democracy	Growth Rate
Gini	1.0000						
Log(Gini)	0.9928	1.0000					
Log(Income)	-0.2875	-0.3232	1.0000				
Log(Oil Wealth per capita)	0.0903	0.0906	0.1806	1.0000			
Log(Population Density)	-0.2207	-0.2117	-0.1521	-0.2069	1.0000		
Democracy	-0.1550	-0.1848	0.3351	-0.0401	0.0500	1.0000	
Growth Rate	-0.1229	-0.1219	-0.0224	-0.0904	0.1429	0.0505	1.0000

Figure 7.2: PANEL B. Correlation Matrix for ASPO DATA (AFRICAN COUNTRIES)

Variable	Gini	Log(Gini)	Log(Inc)	Log(Oil Wealth)	Log(Pop. Density)	Democracy	Growth Rate
Gini	1.0000						
Log(Gini)	0.9985	1.0000					
Log(Income)	-0.1969	-0.1997	1.0000				
Log(Oil Wealth per capita)	0.0934	0.0784	-0.0137	1.0000			
Log(Population Density)	0.5287	0.5513	-0.2003	0.3879	1.0000		
Democracy	0.1247	0.1190	-0.0399	0.2013	0.1087	1.0000	
Growth Rate	0.0639	0.0588	0.1143	0.0309	0.1475	0.0449	1.0000

Figure 7.3: PANEL C. Correlation Matrix for ASPO DATA (NON-AFRICAN COUNTRIES)

Variable	Gini	Log(Gini)	Log(Inc)	Log(Oil Wealth)	Log(Pop. Density)	Democracy	Growth Rate
Gini	1.0000						
Log(Gini)	0.9932	1.0000					
Log(Income)	-0.2723	-0.3042	1.0000				
Log(Oil Wealth per capita)	0.1049	0.1090	0.1955	1.0000			
Log(Population Density)	-0.2337	-0.2195	-0.1866	-0.2991	1.0000		
Democracy	-0.1222	-0.1412	0.2834	-0.0979	-0.0085	1.0000	
Growth Rate	-0.1249	-0.1211	-0.0518	-0.1176	0.1338	0.0190	1.0000

Figure 7: List of Countries used in the study.

List of Countries		
Algeria	Kuwait	Tunisia
Angola	Lebanon	Uganda
Bahrain	Lesotho	United Arab Emirates
Benin	Liberia	West Bank and Gaza
Botswana	Libya	Yemen, Rep.
Burkina Faso	Madagascar	Zambia
Burundi	Malawi	Zimbabwe
Cabo Verde	Mali	
Cameroon	Malta	
Central African Republic	Mauritania	
Chad	Mauritius	
Comoros	Morocco	
Congo, Dem. Rep.	Mozambique	
Congo, Rep.	Namibia	
Cote d'Ivoire	Niger	
Djibouti	Nigeria	
Egypt, Arab Rep.	Oman	
Equatorial Guinea	Qatar	
Eritrea	Rwanda	
Eswatini	Sao Tome and Principe	
Ethiopia	Saudi Arabia	
Gabon	Senegal	
Gambia, The	Seychelles	
Ghana	Sierra Leone	
Guinea	Somalia	
Guinea-Bissau	South Africa	
Iran, Islamic Rep.	South Sudan	
Iraq	Sudan	
Israel	Syrian Arab Republic	
Jordan	Tanzania	
Kenya	Togo	