Resource Curse or Institutions Curse?

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Abstract

In the political economy and resource curse literature, Nigeria is often cited as an example of a country that epitomises the resource curse, due to its vast oil wealth, and the political and economic woes it has experienced since the discovery of oil. The evidence from growth literature, shows that resource endowed economies tend to experience a relatively slower rate of growth than their less endowed counterparts. However, few country specific analysis have been carried out to test this phenomenon, and the role of institutions thereof. The third essay therefore addresses two questions in the institutions and resource curse literature: (i) Is the quality of institutions affected by the wealth of resources in the long-run? (ii) If yes, does resource wealth affect economic growth through institutions, and what is the nature of this relationship? (iii) If no, is there an interaction effect of institutions and resource wealth on economic growth and what is the nature of the interaction? No evidence to support a long-run association going from resource wealth to institutions was found. The estimates indicate the existence of a long-run interactive role of institutions and resource wealth on economic growth, while in some instances, the "resource curse" was reduced in the presence of better institutions. Some puzzling results, suggesting a negative association between *de jure* institutions and economic performance in the long-run.

1 Introduction

Since the work of Sachs and Warner (1995), economists have been puzzled by the seemingly paradoxical finding that highly resource endowed countries tend to experience slower rates of economic growth than their less resourced counterparts (Ross, 1999; Sachs and Warner, 1995, 1999, 2001; Sala-i Martin and Subramanian, 2003; Mehlum et al., 2006). Nigeria is a peculiar example when it comes to the resource curse, because much of the development ills that have befallen it coincide with the discovery of oil, which is just one of Nigeria's wide array of natural resources. This wealth has not resulted in the success story observed in some resource rich countries. Rather it has exemplified the resource curse. The discovery of crude oil in Nigeria is often cited as the reason for Nigeria's poor economic performance (Khan, 1994; Leite and Weidmann, 1999; Sala-i Martin and Subramanian, 2003; Mehlum et al., 2006). For instance, oil rents as a percentage of GDP went from about 3% in 1970, to a high of around 53% by 1979, and currently now sits at about 15% in 2012. Barring the improved economic performance of the past decade, the effect of the oil windfall since the 1970's has not translated into prosperity for the average Nigerian. The rents from oil have amounted to hundred of billions of dollars, while poverty rates have soared, with about 62% of the population living on less than $1.25 a day by 2010 (World Bank Group, 2012).

While there is some consensus on the relatively slow rate of growth experienced by resource rich countries, the explanations for the paradox are mixed. The most common explanation is the "Dutch disease" which posits that the ease of access to and potential for revenue in the resource sector crowds out activities and investments in the non-resource sectors (Davis, 1995; Torvik, 2001). Another explanation is the rent-seeking explanation which states that resource wealth gives incentives for government officials to engage in rent-seeking behaviour (Torvik, 2002). Empirical attempts to explain the resource curse, have considered the role of debt overhang (Manzano and Rigobon, 2001; Jones, 2014), volatility (Van der Ploeg and Poelhekke, 2009), the type of natural resource (Leite and Weidmann, 1999; Boschini et al., 2007), and institutions (Leite and Weidmann, 1999; Ross, 1999; Sachs, 2003; Mehlum et al., 2006; Brunnschweiler and Bulte, 2008) among others, in determining resource wealth effects. More specifically, empirical evidence has suggested an indirect (Sala-i Martin and Subramanian, 2003) or interactive (Mehlum et al., 2006) impact of resource wealth on economic growth through a detrimental impact on institutions. Although the empirical evidence is plenty in literature, concerns have been raised about possible reverse causality or omitted variable bias arising from exclusion of variables that may have adverse effects on growth and the management of natural resources (Brunnschweiler and Bulte, 2008; Norman, 2009). Most studies that have examined the role of institutions in the relationship between natural resources and growth, have found institutions significantly influence the effect of natural resources on economic growth (Sala-i Martin and Subramanian, 2003; Mehlum et al., 2006; Brunnschweiler and Bulte, 2008).

However, a few issues have been raised in recent resource curse literature. The first concerns the endogenous nature of institutions. Here, researchers suggest that institutions are impacted by natural resource wealth, contrary to assumptions implicit in the foremost empirical analysis of the resource curse by Sachs and Warner (1995, 1999, 2001). A second argument is concerned with the proxies used to capture resource endowment. Critics question the use of the ratio of Total resource exports to total exports, and the ratio of total resource exports to GDP, as adequate measures of resource abundance (Brunnschweiler and Bulte, 2008; Norman, 2009). Furthermore, the use of a composite measure for resource abundance has also been criticized, as not all types of natural resources readily exhibit the resource curse (Leite and Weidmann, 1999).

Based on these arguments, this study has three objectives. The first objective is to test the resource curse hypothesis using three distinct resource measures and three distinct institutions measures. Each of the resource measures capture a unique aspect of resource wealth in Nigeria. The first measure aims to capture true resource wealth or resource abundance by evaluating the total value of oil reserves in Nigeria. The second measure captures resource dependence in the form of the total value of oil production in Nigeria. The third measure captures the incidence of oil discovery. In this way, tow of the measurement issues will be attended to. On one hand, the use of ratio of total resource exports to total exports or the ratio of total resource exports to GDP as a proxy, is avoided, as oil reserves is used instead. On the other hand, all the measures used are concern crude oil measures, and as such, the use of a composite measure of resource wealth is avoided. The institutional indicators, namely: civil and political liberties, freehold property rights, and non-freehold property rights, capture three different aspects of institutions. These are: political institutions, economic institutions and customary institutions respectively. The second objective is to test whether resource endowments have a causal impact on the quality of institutions. Recent studies have endogenised institutions in their regressions to address this issue. This premise is tested out, since there is a possibility that institutions in some countries are are not influenced by resource endowment, an outcome that cross-country studies may have missed due to unobserved heterogeneity. The third objective of the study is to examine the role of institutions in the resource wealth and growth relationship, to find out whether the role is indirect—in line with Sala-i Martin and Subramanian (2003) and Brunnschweiler and Bulte (2008) or interactive—in line with Mehlum et al. (2006).

Nigeria is often as cited as the example of a country cursed by its natural resource wealth. In practice however, no formal empirical inquiry has been conducted on the implications of resource wealth on growth dynamics for Nigeria. The closest was the study by Sala-i Martin and Subramanian (2003). However, this was a cross-country study, with an illustrative discussion of Nigeria, without any empirical focus on the country. While it was informative in describing the disappointing performance of Nigeria, no empirical evidence specific to Nigeria was provided. In this study I build on this study, as well as works of Sachs and Warner (1995) and Mehlum et al. (2006) by addressing the resource wealth measurement concerns, and distinguishing between political and economic institutions. More importantly, I add to the literature by empirically testing the resource curse hypothesis in Nigeria. This should shed more light on resource wealth effects. The measures of oil resources used are obtained from data constructed by the Association for the Study of Peak Oil (ASPO), and recently introduced to economists by Tsui (2011). The ASPO has a measure for resource abundance, resource dependence and resource discovery, making it possible to test whether the Nigerian exhibits the resource curse or not.

The results show that the resource curse exists regardless of the resource measure employed. They show that natural resources do not have a long-run influence on institutions, and hence no indirect impact of resource wealth on economic performance via institutions exists either. The results show that in some instances, institutions and resource wealth interact to have a positive influence on economic performance. That is, institutions do indeed reduce the resource curse. They do not completely eliminate it however.

The remainder of this paper is organized as follows. Section 2 presents an overview of the literature and the theoretical framework. Section 3 discusses the data. The empirical methodology is presented in Section 4, while Section 5 presents the results and discussion. Section 6 concludes the paper.

2 Background Literature

The resource curse hypothesis is based on evidence from a number of resource rich countries (Gelb, 1988; Auty, 1990, 2003), which has been criticised because the findings cease to be robust when concerns of endogeneity, problematic proxies and omitted variables have been addressed. This evidently makes some of the previous studies (Sachs and Warner, 1995) whose results are predicated on the above criticised features somewhat irrelevant. This does not mean that some resource rich countries do not perform poorly, relative to their less endowed counterparts, rather, individual country characteristics (in addition to resource endowment) need to be explored to explain the poor performance. As such, cross-country studies will be less enlightening relative to country specific analysis. Studies in both political science and economics have explored the institutions as one of the broader alternative ways to explain the resource curse (Mehlum et al., 2006; Brunnschweiler and Bulte, 2008; Norman, 2009). These studies while important have all been cross-country analysis, and thus suffer from the the same unobserved heterogeneity concerns. Therefore, individual analysis of resource rich countries should provide a better understanding of resource wealth effects.

Case studies in hard resource economies like Bolivia, Chile, Jamaica, Papua New Guinea, Peru and Zambia, have shown than resource wealth leads to sub-par economic performance (Gelb, 1988; Auty, 1990, 1994, 2003). Many of these countries have resource riches similar to those of Nigeria. Even in the case of newly industrialised countries (NIC), which in some cases boast better infrastructures as well as institutional frameworks that could possibly facilitate the best use of resource wealth, the negative impact is still present. The economic performance of these countries have been shown to be poorer than those of less resource endowed countries with similar infrastructure (Auty, 1994).

The resource curse was initially confirmed in the rigorous empirical analysis by Sachs and Warner (1995), which found supporting evidence using cross-country data from 1971-1991. This negative relationship between economic performance and resource endowment was attributed to the Dutch disease (Matsuyama, 1992). Rent seeking behaviour has also been identified as a cause in many of the studies (Ross, 1999; Sachs and Warner, 2001; Torvik, 2002; Mehlum et al., 2006). However, despite these evidence, an explanation of the paradox therefore remains elusive, suggesting that further investigation is needed.

A few dissenting views have challenged the robustness of the results obtained by Sachs and Warner (1995) (Manzano and Rigobon, 2001), or the validity of the measures of resource endowment used, pointing to its endogenous nature

(Stijns 2005; Norman 2009 and Brunnschweiler and Bulte 2008). For instance Manzano and Rigobon (2001) argue that the relationship between growth and resource abundance becomes insignificant once debt overhang is accounted for, while Leite and Weidmann (1999) and Sala-i Martin and Subramanian (2003) find no evidence of the resource curse when institutions are endogenised. In addition, a major hurdle the resource curse literature is faced with, is the lack of a convincing answer to the crucial policy question; Why do some resource rich countries perform well, (for example Botswana, and Norway), while others perform poorly, (for example, Congo, Nigeria or Zambia)?

The institutions and resource curse argument is one of the more explored avenues for explaining the resource curse. This argument is based on the premise that institutions may play a role in how a country's resources are managed. While the institutions examined might differ between studies, the overarching idea is that political institutions have a positive impact on growth. Such positive institutions would be those that foster good governance and limits arbitrary executive powers, or in the case of Mehlum et al. (2006), promotes productive activity friendly (instead of grabber activity friendly) institutions. These institutions can ensure good use of resources, and result in resource wealth having a positive impact on growth. What this implies, is that the impact of resource wealth on economic growth can either be indirect of interactive through institutions.

A number of studies, have found supporting evidence for the indirect impact of resource wealth on economic performance through institutions (Ross, 1999; Leite and Weidmann, 1999; Sala-i Martin and Subramanian, 2003; Mehlum et al., 2006). Leite and Weidmann (1999) and Sala-i Martin and Subramanian (2003) find that the Dutch disease, i.e. the direct negative effect of resource wealth on economic performance disappears once institutions are endogenised. Both studies relied on a two-stage least squares approach, to test the impact of natural resources in the presence of endogenous institutions on economic performance.[1] Mehlum et al. (2006) presents both theoretical and empirical evidence in support of the interactive role of institutions and natural resources. Considering a country's quality of institutions as exogenously given, they find that when institutions are interacted with resource endowment, the resource curse is reduced.

Although the above studies addressed most of the criticisms at the time, there were a few issues that presented problems for the empirical analysis. For example, the use of a composite measure of natural resources in the literature is problematic. The natural resource wealth measure was captured by the total primary exports ratio of total GDP, which include agricultural and food exports in addition to ores and fuel (coal, oil and gas). Leite and Weidmann (1999) however showed that the resource curse is not present across all natural resource elements. More specifically, only the food measure had a negative and significant impact on growth, while the fuel and agriculture measures of resource wealth did not. Therefore, there is a case for the use of non-composite natural resource measures. This is quite relevant for Nigeria, since its main natural surcease wealth is oil, for which Leite and Weidmann (1999) find no resource curse evidence.

More recently, researchers have explored alternative measures and conceptualisation of resource wealth (Brunnschweiler and Bulte, 2008; Norman, 2009). In most resource curse studies the resource exports component of total exports or GDP has been used as a proxy for resource abundance, and often have used resource abundance and resource dependence interchangeably. It is possible that resource dependence can be used as a proxy for resource abundance, however this is not a given condition. In fact, Brunnschweiler and Bulte (2008) showed that resource dependence was a poor predictor of resource abundance. In light of this, an alternative measure of resource abundance such as resource stock or reserves, would be a more appropriate measure (Stijns, 2005; Robinson et al., 2006; Brunnschweiler and Bulte, 2008).

In spite of the progress made in the empirical literature, further arguments against the resource curse hypothesis have arisen. These centre around the conceptualisation and identification of ideal measures for resource abundance. The

[1] In the Leite and Weidmann (1999) paper, they endogenised corruption, while rule of law was not endogenised.

absence of overall accepted measures has raised questions about the inferential capacity of the research results in the literature. The criticism is that the commonly used proxy for resource abundance in the literature captures resource dependence (an endogenous variable) rather than resource abundance (an exogenously given natural endowment). As indicated previously, this widely used measure is the ratio of primary exports over GDP, which is arguably endogenous.[2] Studies that have distinguished between resource abundance and resource dependence , have found that resource abundance has a positive impact on growth while resource dependence does not play a significant role in determining economic performance (Brunnschweiler and Bulte, 2008; Norman, 2009).

Attempts to explain the resource curse have come from both economic and political science angles. On the one hand, the economic explanations have fallen into one of four categories, which include the Dutch disease, international commodity market instability, declining terms of trade, and the absence of linkage between the resource sector and other sectors of the economy. On the other hand, political explanations include, cognitive, societal and state-centered causes. For example, Auty (1994)'s study of resource endowed countries like Bolivia, Chile, Zambia etc. linked the resource curse with policies such as Autarkic industry policy (AIP) in resource endowed countries, in comparison with Competitive industry policy (CIP) in less endowed countries, as one of the main reasons for the different resource wealth effects in these countries (Auty, 1994). Other explanations include; the availability of alternative sources of export revenue, apart from the countries natural resource; the extent to which political contestation and economic patronage affect political elites calculations; and a country's ability to avoid civil war. These were all explored as possible linkage between resource wealth and economic development (Luong and Weinthal, 2001; Sala-i Martin and Subramanian, 2003; Luong and Weinthal, 2010).

Ross (1999) focuses on the state-centered explanation as one of the avenues through which resource wealth leads to poor economic performance. In Ross' study, they conceptualise the resource curse by examining the state of governance. They argue that is, if a country starts from an initial position of no known resource wealth, cognitive, societal and state-centered ideologies all play an important role in determining how any newly found resources will affect the country's growth and development. From a cognitive angle, a resource windfall is met with a myopic attitude by the different agents within the economy. Immediate or short-term and volatile high returns are selected over long-term stable returns to resource investments. From a societal perspective, the resource windfall is said to create an environment in which "unwanted"[3] economic agents are able to flourish, which leads to negative economic outcomes. Lastly, in the state-centered perspective, the resource windfall leads the government to source revenue from resource rents, then neglecting revenue sourced from taxes. This leads to less government accountability to taxpayers.

In Shafer (1994)'s study, they categorize a country's leading sector as either flexible or inflexible. Flexible sectors are those with a large number of small firms (as is the case in many developed countries), while inflexible sectors are those with a leading sector with very few large firms (as is the case in many developing countries, including Nigeria). Whereas an inflexible leading sector in a resource rich country is difficult sector to regulate. These sectors stress the country's institutional resolve, and in some cases succeed in influencing the government to align its agenda to that of the sector. What these studies point toward is the role of the state of governance or institutional environment in a country in resource wealth effects. As far as studies that focus on this phenomenon are concerned, the works of Mehlum et al. (2006) and Brunnschweiler and Bulte (2008) are of particular interest.

In both Mehlum et al. (2006) and Brunnschweiler and Bulte (2008), they extended on previous literature by arguing for a causal relationship going from resource abundance (and or resource dependence) to institutions. They further argue that resource wealth impact growth indirectly or interactively through institutions (Mehlum et al., 2006; Brunnschweiler

[2]The distinction between resource dependence and abundance highlighted through an illustration. For example, the US is abundant in oil and other mineral resources, but it can hardly be classified as a resource dependent country. By contrast, Sudan is less abundant in oil than the US, yet Sudan is dependent on oil exports while the US is not.

[3]Agents/actors who's decision making and economic activities are detrimental to the growth of the economy

and Bulte, 2008). Mehlum et al. (2006) argues that countries already have certain types of institutions. The strength of the institutional environment in a country is not fully determined until it is tested by situations that confront it. Within this set-up, a country can have one of two types of institutional environments; grabber friendly or production friendly. With grabber institutions, there is competition between grabbing and productive activities. However, with production friendly institutions, the two activities are complementary. In essence, grabber friendly, which can also be thought of as "extraction friendly" institutions, will lead to negative economic outcomes. This is because they divert resources from productive activities to grabbing or extractive activities. Production friendly institutions, on the other hand, will lead to positive growth. The argument therefore follows that, with the advent of a resource windfall, if the institutions on ground are grabber friendly, the resource wealth will lead to poor growth. Similarly, if the resource windfall is met by good institutions, which are production friendly, the resource wealth will lead to increased economic growth.

3 Data

In this study, the relationship between natural resources and institutions is explored. The adopted measure of natural resources capture three different different concepts: oil abundance, oil dependence, and oil discovery. The literature suggests that resource endowments tend to impact economic performance indirectly through institutions. Therefore the first analysis pertains to the impact of resources on institutions. The results will inform the approach to the second aspect of this study. If indeed natural resources have an effect on institutions, this would imply the possible existence of an indirect effect of natural resources on economic performance through institutions. If no evidence of a natural resource effect on institutions is found, the subsequent analysis would focus on the interaction between institutions and natural resources, and their effect on economic performance. This analysis will be in line with the research of Mehlum et al. (2006). The indirect resource wealth effects through institutions approach is influenced by Sala-i Martin and Subramanian (2003) and Brunnschweiler and Bulte (2008).[4] In either case, the role of institutions is shown as either interactive or indirect in determining the impact of resource wealth on economic performance.

Choosing a proxy to measures natural resource endowment has two challenges. The first is the definition of resource abundance. Conceptually, the notions of abundance and dependence are different, but data on these are often used interchangeably. In fact the measure most often referred to as resource abundance in most of the resource curse literature, actually captures resource dependence. The second challenge is the exogeneity of the abundance measure. Resource abundance is exogenous to policy and institutional changes while resource dependence is not. As a result of this, studies that address the endogenous institutions issue, but do not address, the endogenous resource dependence issue, are problematic, and would have to contend with problems of reverse causality.[5]

The same approach used in the study by Brunnschweiler and Bulte (2008) is employed. A distinction is made between resource dependence and resource abundance, so that the resource abundance measure is deemed as exogenous. The measures for resource abundance, resource dependence and resource discovery are obtained from the Association for the Study of Peak Oil and Gas (ASPO). The ASPO dataset was was first used by Campbell (2003) and has been recently employed by Bardi (2009) and Tsui (2011). The measures capture the total value of the resource, in millions of barrels per 1000 persons, which is then multiplied by the price of crude oil. All three measures are in logarithmic form. The measures are *oil production*, *oil reserves* and *oil discovery*. These represent, resource dependence, resource abundance and resource discovery respectively. *Oil production* is captured over the period 1953-2008, *oil reserves*, over the period

[4] Note that Sala-i Martin and Subramanian (2003) contend that resource abundance lead to bad institutions, which lead to negative growth, while Brunnschweiler and Bulte (2008) argue that resource abundance enhances institutions, which in turn reduce resource dependence. Therefore the two studies are very different in their propositions, however, they both focus on the indirect role of institutions.

[5] A regression of institutions on resource export-GDP ratio (resource dependence), highlights a case where institutions are regarded as the reflection of policy outcomes, since a ratio of natural resource exports to gross domestic product is arguably a decision that is deliberated upon by the ruling government, and hence is seen as a government policy, which could lead to reverse causality between the two measures. Likewise, similar measures used to capture resource abundance in the literature, such as; mineral resource exports to total exports ratio, will also raise the same concerns.

Table 1: Data Description

Variable	Definition	Source	Period
Growth	Real GDP per capita growth	PENN World Tables 8.0	1950-2008
Oil reserves	Log of value of oil reserves per capita	Association for the study of peak oil	1950-2008
Oil production	Log of value of oil production per capita	Association for the study of peak oil	1950-2008
Oil discovery	Log of value of oil discovery per capita	Association for the study of peak oil	1950-2003
cvpl	Log of civil and political liberties	Author's construction	1950-2008
fhpr	Log of freehold property rights	Author's construction	1950-2008
nfhpr	Log of non-freehold property rights	Author's construction	1950-2008
coup	Coups	Association for the study of peak oil	1950-2008
investment	Investment share of real GDP	PENN World Tables 8.0	1960-2008
openness	Total trade share of GDP	World Bank	1960-2008

1953-2008, and *oil discovery*, from 1956-2003. The first advantage of using the data provided by ASPO is the long time span and covered. The second advantage is the continuous adjustments to the data made over time, to remove non-conventional oil that is identified. The adjustments are made by experts in the oil industry and are at times substantial (Tsui, 2011).

To capture institutions, the institutions index constructed for Nigeria in a previous study is used. This index entails three institutional measures: Civil and political libierties, freehold property rights, and non-freehold property rights. As the *growth* measure, real GDP growth per capita from the Penn World Table version 8.0 is used. It spans the period 1950-2011 (Feenstra et al., 2013). The variables used are listed in Table 1

Table 2 presents the simple correlation matrix between the variables employed in the analysis, using the Spearman rank correlation approach. Bearing in mind that this is simply for descriptive purposes, the table gives a brief overview of the unconditional relationship between the variables. The results show a negative but insignificant correlation between growth and all the resource measures, except for *oil production*, which has a positive and significant correlation with growth. The matrix also shows a positive correlation between customary land rights (*nfhpr*) and both *oil production* and *oil discovery*. Similarly, freehold property rights (*fhpr*) are positively associated with *oil reserves, while* a negative correlation exists between *oil discovery* and *oil production*. Finally, the results show that civil liberties (*cvpl*) is positively correlated with *oil discovery*.

Most of the measures employed for the analysis have not been used in analysing resource wealth effects for Nigeria before. To further gauge the relationship between these resource measures and growth, a simple regression fit for growth and the measures of resource wealth is plotted in Figure 1. It shows that, in accordance to the resource curse hypothesis, there seems to be a weak negative association between economic growth and the various natural resource measures, except for the *oil production*, which is in line with the relationships reported by the Spearman rank correlation.

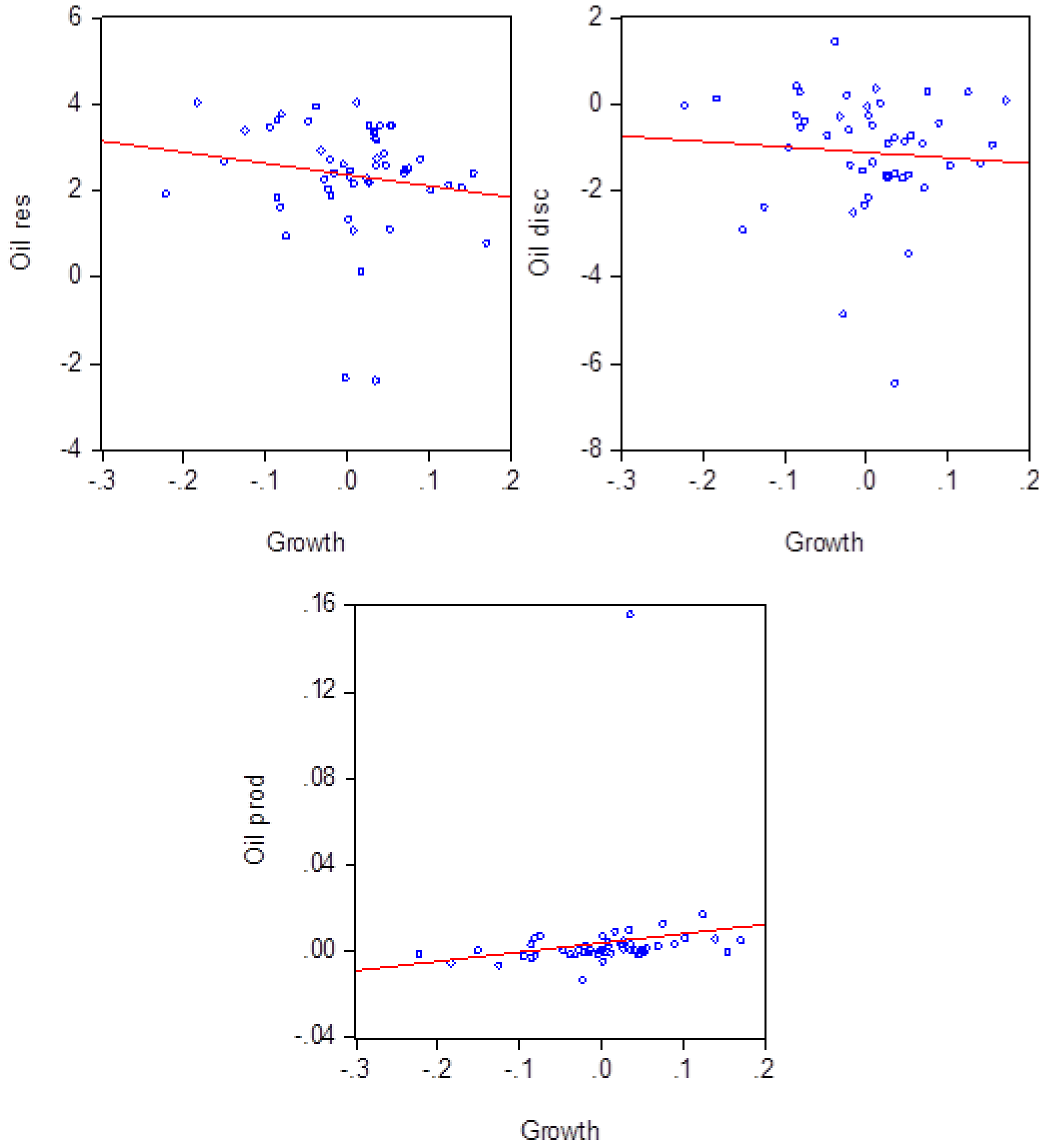
Table 2: Spearman rank correlation

Variables	*growth*	*oil res*	*oil disc*	*oil prod*	*nfhpr*	*fhpr*	*cvpl*	*inv*	*openness*	*coup*
growth	1									
	—									
oil res	-0.179	1								
	0.244	—								
oil disc	-0.140	-0.048	1							
	0.363	*0.757*	—							
oil prod	0.496***	-0.549**	0.113	1						
	0.001	*0.000*	*0.464*	—						
nfhpr	0.030	-0.250	0.355**	0.349**	1					
	0.848	*0.102*	*0.018*	*0.020*	—					
fhpr	-0.011	0.378**	-0.388***	-0.296**	-0.899***	1				
	0.946	*0.012*	*0.009*	*0.052*	*0.000*	—				
cvpl	-0.179	0.061	0.395***	-0.081	-0.053	0.090	1			
	0.244	*0.692*	*0.008*	*0.603*	*0.732*	*0.559*	—			
inv	-0.258*	0.256*	0.412***	-0.013	0.628***	-0.587***	0.023	1		
	0.092	*0.094*	*0.006*	*0.932*	*0.000*	*0.000*	*0.883*	—		
openness	-0.125	0.626***	-0.304**	-0.376**	-0.656***	0.756***	-0.065	-0.264*	1	
	0.418	*0.000*	*0.045*	*0.012*	*0.000*	*0.000*	*0.675*	*0.084*	—	
coup	-0.118	0.157	-0.340**	-0.268*	-0.019	0.018	-0.089	-0.051	0.213	1
	0.447	*0.310*	*0.024*	*0.079*	*0.902*	*0.906*	*0.565*	*0.743*	*0.166*	—

*, **, and *** represent statistical significance at 10%, 5% and 1% respectively. P-values in italics.

It is essential that the univariate properties of the time-series data be explored in order to avoid spurious estimations. To do so, the traditional Augmented Dickey-Fuller (ADF) unit root test is conducted. The results are depicted in Table 3 which indicate that for most of the variables, the null hypothesis of a unit root cannot be rejected. In the presence of structural breaks, however, the ADF unit root test leads to a bias that reduces the ability to reject a false unit root null hypothesis. A few historical events have occurred in Nigeria that may that may have triggered a structural break in the data. Such events include the Biafra civil war of 1967, the surge in oil prices in the mid 1970s and the subsequent fall in the early 1980s. In addition to this, the Land Use Act of 1978 could also have triggered a structural break in the property rights index. The transition from military to civilian rule in 1999 may have had a structural impact on the system as well. This poses some difficulties as most of the unit root analysis only allow for only one or two structural breaks in the series. I nevertheless make use of the Zivot-Andrews unit root test, which is essentially a modified version of the ADF approach that allows for the inclusion of one structural break. The results for both the ADF and Zivot-Andrews tests are reported in Table 3. These show that the variable *cvpl*, earlier reported as having a unit root in the ADF test, does not exhibit the same with the Zivot-Andrews approach. The variable *oil discovery*, for which the null of a unit root is rejected using the standard ADF test, turns out to exhibit unit root features with the Zivot-Andrews test.

Figure 1: Basic regression fit of Growth and resources



Simple regression fit of all the resource measures and growth rate. The growth measure is the real GDP per capita growth rate from he PENN world series data.

Table 3: Unit root test

Variable	Variable name	ADF	Δ ADF	I-Order	Z-Andrews	Δ Z-Andrews	I-Order
Real GDP per capita growth	*Growth*	-5.734***	NA	0	-6.325***	NA	0
Log of value of oil reserves	*Oil reserves*	-2.515	7.721***	1	-4.073	-7.018***	1
log of value of oil production	*Oil production*	-2.518	7.238***	1	-2.111	-7.969***	1
Log of value of oil discovery	*Oil discovery*	-2.985**	-9.474***	0	-2.677	-11.028***	1
Civil and political liberties	*cvpl*	-2.559	-13.69***	1	-5.223**	NA	0
Freehold property rights	*fhpr*	-2.528	-15.54***	1	-2.695	-16.141***	1
Non-freehold property rights	*nfhpr*	-2.101	-7.027***	1	-4.111	-7.367***	1
Coups	*coup*	-7.32***	NA	0	-7.998****	NA	0
Investment	inv	-1.632	-6.361	0	-4.525	-7.794***	1
Trade to GDP ratio	*openness*	-2.230	-8.591	1	-3.537	-9.242***	1

*, **, and *** represent statistical significance at 10%, 5% and 1% respectively. ADF critical value at 5% is -2.9. Z-andrews 5% critical value is 4.8, we reject the null and conclude no unit root if the t-value is greater than this. "I-order" indicates order of integration.

This outcome introduces uncertainty with regard to the degree of integration of these two particular series. However the null hypothesis for the presence of unit root is rejected for the first difference of all the variables.

4 Empirical Strategy

Using the Shafer (1994) approach which categorises the country by the flexibility of its leading sector, the oil industry can be viewed as Nigeria's leading and inflexible sector. A few large multinational corporations exist within this sector. Further following the approach of Mehlum et al. (2006) and Brunnschweiler and Bulte (2008), the institutions in Nigeria are exposed by the way they react to natural resources (in line with Brunnschweiler and Bulte (2008)) or by the way they interact with natural resource (in line with Mehlum et al. (2006)). The state of governance and institutions plays a significant role in determining how a country responds to a resource windfall. This response will then determine whether or not the country is able to take advantage of the resource windfall, or falter as a result of it.

4.1 The ARDL cointegration approach

There are a few guidelines to determining the estimation technique a time series analysis should follow. Where all the series in a data-set are integrated of order zero, I(0), and thus have no unit roots, then the model can be specified in its level form, in which case the ordinary least squares (OLS) estimation technique would suffice. A second scenario is that in which all the series are integrated of order one or higher, but all are integrated of the same order, and are also co-integrated. In such a case, an OLS estimation can still be employed, and the series modelled at the co-integration level. This would still result in consistent estimates of the long-run relationships effects between the series. Alternatively, an OLS estimated error-correction model (ECM) can be used to determine the short-run relationship dynamics of the series. A third scenario is that in which the series are integrated of same order but not co-integrated, in which case, the first difference can be employed, and hence OLS used for estimation. A final scenario, is one where the time-series data are integrated of different orders. This presents a rather unique scenario, where none of the above mentioned estimation techniques would offer consistent estimates, and neither would standard cointegration analysis methods be applicable, due to the different orders of integration. The modelling options suggested in the literature are the fully-modified ordinary least squares (FM-OLS) estimation, and the Auto-regressive distributed lag (ARDL) approach.

The unit root test performed on the dataset showed that the variables are all at most I(1) and no more, but the unit root test were not consistent in determining whether or not some of the variables are I(0). This problem is not an unusual one with unit root analysis, and typically highlights the issue with the low power of many unit root tests. The presence of variables with different levels of integration (I(1) and I(0)) is problematic in that the standard Johansen (1988) methodology is not applicable because it requires all series to be either integrated of level zero or one, and not both. This problem is further exacerbated by sensitivity to short lag lengths, and small sample problems (Johansen, 1988; Johansen and Juselius, 1990). An ARDL cointegration approach seems most appropriate to help circumvent these issues. It has also the advantage of yielding consistent estimates of long-run parameters even in the presence of endogenous regressors. Because this paper's interest lies primarily in the estimation of the long-run dynamics of the relationship between institutions, resource wealth and economic performance, the ARDL cointegration approach is particularly suited to this analysis. In addition, it allows for the estimation of short-run dynamics simultaneously with long-run dynamics.

The ARDL bounds testing approach to cointegration, falls under the family of autoregressive regression models as well as being inclusive of a distributed lag component. An ARDL model is usually of the form ARDL(p,q), in the case of two variables. This approach makes use of the lagged values of the dependent variables (the autoregressive component of the ARDL), and the lagged values of the regressors (the distributed lag component of the ARDL model), in assessing

both long-run and short-run co-movement as well as interdependence.
A simple $ARDL(p,q)$ model is of the form[6]:

$$y_t = a + \sum_{i=1}^{p} \alpha_i y_{t-i} + \sum_{j=0}^{q} \beta_i x_{t-i} + \varepsilon_t \tag{1}$$

where y_t is the autoregressive dependent variable of order p while x_t represents the distributed lag explanatory variables of order q; ε_t is a well-behaved random disturbance term, which is serially uncorrelated. The form of the basic ARDL model presented in equation (1) does not lend itself to the analysis of long-run effects. Instead, Pesaran and Shin (1998) show that the basic ARDL (1) can be reparameterised in an error correction model (ECM) form as:

$$\Delta y_t = a + \theta_o y_{t-1} + \theta_1 x_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta y_{t-i} + \sum_{j=1}^{q} \beta_i \Delta x_{t-i} + e_t \tag{2}$$

The ARDL reparameterisation for numerous variables takes the form $ARDL(p, q_1, q_2, ..., q_{k-1})$ where q_l is number lags for each of the other $k-1$ variables. The general model is of the form:

$$\Delta y_t = a + \theta_o y_{t-1} + \sum_{l=1}^{k-1} \theta_l x_{t-1} + \sum_{i=1}^{p} \alpha_i \Delta y_{t-i} + \sum_{l=1}^{k-1} \sum_{j=1}^{q} \beta_{lj} \Delta x_{lt-j} + e_t \tag{3}$$

Based the above error correction reparameterisation of the ARDL, the existence of long-run relationships between variables can be tested using cointegration tests. This process involves the performing of a Wald test of the lagged level values of all the variables in the system. Specifically, the Wald test is conducted on the level variables on the right hand side of equation (2). The null hypothesis being tested is that of no cointegration, that is, the coefficients on the lagged level variables in the error correction reparameterisation of the ARDL are jointly zero. This null hypothesis is given by:

$$H_o : \theta_0 = \theta_1 =, ..., = \theta_{k-1} = 0 \tag{4}$$

against the alternative hypothesis H_1:

$$H_1 : \theta_0 \neq \theta_1 \neq, ..., \neq \theta_{k-1} \neq 0 \tag{5}$$

The rejection criteria follows the Pesaran et al. (2001) bounds testing approach to cointegration analysis, which involves a comparison of the obtained Wald F-statistic against the Narayan (2005) critical values. Normally, the Wald F-statistic is compared against the Pesaran critical values, however, Narayan (2005) observed that the Pesaran and Shin (1998); Pesaran et al. (2001) critical values were not applicable to small samples, because they were generated using large sample simulations (i.e. between 500 to 1000 observations and 20 000 to 40 000 replications). Narayan (2005) generated critical values for smaller sample sizes ranging from 30 to 80 observations using the same simulation approach as Pesaran et al. (2001) and showed that the critical values were about 18% larger than the Pesaran and Shin (1998); Pesaran et al. (2001) critical values. The sample size of the data is around 50 for the test of interdependence between economic development and institutions, and 150 for the test of interdependence between institutions. The obtained Wald F-statistics will be compared against the critical values provided by Narayan (2005) in the first case, while the traditional Pesaran and Shin (1998) critical values will be used for the second case. These critical values provide lower and upper values that make up the bounds. The values are provided at three different levels of significance and they differ depending on the restrictions placed on trend and constant, as well as the number of regressors k in the model. These upper and lower critical values are what the Wald test statistics are compared against. If the Wald F-statistic is greater than the corresponding upper critical value, I can then reject the null hypothesis of no cointegration. Consequently, if the F-statistic if lower than the lower critical value from either the Pesaran and Shin (1998) or

[6] p is the autoregressive lag component of the dependent variable, which represents the number of lags of the dependent variable included in the RHS of the system. q is the distributed lag component of the explanatory variables, and also represents the number of lags of the explanatory variables to be included in the model on the RHS.

Narayan (2005) tables, then the null hypothesis cannot be rejected. If however, the F-statistic falls between the lower and upper critical values, the bounds test for cointegration is deemed inconclusive, and unable to determine whether the variables in the model are cointegrated.

The execution of the ARDL approach requires that a certain number of lags be included, that make up both the autoregressive and distributed lag dimensions of the $ARDL(p, q_1, q_2, ..., q_{k-1})$ model. Determining the number of lags for each variable can be attained through standard optimal lag selection techniques such as the Akaike information criterion (AIC), the Schwarz's Bayesian information criterion (SBIC), or the likelihood ratio (LR).[7]

4.2 Model Specification

Earlier contributions in the literature (Leite and Weidmann, 1999; Sala-i Martin and Subramanian, 2003; Mehlum et al., 2006; Brunnschweiler and Bulte, 2008) have emphasised the critical role of institutions in determining whether resources will turn out to be a curse or a blessing. In particular, Leite and Weidmann (1999); Sala-i Martin and Subramanian (2003) have suggested that natural resources do not have a direct negative effect one economic performance but an indirect one through a negative impact on institutions. Conversely, Brunnschweiler and Bulte (2008) contend that it is weak institutions that lead to increased resource dependence which in turn might have adverse effects on growth. In what follows, the direction of causality is established (using both ARDL and Granger causality test) between the institutions indices and the natural resources dependence measure (*oil production*) in Nigeria. This will provide a means to ascertain which argument, if any fits the Nigerian case. Subsequently, I estimate a second ARDL equation that estimates the effect of natural resources and institutions on economic growth.

The institutions equation reads as:

$$\begin{aligned} \Delta Inst_t &= a + \theta_0 Inst_{t-1} + \theta_1 NR_{t-1} + \theta_2 coup_{t-1} + \sum_{i=1}^{p} \alpha_{1i} \Delta Inst_{t-i} \\ &+ \sum_{l_1=1}^{q_1} \alpha_{2l_1} \Delta NR_{t-l_1} + \sum_{l_2=1}^{q_2} \alpha_{3l_2} \Delta coup_{t-l_2} + e_t \end{aligned} \quad (6)$$

Where $Inst_t$ represents a particular institutional measure at time t. The institutional indices in question are civil and political liberties (a proxy for political institutions), and freehold and customary property rights (proxies for economic institutions). These indices reflect a *deep* institutional framework that relies on the formal constitutional and legislative history that both governs immovable property, and shapes political rights and civil liberties in Nigeria. By contrast, much of the literature (Leite and Weidmann, 1999; Sala-i Martin and Subramanian, 2003; Mehlum et al., 2006; Brunnschweiler and Bulte, 2008) focuses on political institutions or subjective governance-based variables (rule of law, government effectiveness, corruption). Thus, the consideration of customary property rights in addition to the statutory freehold property rights sets this paper apart.[8] Moreover, I control for natural resources (NR_t) to test the role of natural resources on institutions. Following Mehlum et al. (2006), I introduce the interaction term between institutional indices and natural resources. Finally, I include the incidence of coups to capture the impact of political instability on political and economic institutions (Diamond and Plattner, 1996; Fitch, 1998; Belkin and Schofer, 2003). The Akaike information criterion is used to select the optimal lag for each regressor.[9] The selected lags for all the variables considered are: zero lag for *coup*; *one lag for growth*, *cvpl, fhpr*, *oil reserves,* and *oil production*; two lags for *oil discovery;* and four lags for *nfhpr.*[10]

[7] While the length of time over which the variables I have are available is longer than what has been previously available in the literature, the number of observations are still quite limited, and this will have an impact on the possible lag number included in the data. This should be kept in mind as when determining the optimal number of lags for each variable.

[8] The ubiquity of customary land rights in sub-Saharan Africa makes this study even more important.

[9] Due to limitations on the number of available observations, I have placed a maximum lag limit of four.

[10] What these lags imply in the case of the institutions ARDL regression is that, an $ARDL(p, q_1, q_2, q_3)$ will be of the form; $ARDL(1, 1, 1, 0)$, where

In the growth regression, the main interest is in estimating the effects of institutions and natural resources. The model specification is given by:

$$\begin{aligned}\Delta Growth_t &= a+\theta_0 Growth_{t-1}+\theta_1 NR_{t-1}+\theta_2 Inst_{t-1}+\theta_3 Inst*NR_{t-1}+\theta_4 coup_{t-1}+\\ &\sum_{i=1}^{p}\alpha_{1l}\Delta Growth_{t-l_1}+\sum_{l_1=1}^{q_1}\alpha_{2l_1}\Delta NR_{t-l_1}+\sum_{l_2=1}^{q_2}\alpha_{3l_2}\Delta Inst_{t-l_2}+\sum_{l_3=1}^{q_3}\alpha_{3l_3}\Delta inst*NR_{t-l_3}\\ &+\sum_{l_4=1}^{q_4}\beta_{1l_4}\Delta coup_{t-l_4}+e_t \end{aligned} \tag{7}$$

The initial model specification is designed to be as parsimonious as possible featuring not more than five variables. I also control for investment and trade openness in subsequent regressions, following the suggestions of Sala-i Martin and Subramanian (2003). This is less parsimonious and may have bearing on the degrees of freedom in the model.

5 Analysis and Results

5.1 Long-run relationship between institutions and resources

The results for the institutions equations are presented in Table 4. The first four columns show results of the test for the existence of cointegration relationships between civil and political liberties and the three measures of resource wealth. Column (3) show findings of tests for cointegration between institutions, resource dependence, and resource abundance. Columns (5) to (8) reflect findings of the test for cointegration between freehold property rights and the measures of resource wealth. The last four columns pertain to the cointegration between customary property rights and the natural resource measures. In a similar analysis of the impact of resource wealth on institutions, Sala-i Martin and Subramanian (2003) find there to be a negative and significant impact, while Brunnschweiler and Bulte (2008) find that resource abundance has a positive and significant impact on institutions, and resource dependence does not have a significant impact on institutions. In the results presented in Table 4, the specifications involving *oil reserves* (our measure of resource abundance) can be compared to the findings of Brunnschweiler and Bulte (2008) (Columns (3), (7) and (11)). The specifications involving *oil production* (our measure of resource dependence) are comparable to the work of Sala-i Martin and Subramanian (2003). Following Tsui (2011), I also introduce *oil discovery* as a possible resource shock that may impact on the quality of political and economic institutions.

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p is the number of lagged values for the dependent variable included on the RHS, while q_1, q_2, q_3, represent the lagged values of the explanatory variables on the RHS. Basically, p would give the autoregressive aspect of this particular ARDL, while q_1, q_2, q_3 would inform the distributed lag aspect of the ARDL. More specifically, the if the model specification in equation 6 is considered, the actual ARDL for this specification given the AIC selected optimal lags would be; $ARDL(1,1,1,0)$, where the dependent institution is civil and political liberties. Therefore the lagged values of *cvpl* is 1, and for *oil reserves* it is 1; *growth* is 1 and for *coup*, it is 0. In the case of the examining the influence of oil discovery on *cvpl*, the ARDL model will be of the form: $ARDL(1,2,1,0)$, and for the *oil production* impact, it is $ARDL(1,1,1,0)$.

Considering the regression of *oil reserves* on freehold property rights, the ARDL model will be of the form: $ARDL(1,1,1,0)$, while in the case of oil production, it is $ARDL(1,1,1,0)$, and finally in the case oil discovery, it is $ARDL(1,2,1,0)$. The third institutions measure is the non-freehold property rights, and in this case, the regression with *oil reserves* gives an ARDL model specification of the form: $ARDL(4,1,1,0)$, while with *oil production*, it is $ARDL(4,1,1,1)$, and finally with *oil discovery*, it is $ARDL(4,2,1,0)$.

Table 4: ARDL: Long-run Relationships between Institutions and Natural resources

	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
	Civil & Political Liberties				*Freehold Property Rights*				*Customary Property Rights*			
Oil reserves	-0.015		-0.002		-0.001		-0.003		-0.005		0.000	
	0.332		*0.954*		*0.730*		*0.676*		*0.225*		*0.971*	
Oil production		-0.016	-0.014			0.000	0.003			-0.005	-0.005	
		0.238	*0.677*			*0.875*	*0.663*			*0.279*	*0.668*	
Oil discovery				-0.011				-0.002				-0.001
				0.493				*0.269*				*0.790*
Coup	-0.062	-0.052	-0.052	-0.046	-0.023	-0.031	-0.031	-0.018	-0.016	-0.018	-0.018	-0.007
	0.664	*0.702*	*0.707*	*0.748*	*0.280*	*0.208*	*0.215*	*0.284*	*0.697*	*0.668*	*0.674*	*0.677*
F-Statistic	1.980	2.133	1.531	1.776	1.737	1.769	1.315	2.220	0.958	0.813	0.598	1.156
P-value	*0.129*	*0.107*	*0.208*	*0.166*	*0.171*	*0.165*	*0.277*	*0.099*	*0.420*	*0.493*	*0.666*	*0.338*
Narayan Bounds												
lower	5.247	5.247	5.630	4.368	5.247	5.247	5.630	4.368	5.247	5.247	5.630	4.368
upper	6.303	6.303	6.373	5.545	6.303	6.303	6.373	5.545	6.303	6.303	6.373	5.545
Serial Corr.	0.554	0.514	0.538	0.890	0.435	0.867	0.866	0.311	0.998	0.976	0.904	0.916
R-squared	0.126	0.133	0.133	0.143	0.097	0.132	0.135	0.139	0.136	0.143	0.147	0.185
Obs	58	58	58	52	58	58	58	52	58	58	58	52

*, **, and *** represent statistical significance at 10%, 5% and 1% respectively. P-values in italics, The critical values presented are the Narayan (2005) critical values at 95% level of significance

The Wald tests suggest that the null hypothesis of non-existence of cointegration was not rejected irrespective of the model specification since the F-statistics are constantly below the lower bound critical value from Narayan (2005) at the 95% level. This is indicative of the absence of a long-run relationship that links variations in natural resources to variations in institutions in Nigeria. Thus, in the Nigerian case, the findings do not support the claim by Sala-i Martin and Subramanian (2003) that natural resource dependence weakens institutions (Columns (2), (6) and (10)). Nor do they support the contention of Brunnschweiler and Bulte (2008) that natural resource abundance is associated with stronger institutions (Columns (3), (7), and (11). As a result, the indirect effect of natural resource on economic growth through the impact institutions (in line with Sala-i Martin and Subramanian (2003) and Brunnschweiler and Bulte (2008)) cannot be explored. The focus shifts to the interactive role of institutions and natural resources on economic performance, in line with the analysis performed by Mehlum et al. (2006). It must be noted that this set of institutions (*de jure* civil and political liberties, freehold property rights, and customary land rights) for Nigeria, is unlike any other in the literature. Most studies typically use subjective, governance and outcome based phenomena, such as government effectiveness, corruption, risk of expropriation, political stability, and rule of law. In addition to this, the measures of resource wealth focus entirely on oil (Nigeria's main resource) whereas most studies typically aggregate many different resources in their cross-country analysis. For these reasons, caution should be taken when comparing this study's findings with those of Sala-i Martin and Subramanian (2003) and Brunnschweiler and Bulte (2008).

5.2 Link between resources, institutions and growth

The results of the growth equations involving *oil production* (the measure of resource dependence) are presented in Table 5. The results show that, for all the regressions, the F-statistic is larger than the upper critical values from the Narayan (2005) table. Thus institutions, *oil production* and economic growth all move together in the long-run. Columns (1) and (2) indicates that *oil production* and civil and political liberties alone have no major effect on growth. When the interaction term is included in column (2), both political institutions and the interaction term now have a positive but insignificant association with growth.

Table 5: ARDL: Growth regression, with value of oil production

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Oil production	*-0.002*	*-0.167*	*-0.004*	*0.348*	*-0.001*	*-0.493**
	0.377	*0.172*	*0.122*	*0.597*	*0.763*	*0.064*
cvpl	*-0.071*	*0.067*				
	0.356	*0.583*				
Oil production×cvpl		*0.093*				
		0.178				
fhpr			*-1.079**	*-1.472***		
			0.064	*0.044*		
Oil production×fhpr				*-0.194*		
				0.593		
nfhpr					*0.331*	*0.656*
					0.558	*0.252*
Oil production×nfhpr						*0.301**
						0.065
coup	*-0.051***	*-0.038*	*-0.040**	*-0.050***	*-0.044***	*-0.041***
	0.047	*0.148*	*0.060*	*0.025*	*0.049*	*0.048*
F-Statistic	*7.408****	*5.456****	*7.905****	*6.367****	*6.583****	*6.545****
P-value	*0.000*	*0.001*	*0.000*	*0.000*	*0.000*	*0.000*
Narayan Bounds	✓	✓	✓	✓	✓	✓
lower	4.450	3.890	4.450	3.890	4.450	3.890
upper	5.560	5.104	5.560	5.104	5.560	5.104
Serial Corr.	0.157	0.118	0.011	0.218	0.353	0.106
R-squared	0.444	0.469	0.473	0.572	0.510	0.560
Obs	57	57	57	57	57	57

*, **, and *** represent statistical significance at 10%, 5% and 1% respectively. P-values in italics. Ticked cells, indicate the existence of cointegration for the corresponding regression.

When freehold property rights is controlled for instead of the political institutions index, *oil production does* does not seem to matter for growth in a statistical sense (despite its negative sign). By contrast, property rights do matter but surprisingly, appear to have hindered economic growth in Nigeria. Once the interaction between these two variables is included, *oil production* remains statistically insignificant, although its sign has turned positive. On the other hand, the market-based economic institutions index remains negatively associated with growth, with an increase and more significant coefficient. As for the interaction between *oil production* and property rights, it is negative but insignificant. This result contrasts with the findings in Mehlum et al. (2006). Finally when customary property rights and its interaction with *oil production* are controlled for, there appears to be evidence of the resource curse, although customary property rights do have a significant mitigation effect. This finding accords with Mehlum et al. (2006), although the measure institutions used in this study is different from theirs.[11] The marginal effect of *oil production* on growth is presented in equation (8)

$$\frac{d(growth)}{d(oil\ production)} = -0.493 + 0.301 * nfhpr \tag{8}$$

[11] The institutional quality index in Mehlum et al. (2006) "is an unweighted average of Þve indexes based on data from Political Risk Services: a rule of law index, a bureaucratic quality index, a corruption in government index, a risk of expropriation index, and a government repudiation of contracts index".

At the sample average of customary land rights (1.566), the marginal effect of *oil production* amounts to -0.022.[12] The corresponding t-statistic is 2.00, which is significant at the 90% confidence level.[13] The implication of this result is that, in the presence of institutions, the resource curse impact on economic growth, while reduced, is still significant. If the marginal effect is calculated at an additional standard deviation of the sample average of the customary property right, it gives: $-.006$, with a corresponding t-statistic of 1.631 (see Table 6). This is insignificant, which indicates that, although the marginal effect is negative, it is not significantly different from zero. As such higher levels of customary property rights significantly removes the resource curse.

The results for the regression of *oil reserves* and institutions on growth are presented in Table 7. In the first column *oil reserves* and political institutions are controlled for, while the second column includes their interaction term. The remaining regressions involve the two other institutions measures and subsequently the interaction terms of those measures with *oil reserves*. All the regressions show the existence of long-run association, except for column (2). Columns (1), (3) and (5) in Table 7 show no significant association between resource abundance and economic performance, while those on columns (4) and (6) show a significant association on economic performance. Specifically, two conflicting results are obtained. On the one hand, column (4) suggests that with greater protection of individual property rights, oil endowments turns into a blessing. On the other hand, column (6) indicates that the oil endowment turns into a curse in the presence of greater protection in customary land rights.

[12] This is easily determined from equation (8): $-0.493+(0.301\times 1.566)=-0.0216$.

[13] The degrees of freedom is 42, and thus the corresponding critical values of the t Distribution are: 2.704, 2.021 and 1.684 at the 99%, 95% and 90% significance levels respectively.

Table 6: Marginal effects of oil resource measures

Regression		Variables	Marginal effect	df	t-stat	p-val
Column (6) Table 5		*oil production* and *nfhpr*	-0.024	42	2.003	0.052
	nfhpr avg + 1 std dev	*oil production* and *nfhpr*	-0.006	42	1.631	0.110
Column (4) Table 7		*oil reserves* and *fhpr*	-0.026	44	1.948	0.058
	fhpr avg + 1 std dev	*oil reserves* and *fhpr*	-0.053	44	1.859	0.070
Column (6) Table 7		*oil reserves* and *nfhpr*	-0.023	40	2.140	0.039
	nfhpr avg + 1 std dev	*oil reserves* and *nfhpr*	-0.003	40	1.203	0.236
Column (6) Table 10		*oil production* and *nfhpr*	-0.035	34	2.092	0.043
	nfhpr avg + 1 std dev	*oil production* and *nfhpr*	-0.012	34	2.00	0.054
Column (4) Table 11		*oil reserves* and *fhpr*	1.301	38	-1.574	0.124
	fhpr avg + 1 std dev	*oil reserves* and *fhpr*	1.299	38	-1.571	0.125

Critical values for t Distribution for degrees of freedom of 30 are: 1.697, 2.042 and 2.750 for the 90%, 95% and 99% significance levels respectively. For degrees of freedom of 40, they are: 1.684, 2.021 and 2.704 respectively. I use the critical values corresponding to 30 degrees of freedom for this analysis with $30 < df < 35$*, while I use 40 degrees of freedom critical values for this analysis with* $35 < df < 45$.

Table 7: ARDL: Growth and log of value of oil reserves

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Oil reserves	-0.001	-0.048	-0.003	1.312*	0.000	-0.629**
	0.704	*0.834*	*0.313*	*0.082*	*0.941*	*0.027*
cvpl	-0.059	-0.125				
	0.443	*0.716*				
Oil reserves×cvpl		0.027				
		0.836				
fhpr			-0.965	1.345		
			0.116	*0.312*		
Oil reserves×fhpr				-0.724*		
				0.081		
nfhpr					0.286	-1.093
					0.627	*0.105*
Oil reserves×nfhpr						0.387**
						0.026
coup	-0.054**	-0.050*	-0.045**	-0.082***	-0.045**	-0.067**
	0.039	*0.066*	*0.047*	*0.003*	*0.048*	*0.011*
F-Statistic	6.471***	5.075***	7.219***	8.661***	6.185***	7.420***
P-value	*0.000*	*0.001*	*0.000*	*0.000*	*0.001*	*0.000*
Narayan Bounds	✓		✓	✓	✓	✓
lower	4.450	3.890	4.450	3.890	4.450	3.890
upper	5.560	5.104	5.560	5.104	5.560	5.104
Serial Corr.	0.234	0.166	0.110	0.378	0.250	0.664
R-squared	0.437	0.441	0.460	0.608	0.513	0.610
Obs	57	57	57	57	57	57

*, **, and *** represent statistical significance at 10%, 5% and 1% respectively. P-values in italics. Ticked cells, indicate the existence of cointegration for the corresponding regression.

Columns (3) and (4), show where freehold property rights *(fhpr)* is successively controlled for and subsequently include its interaction with *oil reserves*. Once again resource abundance has a negative but insignificant association with growth in the long run in column (3). The inclusion of the interaction term in column (4) results in *oil reserves* assuming a positive and significant association. Finally, column (5) indicates that neither *oil reserves* nor customary property rights affect economic growth. However, when the interaction term between *oil reserves* and customary property rights is incorporated in column (6), *oil reserves* impede growth while customary economic institutions do not matter. However, there is a mitigating positive and significant interactive effect between *oil reserves* and institutions as in Mehlum et al. (2006). Consequently, two potentially conflicting results are found. In column (4), the results suggest that with greater protection in individual property rights, oil endowment turns into a blessing. In column (6) however, they indicate that oil endowment turns into a curse in the presence of greater protection of customary land rights. Interestingly, increased oil abundance induces a resource blessing that is weakened by greater protection of freehold property rights. By contrast, increases oil abundance also induces a resource curse that is mitigated with greater protection of customary property rights.

The overall marginal effects of oil abundance evaluated at the sample mean of freehold rights (1.833) and customary land rights (1.566) are however negative in both cases. When the sample average of freehold property rights is is taken, the marginal effect from equation (9) is: $1.301-(0.724\times 1.8333)=-0.0263$. This marginal effect has a corresponding t-statistic of 1.948, therefore implying that the marginal effect is significant at the 90% level of confidence.

$$\frac{d(growth)}{d(oil\ reserves)} = 1.301 - 0.724 * fhpr \tag{9}$$

$$\frac{d(growth)}{d(oil\ reserves)} = -0.629 + 0.387 * nfhpr \tag{10}$$

The marginal effect of *oil reserves* at the non-freehold property rights sample average is; -0.023, with a corresponding t-statistic of 2.14, which is significant at the 95% level of significance.[14] The implication of this result is that, in the presence of institutions, the resource curse of *oil reserves* on economic growth is reduced, although it is not completely eradicated. However, as the quality of institutions increase, the overall marginal effect will eventually become positive, and hence the resource curse will no longer exist. When an additional standard deviation of the sample averages of the institutional indices is considered, the marginals effects is: -0.053 and -0.003, with corresponding t-statistics of 1.859 and 1.203 respectively (see Table 6). This indicates that, the marginal effect of oil abundance in equation (9) is still significant, while that of equation (10) is no longer significant.[15]

Table 8: ARDL: Growth and log of value of oil discovery

Variable	(1)	(2)	(3)	(4)	(5)	(6)
oil discovery	0.000	0.202	-0.003	0.255	0.000	-0.064
	0.893	*0.110*	*0.389*	*0.686*	*0.907*	*0.811*
cvpl	-0.084	-0.231**				
	0.343	*0.049*				
Oil discovery×cvpl		-0.115				
		0.109				
fhpr			-1.096	-1.227*		
			0.142	*0.084*		
Oil discovery×fhpr				-0.142		
				0.683		
nfhpr					0.758	0.822
					0.359	*0.354*
Oil discovery×nfhpr						0.039
						0.812
coup	-0.053*	-0.088**	-0.045*	-0.095**	-0.042*	-0.048*
	0.065	0.016	0.082	0.013	0.076	0.065
F-Statistic	5.452***	5.735***	5.833***	5.371***	5.372***	4.076***
P-value	*0.001*	*0.001*	*0.001*	*0.001*	*0.002*	*0.005*
Pesaran Bounds		✓	✓	✓		
lower	4.450	3.890	4.450	3.890	4.450	3.890
upper	5.560	5.104	5.560	5.104	5.560	5.104
Serial Corr.	0.249	0.095	0.030	0.056	0.221	0.098
R-squared	0.448	0.526	0.469	0.522	0.526	0.534
Obs	52	52	52	51	52	52

*, **, and *** represent statistical significance at 10%, 5% and 1% respectively. P-values in italics. Ticked cells, indicate the existence of cointegration for the corresponding regression.

[14] If the *nfhpr* sample average is substituted into equation (10), it gives: $-0.629+0.387\times 1.566=-0.023$,

[15] The marginal effects are reported in Table 6 in the appendix

Table 9: ARDL: Growth and log of value of oil production

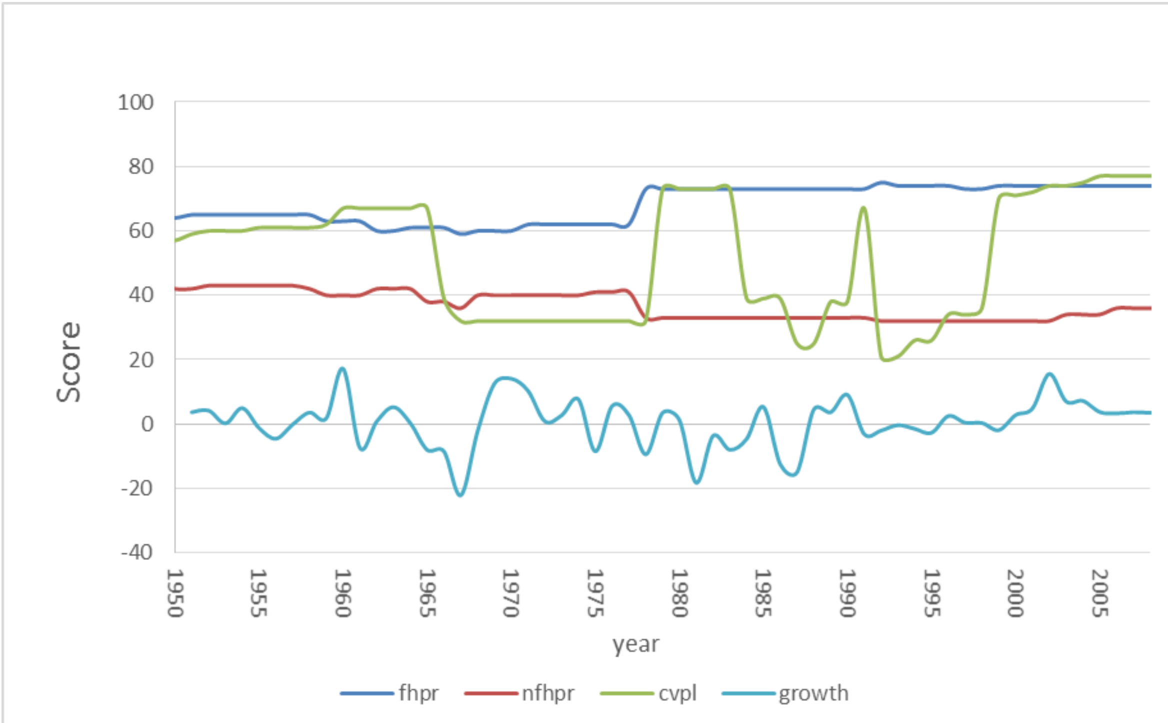
Variable	(1)	(2)	(3)	(4)	(5)	(6)
oil production	-0.007	-0.561**	-0.006	-0.160	-0.002	-0.480
	0.290	*0.019*	*0.234*	*0.891*	*0.631*	*0.497*
oil reserves	0.005	0.709*	0.003	1.226	0.003	-0.001
	0.441	*0.070*	*0.619*	*0.454*	*0.610*	*0.999*
cvpl	-0.080	1.368*				
	0.323	*0.060*				
*oil production*X*cvpl*		0.310**				
		0.021				
*oil reserves*X*cvpl*		-0.394*				
		0.073				
fhpr			-1.073*	1.043		
			0.077	*0.766*		
*oil production*X*fhpr*				0.085		
				0.895		
*oil reserves*X*fhpr*				-0.674		
				0.455		
nfhpr					0.192	0.556
					0.722	*0.774*
*oil production*X*nfhpr*						0.293
						0.499
*oil reserves*X*nfhpr*						0.002
						0.996
coup	-0.052	-0.040	-0.041*	-0.048**	-0.076**	-0.072**
	0.053	*0.186*	*0.067*	*0.028*	*0.014*	*0.016*
F-Statistic	5.285	4.527	6.100	4.629	5.638	4.710
P-value	*0.001*	*0.001*	*0.000*	*0.001*	*0.001*	*0.001*
Pesaran Bounds	✓	✓	✓	✓	✓	✓
lower	3.794	3.197	3.794	3.197	3.794	3.197
upper	4.986	4.460	4.986	4.460	4.986	4.460
Serial Corr.	0.089	0.014	0.007	0.240	0.483	0.286
R-squared	0.451	0.521	0.477	0.592	0.542	0.593
Obs	57	57	57	57	57	57

*, **, and *** represent statistical significance at 10%, 5% and 1% respectively. P-values in italics. Ticked cells, indicate the existence of cointegration for the corresponding regression.

To compare the results with the results obtained by Brunnschweiler and Bulte (2008), I include resource dependence and resource abundance in the same regression presented in Table 9. Indeed, it shows in almost all the regressions, that *oil reserves* is positively associated with economic performance, although it is significant only in column (6). This is in support of the results obtained by Brunnschweiler and Bulte (2008). However, the model specification in column (2) suffers from autocorrelation, and hence inferences cannot be made from it.

In the third growth regression in Table 8, I consider resource discovery (*oil discovery*), which is a relatively new measure in the resource curse literature. With regards to the existence of a long-run co-movement between resource discovery and institutions, only civil and political liberties and freehold property rights move together with resource discovery in the long-run, as shown by the F-statistics reported in columns (2), (3) and (4). This is comparable to the Mehlum et al. (2006) theoretical framework, which approached resource curse from a resource windfall approach. O*il*

Figure 2: Growth and Institutions



Source: Penn World Table 8.0 and constructed data on institutions by author.

discovery has no discernible effect in any of the three relevant specifications. Once again it is evident both political institutions and economic institutions being negatively associated with economic growth. The significance occurs when the interaction term is included on the regressions (see columns (2) and (4)).

There are a few concerns with the regression results in Tables 7 and 5. The first concern is with the conflicting results between freehold property rights and non-freehold property rights effects on growth obtained in columns (4) and (6) of Table 5. To further explore the conflicting results between column (4) and column (6) of Table 7, I included a dummy for the year 1978, when the Land Act was enacted, in order to account for a possible structural break fro the event. Table 14 presents the results, for growth regression involving both oil production (columns (1) to (4)) and oil reserves (columns (5) to (8)). The results in columns (5) to (8) indicate that the conflict no longer exists, as the freehold property rights index is no longer significant, while there is still a mitigating positive and significant interactive effect between *oil reserves* and customary property rights. The results in columns (1) and (2) however indicate that *de jure* market based institutions, still have a detrimental effect on economic growth.

The second concern lies with the negative and in some cases significant coefficients on both the political and economic institutions measures. This result contradicts the institutions and growth literature, which states that good institutions have a positive impact on growth. What the results have suggested is that institutions might be negatively correlated with economic growth. This is more relevant for the political institutions and economic institutions index, while customary property rights index seems to play a positive role. A possible reason for this unexpected outcome, might be the *de jure* method used in constructing the institutions index. The index was constructed using laws and Constitutions as a measure of the quality of institutions, but does not take into account the enforcement of these laws. The majority of the regressions show that as laws promoting civil and political liberties and freehold property rights were passed, the performance of the economy worsened. Another possible avenue for such an outcome is that good institutions tend to be promulgated during desperate times (i.e. poor economic performance) while, improvements in institutions are generally neglected when the economy is performing well. Figure 2 plots the three institutional indicators with per capital GDP growth. It can be observed that around the years 1958, 1978 and 1992, growth and freehold property rights tend to venture in opposite directions. Similarly, with civil and political liberties, there years 1966 and 1978, among others, highlight periods when the two variables venture sharply in opposite directions.

This result while puzzling is not unheralded in the literature. For instance, Khan (2012) postulates that first, the results obtained from cross-country studies, while informative, fail to take into account country specific historical processes that may be even more important for growth than so called "good governance". Secondly, Khan showed that countries with good governance, were mostly developed countries, and that economic development was attained before "good governance". Furthermore, Khan argued that, in order to attain the good governance (or in this case, high quality of market based institutions) necessary for economic development, a country would need to be able to deliver expensive public goods, which a country like Nigeria lacks the infrastructure or the necessary fiscal resources to provide. Given that the quality of institutions in Nigeria were measured against a yardstick of western style institutions (and "good governance"), it is possible that the qualities of governance and historical process that are necessary for economic development have not been captured in these measures. This implies that a developing country like Nigeria does not automatically solve market failures that hamper its growth by promulgating institutions that lead to "good governance". Finally, the negative coefficients obtained between the institutions measures, the interaction term and economic performance, could also be explained by the estimates being biased due to the exclusion of important explanatory variables. The limited data available could be the reason for this. I investigate how the results are affected when I include more control variables in the regressions. The two extra control variables are *openness*, which is measured as a ratio total trade to GDP, and *investment*. The immediate concern with these regressions then is the reduced power of the estimation, due to the reduced degrees of freedom. Tables 10, 11, 12 and 13 present the results. These show that the coefficients on the main variables of interest remain the same for those that show up as significant. More importantly, the coefficients on the measures of institutions are mostly show up as negative. In the regressions of resource dependence measures, the inclusion of the *openness* and *investment* variables results in most of the variables no longer being cointegrated. This suggests that one or both of the newly included control variables does not move together with the rest in the long run. While the magnitude of the coefficients have changed, the nature of association has remained the same, as shown in column (6) of Tables 5 and 10. The results in presented in Table 13, control for both resource abundance and resource dependence. Only the regression in column (6) shows a long-run association between the variables.

The results presented in Table 11 pertaining to resource abundance, are quite different from the initial results, where openness and investment were excluded. The F-statistic results indicate that only the regression involving freehold property rights and the interaction with *oil reserves*, had a long-run relationship with economic growth. The significance and nature relationship in this particular regression in column (4) however remains the same as the results reported in the initial regressions in Table 7. The marginal effect of *oil production*, at the sample average of non-freehold property for the regression in column (6) of Table 10 is computed using equation (11), for which I obtain -0.035. The t-statistic for this marginal effect is 2.092, signifying that this negative marginal effect is significant at the 95% significance level. On the contrary, the marginal effect of *oil reserves*, at the sample average of freehold property rights for the regression in column (4) of Table 11 is 1.301. This marginal effect is insignificant, with a t-statistic of -1.574. As such marginal effect of oil abundance on growth is not significantly different from zero.

$$\frac{d(growth)}{d(oil\ production)} = -0.740 + 0.450 * nfhpr \tag{11}$$

$$\frac{d(growth)}{d(oil\ reserves)} = 1.417 - 0.063 * fhpr \tag{12}$$

When I consider the final regressions with *oil discovery* in Table 12, a similar pattern is observed, with only the regression in column (4) exhibiting evidence of a long-run co-movement between all the variables and economic performance. However both freehold property rights and the subsequent interactions with institutions are insignificant.

Table 10: ARDL: Growth regression, with value of oil production

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Oil production	0.000	-0.134	-0.003	0.596	0.001	-0.740**
	0.978	*0.217*	*0.504*	*0.400*	*0.717*	*0.044*
cvpl	-0.131*	-0.007				
	0.077	*0.950*				
Oil production×cvpl		0.075				
		0.216				
fhpr			-1.364*	-2.295***		
			0.061	*0.009*		
Oil production×fhpr				-0.331		
				0.396		
nfhpr					0.570	0.876
					0.308	*0.135*
Oil production×nfhpr						0.450**
						0.044
coup	-0.056**	-0.040	-0.045*	-0.064***	-0.041**	-0.040**
	0.030	*0.126*	*0.053*	*0.010*	*0.036*	*0.013*
inv	-0.261	-0.240	-0.107	0.006	-0.072	0.528
	0.314	*0.343*	*0.702*	*0.984*	*0.751*	*0.100*
openness	0.205	0.196	0.159	0.086	0.175	0.095
	0.208	*0.206*	*0.283*	*0.578*	*0.222*	*0.417*
F-Statistic	4.867***	4.124***	4.508***	4.232***	4.807***	7.213***
P-value	*0.001*	*0.002*	*0.001*	*0.002*	*0.001*	*0.000*
Pesaran Bounds	✓				✓	✓
lower	3.480	3.229	3.480	3.229	3.480	3.229
upper	4.782	4.536	4.782	4.536	4.782	4.536
Serial Corr.	0.210	0.075	0.043	0.243	0.235	0.211
R-squared	0.568	0.590	0.531	0.637	0.629	0.732
Obs	56	56	56	56	56	56

*, **, and *** represent statistical significance at 10%, 5% and 1% respectively. P-values in italics. Ticked cells, indicate the existence of cointegration for the corresponding regression.

Table 11: ARDL: Growth and log of value of oil reserves

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Oil reserves	0.003	0.015	0.000	1.417*	0.003	-0.684
	0.366	*0.948*	*0.946*	*0.097*	*0.354*	*0.151*
cvpl	-0.118	-0.098				
	0.134	*0.767*				
Oil reserves×cvpl		-0.006				
		0.959				
fhpr			-1.079*	0.863		
			0.099	*0.552*		
Oil reserves×fhpr				-0.063***		
				0.004		
nfhpr					0.614	-0.454
					0.325	*0.588*
Oil reserves×nfhpr						0.419
						0.149
coup	-0.056**	-0.054*	-0.046**	-0.782*	-0.043**	-0.043**
	0.041	*0.060*	*0.047*	*0.097*	*0.048*	*0.035*
inv	-0.401	-0.400	-0.227	-0.071	-0.175	0.152
	0.121	*0.128*	*0.352*	*0.748*	*0.452*	*0.622*
openness	0.257	0.253	0.181	0.051	0.208	0.129
	0.147	*0.161*	*0.223*	*0.711*	*0.192*	*0.413*
F-Statistic	4.260***	3.450***	4.465***	5.605***	4.136***	4.128***
P-value	*0.002*	*0.006*	*0.002*	*0.000*	*0.003*	*0.002*
Pesaran Bounds				✓		
lower	3.480	3.229	3.480	3.229	3.480	3.229
upper	4.782	4.536	4.782	4.536	4.782	4.536
Serial Corr.	0.159	0.149	0.093	0.639	0.661	0.641
R-squared	0.517	0.518	0.526	0.658	0.580	0.616
Obs	56	56	56	56	56	56

*, **, and *** represent statistical significance at 10%, 5% and 1% respectively. P-values in italics. Ticked cells, indicate the existence of cointegration for the corresponding regression.

Table 12: ARDL: Growth and log of value of oil discovery

Variable	(1)	(2)	(3)	(4)	(5)	(6)
Oil discovery	0.004	0.238	-0.002	-0.797	0.001	0.034
	0.298	*0.115*	*0.651*	*0.344*	*0.617*	*0.932*
cvpl	-0.214**	-0.361**				
	0.037	*0.015*				
Oil discovery×cvpl		-0.133				
		0.120				
fhpr			-1.364*	-1.088		
			0.069	*0.136*		
Oil discovery×fhpr				0.439		
				0.345		
nfhpr					1.301	1.288
					0.195	*0.239*
Oil discovery×nfhpr						-0.020
						0.935
coup	-0.060**	-0.062*	-0.047*	-0.046*	-0.045*	-0.048*
	0.043	*0.052*	*0.068*	*0.068*	*0.057*	*0.062*
inv	-0.227	-0.270	-0.141	-0.330	-0.233	-0.234
	0.398	*0.333*	*0.585*	*0.309*	*0.377*	*0.555*
openness	0.373*	0.276	0.170	0.068	0.092	0.089
	0.067	*0.216*	*0.277*	*0.704*	*0.598*	*0.753*
F-Statistic	4.115***	3.693***	3.888***	3.364***	3.434***	2.689**
P-value	*0.003*	*0.005*	*0.005*	*0.009*	*0.010*	*0.029*
Pesaran Bounds				✓		
lower	3.480	3.229	3.480	3.229	3.480	3.229
upper	4.782	4.536	4.782	4.536	4.782	4.536
Serial Corr.	0.126	0.001	0.058	0.114	0.434	0.334
R-squared	0.559	0.595	0.547	0.571	0.606	0.609
Obs	51	51	51	51	51	51

*, **, and *** represent statistical significance at 10%, 5% and 1% respectively. P-values in italics. Ticked cells, indicate the existence of cointegration for the corresponding regression.

Table 13: ARDL: Growth and log of value of oil production

Variable	(1)	(2)	(3)	(4)	(5)	(6)
oil production	-0.003	-0.538**	-0.006	0.407	-0.001	-0.575
	0.616	*0.029*	*0.357*	*0.819*	*0.825*	*0.409*
oil reserves	0.006	0.831*	0.004	0.849	0.002	-0.095
	0.353	*0.059*	*0.532*	*0.724*	*0.637*	*0.895*
cvpl	-0.129	1.489*				
	0.129	*0.064*				
*oil production*X*cvpl*		0.299**				
		0.030				
*oil reserves*X*cvpl*		-0.463*				
		0.061				
fhpr			-1.385*	-0.756		
			0.069	*0.879*		
*oil production*X*fhpr*				-0.229		
				0.815		
*oil reserves*X*fhpr*				-0.466		
				0.725		
nfhpr					0.564	0.711
					0.338	*0.654*
*oil production*X*nfhpr*						0.349
						0.412
*oil reserves*X*nfhpr*						0.059
						0.893
coup	-0.057**	-0.041	-0.045**	-0.065***	-0.042**	-0.040**
	0.050	*0.189*	*0.062*	*0.007*	*0.043*	*0.016*
openness	-0.376	-0.353	-0.098	0.045	-0.064	0.455
	0.201	*0.252*	*0.739*	*0.904*	*0.788*	*0.181*
investment	0.267	0.308	0.172	0.059	0.186	0.094
	0.158	*0.112*	*0.268*	*0.757*	*0.217*	*0.458*
F-Statistic	3.466***	3.093***	3.758***	3.795***	3.921***	5.085***
P-value	*0.006*	*0.008*	*0.004*	*0.002*	*0.003*	*0.000*
Pesaran Bounds						✓
lower	3.197	2.989	3.197	2.989	3.197	2.989
upper	4.460	4.271	4.460	4.271	4.460	4.271
Serial Corr.	0.107	0.002	0.023	0.496	0.192	0.368
R-squared	0.521	0.587	0.536	0.678	0.632	0.738
Obs	56	56	56	56	56	56

*, **, and *** represent statistical significance at 10%, 5% and 1% respectively. P-values in italics. Ticked cells, indicate the existence of cointegration for the corresponding regression.

6 Conclusion

Nigeria is cited as a country that exemplifies the resource curse. Despite large oil endowment and rents, the country has remained disappointingly poor. However, beyond anecdotal evidence, there is lack of studies performing rigorous country specific analysis to investigate the issue of the resource curse in Nigeria. The purpose of this study was to fill that research gap by examining the nature of the long-run relationship between Nigeria's economic performance and its natural resources, while factoring in the role of institutions.

I used the index of institutions constructed for Nigeria in a previous study, which focuses on three separate categories of institutions. I borrow from studies by Sala-i Martin and Subramanian (2003); Mehlum et al. (2006); Brunnschweiler and Bulte (2008) and Norman (2009) and distinguish between two often mixed measures of resource wealth (which are resource abundance and resource dependence). A third and newly introduced measure of natural resource (resource discovery) is also employed.

The results obtained were contrary to the evidence presented by some studies in the literature: I was unable to find any evidence of a consistent and significant impact of any of the resource wealth measures on any of the institutions measures in the long-run. The cointegration tests were not able to reject the null hypothesis of no cointegration between the three resource measures and measures of institutions quality. I however did find a causal impact of *oil production* on customary land rights using the Granger causality test approach. In the absence of any form of long-run co-movement between institutions and resource wealth measures, its was impossible to trace out the indirect impact of resource wealth on economic growth through institutions. I then borrow from the position of Mehlum et al. (2006) which states that the resource curse occurs when a resource windfall is met with bad institutions. Here supporting results are observed when considering customary property rights and resource abundance, which show a mitigating effect of customary property rights on oil dependence induced resource curse. On the other hand, no long-run causal relationship was found with the political and economic institutions. This suggests that more attention should to be paid to the institutions that impact customary land rights.

I also find that two of the three measures of institutions (civil and political liberties and freehold property rights) have a negative association with economic performance in the long-run. This result contradicts predictions from the institutions and growth literature. The suspicion of possible missing variable bias was tested by running the regression with more control variables in the system, but the results remain the unchanged. It is possible that the negative association is due to the use of *de jure* institutions (laws in this case) which might not have translated into actually implemented *de facto* institutions. This may result in institutions that are otherwise classified as good, having a consistently detrimental impact on economic performance in Nigeria.

Finally, I am aware that such empirical analyses have not been carried out in the past. This is not because of a lack of interest in the research questions, but rather due to the unavailability of the necessary data to tackle the questions. In this case, the dataset on institutions covered a long time span. However the data on the other variables, while slightly longer in time-span than previous available datasets, is still not comprehensive. This limits the power of the estimation techniques used, due to the small number of observations. Nevertheless, the results obtained have shed some light on the dynamics of resource wealth and institutions and how these interact to impact economic performance in the long run.

References

Auty, R.: 2003, 'Natural Resources, Development Models and Sustainable Development'.

Auty, R. M.: 1990, *Resource-based industrialization: Sowing the oil in eight developing countries*. Clarendon Press Oxford.

Auty, R. M.: 1994, 'Industrial policy reform in six large newly industrializing countries: The resource curse thesis'. *World development* **22**(1).

Bardi, U.: 2009, 'Peak oil: The four stages of a new idea'. *Energy* **34**(3), 323–326.

Belkin, A. and E. Schofer: 2003, 'Toward a structural understanding of coup risk'. *Journal of Conflict Resolution* **47**(5), 594–620.

Boschini, A. D., J. Pettersson, and J. Roine: 2007, 'Resource Curse or Not: A Question of Appropriability*'. *The Scandinavian Journal of Economics* **109**(3), 593–617.

Brunnschweiler, C. N. and E. H. Bulte: 2008, 'The resource curse revisited and revised: A tale of paradoxes and red herrings'. *Journal of Environmental Economics and Management* **55**(3), 248–264.

Campbell, C. J.: 2003, *The Essence of Oil & Gas Depletion: Collected Papers and Excerpts*, Vol. 19. Multi Science Publishing Company Limited.

Davis, G. A.: 1995, 'Learning to love the Dutch disease: Evidence from the mineral economies'. *World development* **23**(10).

Diamond, L. and M. F. Plattner: 1996, *Civil-military relations and democracy*. JHU Press.

Feenstra, R. C., R. Inklaar, and M. Timmer: 2013, 'The next generation of the Penn World Table'. Technical report, National Bureau of Economic Research.

Fitch, J. S.: 1998, *The armed forces and democracy in Latin America*. JHU Press.

Gelb, A. H.: 1988, *Oil windfalls: Blessing or curse?* Oxford University Press.

Group, W. B.: 2012, *World development indicators 2012*. World Bank Publications.

Johansen, S.: 1988, 'Statistical analysis of cointegration vectors'. *Journal of economic dynamics and control* **12**(2).

Johansen, S. and K. Juselius: 1990, 'Maximum likelihood estimation and inference on cointegration - with applications to the demand for money'. *Oxford Bulletin of Economics and statistics* **52**(2), 169–210.

Jones, Y. M.: 2014, 'Debt overhang and natural resources: revisiting the resource curse hypothesis'. Ph.D. thesis, University of London.

Khan, M.: 2012, 'Governance and growth: history, ideology and methods of proof'. *Good Growth and Governance in Africa: Rethinking Development Strategies* pp. 51–79.

Khan, S. A.: 1994, *Nigeria: The political economy of oil*. Oxford University Press.

Leite, C. A. and J. Weidmann: 1999, 'Does mother nature corrupt? Natural resources, corruption, and economic growth'. *Natural Resources, Corruption, and Economic Growth (June 1999). IMF Working Paper* (99/85).

Luong, P. J. and E. Weinthal: 2001, 'Prelude to the resource curse explaining oil and gas development strategies in the Soviet successor states and beyond'. *Comparative Political Studies* **34**(4).

Luong, P. J. and E. Weinthal: 2010, *Oil is not a curse: ownership structure and institutions in Soviet successor states*. Cambridge University Press.

Manzano, O. and R. Rigobon: 2001, 'Resource curse or debt overhang?'. Technical report, National bureau of economic research.

Matsuyama, K.: 1992, 'Agricultural productivity, comparative advantage, and economic growth'. *Journal of economic theory* **58**(2).

Mehlum, H., K. Moene, and R. Torvik: 2006, 'Institutions and the resource curse'. *The Economic Journal* **116**(508).

Narayan, P. K.: 2005, 'The saving and investment nexus for China: evidence from cointegration tests'. *Applied economics* **37**(17).

Norman, C. S.: 2009, 'Rule of law and the resource curse: abundance versus intensity'. *Environmental and Resource Economics* **43**(2).

Pesaran, M. H. and Y. Shin: 1998, 'An autoregressive distributed-lag modelling approach to cointegration analysis'. *Econometric Society Monographs* **31**.

Pesaran, M. H., Y. Shin, and R. J. Smith: 2001, 'Bounds testing approaches to the analysis of level relationships'. *Journal of applied econometrics* **16**(3).

Robinson, J. A., R. Torvik, and T. Verdier: 2006, 'Political foundations of the resource curse'. *Journal of development Economics* **79**(2), 447–468.

Ross, M. L.: 1999, 'The political economy of the resource curse'. *World politics* **51**(02).

Sachs, J. D.: 2003, 'Institutions don't rule: direct effects of geography on per capita income'. Technical report, National Bureau of Economic Research.

Sachs, J. D. and A. M. Warner: 1995, 'Natural resource abundance and economic growth'. Technical report, National Bureau of Economic Research.

Sachs, J. D. and A. M. Warner: 1999, 'The big push, natural resource booms and growth'. *Journal of development economics* **59**(1).

Sachs, J. D. and A. M. Warner: 2001, 'The curse of natural resources'. *European economic review* **45**(4).

Sala-i Martin, X. and A. Subramanian: 2003, 'Addressing the natural resource curse: An illustration from Nigeria'. Technical report, National Bureau of Economic Research.

Shafer, D. M.: 1994, *Winners and losers: How sectors shape the developmental prospects of states*. Cornell University Press.

Stijns, J.-P. C.: 2005, 'Natural resource abundance and economic growth revisited'. *Resources policy* **30**(2).

Torvik, R.: 2001, 'Learning by doing and the Dutch disease'. *European economic review* **45**(2), 285–306.

Torvik, R.: 2002, 'Natural resources, rent seeking and welfare'. *Journal of development economics* **67**(2), 455–470.

Tsui, K. K.: 2011, 'More oil, less democracy: Evidence from worldwide crude oil discoveries*'. *The Economic Journal* **121**(551), 89–115.

Van der Ploeg, F. and S. Poelhekke: 2009, 'Volatility and the natural resource curse'. *Oxford economic papers* p. gpp027.

Appendix

Table 14: ARDL: Growth with both economic institutions and 1978 dummy

Variable	(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)	(9)	(10)	(11)	(12)
fhpr	-3.542*	-5.130*			-0.362	1.213			-0.965	-2.053		
	0.066	*0.069*			*0.832*	*0.501*			*0.641*	*0.432*		
nfhpr			-0.534	0.428			-0.161	-1.023			0.087	-5.916
			0.484	*0.696*			*0.845*	*0.162*			*0.951*	*0.960*
oil production	-0.009**	0.751	-0.002	-0.452								
	0.013	*0.325*	*0.500*	*0.181*								
oil production×fhpr		-0.419										
		0.320										
oil production×nfhpr				0.277								
				0.182								
oil reserves					-0.002	1.443	-0.001	-0.696*				
					0.513	*0.127*	*0.691*	*0.089*				
oil reserves×fhpr						-0.796						
						0.127						
oil reserves×nfhpr								0.428*				
								0.089				
oil discovery									-0.003	0.285	-0.001	-1.142
									0.437	*0.667*	*0.690*	*0.469*
oil discovery×fhpr										-0.159		
										0.662		
oil discovery×nfhpr												-0.703
												0.472
F-Statistic	8.424	6.108	6.341	5.936	5.694	6.369	5.248	6.047	4.948	4.767	4.303	4.070
P-value	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.000*	*0.001*	*0.000*	*0.001*	*0.001*	*0.003*	*0.004*
Narayan Bounds												
lower	3.794	3.442	3.794	3.442	3.794	3.442	3.794	3.442	3.834	3.480	3.834	3.480
upper	4.986	4.690	4.986	4.690	4.986	4.690	4.986	4.690	5.064	4.782	5.064	4.782
	✓	✓	✓	✓	✓	✓	✓	✓				
Serial Corr.	0.093	0.276	0.075	0.266	0.072	0.391	0.065	0.692	0.047	0.064	0.054	0.050
R-squared	0.556	0.610	0.557	0.588	0.461	0.578	0.524	0.611	0.471	0.525	0.531	0.578
Obs	57	57	57	57	57	57	57	57	52	52	52	52

*, **, and *** represent statistical significance at 10%, 5% and 1% respectively. The lower and upper bounds re obtained from the Narayan (2005) critical values. are: 3.210 - 4.294, 3.794 - 4.986 and 5.106 - 6.494 for the 10%, 5% and 1% significance level for k = 4. For k=5, they are: 2.724 - 3.893, 3.197 - 4.460, and 4.230 - 5.713 at the 10%, 5% and 1% significance levels respectively. For they are: P-values in italics. Ticked cells, indicate the existence of cointegration for the corresponding regression.