CORRUPTION LOVES COMPANY: THE INTERACTIVE EFFECT OF CORRUPTION AND RESOURCES ON ECONOMIC GROWTH

A Thesis presented to the Faculty of the Graduate School at the University of Missouri-Columbia

---

In Partial Fulfillment of the Requirements of the Degree

Master of Arts

By

NOAH DEVINE

Dr. Jonathan Krieckaus, Thesis Supervisor

MAY 2012

APPROVAL PAGE

The undersigned, appointed by the dean of the Graduate School, have examined the thesis entitled:

CORRUPTION LOVES COMPANY: THE INTERACTIVE EFFECT OF CORRUPTION AND RESOURCES ON ECONOMIC GROWTH

presented by Noah Devine,

a candidate for the degree of Master of Arts,

and hereby certify that, in their opinion, it is worthy of acceptance.

____

Professor Jonathan Krieckhaus

____

Professor Moises Arce

____

Professor Vitor Trindade

DEDICATION

I dedicate this work to my mother and father. My father's sudden and untimely death two years ago left an irreplaceable hole in my heart. His guidance from above has allowed me to continue on. My mother's strength in the face of distress and ability to get the job done inspires me on a daily basis.

I would also like to dedicate this work to my fiancé, Kate, my brothers Zach and Josh, the Gallen family, and all of those who have supported me throughout the years. I cannot thank and repay them enough. Kate especially has managed to boost me up in the most trying of times. Her ability to always have the right words for the right time has made this project complete.

ACKNOWLEDGEMENTS

I would like to thank Dr. Jonathan "Vanya" Krieckhaus, Dr. Moises Arce, and Dr. Vitor Trindade for their oversight, assistance, and help with this project. In particular, the communication, thoughts, and insights from Vanya gave me the drive and ability to put this work together. I would also like to thank the faculty of the Department of Political Science at the University of Missouri for their excellent instruction during my time as a graduate student. Without them I would not have the skills or ability to have prepared and performed this work. Finally, I would like to thank my fellow graduate students and cohort members, especially Paul Daniels, Mathias Tromborg, and Chris Raymond. Your thoughts, insights, commentary, laughter, and friendship propelled me to endure during this project.

TABLE OF CONTENTS

LIST OF TABLES AND GRAPHS

Tables

Figures

ABSTRACT

The resource curse has become one of the more studied comparative political economic phenomena over the last twenty years. Here, the role of corruption as a conditioning effect on the resource curse is explored. I argue that corruption modifies the impact of natural resources on economic growth; at higher levels of corruption, the effect of resources on growth becomes more negative. I empirically test this proposition over two ten-year periods from 1984-2003 using a new measure of natural resources, which accounts for resource abundant and dependent countries. Contrary to conventional wisdom, I find more resources are not associated with slow growth. Moreover, I find only marginal support for my theory, with only the effect of metal resources on growth being conditioned by corruption. These findings indicate that when examining the effect of resources on growth we must pay special attention to (1) the metric employed, (2) the type of resource examined, and (3) the potential for conditioning effects.

INTRODUCTION

Two arguments that exist in the resource curse literature are investigated here. First, I investigate the relationship between resources and corruption and their effects on economic growth. Second, I examine the issue of measurement; recent resource literature has drawn attention to this important aspect of the resource curse debate (Brunnschweiler 2008; Ding and Field 2005 Lujala et al. 2005), and I expand upon it here.

I examine the interactive effects of resources and corruption on economic growth, arguing that corruption modifies the negative effects of resources on economic growth. I examine this proposition over two, ten-year periods from 1984-2003, utilizing a new measure of resources. In doing so, I find surprisingly little evidence in favor of the resource curse hypothesis and only marginal evidence in favor of my theory. Instead, the clearest findings that come from this work are (1) that corruption harms long-term economic growth, (2) that the measurement of resources impacts the resource curse findings, and (3) that the conditional effect of corruption on the relationship between resources and growth is only marginally apparent.

This work proceeds as follows. I begin with a review of the literature on the relationship between (1) corruption and growth and (2) resources and growth. The corruption literature has received substantial treatment, with empirical evidence generally indicating that corruption harms growth (Mo 2001; Mauro 1995, 1997). This relationship will be examined in Chapter 1. The resource curse literature has also been quite substantial since Sachs and Warner's (1995) early work and has evolved into a plethora of important theoretical and empirical findings. They will be discussed and analyzed here in Chapter 2. Second, I articulate and develop a theory on the interactive effects of corruption and natural resources on economic growth. To preview my argument and theory detailed in Chapter 3, I argue that corruption modifies the effects of resources on economic growth, accentuating the negative effect of resources on economic growth. Third, from this, I develop hypotheses, operationalize the variables, and empirically test my theory. This is laid out in Chapter 4. Fourth, and finally, I discuss and detail the implications of the findings in the concluding chapter, Chapter 5.

CHAPTER 1: CORRUPTION AND ECONOMIC GROWTH

To begin, I first review the relationship between corruption and economic growth. It is generally argued that corruption negatively affects economic growth for a variety of reasons that will be discussed, many of which have empirical support. This expectation, that corruption harms economic growth, is perhaps best noted by Easterly (2002), who stated, "the urge to steal everything not bolted to the floor is the most obvious growth-killing incentive that government officials face" (241). This chapter proceeds by first defining and providing a broad understanding of corruption. Then, I detail the theoretical connection between corruption and economic growth. Third, I examine the empirical evidence on corruption and economic growth, while focusing on the main, substantive findings. Lastly, I summarize the relationship and this chapter while also integrating case evidence from Nigeria to further support framework.

Defining Corruption

Before moving forward in discussing the impact of corruption on economic growth, corruption itself must be defined[1]. Accordingly, Transparency International has defined corruption "as the abuse of entrusted power for private gain" (Transparency International 2012). Typically, according to the *International Country Risk Guide* (ICRG), this entails bribes but it also contains "corruption in the form of excessive patronage, nepotism, job reservations, 'favors-for-favors', secret party funding, and

[1] Transparency International (2012) defines corruption and transparency on their website under "frequently asked questions." This definition is found at: http://www.transparency.org/news_room/faq/corruption_faq.

suspiciously close ties between politics and business" (ICRG Methodology 2012).[2] Similarly, Gyimah-Brempong (2002) defines corruption as quite simply the "use of public office for private gains" (186) while Kopecký (2006) defines it as "the exchange of money in return for favorable public decisions" (259). Thus, from these definitions, corruption is when a public official enjoys private gains, through some illegitimate mechanism.

Given the relative clarity in defining corruption, one might think that actually measuring and operationalizing corruption would be relatively easy and agreed upon. However, corruption is actually quite difficult to grapple with because the actual level of corruption might differ from either the reported or perceived level. Though this will be addressed later during the operationalization section, for now, it simply important to note that many indices examine corruption in a given country through perceived corruption because actual corruption is virtually impossible to measure (Olken 2006).

<u>Causes of Corruption</u>

Examining the reported causes of corruption is quite a challenging task given that the measurement of corruption varies so greatly and that many of the associated factors that cause corruption appear to be somewhat related (Treisman 2000). Assuredly, corruption is the result of culture and tradition, sociological factors, incentives, institutional structure, economics, and development. To this end, Easterly (2002) asserted that the incentive structure for corruption may differ between centralized and decentralized states, with increased incentives in a decentralized state. Empirically, Treisman (2000) found some support for this proposition with federal state structures

[2] The Political Risk Services (PRS) Group provides the ICRG Methodology and Risk Guide. This aspect of corruption comes directly from the ICRG Methodology and can be found at: http://www.prsgroup.com/ICRG_Methodology.aspx.

being associated with higher corruption. In terms of culture and tradition, Treisman (2000) found less corruption in societies that maintained a British heritage, suggesting that there may be some underlying causal structure between culture and corruption. Corruption may well also be the result of sociological factors. While these sociological factors, traditions, and structures are indeed important to understanding the causes of corruption, the focus here will be on the latter two factors, economics and development, given the overall economic focus of this work.

Several scholars have argued that corruption is caused by a multitude of economic factors, focusing on trade, economic status, modernization, and transactional costs. Ades and Di Tella (1997) argued that corruption is the product of trade restrictions, as countries with more open economies tend to have lower corruption. Treisman (2000), when examining economic development, argued that corruption might be more common in lesser-developed countries. Also economically, Easterly (2002) argued that foreign aid and corruption are correlated in societies with relatively weak governments, which suggest a tie between government structure, economics, and corruption.

Additional support for these factors and others has been provided in the literature. Mauro (1997), in analyzing the impact of corruption on growth and investment, argued that corruption is the product of trade restrictions, the degree of government involvement in the economy, price controls, low wages, and high rents. Low wages, specifically to civil service employees, have the unintended consequence of increasing incentives to accept bribes. Greater government involvement with high restrictions may also result in corruption because officials may "have wide discretion" in applying such restrictions which result in "private parties being willing to pay bribes to government officials to obtain any rents that the regulations may generate" (Mauro 1997, 85). Lastly, and especially important for the argument here, Mauro (1997) noted that corruption may be the result of "certain underlying characteristics of an economy or society" (86) like resource rich societies. Natural resource abundance can generate increased rent seeking behavior to that resource and into more exploitation because of their potential to be sold at a relatively high profit margin (Mauro 1997). In this view, corruption and resource-endowed economies are closely linked, with existing corruption being directed to resources due to the opportunity for relatively large rents that come with such resources.

Corruption is thus caused by a variety of complex and intertwined forces associated with incentives, institutions, economics and development, culture and tradition, and sociological factors (Easterly 2002; Mauro 1997). In the contexts of the work here, it is particularly important to note the economic causes of corruption as they provide the context for the economic consequences.

Theory: The Positive Effects of Corruption on Growth

In examining the impact of corruption on economic growth, several early scholars, notably Leff (1964) and Huntington (1968), argued that corruption could conceivably aid in economic growth. Leff (1964) argued that corruption might indicate that groups or individuals are "participating in the decision-making process to a greater extent than would otherwise be the case" (8) which could ultimately help the economy. As Leff (1964) aptly states:

> "Typically the bureaucracy plays an extensive interventionist role in the economy, and its consent or support is a *sine qua non* for the conduct of most economic enterprise. In such situations, graft can have beneficial effects. First, it can induce the government to take a more favorable view of activities that would further economic growth. The policies or freedom sought by the entrepreneurs would help development, while those they subvert are keyed to other goals.

> Second, graft can provide the direct incentive necessary to mobilize the bureaucracy for more energetic action on behalf of the entrepreneurs. This is all the more important because of the necessity for bureaucratic help in so many areas- e.g. licenses, credit, and foreign exchange allocation- in order to get anything done" (10).

Corruption, from this point of view, acts as a mechanism for those who would otherwise be kept out of the process to enter the fold and generate growth as entrepreneurs.

Similarly to Leff (1964), Huntington (1968) argued that corruption might have positive effects for economic growth. Accordingly, "corruption may be one way of surmounting traditional laws or bureaucratic regulations which hamper economic expansion" (Huntington 1968, 68). By example, the American economy during the late 1800s was undoubted aided by corrupt officials and industrial corporations in the building of railroads and various other industrial projects (Huntington 1968). In short, according to Huntington (1968), "a society which is relatively uncorrupt- a traditional society for instance where traditional norms are still powerful- may find a certain amount of corruption a welcome lubricant easing the path to modernization" (69).

Building from the arguments of Leff (1964) and Huntington (1968) several more recent scholars have also argued that some corruption may be beneficial for economic growth. For example, in a formal model, Acemoglu and Verdier (1998) examined the relationship between corruption, property rights, and investment and, though they argued that protection of contracts and property rights are necessary, they asserted that preventing all corruption may prove to be cost prohibitive. Stated more explicitly, "it could be optimal for less developed economies, which may have less productive investment opportunities, to have a lower level of property right enforcement and more corruption" (Acemoglu and Verdier 1998, 1382). Liu (1996) argued that the existence of corruption could actually correct inefficiencies in the market, though the total effects of corruption may "not necessarily be beneficial to society" (27).

The thrust of these arguments is quite simple: corruption could aid in economic growth by facilitating efficiency and action in an otherwise "status quo holding" bureaucracy. Further, some corruption may be allowable and even necessary because it is inconceivable to rid a system of corruption without undertaking substantial costs and some corruption could aid an inefficient market.

Theory: The Negative Effects of Corruption on Growth

Scholars who have argued that corruption negatively impacts growth have focused on at least six causal mechanisms: (1) increasing uncertainty and decreasing investment (Gyimah-Brempong 2002; Tanzi 1998; Easterly 2002; Mauro 1995; Mo 2001), (2) budget composition and the budget deficit (Easterly 2002; Mauro 1997), (3) transactional costs and "taxation" (Mauro 1997; Drury et al. 2006), (4) human capital (Mo 2001; Murhpy et al. 1991), (5) the corruption "mindset" (Gyimah-Brempong 2002; Murphy et al. 1991), and (6) political instability (Mo 2001).

First, corruption harms investment, which hinders economic growth, because "nobody wants to invest in a corrupt economy" (Easterly 2002, 246). The logic behind this mechanism is almost as simple as Easterly's statement makes it seem. Corruption signals to investors, both domestically and international ones, that their investments are not safe and that potential profits from their investment may be diverted or sucked-up by corrupt individuals (Mauro 1997). Because of this, investors view highly corrupt states as maintaining an implicit tax on their investment as they fully recognize some of their potential investment and profit will never reach them (Mauro 1995, 1997). Corruption, therefore, signals uncertainty to investors (Anoruo and Braha 2005; Mo 2001). This uncertainty almost always decreases the likelihood of investment and decreases the likelihood of innovation and entrepreneurship (Mo 2001; Anoruo and Braha 2005).

Corruption can also affect the budget and the budget deficit, which also harms growth (Easterly 2002; Mauro 1997). According to Easerly (2002), increased corruption is typically associated with larger deficits. The logic here is that governments are either spending to try and curb corruptive practices or the government is engaging in corruption itself. In this regard, Mauro (1997) argued that corruption brings about a loss in tax revenues, which also results in a budget deficit because individuals feel they can evade taxes or are engage in money-capturing behavior that cannot be taxed. Moreover, in terms of the overall composition of state budgets, increased corruption can result in government officials skewing the budget to projects that are easily corruptible. In particular, "corrupt government officials may come to prefer those types of expenditures that allow them to collect bribes and keep them secret" (Mauro 1997, 88).

Third, and in a similar fashion to the previous two points, corruption harms economic growth by effectively adding a tax on the economy. Corruption is an inefficient mechanism because each transaction and investment entails an added tax, a point noted by Drury et al. (2006) when they state that, "corruption is damaging to economic performance as both a tax on productivity and a market distortion" (122). This tax is highly variable and depends on the level of bribe or rake-off the top that the corrupt individual is taking, which decreases growth through declining citizen productivity and investment (Mauro 1997; Wei 1997). Moreover, if investment does occur, the overall costs of production are greatly increased due to the corruption, which is also effectively a tax on the economy (Gyimah-Brempong 2002). Additionally, corruption is also a tax on the economy because it permits tax evasion and a relative loss of revenues (Mauro 1997).

Fourth and fifth, corruption harms growth because it affects human capital and the individual mindset. Corruption has the extremely adverse effect of conditioning the human mindset into believing that the only way to gain wealth and be productive is through corruptive practices which may include rent-seeking or other jobs that allow corruptive practices (Mo 2001; Murphy et al. 1991; Aidt 2003). As Gyimah-Brempong (2002) states, "corruption slows economic growth because it distorts incentives and market signals leading to misallocating of resources, especially human talent, into rent-seeking activities" (187). Murphy et al. (1991) also echo this point when they argued that highly capable and potentially productive individuals will pursue rent-seeking activities when the value of such activities outweighs the value of normal, productive work.

Finally, corruption harms economic growth because it can generate political instability. Mo (2001) is the main proponent of this argument and argued that the effects of corruption on instability and growth have been understudied. Per his argument, "in addition to shrinking of opportunities due to productivity retardation, inequality of opportunities, which is similar to income and wealth inequality, corruption will head to frustration and sociopolitical instability" (67). Mo's (2001) intuition is that at higher levels of corruption, ordinary citizens are bound to become frustrated by the lack of opportunities and the added fees to complete even basic tasks which will ultimately result in political instability. In turn, greater instability generates decreased growth.

These six mechanisms connect corruption to declining growth and are key to understanding how the process works. They are not necessarily separate nor are they interconnected, in all cases. To assess these theories, we now look at empirical evidence.

Empirical evidence

Evidence on the relationship between corruption and growth supports the latter of the two views presented above; higher corruption does result in decreased economic growth. A variety of statistical methods and channels have been assessed in the literature with this result being the overwhelming finding.

Easterly (2002) has shown that corruption in 1982 negatively affected economic growth in the 1980s while corruption in 1990 negatively affected growth in the 1990s, through decreased investment. When focusing on the differences between regimes, Drury et al. (2006) found that corruption harms economic growth and more specifically, harms economic growth in non-democracies. Mauro (1995, 1997), Anoruo and Braha (2005), and Mo (2001), among others, have all also found that corruption reduces economic growth. More exactly, though the degree to which corruption decreases economic growth varies based on the study and the measure of corruption, it has generally been found that a unit-increase in corruption results in somewhere between a .3and .9 percentage point decrease in economic growth (Anoruo and Braha 2005; Gyimah-Brempong 2002; Mo 2001).

Importantly, from this, scholars have worked to investigate the causal mechanisms noted above as well as regionalized their investigation of corruption and economic growth. In terms of investment, Mauro (1995, 1997), Mo (2001), Rock and Bonnett (2004), among others, have shown that corruption results in reduced investment (though Rock and Bonnett (2004) note an East Asian exception). In terms of human capital, Mo (2001) found that corruption decreases growth by affecting schooling and reducing overall productivity. In terms of the budget, Mauro (1997) found that corruption harms the budgetary composition with a negative and significant relationship between corruption and public expenditure on education. And, in terms of political instability, Mo (2001) found that such instability was one of the main channels that corruption can harm growth.

In sum, the empirical evidence has strongly supported the negative effects of corruption on economic growth. Though many of the mechanisms are difficult to tease out, the findings nonetheless provide strong support for the propositions. More importantly, however, of these findings, none asserted that increasing corruption resulted in even moderate or sustained levels of economic growth.

Case Evidence: Nigeria

To further illustrate to role of corruption on economic growth and its negative impact, I now examine the country of Nigeria under the role of Sani Abacha, one of the more corrupt political leaders in recent memory. While this example is in no way representative of all countries, especially given that Nigeria has routinely been rated as one of the more corrupt countries (Obayelu 2007), it is nonetheless helpful to see how the relationship between corruption and growth actually works.

From 1984-2007, Nigeria has had an average growth rate of 1.78% with ten years of negative growth.[3] During the near five-year (1993-1998) reign of dictator Sani Abacha, Nigeria experienced three years of negative growth and one year of zero

[3] This was computed from growth data provided by Penn World Tables 6.3 (Heston et al. 2009).

growth.[4] In large part this lack of growth was due was due to the corruptive practices of Abacha himself, along with his family members, in a relatively more centralized form of corruption (Obayelu 2007; Daniel and Malton 2008; Easterly 2002).

Specifically, Abacha was adept at engaging in corrupt practices with regards to Nigeria's natural resources, especially oil. His corruptive practices did not just harm the economy, it harmed the overall quality of life for the citizens of Nigeria. For example, despite the fact that "during Abacha's time, Nigeria earned about USD 10 billion per annum from its oil sales," the country as a whole suffered with workers receiving extremely low wages and literacy remaining low (Daniel and Malton 2008, 64). The extent and level of Abacha's corruption was severe; of the "USD 3 billion a year profit earned by Nigeria's oil, it has been estimated that the Abacha family helped itself at the rate of between one half and one billion dollars a year" (Daniel and Malton 2008, 64).

In terms of the actual corruptive practices he undertook, Abacha excelled at obtaining the profits from the oil and other projects in a number of different manners. Primarily, Abacha "simply removed funds in cash from the Central Bank of Nigeria, under the pretext of being required for national security purposes" (Daniel and Malton 2008, 64). Additionally, Abacha and his cronies paid off contractors, bribed officials, and positioned businesses and contracts so that profits could easily be obtained (Easterly 2002; Daniel and Malton 2008). In short, despite impressive funds coming in to Nigeria, economic growth was stifled and the quality of life was rather poor as a result of the corruptive practices of Abacha (Obayelu 2007).

More directly related to economic growth, Abacha's methods had far-reaching consequences that are emblematic of the theory discussed above. First, Nigeria had

[4] This was computed from growth data provided by Penn World Tables 6.3 (Heston et al. 2009).

impressively rising debt, with an "external debt of USD 30 billion" (Daniel and Malton 2008, 64). This rising and rather extensive debt made it difficult for Nigeria to engage in any substantial economic growth projects. Second, Nigeria also experienced declining investment. Daniel and Malton (2008) describe this as one of the great "ironies" of Nigeria during Abacha's rule, as "Nigeria actually had to start importing petroleum because her refineries had been allowed to grind to a halt through lack of capital investment" (64). In sum, Abacha's corruptive ways had real and devastating consequences for the Nigeria economy and people. By siphoning money through various projects, especially through oil, Abacha negatively impacted investment and the budget, which resulted in the overall slowing and decline of the Nigerian economy.

Importantly, it is worth noting that Abacha was not the only individual undertaking corruptive practices in Nigeria; his corruptive practices are actually more emblematic of a general culture of corruption (Obayelu 2007). This culture generates a "get rick quick" mindset among people and creates a negative image, which has routinely placed Nigeria as one of the more corrupt countries in the world (Obayelu 2007). These aspects in Nigeria, coupled with the direct consequences for corruption on investment and the deficit, has hampered the quality of life, education, social fabric, and economic growth (Obayelu 2007).

Thus, Nigeria, particularly under the leadership of Abacha, suffered from severe corruption, which had negative consequences for the economy by suppressing investment and increasing the budget deficit. These factors are in-line with the story presented above; Nigeria, through three key causal mechanisms, suffered economically. In response to these issues, especially since the death of Abacha in 1998, Nigeria has undertaken substantial economic reforms. As Obayelu (2007) notes, Nigeria has worked to address the corruptive practices in Nigeria through three distinct avenues: “improved macroeconomic management, reform of the financial sector, institutional reforms, privatization and deregulation, and improvement of the infrastructure” (3). Though Nigeria undoubtedly has substantial more progress to make in order to address the corruption problems (for example, Nigerian police are still believed to be quite corrupt), these reforms have had some success, with several public officials being convicted of corruption and significant amounts of money being recovered from the diverted funds of Abacha (Obavelu 2007). Nonetheless, the story here is quite simple and fairly representative of a “corruption harms growth” perspective and theory.

Summation

In this section, the rather expansive literature linking corruption and economic growth has been reviewed, which can be summarized in three key points. First, corruption can be defined as behavior undertaken by a public official for personal gain. With this, corruption can be somewhat challenging to measure (Olken 2006). Second, the causes of corruption are important to understand in themselves and for understanding the effects. From the economic perspective, corruption is perhaps the product of trade restrictions, modernization, and rapid growth (Treisman 2000; Ades and Di Tella 1997). Third, corruption has been generally argued to have a negative effect on economic growth, with empirical evidence supporting such arguments. Corruption can impact economic growth through a variety of different channels and literature has worked to disentangle these effects. Regardless, the empirical evidence strong supports the notion that corruption has relatively devastating consequences for growth.

CHAPTER 2: NATURAL RESOURCES AND ECONOMIC GROWTH

Last chapter I reviewed the core arguments concerning the relationship between corruption and economic growth, with the key finding that corruption harms growth. Here, I maintain my focus on economic growth but move to another determinant, natural resources. The literature on the effects of natural resources is especially broad and a full review would be outside the scope of this work.[5] To focus my efforts, I first lay out the framework and theory that connects resources to growth. I then review the empirical findings, which has both supported and rejected the resource curse. Third, I direct attention to the prominent tensions in this literature, with a focus on conditional relationships and measurement. Fourth, I present case evidence of the relationship between resources and growth.

This chapter provides the backbone of my theory, along with the previous chapter, and reflects a key component of the economic growth literature. To this end, the reader should pay particular attention to the potential connections between resources and growth and resources, corruption, and growth, which will shape the forthcoming chapter.

Framework

The relationship between resources and economic growth has been termed the "resource curse," for the proposed negative effects that an abundance of resources have on economic growth (Sachs and Warner 1995, 1997). Sachs and Warner (1995, 1997) popularized this relationship by empirically showing that resources resulted in decreased economic growth. According to them, the negative impact of resources on economic

[5] For a review and understanding of the arguments between resources and regime, please see Haber and Menaldo (2011) or Dunning (2008). For a review and understanding of the arguments between resources and conflict, please see Ross (2004) or Collier and Hoeffler (2005).

growth poses quite the irony; an abundance of resources should permit economic growth but, instead, countries with resource wealth have experienced slow, if not negative, growth (Sachs and Warner 1995). As they state, "in the past thirty years, the world's star performers have been the resource-poor New Industrialized Economies (NIEs) of East Asia- Korea, Taiwan, Hong Kong, Singapore- while many resource-rich economies such as the oil rich countries of Mexico, Nigeria, and Venezuela, have gone bankrupt" (Sachs and Warner 1995, 1). Prior to Sachs and Warner's work, however, several scholars had already suspected a resource curse. In particular, Gelb (1988) and Auty (1990) were instrumental in laying out evidence and a framework for the resource curse. The importance of Sachs and Warner's (1995, 1997) works, however, for understanding the purported inverse relationship between resources and growth, cannot be overstated. The majority of the literature on this relationship begins with their proposition and either accepts, rejects, or conditionally accepts the association, for a variety of reasons.

Theory

The theory behind the resource curse can generally be divided into economic and political explanations. On the economic side, scholars argue that the resource curse is the byproduct of (1) the volatility of natural resources and commodities (Humphreys et al. 2007; Gylafson 2001; Ross 1999; Sachs and Warner 1995, 1997; Di John 2011), (2) the Dutch disease (Sachs and Warner 1995, 1997; Bravo-Ortega and de Gregorio 2007; Di John 2011; Humphreys et al. 2007; Ross 1999; Boschini et al. 2007), and (3) other economic factors such as borrowing problems (Manzano and Rigobon 2007), lack of investment in productive activities (Barbier 2003), trade structure (Hasumann and Rigobon 2002) and resource sector decline (Davis 2011).

On the political side, scholars have argued that the resource curse is the connected (1) to poor or weak institutions (Boschini et al. 2007; Brunnschweiler 2008; Mehlum et al. 2006; Humphreys et al. 2007; Di John 2011; Sala-i-Martin and Subramanian 2003; Damania and Butle 2008) and (2) corruption, rent-seeking, and a lack of transparency (Sala-i-Martin and Subramanian 2003; Pendergast et al. 2011; Damania and Butle 2008; Leite and Weidmann 1999; Humphreys et al. 2007; Ross 1999; Torvik 2002).

In addition to these two explanations, scholars argue that education (Humphreys et al. 2007; Gylafson 2001; Bravo-Ortega and de Gregorio 2007), human capital (Stijns 2006; Bravo-Ortega and de Gregorio 2007), and differing levels of expertise (Humphreys et al. 2007) are important to understanding the resource curse.

The three economic theories for the resource curse are closely intertwined. The basic intuition is that with a resource boom comes several adverse effects to the overall economy, which hinders future economic growth. The volatility argument asserts that natural resources tend to have substantial trade and price instability, as compared to other products or economic sectors, which leads to uncertainty (Sachs and Warner 1997; Gylafson 2001). For example, Humphreys et al. (2007) tracked oil prices from 1987 to 2006 and found a fairly routine "week to week change of plus or minus 5 to 10 percent common" (7). This type of price volatility, coupled with trade volatility, leads to uncertainty, which impacts the overall economy (Sachs and Warner 1997). Economic uncertainty is almost always problematic for investment, trade, and future exporting. Thus, over the long haul, economies that are heavily dependent on a sector that is volatile will suffer economically. Additionally, resources are also volatile because they have to be extracted from the ground, which is a variable and unreliable process (Humphreys et al. 2007).

The Dutch disease explanation is closely tied to the volatility argument. The core argument of those who assert that the Dutch disease is the mechanism that links resources to slow growth is that countries that have recently found resources, shift their assets, both financial and human, to the resource sector of the economy which, thereby, neglects other necessary sectors (Lederman and Maloney 2007; Humphreys et al. 2007; Stijns 2005; Sachs and Warner 1995, 1997). This phenomenon has been referred to as the Dutch disease because such assets shifting occurred in The Netherlands in 1959 when a natural gas field was found. Moreover, the Dutch disease also describes a crowding out (Di John 2011) and trade related effect (Di John 2011; Ross 1999). The latter notion refers to the idea that with a resource boom comes an "appreciation of a state's real exchange rate that is caused by the sharp rise in exports" (Ross 1999, 306), which ultimately has negative consequences for the economy. The former issue of "crowding out" refers to the potentially dominating position the resource sector will take in the economy in relation to the other sectors, which are also needed for growth (Di John 2011; Davis 2011).

Borrowing problems, lack of investment in productive activities, trade structure, and resource sector decline, have also been proposed as economic explanations for the resource curse. Manzano and Rigobon (2007) argued that an accumulation of debt, or a borrowing problem, by resource-rich countries is to blame for the resource curse. In terms of a lack of investment in productive activities, it has been argued that many resource-rich countries have failed to invest their profits from the resources into needed activities that would benefit long-term growth, such as technology, and instead squandered or hoarded the profits (Barbier 2003). In terms of trade structure, Hausmann and Rigobon (2002) argued countries that maintain diversified trade are better suited in general for growth and, thus, better able to grow in the presence of large amounts of natural resources. Lastly, Davis (2011) recently argued that it is necessary to understand the rate at which the resource sector is growing with the resource curse being particularly related to a drag, whereby declining growth is the product of declining production.

The economic theories associated with the resource curse have offered a host of explanations as to why natural resources negatively affect economic growth. The Dutch disease and volatility arguments have dominated the literature but other theories are important to consider. Based on these theories, it seems reasonable to suspect that resources result in declining growth and that the apparent irony can be explained.

Resources negatively impact economic growth in a political way. On the institutional side, the logic has been that resources themselves don't fully affect growth but rather high amounts of resources, coupled with poor institutions, affect growth (Boschini et al. 2007; Brunnschweiler 2008; Mehlum et al. 2006). More explicitly, Mehlum et al. (2006) argued that resources deteriorate institutions, which, in turn, lowers growth. When disaggregating between what they call "grabber friendly" and strong institutions, Mehlum et al. (2006) find that strong institutions are vital to ensuring that economic growth. Brunnschweiler (2008) and Boschini et al. (2007) have made similar arguments, focusing on how accountability and efficiency within institutions affect the relationship between resources and growth. This institutional line of reasoning is thus quite simple: resource abundance is problematic for growth unless political controls are in place to guard against potential economic problems that come with resources.

Corruption and rent seeking are also political aspects that have been theorized to explain the resource curse. The argument here is that corruption and rent seeking occur with resources. Leite and Weidmann (1999) argued this when they asserted that resources increase capital-intensive production and bureaucratic power concentration, thereby lowering growth (Leite and Weidmann 1999). In turn, economic growth is hindered from natural resource abundance through corruption. Additionally though, Leite and Weidmann (1999) also argued that several scholars have modeled theories where corruption, rent seeking, and resources intermingle to effect growth. For example, Damania and Butle (2008) argued that resources, in the presence of political competition and corruption, negatively impact growth because they affect system efficiency and government policy in a negative manner. Specifically, resources with corruption cause "entrepreneurial talent to re-allocate among sectors in an inefficient way and the government (responding to bribes) to implement policies that do not maximize economic growth" unless political competition, like that in democracies, induces those in government to stay on an income maximizing path (Damania and Butle 2008, 30). Thus, in this situation, it is possible that leaders in different regimes or different competitions will use resource wealth more to solidify their status, which would result in declining growth because such solidification would come from illegitimate means. Lastly, in examining the relationship between corruption and resources, Humphreys et al. (2007) asserted that "the short run availability of large financial assets increases the opportunity for the theft of such assets by political leaders" and that "higher levels of political corruption present the most obvious political risk that can arise from large holdings of natural resources" (10-11). The decline of economic growth from resources, in this way, seems to coincide with political corruption.

These two political explanations, therefore, indicate that it may not necessarily be resources themselves that harm growth but other political factors. This last factor, corruption, is particularly important in the context of this work.

Though the political and economic theories explaining the resource curse are by far the most cited and prominent explanations, three additional theories are worth noting.[6] The first concerns the role of education. Humphreys et al. (2007), Gylafson (2001) and Bravo-Oretega and de Gregorio (2007) have all argued that resources, through a decline in education, harm economic growth. For a country's economy to develop and grow it needs an educated class but, unfortunately, resource-rich countries are correlated with spending less on education (Gylafson 2001) and, in turn, have a less skilled workforce (Humphreys et al. 2007). Essentially, when a country relies on natural resources for its wealth, less attention and money is given to education, which can have devastating and long-term consequences for economic growth.

Closely linked to education is the human capital explanation (as education is often a proxy for human capital). Stijns (2006) and Bravo-Ortega and de Gregorio (2007) have both argued that investment in human capital is necessary for economic growth. In this way, resources provide substantial potential wealth and for economic growth to occur, human capital must be addressed, or else there could well be a decline.

Finally, as a third additional argument, Humphreys et al. (2007) argued that there exists an information asymmetry when dealing with natural resources that can be to the

[6] Conflict and regime could also be included as explanations for a curse but they are outside the scope of this work, as previous noted. See footnote 5 for works to examine if interested in conflict and regime theories.

detriment of a country. As the extraction of resources has become increasingly technologically and monetarily expensive, international companies have become the front-runners in resource extraction (Humphreys et al. 2007). This puts international companies ahead of countries in both negotiations and information when it comes to extracting a resource, which can be costly to the country. Competition between companies can lessen this effect, but it is nonetheless problematic. As Humphreys et al. (2007) state, "the challenge for host countries is to find ways to contract with the international companies in a manner that also gives them a fair deal" (5).

In total, these political, economic, and other theories explain why an increase in resources could lead to slow economic growth. To assess this literature and, more importantly, the overall notion of a resource curse, we examine the empirical evidence.

Empirical Evidence

One side of the literature fervently has argued that resources, unquestionably, harm economic growth. Typically, this has been argued by evaluating growth over a fairly long period of time, for a relatively large, cross-section of countries, based on the level of resources at some prior point. In this vein, the seminal work of Sachs and Warner (1995), who used primary product exports as a share of GDP to measure resources, found that "a higher share of primary product exports at the start of the period is associated with lower growth over the next 20 years" (8). Specifically, "a unit standard deviation increase in the share of primary exports in 1971 would be associated with a reduction in annual per-capita growth of a little less than one percent per year" (Sachs and Warner 1995, 8). Moreover, their finding held with including significant control variables, such as tropical climate, trade, and investment, which reflects an overall robustness in the finding. Sachs and Warner (1997) further substantiated their initial finding when they directed their attention to Africa specifically and examined the causes of growth. In addition to finding that regional and continent specific factors associated with African countries, such as "limited sea access and tropical climate" have played an important role in African country's slow growth. Sachs and Warner (1997) found that natural resource abundance was a strong determinant of growth (26). In terms of the specific effect, Sachs and Warner (1997) find that "an increase in the initial share of natural resource exports in GDP from .1 to .2 (10 to 20 percent) is predicted to reduce subsequent growth by .33 percentage points per annum" (14).

Importantly, numerous works have provided additional empirical support for the resource curse. Gylafson (2001), when examining the role of education as connected to resource endowment and economic growth, found that resources, measured as total natural capital, statistically significantly reduced economic growth during the period 1965-1998. Auty (2000) also has supported the notion that resource abundant countries have experienced poor growth. In fact, his empirical analysis of 70 countries, from 1960-1997, is so suggestive of this relationship that he boldly states, "resource-poor countries have performed superiorly since the first oil shock" (Auty 2000, 348). Small countries that were classified as resource poor experienced growth between 4.0 and 6.1% while countries that were classified as resource rich, dependent on minerals, oils, or ores, experienced slower growth (Auty 2000).

Additional support for Sachs and Warner's initial findings can also be found in Kronenberg (2004), Neumayer (2004), Van der Ploeg and Poelhekke (2009), Isham et al. (2005), and Rodriguez and Sachs (1999). Van der Ploeg and Poelhekke (2009), for example, though critical of Sachs and Warner's interpretation for the causes of the resource curse, found that resources negatively affect growth due to their volatility. Kroenenberg (2004), who examined transition economies and states, found that such states with high resources also experienced slow growth. Isham et al. (2005) showed that "point source" resources, or resources that are "extracted from a narrow geographic or economic base, such as oil, minerals, and planation crops" (143) have an effect on institutions and, through that, negatively affect economic growth.

To put it bluntly, a wide range of empirical evidence supports the notion that natural resources negatively effects economic growth. Regardless of time period and country inclusion, the relationship seems to hold. This is not to say, however, that it is entirely deterministic. There are clearly countries, Norway for example, who are blessed with substantial natural resources that have experienced strong economic growth. Nonetheless, the resource curse does seem to generally hold.

Yet, this is only one side of the empirical literature. Not surprisingly, since the early Sachs and Warner (1995, 1997) findings, several scholars have attempted to account for countries that have not seen the resource curse theory hold and, in turn, have developed explanations and presented results that strongly contrast the resource curse hypothesis. Literature that has refuted the resource curse has done so on three grounds. First, literature has argued that the resource curse is conditional, based on a number of other factors that, when properly controlled for, actually explain the slow growth, not resources. Second, literature also argues that the empirical relationship is simply not present when properly specified. Third, and finally, literature has argued that the resource curse may well be an artifact of measurement and that previous measures of resources have both confused the argument and improperly specified for resources.

At the first level, scholars have argued that there is simply not a resource curse when the relationship is properly specified and additional controls are included. Lederman and Maloney (2007) have argued that the resource curse finding is not robust to additional metrics, though it is robust when you examine export concentration. In fact, using their measure in a panel estimation, they find that more resources aid in growth which leads them to argue that, "at the very least we should probably abandon the stylized fact that natural resource abundance is somehow bad for growth and even perhaps consider a research agenda on the channels through which they may have a positive effect, possibly, through inducing high productivity growth" (Lederman and Maloney 2007, 15). Additionally, when simply examining the many factors that impact growth, Sala-i-Martin et al. (2004) found that resources, using the Sachs and Warner measure, was not one of the 18 variables (of the 67 they examined) that was "significantly and robustly partially correlated with long-term growth" (813).

In terms of variable omission and the contingency of the resource curse, Manzano and Rigobon (2007) argued that the resource curse goes away if you account for an important omitted variable, the ratio of foreign debt to GDP, while Papyrakis and Grelagh (2004) argued that, when considered in insolation, resources do have a negative effect on growth but, when "other explanatory variables such as corruption, investment, openness, terms of trade, and schooling are included," (181) the negative effects of resources on growth go away. Additionally, Bravo-Ortega and de Gregorio (2007) and Stijns (2005) argued that the negative relationship between resources and growth is contingent upon human capital. As Bravo-Ortega and de Gregorio (2007) state, "once human capital exceeds a very low threshold, the rate of growth also increase with the abundance of natural resources" (73). Finally, several scholars have argued that the differentiation between different types of resources has been missing from the literature and that if there is a resource curse, it is only with specific types of resources (Leite and Weidmann 1999; Sala-i-Martin and Subramanian 2003; Stijns 2005). Generally, it has been argued that resources that are more consolidated and have greater profit margins, like ores, and minerals are more susceptible to the resource curse hypothesis (Isham et al. 2005).

Lastly, in terms of conditionality, empirical evidence has strongly supported the role of institutions. Accordingly, when controlling for an including institutions, several scholars have argued that there is not necessarily a curse of resources. Though this first explanation in refutation of the resource curse hypothesis closely aligns to the political explanation of the resource curse, it actually takes it step further by showing that impact of resources themselves are modified by institutions. Starting with Mehlum et al. (2006), the argument has been that institutions explain the divergent paths of resources-based countries. By simply graphically showing the relationship between growth and resource-rich countries, they argue that resources do appear to cause slow growth. However, when you divide countries based on "good" and "bad" or what they call "production" and "grabber" institutions, you immediately see that institutions determine the path of the resources and growth (Mehlum et al. 2006). In themselves, however, Mehlum et al. (2006) show that institutional quality does not determine growth but that it modifies the effects of resources on growth.

Brunnschweiler (2008) and Boschini et al. (2007) have argued similar points to Mehlum et al. (2006). Boschini et al. (2007) find that including institutions actually wipes out the statistical significance of resources on growth (using the Sachs and Warner measure) but that when you replace resources with ore and metal, mineral, and gold, silver, and diamond production as a share of GDP, resources, institutions, and the interactive effect all become significant predictors of growth. According to the authors, this finding is supportive of the idea that certain resources are more appropriable and that good institutions are necessary to prevent slow growth (Boschini et al. 2007). Brunnschweiler (2008) also examined the role of institutions with new metrics of resources and found "no evidence of a negative growth effect of natural resource abundance" (400). Moreover, Brunnschweiler (2008) finds that resources do not hinder growth, even with including institutions in the statistical models, except when using only the Sachs and Warner measure.

Collectively, these authors have provided significant, empirical challenges to the resource curse hypothesis. This debate over the existence of the resource curse, from an empirical perspective, is an important tension in the literature. Not only does it raise questions about the theories behind the curse, but it also raises empirical and methodological issues.

Resource Measurement

Though evidence in favor of a resource curse appears quite strong, so does evidence against it, especially in the context of conditional effects. An aspect of these arguments, and a tension to now be addressed, is the issue of measurement. Specifically, resource curse findings have varied based on the measurement of resources and even varied when using similar measures.

In measuring natural resources, it must be clear the chosen metric actually proxies for resource abundance.[7] Several measures of resource abundance have been employed in the resource curse literature. Starting with the initial measure, Sachs and Warner (1995, 1997) utilized primary product exports, as a share of GDP, (in 1971) to proxy for resources, and this was common practice in the resource curse literature for some time. Though they also employed three other measures for robustness checks on their argument (two were associated with export data as well while the other focuses on land area), Sachs and Warner (1995) preferred this measure of resources because "the intersectoral and political economy effects of natural resources should depend on the weight of those resources in total income (that is, GDP) rather than total exports" (13). Further, the measure got at agriculture, mineral, and fuel resource exports, which provides the best treatment of resources for their argument (Sachs and Warner 1995).

Many scholars have also used this metric for resource abundance in one fashion or another. For example, Boschini et al. (2007), Mehlum et al. (2006), Lederman and Maloney (2007), Manzano and Rigobon (2007), Kronenberg (2004), and Neumayer (2004) all employed the Sachs and Warner (1995) measure for natural resource abundance. Thus, a considerable body of resource literature has employed a single metric for capturing resource abundance. Even within this sample of literature, however, findings have varied. As previous noted, both Boschini et al. (2007) and Mehlum et al.

[7] The term "abundance" is used here, rather then dependence, to express the resource-growth relationship because, up to this point, literature has made very little distinction between the terms (with exception of Brunnschweiller (2008) and few others). This distinction will be addressed in the forthcoming chapter and is, indeed, quite central to the resource curse literature itself.

(2006) have argued that the curse depends on institutions. All scholars, however, have not accepted this measure, with varying critiques leveled upon it.

Three of these critiques deserve attention. Primarily, it has been argued that Sachs and Warner's (1995) measure of resources obfuscates the differentiation between specific resources, which may be of particular interest (Lujala et al. 2005; Sala-i-Martin and Subramanian 2003). For example, the Sachs and Warner (1995) measure of natural resource abundance would inhibit the examination of fuel and non-fuel resources, like the one conducted by Leite and Weidmann (1999). Second, the Sachs and Warner (1995) metric is also problematic because it only examines exports of resources which may not address the fact that some resources are stolen long before they are exported (Lujala et al. 2005). Third, the Sachs and Warner (1995) resource measure is problematic because it may not actually measure what it claims to measure (Brunnschweiler 2008; Pedergast et al. 2011). Though this last concern will be addressed in the coming chapter, the basic argument is that Sachs and Warner may only be tapping into dependence instead of abundance with their measure.

In lieu of the Sachs and Warner (1995) measure, several other metrics have been employed. Several works have disaggregated the measure to examine the impact of specific resources. For example, Sala-i-Martin and Subramanian (2003) focused on oil and "enlarged" the Sachs and Warner measure "to include (i) the share of the exports of four types of natural resources- fuels, ores and metals, agricultural raw materials, and food- in GDP and total exports; (ii) the share of the exports of all natural resources in total exports; and (iii) a dummy for oil producing countries" (8). Similarly, Leite and

Weidmann (1999) and Isham et al. (2005) also disaggregated the measure or disaggregated exports for their research purposes.

Other works have proposed different measures of natural resources altogether. Ding and Field (2005) measured endowments and dependence on resources differently; resource dependence is measured using the Sachs and Warner (1995) metric while resource endowments are measured as natural resource capital per capita. In doing this, Ding and Field (2005) find that endowments actually have a positive and significant relationship with economic growth while dependence has the expected negative relationship. Brunnschweiler (2008) examined resources by measuring fuels and minerals, non-fuels and minerals, minerals as both shares of GDP and per capita as well total natural capital, which effectively captures the present value of rents. When doing so, Brunnschweiler (2008) finds that reported negative relationship between resources and growth that defines the resource curse effectively goes away and actually turns positive. Similarly to Brunnschweiler (2008), Atkinson and Hamilton (2003), Gylafson (2001), and Stijns (2006) argued in favor of using rents data, specifically natural capital, as a measure of resources. This metric, in effect, is defined as natural capital divided by natural capital, produced assets, and human resources, which arguably captures resources better than other measures.

In sum, there are a host of measures that proxy for resources. Based on some of the differing findings between these measures, it is quite clear that measurement matters for the resource curse argument. The key here, in my view, is justification of the measure and being able to confidently argue that the measure captures resource abundance. To this end, it is necessarily to keep this tension in the literature in the forefront of our minds, as it will play an important role in my argument in the forthcoming chapters.

Case Evidence

To more fully conceptualize the arguments contained in this chapter, it is helpful to consider an example of a country with a great deal of resources that has experienced slow economic growth and a country with a great deal of resources that has experienced relatively stable growth. For the former, I once again return to the example of Nigeria while for the latter, I turn to Norway.

As noted in Chapter 1, Nigeria has significant oil wealth but has experienced slow economic growth. Sala-i-Martin and Subramanian (2003) articulate this fact when they note that "Nigeria's GDP was US$ 1,113 in 1970 and has been estimated to remain at US$ 1,083 in 2000" (4) despite the significant natural resource wealth. Those that argue that there is in fact a resource curse would have essentially predicted Nigeria's fate.

The case of Nigeria presents an interesting examination of the theory and arguments presented above. On the one hand, Nigeria has experienced relatively disastrous growth. Sala-i-Martin and Subramanian (2003) explain this fact with startling evidence:

> "Over a 35 year period, Nigeria's cumulative revenues from oil have amounted to about $350 billion at 1995 prices. In 1965, when oil revenues per capita were about $33, per capita GDP was $245. In 2000, when oil revenues per capita were $325 per capita, per capita GDP remained at the 1965 level. In other words, all the oil revenues- $350 billion in total- did not seem to add to the standard of living at all" (4).

At first glance, the resource curse appears to have taken hold. However, Sala-i-Martin and Subramanian (2003) notably rejected the Dutch disease explanation and instead argued that Nigeria's slow growth was the result of simple waste and corruption, which seems to fit the political theories associated with the resource curse. Regardless, what is clear from the case of Nigeria is this: over the last approximately thirty years, Nigeria has experienced slow, if not flat-line growth by virtually any measure, and the amount of resources, specifically oil, has played an important role.

Norway, on the other hand, is also a country with substantial amounts of oil but has maintained relatively steady economic growth. As an illustration, over approximately the last thirty years, Norway has maintained an average growth rate of 2.6% with only one year of negative growth.[8] This growth rate has been maintained and strong despite the presence and dependence of Norway on oil (Boschini et al. 2007). Arguably, Norway has been able to avoid the resource curse by properly investing, training its citizens, and improving its technology to better obtain the resource (Wright and Czelusta 2004). More specifically, "Norway has extended the quantity of petroleum reserves" by "advancing in technology" and allowing educating its citizens and own state about the resource (Wright and Czelusta 2004, 22). Undoubtedly, in comparing Norway to Nigeria, Norway has experience much more stable growth due, at least in part, to its stronger governance. But, in this important regard, we see that resources themselves are not deterministically correlated to slow growth and that countries, with substantial natural resources, like Norway, can actually avoid the curse.

These two cases of Nigeria and Norway are by no means the "full story" of their economic growth and they are not meant to be. Rather, the key here is to recognize that two countries, both with substantial amounts of the same natural resource, have enjoyed different levels of economic growth and experienced different factors in their given situation. In short, these two stories are rather illustrative of the theory and evidence

[8] This calculation comes from Penn World Tables 6.3 (Heston et al. 2009).

above in that while there may be a resource curse, even such a curse might be conditional on additional factors, and that the existence of natural resources does not guarantee negative economic growth.

Summation

This chapter has reviewed a wide range of literature on the resource curse with direct attention to the underlying theory, empirical evidence, both for and against, and the tensions that are present. From this review, two facts have emerged that shape this work. First, it is difficult to argue, unconditionally, that there is a resource curse or that resources directly, negatively affect economic growth. While evidence has been supportive of this relationship, a substantial body of literature has also been able to show that an abundance of resources may not directly affect growth, when additional variables are controlled (for example, see Papyrakis and Gerlagh 2004) or only have conditional effects that are directly tied to other variables (for example, see Boschini et al. 2007). Thus, it is not unreasonable to suspect that there is in fact a resource curse, but it is far from a given. Second, how resources are measured and defined makes a substantial difference in the empirical findings. Though this will be addressed in the forthcoming chapters, suffice to say that this issue is extremely important and necessary to address if one is to talk about a resource curse.

The resource curse is indeed a puzzle, though not just one necessarily consisting of an irony between an amount of resources and economic growth. Rather, the puzzle also lies in whether or not a resource curse necessarily even exists. In the context of this work, it is particularly noteworthy to consider the conditional relationship noted in this literature and the potential role of corruption.

CHAPTER 3: RESEARCH QUESTION, DEFINITIONS, AND THEORY

Having reviewed the corruption and resource curse literature in the previous two chapters, I now undertake the several steps that must be made to present and test my theory. First, I define my research question, as based on these two literatures. Second, I define resources and give significant attention to the distinction between resource *abundance* and resource *dependence* which frame the debate. Third, I present my theory. Fourth, and finally, from this theory, I derive specific hypotheses to be tested and operationalized in the forthcoming chapter.

To preview, I argue that the effect of resources on growth should be conditioned by corruption, which would represent, econometrically, an interactive process. Though the existing literatures tell us that corruption and resources maintain a relationship (Leite and Weidmann 1999; Damania and Butle 2008; Baland and Francois 2000), works have not theorized or empirically tested their potential joint relationship with economic growth.

Research Question

The resource curse literature presents compelling theory and evidence in support of an inverse relationship between resources and economic growth (Sachs and Warner 1995; Auty 2000; Kronenberg 2004). However, substantial evidence indicates that the relationship may not hold based on three factors: measurement, the specific type of natural resource, and additional variables that may conditionally affect the relationship.

The corruption literature presents compelling theory and evidence as well in support of an inverse relationship between corruption and economic growth. Empirical evidence and theory broadly support the proposition that increased corruption will result in less growth (Mauro 1995, 1997; Mo 2001; Gyimah-Brempong 2002).

Therefore, from these two literatures, the basic research question was formed: Do corruption and resources interact, and does corruption condition the effect of resources on growth? Indeed, I have probably tipped my hand in the first two chapters and believe that they do. Specifically, the resource literature already "talks" about the role of corruption and, in the pages to come, I distill this "talk" into my core theory.

Defining and Measuring Resources

Of particular interest in this work is the definition and measurement of resources. The exact measurement and definition of such a term seems rather intuitive, yet the literature has clearly been divided on this particular topic. To put it differently, though the word corruption has a largely agreed upon definition, the conceptualization of natural resources, and measurement of them, is not nearly as clear. Defining resources is thus absolutely essential to understanding the arguments associated with the resource curse.

For the purposes here, I define natural resources as any resource of a country that is exhaustible and exists in the natural environment.[9] These include minerals, oils, fuels, gases, timber, and other resources that have substantial potential for economic gain, are finite in nature, and differ from country to country and area to area. Thus, when scholars speak of a natural resource curse, they are referring to the inverse relationship between the amount of exhaustible and natural environment, potentially wealth generating, resources that a country maintains, and economic growth.

---

[9] The World Trade Organization similarly defines natural resources as "stocks of materials that exist in the natural environment that are both scare and economically useful in production or consumption, either in their raw state or after a minimal amount of processing" (World Trade Report 2010, 46).

This last point, on amounts, deserves particular attention in the contexts of the resource curse, as it is a point of contention. Specifically, when discussing the resource curse, scholars are unclear as to what exactly is the curse of resources. Is it resource *abundance* or is it resource *dependence*? Abundance, by its very definition, implies a volume. In the context of the resource curse, this would imply that the volume of resources produced negatively effects growth. Dependence, on the other hand, though closely related to abundance, implies degree. In the context of the resource curse, this would imply that rate of resources, or the proportion of resources to the population or total exports or some other size-based denominator, negatively effect growth.

This distinction is important as it fundamentally shapes the resource curse argument and measurement of resources themselves. Brunnschweiler (2008), for example, has argued that Sachs and Warner's (1995, 1997) commonly used resource measure more closely approximates a dependence of an economy on resource exports, despite the fact that they speak in terms of resource abundance. In the work itself, Sachs and Warner (1995) articulate a finding of resource dependence, in-line with their measure, yet speak and introduce the resource curse idiosyncrasy in terms of abundance. Similarly, Mehlum et al. (2006), who also use Sachs and Warner's measure of resources, articulate a theory of abundance but measure dependence.

Though fuller treatment of this distinction will be given in the forthcoming chapter, during operationalization, it is sufficient to say for now that abundance and dependence imply different phenomenon and that the literature itself should be more attentive to this distinction. Since the literature largely speaks of the resource curse in abundance terms, we should be measuring and defining the resource curse as such. However, both will be operationalized and measured in this work for robustness.

Framework

Existing theories explaining the resource curse argue that it is the result of a number of different economic, structural, and political factors, as discussed in the previous chapter. The Dutch disease, the volatility of natural resources, and a host of other explanations have all been used to explain the debated negative relationship between resources and economic growth.

Drawing from these previous explanations, I offer a political-economic explanation to the resource curse that is premised on the direct inclusion of corruption. Independently, corruption harms economic growth. Empirically, the literature has largely shown this fact (Mo 2001; Anoruo and Braha 2005; Mauro 1995, 1997). Independently, resources can also harm economic growth. One of the key mechanisms that connect resources to economic growth is corruption (Mock 2003; Sala-i-Martin and Subramanian 2003; Mauro 1997; Damania and Butle 2008; Humphreys et al. 2007). I argue that *the negative effect of resources on economic growth is increased in the presence of high corruption. However, in the presence of low corruption, the negative effects of resources on growth are moderated or altogether eradicated.* Inherently, this is the logic of an interactive effect and the mechanism and theory behind this logic are now addressed.

Theory

Corruption conditions the effect of resources on economic growth. If corruption is higher, the effect of natural resources on growth will be more negative than it otherwise would. In the presence of high corruption, citizens and leaders, who already engage in corruption, will concentrate their corruption to the natural resource sector, which will hinder economic growth more so. This occurs because natural resources give those who are corrupt ample *opportunity* and avenues to engage in such corruption.

With a booming natural resource sector opportunities to engage in corruption are abound, which makes resources more "stealable" and incentivizes leaders and citizens to direct their corruption to the resource sector (Humphreys et al. 2007). Many opportunities occur through the state. The state plays a prominent role in the natural resource sector (for example, see Sala-i-Martin and Subramanian 2003 in their discussion of the role of Nigeria government in the resource sector). The state either directly has a hand in the sector through state run natural resources or has an indirect role through contracts and agreements with outside corporations (for example, see Stiglitz 2007 and Humphreys et al. 2007). In either case, there are multiple "ins" for corrupt individuals to engage in bribery or other forms of corruption. Mock (2003) perhaps best describes these "ins" when he states that "natural resource sectors are often governed by complicated regulations, with special permits for exploitation and export, and [natural resources] must be inventoried and accounted for to determine royalties and taxes- all of which are entry points for manipulation and corruption" (36). Mauro (1997), in examining corruption generally, similarly stated that "where regulations are pervasive and government officials have wide discretion in applying them, private parties may be willing pay bribes to government officials to obtain any rents that the regulations may generate" (85). In short, those who are corrupt direct their corruption to the resource sector because they have *opportunity* through the state's role in the natural resource sector. In doing so, the negative effects of resources on economic growth are accentuated when corruption is high.

Opportunity also arises due to the concentrated nature of natural resources. Oftentimes, natural resource operations occur in far-off a location, which gives leaders and citizens an opportunity to engage in various forms of corruption (Mock 2003; Pendergast et al. 2011; Isham et al. 2005). Mock (2003) explicitly notes this point when he states that "most natural resource exploitation takes place far from public view, in remote regions where monitoring and media scrutiny are low" and that "the areas at issue may be physically vast and sparsely populated" (36). To this end, corruption specifically conditions the effects of resources on growth because corruption can be more directed at resources due to their concentration, which, in turn, accentuates the negative impact of resources on growth.

Scholars have frequently referred to these opportunities through such terminology as "appropriability," which indicates that there is something inherent about natural resources that make them the target of corruption (Boschini et al. 2007; Van Der Ploeg 2011; Isham et al. 2005; Damania and Butle 2008). Whether it is their finite nature or their "stealability" and many opportunities that the natural resource sector provides for corrupt leaders and citizens, the fact remains that corruption is concentrated towards natural resources. High corruption generates a situation where the effect of natural resources on economic growth is even slower growth.

<u>Hypotheses and Expectations</u>

Based on this theory and the existing literature, the following predictions have been formulated.

Hypothesis 1: Corruption will have a negative effect on economic growth. This proposition comes directly from the corruption and growth literature and is largely in-line with existing findings. As previously noted, several scholars have argued that corruption has a negative effect on economic growth (See, for example, Mo (2001); Mauro 1995,1997; Gyimah-Brempong 2002; Anoruo and Braha 2005). Based on this preponderance of evidence, this hypothesis is a reasonable expectation.

Hypothesis 2: Natural resources will have a negative effect on economic growth. This proposition is less intuitive than the first because it has received tentative support in the literature, as noted in the previous chapter. However, based on the seminal works of Sachs and Warner (1995, 1997) and the several other scholars noted in the previous chapter, it is reasonable to maintain this expectation as a starting point for testing purposes. At the same time, we should be cautious with regards to the type of resource, as the literature indicates.

> *Hypothesis 3: The effect of natural resources on economic growth will be conditioned by corruption. As corruption increases, the negative effects of resources on growth will be accentuated. However, at lower levels of corruption, the potential negative effects of resources on growth will be lessened.*

This proposition directly stems from the theory presented here. Independently, corruption and resources have arguably negative effects on economic growth (*hypothesis 1* and *2*). Combined, interactively, the effect of resources is conditioned by corruption due to the opportunities that come with a resource sector, with higher corruption impacting the direct relationship between resources and growth (*hypothesis 3*).

CHAPTER 4: METHODOLOGY AND RESULTS

Design and Methodology

In order to test hypotheses outlined we must first operationalize the concepts. The dependent variable of this study is economic growth. Put simply, economic growth captures the rate at which the economy in a given country, during a given year, is growing, remaining the same, or declining. The independent variables in this study are resources, corruption, and the interaction of resources and corruption, which is explained below. The control variables in this study are variables that have been found to impact economic growth and are commonly utilized in studies on corruption and resources. Specifically, trade, GDP per capita, civil war, government consumption, and population will all be controlled. Time period controls, along with an Africa continent and tropical climate control are also employed.

The units of analyses for this study are individual countries in the world for which data was available. Thus, we have roughly 130 countries in this study, which permits substantial traction on the arguments outlined. The time period of this study is from 1984-2003. This time period has been broken down into two ten-year periods due to the nature of the dependent variable, as outlined below. The time and country variation of this study, therefore, make it cross-sectional in nature, though two time periods are effectively examined.

To conduct this study, all variables were gathered and complied into a single dataset. In specific cases, certain variables were recoded or transformed and have been noted as such. Additional information on these variables, not listed below, can be found in the Data Explanation Appendix.

The dependent variable of economic growth was gathered from Penn World Tables 6.3 (Heston et al. 2009). Economic growth is measured as the percent change in GDP from one year to the next, in 2005 dollars. This particular measure of economic growth has become commonplace in the growth literature and has been utilized by Sachs and Warner (1995) when studying the resource curse and Mauro (1995) when studying corruption, among others. Because growth is highly sensitive to a specific time point, this variable has been averaged for two, ten-year time periods, 1984-1993 and 1994-2003. Averaging growth in this manner gives us an indication of how much a country has grown economically over a ten-year period and accounts for any huge spikes or low dips in any given year, which can occasionally occur. Moreover, taking average growth for an extended period of time has been common in the growth literature, with Sachs and Warner (1995, 1997) and Brunnschweiler (2008), among others, similarly using average growth over a time period in resource curse studies. Thus, this measure of growth should indicate the effect of our independent variables, over two ten-year periods, on growth.

Turning to the independent variables, the variable of corruption is measured utilizing the corruption variable from the *International Country Risk Guide* (ICRG). The ICRG maintains data on several political risk components with corruption being such a measured factor as ascertained by experts of the organization. Corruption data began in 1984 and covers the full time period of this study. With this in mind, the corruption variable itself measures corruption in a given country on a scale of 0 to 6, with 6 being the lowest risk or least corrupt system and 0 being a highly corrupt system. For ease, this scale was inverted in this work so that a 0 now represents a country with "no" corruption and a 6 a country that is highly corrupt. This variable is measured on a monthly basis, which were averaged within a year to obtain yearly corruption data.

Importantly, this measure of corruption was selected for two reasons. First, it has been commonly used in the corruption literature and thus represents a commonly accepted measure of corruption. For example, Drury et al. (2006), Mauro (1997), among others, have employed this measure of corruption. Second, this measure of corruption was selected because of its inclusion of countries and the time-span covered. Other measures of corruption, such as Transparency International, simply do not have as many countries in their sample or do not have yearly data, which would deter the cross-national investigation undertaken here. Additionally, it is important to note that the measure employed here ascertains perceived corruption by way of how fundamentally corrupt citizens and leaders may be, as judged by experts.[10]

Next, the independent variable of natural resources must be operationalized, which is not necessarily an easy task. Clearly, there is substantial disagreement on an appropriate measure to capture resource abundance. Given these disagreements, I have opted to measure natural resources by taking into account two important arguments in the literature. First, the measure I employ disaggregates between types of natural resources, which will allow me to examine the effects of different resources on growth. Second, I employ a measure that will allow for an examination both resource *dependence* and

[10] The ICRG Methodology Guide (2012) specifically describes their measure as being concerned with "actual or potential corruption." Moreover, they detail that the most common forms of corruption met by business is "demands for special payments and bribes connected with import and export licenses, exchange controls, tax assessments, police protection, or loans" (ICRG Methodology Guide 2012). This later point further justifies the use of this measure of corruption for this work.

abundance. In light of the debate in the literature on measurement, it seems prudent to include a measure that captures both.

With these two aspects in mind, I measure natural resources utilizing new resource measures from Haber and Menaldo (2011), who re-examined the resource curse in terms of the effect of resources on regime type. Specifically, I utilize their measures of total oil, coal, natural gas, fuel, and metal income as well as total resource income for resources. Each of these measures determines the amount of the given resource in per capita terms, which should proxy for resource *dependence*. For example, Haber and Menaldo (2011) determined *total oil* as the product of the amount of crude oil produced in a given year and the value of crude oil in 2007 dollars, which they then divide by the population to effectively give the total crude oil income per capita for each year in a given country. Because each of these variables are in "per capita" terms, they proxy for *dependence* or reliance, rather than abundance, of resources. In effect, each of these variables, total oil, coal, natural gas, fuel, metal income per capita, and total resource income, indicate how dependent the country is on each resource as part of it's per capita income. In many ways, this fits the very definition of resource *dependence*. To move to resource *abundance*, however, is not terribly challenging, as resource abundance is simply how much of a resource a country maintains. To do this, I generated a new variable for each of the resource types that only contains the product of the amount of the resource produced and the value of that resource in 2007 dollars for each given year. For example, *oil abundance* is defined as the amount of oil produced in a given country in a given year, multiplied by the value of oil in 2007 dollars, as both ascertained by Haber and Menaldo (2011).

In brief, I employ two categories of resources to be measured: *resource dependence* and *resource abundance*. Within each of these we have six measures of resources that disaggregate between the different types: oil, coal, natural gas, fuel, metal, and total resources.

Importantly, these direct measures of resources are relatively new and thus, have not been employed before in this context to examine economic growth. Haber and Menaldo (2011), in developing the actual measures of these variables, relied heavily on primary sources and their own research to obtain accurate and detailed measures. For example, to measure *total oil* income per capita, Haber and Menaldo (2011) consulted to several oil and gas journals, energy guides, and development indicators, to construct a sound and accurate measure of resources. Thus, though this metric is relatively new, its completeness, breadth, and variation make it an ideal measure for resources.

The third independent variable of this work, which proxies for my core theory, is the interactive effect of resources and corruption. To obtain an interaction variable, you simply multiple the two independent variables of interest which, in the case here, means multiplying corruption (as measured by the ICRG) and resources, which has been done for all of the resource dependence and resource abundance variables. This generated six separate interaction terms for resource dependence (an interaction term for each type of resource as conditioned by corruption) and six for resource abundance (an interaction term for each type of resource as conditioned by corruption).

In addition to these independent variables, I control for several factors. Specifically, *lgdppercap* is a control for the level of GDP per capita, in the starting year of the two time periods. Growth scholars argue that such a control is necessary because

GDP growth may hinge upon the existing level of wealth in a given country (Barro 1996). Data for this variable comes from Penn World Tables 6.3 (Heston et al. 2009) and is generally complete for the time periods of this study. In the dataset, the variable is logged to linearize it for analysis.

Second, *trade openness* is a control for openness of the economy in a given year. It is measured as simply the exports plus imports, divided by the real GDP per capita, in 2005 constant prices, and thus indicates the degree of openness of an economy. Data for this variable comes from Penn World Tables 6.3 (Heston et al. 2009). Works studying both the effects of corruption and resources on economic growth have routinely controlled for trade. Sachs and Warner (1995, 1997), for example, controlled for trade by indicating openness in terms of years the economy was open. Additionally, Yanikkaya (2003), when examining the impact of trade on economic growth, has drawn attention to understanding the impacts of trade on growth, while Barro (2003), found that trade and trade openness were influential in understanding economic growth.

Third, the economic control of *government consumption* is also employed. It effectively represents the size of government and is a component part of real GDP. Specifically, this variable comes from Penn World Tables 6.3 and is measured as the consumption share of GDP in constant 2005 prices (Heston et al. 2009). Data for this variable is complete for the time periods of this study and comes as a percentage. Growth scholars have argued that consumption can affect economic growth and such a measure of consumption has been used in the existing literature. For example, Gyimah-Brempong (2002) controls for government consumption when examining the effects of corruption on economic growth in Africa.

Fourth, I control for the *population growth rate*. In particular, it has been argued that the rate of population growth can affect the economic growth rate, with increasing population growth tending to harm economic growth, as found, for example, by Van der Ploeg and Poelhekke (2009). This variable comes from the World Bank's World Development Indicators (2011) and is simply the percentage change in population between years. Importantly, scholars have measured the effects of population in different manners with some using measures of the population growth rate and others simply using the log of the total population. Using either measure, however, does not significantly affect the regression models in this work.

Fifth, I control for the instance of a *civil war*. This is a dichotomous variable and equals a one during the instance of a civil war. It comes from the Haber and Menaldo (2011) dataset but is based on the general definition of a civil war according to the Correlates of War Project. The instance of a civil war can have unsettling economic effects and thus is important to control. Collier (1999), for example, has shown that the instance of a civil war has a substantial negative effect on long-run economic growth.

Sixth, and finally, I employ several additional controls to ensure that the findings and regressions ran are not sensitive to climate, region, and time. In terms of climate, I employ the control of *tropics*, which measures the fraction of land that is subject to a tropical climate. Sachs and Warner (1997) similarly employed this metric and argued that countries in a tropical climate may be subject to slower long-term economic growth. In their work, they found that more tropical land is associated with slower growth. The measure of tropical climate here came from Sachs and Warner (1997) and spans from 1 to 0, with 1 indicating a country that is contained entirely in a tropical climate.[11] To control for region, I employed the dummy control of *Africa*, which simply coded as a 1 for any country in Africa and a 0 otherwise. Growth literature has noted the relatively slow economic growth of many African countries (Sachs and Warner 1997; Gyimah-Brempong 2002) and thus indicates that such a control variable may be influential.[12] Lastly, I controlled for the two time blocks studied here by employing a simple time dummy variable, coded as 1 for the second ten-year time period and 0 for the first ten-year period, to ensure that the results are not contingent upon either one of the ten-year time periods of growth.[13]

In sum, this study examines economic growth over two ten-year time periods, from 1984-2003, with a specific focus on the effect of corruption, resources, and the their interaction. According to my theory, it is expected that corruption will have a significant modifying effect on the relationship between resources and economic growth, with increased corruption resulting in marginally larger negative effects of resources on growth.

<u>Statistical methods</u>

To actually examine the effects of the independent variables on the dependent variable, I employ OLS cross-section regression due to the very nature of the dependent variable. Though there is an element of time in this work, the two ten-year averaged

---

[11] Sachs and Warner's (1997) dataset did not include five countries that were analyzed in this work. I calculated the tropical climate variable for these countries, which are noted in the Data Explanation Appendix.

[12] I also tried a regional dummy variable to account for all regions and it did not substantively change the findings.

[13] Though not noted, I also controlled for ethnic fractionalization, which did not substantive effect the results. Because it slightly decreased the observations and maintained no substantive effect, I chose not to include it in the main regressions, though some scholars have argued that it can influence economic growth (for example, see Easterly and Levine 1997).

growth periods only constitute two time points (1984 and 1994). With only two time points, using time-series cross-section would be inappropriate since the effective time frame is so small. To account for this time component, however, I have included a time dummy variable as noted, which will account for any potential difference in economic growth between the two ten-year average periods. OLS regression, therefore, serves as the appropriate medium to test the arguments put forth here because the time period is so small and the dependent variable is effectively continuous in nature.

Before moving forward, it is necessary now to note four specific statistical issues and address the expected directions of the independent variables based on the hypotheses, as well as address the interpretation of an interaction term.

In terms of the data, we must be aware of four specific factors that could influence the estimates obtained by OLS regression. First, heteroskedasticity, or non-constant variance of the error terms, can bias the standard errors, which, in turn, will bias the significance of the findings (Wooldridge 2009). To address this, I utilize robust standard errors in all regression models presented. Second, OLS regression assumes that the variables measured are linear in parameters. To address this, several variables in this work were logged because they presented elements of non-linearity. When this was done, notations have been made in the above operationalization or in the Data Explanation Appendix. Third, simple cross-section analysis can frequently present issues of collinearity, which will affects the validity of the estimates (Wooldridge 2009). To address this potential problem, I have checked for collinearity between all independent and control variables, with no one variable maintaining a correlation of above .6 with any other variable and, in most cases, maintaining a correlation of below .4. Though it can be difficult to rule out collinearity in some cases, significant caution has been taken to address such a concern. Fourth, any statistical analysis can have issues with endogeneity, or multiple-way causality between the dependent and independent variables. However, such issues should not be present here, due to the very nature of the data. Because growth is measured as a ten-year average, our independent and control variables effectively only pick-up measurement in the time period at the start of the cross-section. To this end, it is unlikely, for example, that the level of corruption in 1984 is somehow affected by the average growth from 1984-1993.

In terms of understanding the results and expected direction of the coefficients, we return back to the theory and operationalization of the variables. Based on the hypotheses, it is expected that the corruption variable (0 is "no" corruption) will negatively effect economic growth and thus maintain a negative sign on the coefficient. Second, it is expected that all resource variables will also negatively effect economic growth and thus also maintain a negative sign on the coefficient. Third, the interaction term of corruption and resources, in all cases, is expected to maintain a negative sign, according to the argument.

Importantly, however, interaction terms require especially careful interpretations when included in any statistical model because they affect the values of the independent variables (Brambor et al. 2006). Specifically, it is a bit challenging to directly interpret the value of the constituency terms independent of the interaction term. In turn, to interpret that effect of the constituency terms (corruption and resources independently), the marginal effects of each term must be examined at given values of the other variable (Brambor et al. 2006). Additionally, it is also necessary to not just examine the statistical significance of the interaction term in the regression because it, along with the two constituency terms, are dependent on each other. To properly interpret the interaction term then, I also conduct joint significance tests of each term along with the interaction term, which indicates if they are jointly significant and, if so, which variable is modifying the other. For example, I test to see if variable A and the interaction, C, are statistically significant and also test to see if variable B and the interaction C are significant. All told, conducting and interpreting the interaction term in this manner, in addition to examining the interaction coefficient itself, should effectively indicate if my theory is correct.

To restate the model and operationalization employed here, I examine the impact of resources and corruption on economic growth over the time period 1984-2003, with two ten-year time periods covering the economic growth dependent variable. In effect, this means that the independent variables have measures for the years 1984 and 1994, which are tested against the two ten-year periods of economic growth. According to my argument, it is expected that the interactive effects of corruption and resources will negatively affect economic growth. Additionally, the construction and measurement of the variable of resources, with a new measure that allows us to capture both resource dependence and abundance, is employed, which also disaggregates between different kinds of resources. It is expected, based on the stated hypotheses, that corruption, resources, and the interaction term will all display negative effects on economic growth.

[Table 1, 2, and 3 About Here]

Results

As a first cut at examining the effects of corruption and resources on economic growth, I examined the independent effects of each variable, separate of each other, and separate of an interaction term. Table 1 displays the effect of corruption on economic growth, Table 2 the effect of resource dependence on economic growth, and Table 3 the effect of resource abundance on economic growth.

The regression in Table 1 indicates that corruption has a statistically significant impact on economic growth, at the .05 level of significance. The value of the coefficient, at -.255, indicates that a one-unit increase in the corruption variable will result in a .255 decrease in economic growth in the ten-year period. Because economic growth is measured as a percentage, a .255 decrease is quite significant and signals that unit increase in corruption, or, for example, moving from a 0 to 1 (not corrupt to "a little" corruption) has a significant, negative effect on growth. The level of significance of this variable further indicates that we can confidently reject a null hypothesis of no effect of corruption on growth. Moreover, the finding is rather consistent with the corruption literature and *hypothesis 1*. Overall, the model itself in Table 1 performs quite well as we observe an R-squared, or the amount explained, of .2237. This indicates this model explains roughly 22% of the variance in the dependent variable. Lastly, we also observe that initial GDP per capita, being in Africa, having a higher proportion of land in the tropics, and population growth rate are all statistically significantly, negatively, predictive of economic growth, while trade openness is significantly, positively predictive of growth.

Turning to the models in Tables 2 and 3, we observe the independent effects of resource dependence (Table 2) and abundance (Table 3) on growth. In contrast to my hypothesis, Tables 2 and 3 provide little, if any support of the notion that resources negatively affect growth. In fact, they lend some support to the opposite notion; resource may actually aid in economic growth. In not a single model (2.1-2.6) are any of the resource *dependence* variables statistically significant and, moreover, in all but two cases, the coefficients are pointing in the opposite direction (positive). In not a single model (3.1-3.6) are any of the resource *abundance* variables statistically significant in the predicted, negative direction. Moreover, in four models, with natural gas, fuel, metals, and total resources as the independent variables, the coefficients statistically significantly indicate that resources have a positive effect on growth. Though these particular coefficients are challenging to interpret because they are logged values, the fact that natural gas, fuel, metals, and total resource abundance all positively impact economic growth over the future ten-year period, is quite telling. Thus, the empirical results from Tables 2 and 3 indicate two important facts that will be discussed in the forthcoming chapter: (1) resources, as measured by dependence, do not statistically significantly, negatively affect growth and (2) resources, as measured by abundance, present some mixed evidence indicating that some resource types may actually aid in economic growth while others have no effect. In short, Tables 2 and 3 provide us no empirical evidence in favor of the resource curse hypothesis. Perhaps, however, the relationship has been slightly misspecified and corruption needs to be included in the model; the models in Tables 4 and 5 indicate precisely this specification.

[Table 4 and 5 About Here]

Tables 4 and 5 present the regressions of the resource dependence and resource abundance variables along with corruption (no interaction). In examining the models in Table 4, we see that corruption, with every specification of resource *dependence*, has a statistically significant, negative impact on economic growth. More specifically, in

Model 4.1, we see that a one-unit increase in the level of corruption results in a .273 decrease in economic growth over the ten-year period, a fairly substantial decrease in growth. Turing to the resource dependence measures, Table 4 largely presents the same conclusions as Table 2: resources do not have any statistically significant effect on growth over the ten-year period and, moreover, only Models 4.2 and 4.5 indicate a coefficient that is pointing in the negative, expected direction.

Table 5 indicates the effects of corruption and resource *abundance* on growth, which largely reconfirms the story told by the models in the previous tables. Primarily, we once again observe that corruption has a statistically significant, negative effect on growth. In general, this effect is about -.25, which indicates that a one-unit increase in the level of corruption of a country will result in a .25 decrease in economic growth on the ten-year average. Similar as to the results in Table 3, the models in Table 5 also indicate little evidence in favor of the proposition that resource abundance negatively effects economic growth. In fact, in two of the models the effect of resource abundance is indistinguishable form zero while in the other four models, with natural gas, fuel, metals, and total resource abundance as the metrics, we have evidence of actual positive effects of resources on economic growth. Thus, from Tables 4 and 5 we draw largely the same conclusions as before. On one level, we have relatively strong evidence of the effects of corruption. On another level, we have almost no evidence in support of a resource curse.

To this point, however, I have only examined the independent effects of resources and corruption on growth. The argument presented here, as noted before, is predicated on an interactive effect and it is to this I now turn. Perhaps including the interaction term will reveal some support for the resource curse.

[Table 6 About Here]

Tables 6 and 7 represent the models that specify my core theory. To briefly restate, I have argued that corruption should condition the effects of resources on economic growth. The reason behind this, as spelled out in Chapter 3, is because at higher levels of corruption, such corruption can be directed specifically to natural resources. In turn, at higher levels of corruption, we should expect to see evidence of more negative effects of resources on growth. Examining the models in Table 6, which indicates the resource *dependence* variables and their interaction terms, we observe several key findings. First, once again, it appears that corruption has a statistically significant, independent negative impact on economic growth; four of the models specify such a relationship. In the other two models, where metals and total resources are the resource variables, corruption is statistically insignificant but still showing the correct sign. However, the interpretation of these coefficients requires great care, as previous mentioned, due to the interaction term. Looking at the resource dependence variables, we see that oil, coal, natural gas, fuel, and total resources all appear to have a statistically insignificant effect on economic growth, with only coal showing the expected negative sign. Once again, this appears to indicate contrary evidence to the resource curse story.

Examining the interaction coefficient between the different resource types and corruption will allow us to both substantively interpret the effects of corruption and resource dependence, as well as understand their potential interactive effects. Clearly, however, only one of the interaction terms, that of metals and corruption, reaches conventional level of statistical significance. Importantly, this coefficient is highly statistically significant and indicates the hypothesized relationship, with a negatively signed coefficient. To interpret the impacts of these variables, I graphed the marginal effects of metal resources on economic growth, as modified by corruption. This graph is shown in Figure 1. The downward sloping line of the graph indicates that corruption indeed accentuates the negative effects of metal resources on economic growth. Focusing on the 0 line on the y-axis, we see that at low levels of corruption, the impact of metal resources on growth is actually positively affected. By simply calculating this marginal effect, when corruption is at 0, the effect of metal resources on growth is .268 and noticeably positive. However, as corruption increases, the effects of metals on growth becomes unaffected by corruption *until* corruption becomes rather high. In calculating the marginal effects, when corruption is average (3.004), the effect of metal resources on growth is not statistically significant. Conversely, in calculating the marginal effects, when corruption is at level 6 (highest), the effect of metal resources on growth becomes statistically significantly negative, with a coefficient of -.513. Indeed, we see here that corruption modifies the effects of metal resources, as my theory predicts, an important finding to be discussed in the coming chapter.

The rest of the results in Table 6, however, do not provide much support for my theory. No other interaction term maintains statistical significance and only two others, with coal and natural gas as the resources, maintain interaction terms in the predicted direction. Importantly, however, by conducting joint significance tests of the constituent terms and the interaction term in each case, we quickly see that see a statistically significant joint effect is present in both of these cases. However, in these two cases, it is specifically the relationship between corruption and the interactive term that is statistically significant which suggests that resources are actually modifying the effects of corruption on economic growth, not the other way around, as I argued. For coal and natural gas resources, the empirical results lend some support to the notion of an interaction, but not necessarily to my theory.

In short, Table 6 presents only little support for my theoretical story, with only Model 6.5 performing as I theorized. Models 6.2 and 6.3 maintain the expected directional sign of the interaction term but actually lend support to the notion that indicate that it is actually resources that modify the negative relationship between corruption and economic growth, not the other way around.

[Table 7 About Here]

Table 7 is the final examination of my theory. The only methodological difference between the models found in Table 7 and Table 6 is the resource variable measure, with Table 7 containing resource *abundance*. The results in Table 7 essentially echo the results in Table 6. Only the interaction term of the metal resources variable (Model 7.5) displays the expected sign and maintains statistical significance though the coal and total resources models' (Model 7.2 and 7.6) interaction terms maintain the expected direction. Figure 2 graphically shows the marginal effects of metal resources on growth as modified by corruption. Here, we see the effect of metal resources (abundance) on growth is greatly impacted by the modifying variable corruption. At low levels of corruption, metal resources maintain a positive coefficient but as corruption increases, the positive effects of metals on growth greatly decline, passing the 0 point on the y-axis.

In examining Model 7.2 and 7.6, which maintain interaction terms with the hypothesized direction, and testing their joint significances, we see that coal once again seems to be modifying the direct relationship between corruption and growth. However, Model 7.6, with total resources, actually provides some additional evidence in support of my theory. Indeed, by conducting the appropriate significance tests, we see that corruption is modifying the effects of resources on economic growth. Figure 3 indicates this effect, which shows that the marginal effects of total resources (abundance) are accentuated by corruption. Noticeably, the marginal effect remains positive and significant until higher levels of corruption.

Examining Table 7 further, we see that the oil, coal, and fuel abundance models indicate that more resources actually positively impact the negative effect of corruption on growth, a rather unintuitive finding. Importantly though, at no value of resource abundance for any of the measures does corruption ever have a positive effect on economic growth and in most cases, the effect becomes statistically insignificant unless the resources variable is at low or moderate levels.

Table 6 and 7 therefore represent the empirical testing of my core theory and provide, at best, only limited support for it. In fact, only the models with metal resources (Models 6.5 and 7.5) and the accompanying interaction term, along with the total resources (abundance) model (Model 7.6) with the accompanying interaction term, maintained findings that comport with my theory. Models 6.2, 6.3, 6.6, and 7.2 actually provide empirical support for the inclusion of an interaction term between corruption and resources but further statistical testing indicates that it is actually resources modifying the effects of corruption on growth, not the other way around. Furthermore, under multiple specifications of resource dependence and abundance, no support was found for my hypothesis and, indeed, the interaction term coefficient pointed in the wrong direction.

CHAPTER 5: DISCUSSION AND CONCLUSIONS

Three key points can summarize the empirical findings presented in Chapter 4. First, it was found that corruption negatively impacts economic growth, under almost any empirical specification. The magnitude of the effect of corruption on economic growth varied but generally stays between .2 and .3, which indicates that a one-unit increase in corruption has a fairly substantial negative effect on economic growth. This finding is supportive of *hypothesis 1* and further confirms previous findings.

Second, the empirics here provide little evidence in support of the resource curse. Examining both resource dependence and abundance through a number of particular types of resources, growth was never hindered by independently increasing resources. In fact, in multiple cases, specific resources actually indicated a positive correlation with economic growth, which is in direct contrast to *hypothesis 2*.

Third, the main theory presented here, on the interactive effects of corruption and resources, with corruption modifying the effects of resources on growth, received only minimal support. Only in the case of metal resources, Models 6.5 and 7.5, was the interaction term significant, in the predicted direction, and reflective of corruption acting as the modifying variable. Additionally, Model 7.6 indicated some support for my theory. Models 6.2, 6.3, 6.6, and 7.2, importantly, did maintain interaction terms with the proper sign but significance tests revealed that in these cases, it was actually resources modifying the effects of corruption on growth. All other interaction models, however, provided no empirical support for my theory. Thus, only minimal empirical support is found for *hypothesis 3*, the core of my theory.

Though the findings can nicely be summed into three key points, the implications of these findings are much broader. On the one hand, the empirical findings provide only minimal support for my theory. On the other hand, this is not entirely surprising given the nature and tensions in the resource curse literature. The findings here thus maintain four important implications for the resource curse debate.

Primarily, scholars should not simply accept the resource curse as truth. Numerous works since the early empirical findings have drawn our attention to the shortcomings of the resource curse theory. Many of the critiques of the resource curse literature, as noted in Chapter 2, concern conditional relationships. For example, several scholars found that institutions condition the impact of resources on growth (Mehlum et al. 2006; Brunschweiler 2008; Boschini et al. 2007). Many other critiques of the resource curse have argued that such resources do not necessarily cause slow growth, when additional variables are added and the relationship is properly specified. For example, Papyrakis and Gerlagh (2004) found that the negative effect of resources on growth disappears when you include additional controls. Thus, the fact that my findings are mixed for the conditioning effects of corruption on resources and growth, and largely unsupportive of the resource curse (Tables 2-5), is actually unsurprising.

Second, this work continues to raise red flags on the issue of measurement. By employing a new measure of resources that can account for multiple types of resources and resource dependence and abundance, I sought to test my theory. Clearly, resource measurement may well be central to a finding in favor of the resource curse and several scholars have drawn attention to such. For example, Brunschweiler (2008) found that examining the resource curse with four new proxies resulted in findings mostly supportive of a positive effect of resources on growth. Several other scholars, when employing different measures of resource abundance or dependence, or when examining different types of resources, have similarly been unable to support the resource curse. Therefore, the use of the resource measure here adds to this measurement debate. Based on my findings and the debates in the field that exist on this issue, I cannot help but feel that contrary and competing findings will continue to be the norm until a single measure, that fully represents the resource curse argument, is employed. Based on measurement issues in other political science fields, like the democracy measurement issue between Polity, Freedom House, and PACL, the chances of such reconciliation are unlikely.

Third, the findings here have made it tough to interpret the exact role of corruption in the effects of resources on growth. Only in the cases of metals and total resource abundance, do the findings comport with my theory. In the case of several other specifications, empirical results suggest a relationship between corruption and resources but statistical examination suggests that the relationship may be opposite of my theory, with resources modifying the effect of corruption on growth. Further, in several other specifications, an interactive effect between corruption and resources is not in the expected direction and corruption itself is the variable harming long-term growth. Thus, it is possible that corruption conditions the effect of resources on growth but the majority of the results here indicate that such a finding is tentative, at best. At the same time, there is a great deal we can say about the role of corruption; it clearly seems to be an important factor in understanding growth.

Fourth, this work further highlights the importance of disaggregating between different types of resources and understanding how the impact of specific resources on economic growth might be conditioned by other variables. Several scholars have highlighted the importance of breaking down resources into different types and this work clearly supports that intuition. Furthermore, the finding that the effects of metal resources on economic growth are attenuated by corruption highlights the idea that some resources are perhaps more susceptible to corruption than others, a finding that is largely in-line with Isham et al. (2005), among others.

In sum, though the empirical findings here provided only marginal support for my theory, much has been learned concerning the impacts of corruption, resources, and their interactive effects on economic growth. Future works should explore and build upon the implications here and specifically work to resolve the key tensions and debates that this work has brought to light.

APPENDIX: TABLES

Table 1: Corruption and Economic Growth

Variable	
Corruption	-.255** (.104)
GDP per capita	-1.534** (.679)
Trade	.012*** (.004)
Government Consumption	.017 (.015)
Civil War	-.490 (.675)
Africa	-1.583*** (.486)
Tropics	-1.235*** (.481)
Population Growth Rate	-.384*** (.129)
R-square	.2237
Observations	247

DV: economic growth, 1984-1993, 1994-2003
p<.01=*** p<.05=** p<.1=*
Note: time dummy not shown. Coefficient with standard error, in parentheses, listed.

Table 2: Resource Dependence and Economic Growth

Variable						
	Model 2.1: oil	Model 2.2: coal	Model 2.3: Natural gas	Model 2.4: fuel	Model 2.5: metals	Model 2.6: total resources
Resource Dependence	.047 (.068)	-.001 (.096)	.038 (.086)	.072 (.069)	-.025 (.090)	.088 (.072)
GDP per capita	-1.010 (.669)	-1.108 (.659)	-1.093* (.673)	-1.042 (.653)	-.998 (.669)	-1.074 (.677)
Trade	.010*** (.004)	.010*** (.004)	.010*** (.004)	.010*** (.004)	.010*** (.004)	.010*** (.004)
Government Consumption	.022 (.015)	.018 (.014)	.019 (.015)	.023 (.015)	.017 (.014)	.025* (.015)
Civil War	-.485 (.572)	-.424 (.572)	-.434 (.571)	-.471 (.567)	-.443 (.559)	-.420 (.567)
Africa	-1.490*** (.488)	-1.451*** (.484)	-1.453*** (.484)	-1.511*** (.490)	-1.450*** (.482)	-1.534*** (.478)
Tropics	-1.096** (.470)	-1.242*** (.493)	-1.219** (.496)	-1.021** (.479)	-1.212** (.503)	-1.084** (.471)
Population Growth Rate	-.428*** (.126)	-.384*** (.134)	-.392*** (.131)	-.433*** (.122)	-.386*** (.123)	-.426*** (.126)
R-square	.2083	.2063	.2065	.2102	.2063	.2107
Observations	246	246	247	246	247	246

DV: economic growth, 1984-1993, 1994-2003

p<.01=*** p<.05=** p<.1=*

Note: time dummy not shown. Coefficient with standard error, in parentheses, listed.

Table 3: Resource Abundance and Economic Growth

Variable						
	Model 3.1: oil	Model 3.2: coal	Model 3.3: Natural gas	Model 3.4: fuel	Model 3.5: metals	Model 3.6: total resources
Resource Abundance	.020 (.019)	.021 (.021)	.034* (.020)	.036* (.022)	.037** (.019)	.076*** (.021)
GDP per capita	-1.019 (.657)	-1.001* (.655)	-1.190* (.645)	-1.020** (.642)	-1.119* (.663)	-1.101 (.637)
Trade	.011*** (.004)	.012*** (.004)	.012*** (.004)	.012*** (.004)	.012*** (.004)	.012*** (.004)
Government Consumption	.022 (.015)	.020 (.015)	.022 (.014)	.025* (.015)	.020 (.014)	.030** (.014)
Civil War	-.492 (.571)	-.388 (.567)	-.485 (.556)	-.442 (.561)	-.279 (.569)	-.361 (.565)
Africa	-1.459*** (.475)	-1.446*** (.478)	-1.380*** (.471)	-1.501*** (.476)	-1.519*** (.474)	-1.628*** (.467)
Tropics	-1.067** (.469)	-1.134** (.497)	-1.089** (.510)	-.911* (.491)	-1.413*** (.500)	-1.016** (.463)
Population Growth Rate	-.425*** (.122)	-.363*** (.133)	-.412*** (.127)	-.439*** (.120)	-.346*** (.123)	-.42*** (.122)
R-square	.2108	.2100	.2156	.2178	.2182	.2386
Observations	246	246	247	246	247	246

DV: economic growth, 1984-1993, 1994-2003

p<.01=*** p<.05=** p<.1=*

Note: time dummy not shown. Coefficient with standard error, in parentheses, listed.

Table 4: Resource Dependence, Corruption, and Economic Growth

Variable						
	Model 4.1: oil	Model 4.2: coal	Model 4.3: Natural gas	Model 4.4: fuel	Model 4.5: metals	Model 4.6: total resources
Corruption	-.273*** (.108)	-.256** (.110)	-.260*** (.105)	-.282*** (.111)	-.270*** (.109)	-.265*** (.105)
Resource Dependence	.077 (.071)	-.015 (.097)	.055 (.085)	.108 (.073)	-.063 (.093)	.107 (.072)
GDP per capita	-1.640** (.710)	-1.539** (.679)	-1.663** (.697)	-1.691** (.696)	-1.531*** (.678)	-1.659** (.707)
Trade	.012*** (.004)	.011*** (.004)	.012*** (.004)	.012*** (.004)	.012*** (.004)	.011*** (.004)
Government Consumption	.022 (.015)	.016 (.014)	.018 (.015)	.024 (.015)	.015 (.014)	.024* (.015)
Civil War	-.495 (.555)	-.417 (.561)	-.434 (.556)	-.469 (.550)	-.476 (.544)	-.404 (.552)
Africa	-1.636*** (.493)	-1.582*** (.489)	-1.587*** (.487)	-1.672*** (.496)	-1.586*** (.488)	-1.683*** (.482)
Tropics	-1.100** (.464)	-1.25*** (.489)	-1.205** (.490)	-.988** (.474)	-1.167** (.490)	-1.083** (.465)
Population Growth Rate	-.448*** (.129)	-.387*** (.138)	-.401*** (.133)	-.451*** (.124)	-.399*** (.127)	-.435*** (.129)
R-square	.2283	.2237	.2248	.2315	.2255	.2300
Observations	246	246	247	246	247	246

DV: economic growth, 1984-1993, 1994-2003

p<.01=*** p<.05=** p<.1=*

Note: time dummy not shown. Coefficient with standard error, in parentheses, listed.

Table 5: Resource Abundance, Corruption, and Economic Growth

Variable						
	Model 5.1: oil	Model 5.2: coal	Model 5.3: Natural gas	Model 5.4: fuel	Model 5.5: metals	Model 5.6: total resources
Corruption	-.273*** (.107)	-.247** (.106)	-.260*** (.105)	-.274*** (.107)	-.229** (.106)	-.243** (.103)
Resource Abundance	.026 (.019)	.017 (.020)	.035* (.019)	.041* (.022)	.032* (.019)	.074*** (.021)
GDP per capita	-1.619** (.687)	-1.507** (.675)	-1.732*** (.669)	-1.601** (.669)	-1.573** (.679)	-1.608** (.661)
Trade	.013*** (.004)	.013*** (.004)	.013*** (.004)	.013*** (.004)	.013*** (.004)	.013*** (.004)
Government Consumption	.022 (.015)	.018 (.014)	.021 (.014)	.025* (.015)	.018 (.014)	.028** (.014)
Civil War	-.494 (.554)	-.380 (.555)	-.480 (.542)	-.431 (.546)	-.294 (.554)	-.354 (.552)
Africa	-1.593*** (.475)	-1.575*** (.484)	-1.511*** (.472)	-1.654*** (.477)	-1.627*** (.480)	-1.701*** (.472)
Tropics	-1.059** (.463)	-1.148** (.495)	-1.079** (.506)	-.885* (.487)	-1.382*** (.497)	-1.016** (.457)
Population Growth Rate	-.436*** (.126)	-.366*** (.136)	-.417*** (.131)	-.447*** (.125)	-.354*** (.126)	-.445*** (.126)
R-square	.2311	.2261	.2341	.2383	.2323	.2550
Observations	246	246	247	246	247	246

DV: economic growth, 1984-1993, 1994-2003

p<.01=*** p<.05=** p<.1=*

Note: time dummy not shown. Coefficient with standard error, in parentheses, listed.

Table 6: Resource Dependence, Corruption, and Economic Growth (interaction)

Variable						
	Model 6.1: oil	Model 6.2: coal	Model 6.3: Natural gas	Model 6.4: fuel	Model 6.5: metals	Model 6.6: total resources
Corruption	-.300** (.150)	-.249* (.129)	-.251* (.143)	-.377** (.192)	-.026 (.114)	-.195 (.185)
Resource Dependence	.048 (.094)	-.003 (.111)	.066 (.104)	.040 (.087)	.268*** (.106)	.153 (.098)
Corruption*Resource Interaction	.011 (.035)	-.004 (.044)	-.005 (.044)	.026 (.036)	-.117*** (.046)	-.016 (.035)
GDP per capita	-1.658** (.713)	-1.538** (.679)	-1.658** (.696)	-1.743*** (.700)	-1.457** (.682)	-1.634** (.715)
Trade	.012*** (.004)	.011*** (.004)	.012*** (.004)	.012*** (.004)	.011*** (.004)	.011*** (.004)
Government Consumption	.022 (.016)	.016 (.014)	.018 (.015)	.026 (.016)	.014 (.014)	-.024 (.015)
Civil War	-.502 (.559)	-.418 (.563)	-.430 (.560)	-.477 (.552)	-.495 (.540)	-.402 (.554)
Africa	-1.643*** (.501)	-1.583*** (.489)	-1.588*** (.487)	-1.678*** (.496)	-1.583*** (.485)	-1.679*** (.483)
Tropics	-1.104** (.465)	-1.253*** (.491)	-1.208** (.496)	-.984** (.476)	-.983* (.514)	-1.074** (.465)
Population Growth Rate	-.456*** (.132)	-.388*** (.139)	-.398*** (.141)	-.468*** (.126)	-.411*** (.124)	-.429*** (.131)
R-square	.2285	.2237	.2249	.2332	.2493	.2305
Observations	246	246	247	246	247	246

DV: economic growth, 1984-1993, 1994-2003
p<.01=*** p<.05=** p<.1=*
Note: time dummy not shown. Coefficient with standard error, in parentheses, listed.

Table 7: Resource Abundance, Corruption, and Economic Growth (interaction)

Variable						
	Model 7.1: oil	Model 7.2: coal	Model 7.3: Natural gas	Model 7.4: fuel	Model 7.5: metals	Model 7.6: total resources
Corruption	-.285* (.167)	-.189 (.128)	-.312** (.156)	-.306 (.211)	.044 (.136)	-.140 (.247)
Resource Abundance	.023 (.028)	.035 (.026)	.021 (.029)	.034 (.030)	.096*** (.025)	.093** (.041)
Corruption*Resource Interaction	.001 (.010)	-.006 (.009)	.005 (.010)	.002 (.011)	-.022** (.010)	-.005 (.013)
GDP per capita	-1.621** (.687)	-1.511** (.675)	-1.734*** (.672)	-1.602** (.669)	-1.487** (.678)	-1.603** (.661)
Trade	.013*** (.004)	.013*** (.004)	.013*** (.004)	.013*** (.004)	.014*** (.004)	.013*** (.004)
Government Consumption	.022 (.015)	.018 (.015)	.021 (.015)	.025* (.015)	.019 (.014)	.028** (.014)
Civil War	-.497 (.561)	-.376 (.553)	-.493 (.546)	-.432 (.549)	-.189 (.560)	-.340 (.557)
Africa	-1.594*** (.478)	-1.582*** (.486)	-1.507*** (.473)	-1.650*** (.473)	-1.551*** (.471)	-1.748*** (.472)
Tropics	-1.059** (.464)	-1.141** (.495)	-1.067** (.511)	-.887* (.486)	-1.320*** (.500)	-1.017** (.459)
Population Growth Rate	-.438*** (.126)	-.361*** (.134)	-.427*** (.134)	-.451*** (.124)	-.352*** (.123)	-.441*** (.126)
R-square	.2311	.2274	.2349	.2385	.2453	.2554
Observations	246	246	247	246	247	246

DV: economic growth, 1984-1993, 1994-2003
p<.01=*** p<.05=** p<.1=*
Note: time dummy not shown. Coefficient with standard error, in parentheses, listed.

APPENDIX: FIGURES

Figure 1

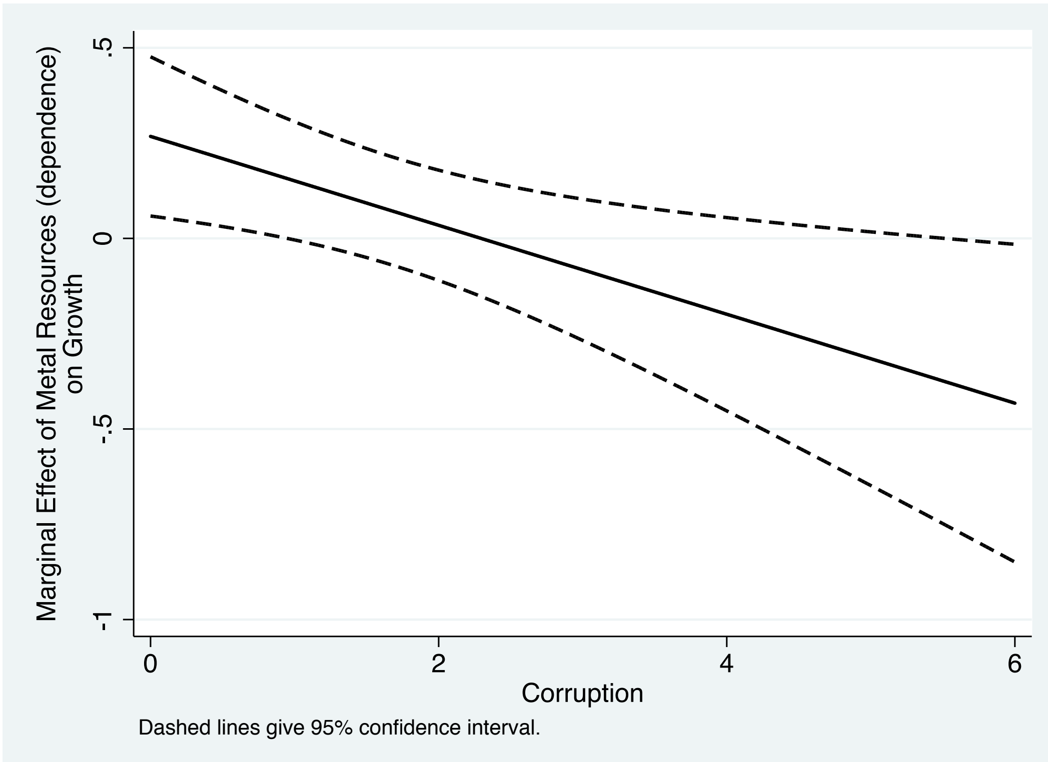


Figure 2

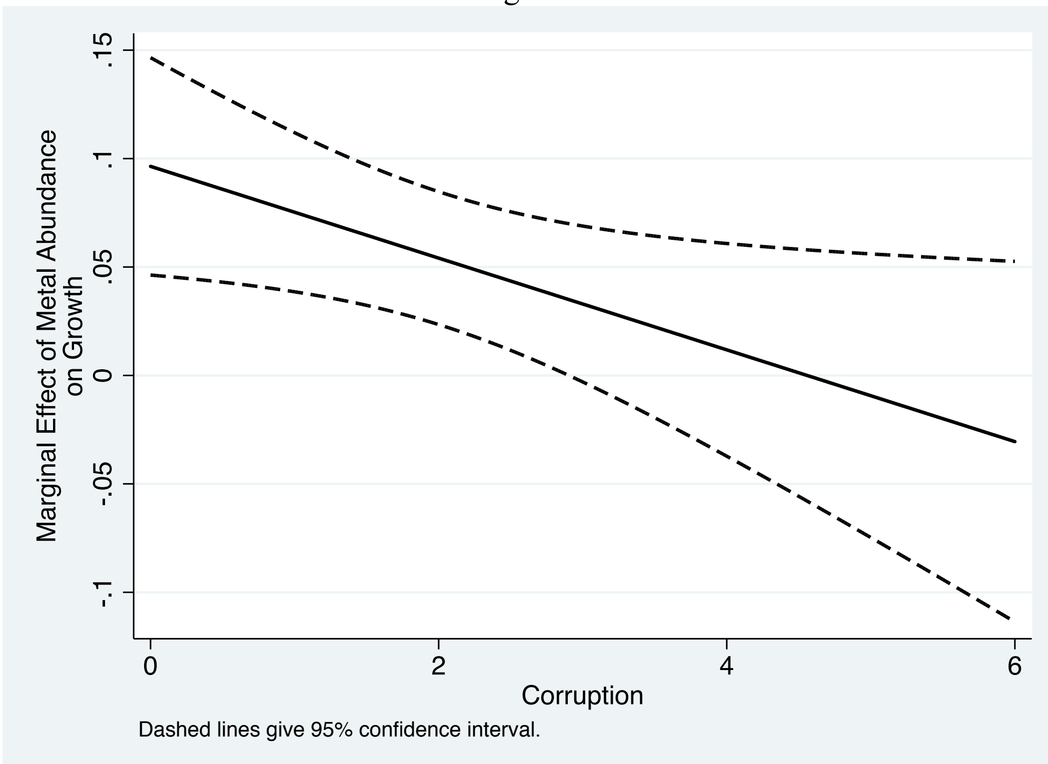
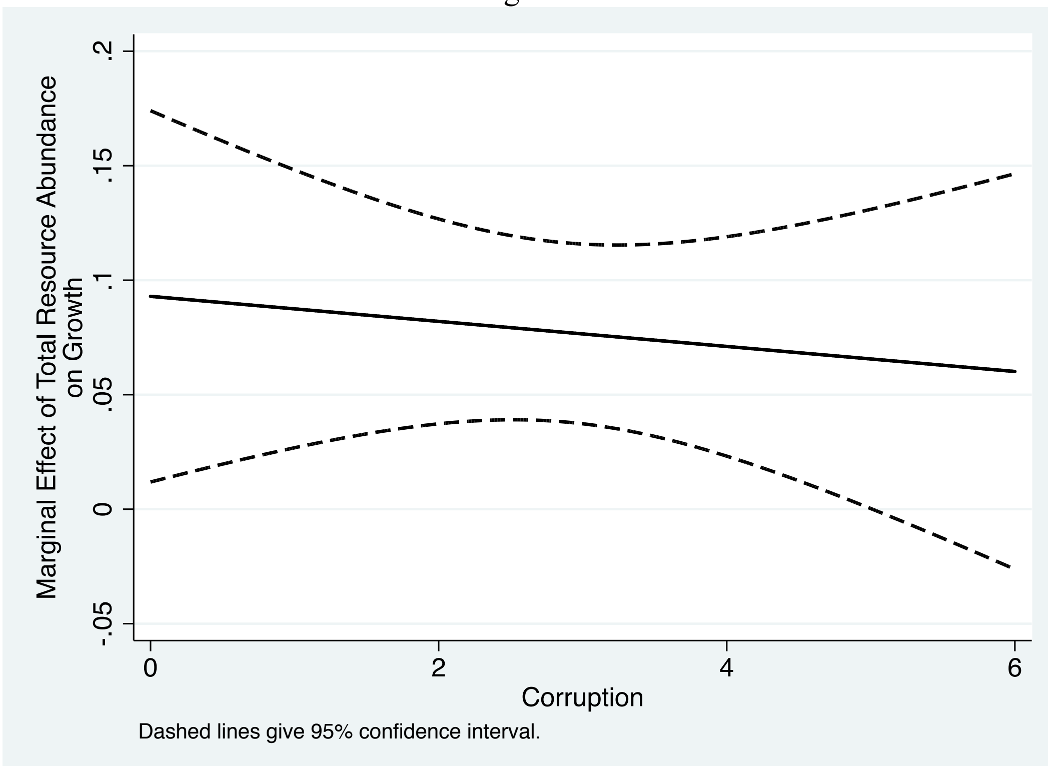

Marginal Effect of Metal Abundance on Growth
.15
.1
.05
0
-.05
-.1
0
2
4
6
Corruption
Dashed lines give 95% confidence interval.

Figure 3


Marginal Effect of Total Resource Abundance on Growth
-.05
0
.05
.1
.15
.2
0
2
4
6
Corruption
Dashed lines give 95% confidence interval.

APPENDIX: ADDITIONAL CONSIDERATIONS

As a point of speculation, I examined my findings in two additional contexts to attempt to provide deeper understanding. Specifically, I decided to conduct some further empirical testing by examining the effects of regime and region on the models presented. Several scholars have noted the effects of regime type on corruption (for example, see Drury et al. 2006) while others have investigated the effects of resources on regime (for example, Haber and Menaldo 2011). Though not formally presented, I did find that regime perhaps plays an important role in the context of these findings, with autocracies experiencing the negative effects of resources and corruption, as interacted, more than democracies. Specifically, of the twelve potential specifications in the models (six resource dependence and six abundance models), I found that in nine cases, corruption and resources maintained a negative interactive effect on economic growth. Overall, this suggests that regime itself may be an important aspect of the resource curse and define the interactive role of corruption and resources. For now though, this is speculation.

Additionally, as a further investigative technique, I examined the findings here in the context of only Africa. Several authors have noted the resource curse and high corruption specifically in the context of Africa (Gyimah-Brempong 2002; Sala-i-Martin and Subramanian 2003; Sachs and Warner 1997). Though the sample is rather small, the preliminary findings indicated that ten of the twelve models maintain a negative interaction term coefficient. Similar to the regime proposition, this finding is only speculative in nature, but perhaps indicates that the resource curse is even more nuanced and more detailed than originally thought.

APPENDIX: DATA EXPLANATION

Dependent Variables

GDP Growth Rate (Full period)	GDP growth rate is the real rate of Gross Domestic Product growth, from year to year, for a given country. Because it is a rate, is defined as a percentage, in 2005 dollars and represents the rate of change in GDP. It was obtained from Penn World Tables 6.3 (Heston et al. 2009). Data runs from 1984-2003.
GDP Growth Rate (10 year averages)	GDP growth rate is the real rate of Gross Domestic Product growth, from year to year, for a given country. Because it is a rate, is defined as a percentage, in 2005 dollars and represents the rate of change in GDP. It was obtained from Penn World Tables 6.3 (Heston et al. 2009). Data runs from 1984-2003.Penn

Independent Variables

Corruption variable	
Corruption	This variable comes from the *International Country Risk Guide* (2012) and is a component of the political risk components. Specifically, this variable is assessed by country experts of the ICRG and as "an assessment of corruption within the political system" and in particular is "concerned with actual or potential corruption in the form of excessive patronage, nepotism, job reservations, 'favors-for-favors, secret party funding, and suspiciously close ties between politics and business" (*ICRG* Methodology 2012).[14] ICRG measures corruption on a scale from 0 to 6 with 6 being least corruption. This scale was inverted for clarity so that 0 now indicates no or the least corruption and 6 indicates extensive corruption. Further, this variable is also measured on a monthly basis and was thus averaged over the twelve-month period to obtain a single year value. Data runs from 1984-2003.
Resource Variables	
Total Resources	This variable comes from Haber and Menaldo (2011) and is the total resource income per capita (total fuel plus total metal). It was calculated by adding total fuels and total metals by production, multiplying that times their respective value in 2007 dollars, and dividing by population. Effectively, it represents the total resource income per capita in 2007 dollars for a given country in a given year. This variable was logged to normalize it and contains data from 1984-2003.
Resource Abundance	Resource abundance is the result of a transformation of the total resources variable and is measured as the value of total resources in 2007 dollars times the estimated production. It was obtained from the total resources variable from Haber and Menaldo (2011). Effectively, it measures how much money, regardless of population, came from total resources for a country in a given year.
Total Oil	Total oil comes from Haber and Menaldo (2011) and is measured as total oil income per capita. To obtain this, Haber and Menaldo (2011) consulted several primary sources as indicated in their appendix. In effect, this variable is the crude oil produced each year, times the value of crude oil in 2007 dollars, divided by the population. Thus, this variable effectively represents the total oil income per capita of a country in a given year. In this work, data runs from 1984-2003. This variable was logged here in order to linearize it.
Oil Abundance	This variable was transformed from the total oil variable and is simply the total oil produced each year, times the value of crude oil in 2007 dollars. It does not account for population and is thus effectively the total oil income of a country in a given year. The original variable of total oil income came from Haber and Menaldo (2011). Data runs from 1984-2003. This variable was logged here in order to linearize it.

[14] Additional notes on the methodology of the ICRG and this quotation can be found on the ICRG, PRS Group website at: http://www.prsgroup.com/ICRG_Methodology.aspx.

Total Coal	Total coal comes from Haber and Menaldo (2011) and is measured as total coal income per capita. Haber and Menaldo (2011) consulted several primary sources in order to obtain the amount produced and the value of coal. This variable is defined as the coal produced each year, times the value of coal in 2007 dollars, divided by the population. This variable represents the total coal income per capita of a country in a given year. Data runs from 1984-2003 in this work. This variable was logged here in order to linearize it.
Coal Abundance	Coal abundance is simply total coal income of a country in a given year. It was obtained by transforming the total coal variable from Haber and Menaldo (2011), and eliminating population from the equation. Data runs from 1984-2003. This variable was logged here in order to linearize it.
Total Natural Gas	Total natural gas is defined as the estimated volume of natural gas production, times the value of natural gas in 2007 dollars, divided by the population. It was obtained from Haber and Menaldo (2011) upon their consultation of several primary sources.
Natural Gas Abundance	Natural gas abundance is the total natural gas income of a country in a given year. To obtain this variable, I simply transformed the total natural gas variable by removing population from it. This variable was logged to linearize it and data runs from 1984-2003.
Total Fuel	Total fuel is comprised of the total fuel production in a given year, times the value of fuel in 2007 dollars, divided by the population. It was obtained from Haber and Menaldo (2011) and effectively indicates the total fuel income per capita of country in a given year. This variable logged to linearize it and runs from 1984-2003.
Fuel Abundance	This variable is the result of a transformation of the total fuel variable and is simply the value of fuel in 2007 dollars times the amount produced in a given year. It was obtained by transforming the Haber and Menaldo (2011) total fuel income per capita variable. This variable was logged to linearize it and runs from 1984-2003.
Total Metals	Total metals comes from Haber and Menaldo (2011) and is comprised of the estimated volume of metals produced in a given year in a country, times the value of metals in 2007 dollars, divided by the population. It is thus, total metals income per capita. This variable was logged to linearize it and contains data from 1984-2003.
Metal Abundance	This variable is simply the estimated metal production times the value of metals in 2007 dolllars. It was obtained by transforming the total metals variable from Haber and Menaldo (2011). This variable was logged to linearize it and runs from 1983-2004.

<u>Control Variables</u>

GDP Per capita	Real GDP per capita in constant prices from Penn World Tables 6.3 (Heston et al. 2009). This variable was logged to normalize it. Data ranges from 1984-2003. However, it was only ran in the initial period in each regression.
Africa regional dummy	This is a binary variable that is coded as 1 if country is located in Africa and a 0 otherwise. It simply controls for geographic location, specifically if a country is located on the continent of Africa.
Tropical Climate	This variable comes from Sachs and Warner (1997) and is defined as the fraction of land that is contained in a tropical climate, specifically within the tropic of Cancer and Capricorn. Four countries, Albania, Brunei, Cuba, Cyprus, and Lebanon did not have values in the original dataset but were coded according to Sachs and Warner's (1997) criteria. Data from this variable runs from 1984-2003.
Population Growth Rate	This variable comes from the World Bank (2011) and is defined as the year growth rate of the population between two years. Data comes in a percentage and spans from 1984-2003.
Trade	This variable measures the trade openness of a country in a given year and comes from Penn World Tables 6.3 (Heston et al. 2009). It is the exports plus imports and then divided by real GDP per capita and is measured in 2005 constant prices. Data for this variable runs from 1984-2003.
Period dummy	This is a binary variable that codes which time period the independent variables came from,

	in case one time period is driving the result. It is coded as a 1 if the year is 1994 and a 0 if the year is 1984.
Government Consumption	Percentage of GDP that is consumed by the government. In practice, GDP is comprised of private consumption, total investment, government spending, and trade balance. This variable is, effectively, the size of government as a percentage of total GDP and comes from Penn World Tables 6.3 (Heston et al. 2009). Data runs from 1984-2003.
Civil War	This variable is simply coded as a 1 if a country has had at least one intra-state war with at least 1,000 battle deaths in a given year and a 0 otherwise. It comes from the Haber and Menaldo (2011) dataset,which relied on the COW definition of civil war. In this dataset, this variables runs from 1984-2003.

REFERENCE

Acemoglu, Daron and Verdier, Thierry. 1998. "Property Rights, Corruption and the Allocation of Talent: A General Equilibrium Approach." *The Economic Journal* 108(450): 1381-1403.

Ades, Alberto and Di Tella, Rafael. 1997. "The New Economics of Corruption: A Survey and Some New Results." *Political Studies* 45(3): 496-515.

Aidt, Toke S. 2003. "Economic Analysis of Corruption." *The Economic Journal* 113: 632-652.

Anoruo, Emmanuel and Braha, Habtu. 2005. "Corruption and Economic Growth: The African Experience." *Journal of Sustainable Development in Africa* 7(1): 43-55.

Atkinson, Giles. and Hamilton, Kirk. 2003. "Savings, Growth, and the Resource Curse Hypothesis." *World Development* 31(1): 1793-1807.

Auty, Richard M. 1990. *Resource-Based Industrialization: Sowing the Oil in Eight Developing Countries*.

Auty, Richard M. 2000. "How Natural Resources Affect Economic Development." *Development Policy Review* 18: 347-364.

Baland, Jean-Marie and Francois, Patrick. 2000. "Rent-seeking and resource booms." *Journal of Development Economics* 61: 527-542.

Barbier, Edward B. 2003. "The Role of Natural Resources in Economics." *Australian Economic Papers* 42(2): 253-272.

Barro, Robert J. 1996. "Determinants of Economic Growth: A Country Empirical Study." NBER Working Paper No. 5698.

Barro, Robert J. 2003. "Determinants of Economic Growth in a Panel of Countries." *Annals of Economics and Finance* 4: 231-274.

Boschini, Anne D., Jan Pettersson, and Jesper Roine. 2007. "Resource Curse or Not: A Question of Appropriability." *Scandinavian Journal of Economics* 109(3): 593-617.

Brambor, Thomas, William Roberts Clark, and Matt Golder. 2006. "Understanding Interaction Models: Improving Empirical Analyses." *Political Analysis* 14: 63-82.

Bravo-Ortega, Claudio and de Gregorio, Jose. 2007. "The Relative Richness of the Poor? Natural Resources, Human Capital, and Economic Growth." In *Natural Resources: Neither Curse nor Destiny*, ed. Daniel Lederman and William F. Maloney. Washington DC: World Bank and Stanford University Press.

Brunnschweiler, Christa N. 2008. "Cursing the Blessings? Natural Resource Abundance, Institutions, and Economic Growth." *World Development* 36(3): 399-419.

Collier, Paul. 1999. "On the Economic Consequences of Civil War." *Oxford Economic Paper* 51(1): 168-183.

Collier, Paul and Hoeffler, Anke. 2005. "Resource Rents, Governance, and Conflict." *The Journal of Conflict Resolution* 49(4): 625-633.

Daniel, Tim and Maton, James. 2008. "Recovering the proceeds of corruption: General Sani Abacha- a nation's thief." In *Recovering Stolen Assets*, ed. Mark Pieth. Bern: Peter Lang Publishing.

Damania, Richard and Butle, Erwin. 2008. "Corruption, Democracy and the Natural Resource Curse." *The B.E. Journal of Economic Analysis & Policy* 8(1), Article 5 (Contributions).

Davis, Graham A. 2011. "The resource drag." *International Economics and Economic Policy* 8(2): 155-176.

Di John, Jonathan. 2011. "Is There Really a Resource Curse? A Critical Survey of Theory and Evidence." *Global Governance* 17(2): 167-184.

Ding, Ning and Field, Barry C. 2005. "Natural Resource Abundance and Economic Growth." *Land Economics* 81(4): 496-502.

Drury, A. Cooper, Jonathan Krieckhaus, and Michael Lusztig. 2006. "Corruption, Democracy, and Economic Growth." *International Political Science Review* 27(2): 121-136.

Dunning, Thad. 2008. *Crude Democracy: Natural Resource Wealth and Political Regimes*. Cambridge, MA: Cambridge University Press.

Easterly, William and Levine, Ross. 1997. "Africa's Growth Tragedy: Policies and Ethnic Divisions." *Quarterly Journal of Economics* 113: 1203-1249.

Easterly, William. 2002. *The Elusive Quest for Growth: Economists' Adventures and Misadventures in the Tropics.* Cambridge, MA and London, England: The MIT Press.

Gelb, Alan. 1988. *Oil Windfalls: Blessing or Curse?* New York: Oxford University Press.

Gylafson, Thorvaldur, Tryggvi Thor Herbertsson, and Gylfi Zoega. 1999. "A Mixed Blessing: Natural Resources and Economic Growth." *Macroeconomic Dynamics* 3: 204-225.

Gylfason, Thorvaldur. 2001. "Natural Resources, Education, and Economic Development." *European Economic Review* 45: 847-859.

Haber, Stephen and Menaldo, Victor. 2011. "Do Natural Resources Fuel Authoritarianism? A Reappraisal of the Resources Curse." *American Political Science Review* 105: 1-26.

Hausmann, Ricardo and Rigobon, Roberto. 2002. "An Alternative Interpretation of the 'Resource Curse': Theory and Policy Implications." NBER Working Paper 9424.

Heston, Alan, Robert Summers and Bettina Aten. 2009. Penn World Table Version 6.3. Center for International Comparisons of Production, Income and Prices, University of Pennsylvania.

Humphreys, Macartan, Jeffrey D. Sachs, and Joseph E. Stiglitz. 2007. *Escaping the Resource Curse*. New York: Columbia University Press.

Huntington, Samuel P. 1968. *Political Order and Changing Societies*. New Haven, CT: Yale University Press.

ICRG Methodology. 2012. "ICRG Methodology." *The PRS Group*. https://www.prsgroup.com/ICRG_Methodology.aspx

International Country Risk Guide. 2012. "International Country Risk Guide (ICRG) Table 3b: Political Risks by Component, 1984-2009." *The PRS Group*.

Isham, Jonathan, Michael Woolcook, Lant Pritchett, and Gwen Busby. 2005. "The Varieties of Resource Experience: Natural Resource Export Structure and the Political Economy of Economic Growth." *The World Bank Economic Review* 19(2): 141- 174.

Kopecký, Petr. 2006. "Political Parties and the State in Post-Communist Europe: The Nature of Symbiosis." *The Journal of Communist Studies and Transition Policies* 22: 251-273.

Kroenenberg, Tobias. 2004. "The curse of natural resources in the transition economies." *Economics of Transition* 12(3): 399-426.

Lederman, Daniel and Maloney, William F. "Trade Structure and Economic Growth." In *Natural Resources: Neither Curse nor Destiny*, ed. Daniel Lederman and William F. Maloney. Washington DC: World Bank and Stanford University Press.

Leff, Nathaniel H. 1964. "Economic Development Through Bureaucratic Corruption." *The American Behavioral Scientist* 8(3): 8-14.

Leite, Carlos and Weidmann, Jens. 1999. "Does Mother Nature Corrupt? Naturel Resources, Corruption, and Economic Growth." IMF Working Paper.

Liu, Francis T. 1996. "Three Aspects of Corruption." *Contemporary Economic Policy* 14(3): 26-29.

Lujala, Paivi, Nils Petter Gleditsch, and Elisabeth Gilmore. 2005. "A Diamond Curse?: Civil War and a Lootable Resource." *Journal of Conflict Resolution* 49(4): 538-562.

Manzano, Ozmel and Rigobon, Roberto. 2007. "Resource Curse or Debt Overhang?" In *Natural Resources: Neither Curse nor Destiny*, ed. Daniel Lederman and William F. Maloney. Washington DC: World Bank and Stanford University Press.

Maruo, Paolo. 1995. "Corruption and Growth." *The Quarterly Journal of Economics* 110(3): 681-712.

Mauro, Paolo. 1997. "The Effects of Corruption on Growth, Investment, and Government Expenditure: A Cross-Country Analysis." In *Corruption and the Global Economy*, ed. Kimberly Ann Elliot. Washington: Institute for International Economics.

Melhum, Halvor, Karl Moene, and Ragnar Torvik. 2006. "Institutions and the Resource Curse." *The Economic Journal* 116: 1-20.

Mo, Pak Hung. 2001. "Corruption and Economic Growth." *Journal of Comparative Economics* 29: 66-79.

Mock, Gregory. 2003. "Undue Influence: Corruption and Natural Resources." In *World Resources 2002-2004*: *decisions for the earth- balance, voice and power*." Washington, DC: World Resources Institute.

Murphy, Kevin M. Andrei Shleifer, and Robert W. Vishny. 1991. "The Allocation of Talent: Implications for Growth." *The Quarterly Journal of Economics* 106(2): 503-530.

Neumayer, Eric. 2004. "Does the "Resource Curse" hold for Growth in Genuine Income as Well?" *World Development* 32(10): 1627-1640.

Obavelu, Abiodum Elijah. 2007. "Effects of Corruption and Economic Reforms on Economic Growth and Development: Lessons from Nigeria." Presented at the 2007 African Economic Conference.

Olken, Benjamin A. 2006. "Corruption Perceptions vs. Corruption Reality." NBER Working Paper No. 12428.

Papyrakis, Elissaois. and Gerlagh, Reyer. 2004. "The Resource Curse Hypothesis and its Transmission Channels." *Journal of Comparative Economics* 32: 181-193.

Pendergast, Shannon, Judith A. Clarke, and G Cornelis Van Kooten. 2011. "Corruption, Development and the Curse of Natural Resources." *Canadian Journal of Political Science* 44(2): 411-437.

Rock, Michael T. 2003. "The Politics of Development Policy and Development Policy Reform in New Order Indonesia." William Davidson Institute Working Paper No. 632. 1-56.

Rock, Michael T. and Bonnett, Heidi. 2004. "The Comparative Politics of Corruption: Accounting for the East Asian Paradox in Empirical Studies of Corruption, Growth and Investment." *World Development* 32(6): 999-1017.

Rodriguez, Francisco and Sachs, Jeffrey D. 1999. "Why Do Resource-Abundant Economies Grow More Slowly?" *Journal of Economic Growth* 4: 277-303.

Ross, Michael L. 1999. "The Political Economy of the Resource Curse." *World Politics* 51: 297-322.

Ross, Michael L. 2004. "What Do We Know about Natural Resources and Civil War?" *Journal of Peace Research* 41(3): 337-356.

Sachs and Warner. 1995. "Natural Resource Abundance and Economic Growth." NBER Working Paper 5398.

Sachs, Jeffrey and Warner, Mark. 1997. "Sources of Slow Growth in African Economies." *Journal of African Economies* 6: 335-376.

Sala-i-Martin, Xavier and Subramanian, Arvind.. 2003. "Addressing the Natural Resource Curse: An Illustration from Nigeria." IMF Working Paper.

Sala-i-Martin, Xavier, Gernot Doppelhofer, and Ronald I. Miller. 2004. "Determinants of Long-Term Growth: A Bayesian Averaging of Classical Estimates (BACE) Approach." *The American Economic Review* 94(4): 813-835.

Shliefer, Andrei and Vishny, Robert W. 1993. "Corruption." *The Quarterly Journal of Economics* 108(3): 599-617.

Stijns, Jean-Philippe. 2005. "Natural Resource Abundance and Economic Growth Revisited." *Resources Policy* 30: 107-130.

Stijns, Jean-Philippe. 2006. "Natural Resource Abundance and Human Capital Accumulation." *World Development* 34(6): 1060-1083.

Tanzi, Vito. 1998. "Corruption Around the World: Causes, Consequences, Scope and Cures." *International Monetary Fund Staff Papers* 45(December): 559-594.

Torvik, Ragnar. 2002. "Natural Resources, Rent Seeking and Welfare." *Journal of Development Economics* 67: 455-470.

Transparency International. 2012. "Frequently asked questions about corruption." http://www.transparency.org/news_room/faq/corruption_faq

Treisman, Daniel. 2000. "The Causes of Corruption: A Cross-National Study." *Journal of Public Economics* 76: 399-457.

Van der Ploeg, Frederick and Poelhekke, Steven. 2009. "Volatility and the Resource Curse." *Oxford Economic Papers* 61: 727-760.

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

Wei, Shang-Jin. 1997. "How Taxing is Corruption on International Investors?" NBER Working Paper Working Paper Number 6030.

Wooldridge, Jeffrey M. 2009. *Introductory Econometrics: A Modern Approach.* 4th ed. Cincinnati, OH: South-Western College Publishing.

World Bank. 2011. *World Development Indicators Online database*. Washington, DC: World Bank.

World Trade Report. 2010. "Natural Resources: Definitions, trade patterns, and globalization." *World Trade Organization*. http://www.wto.org/english/res_e/publications_e/wtr10_e.htm

Wright, Gavin and Czelusta, Jesse. 2004. "Why Economies Slow: The Myth of the Resource Curse." *Challenge* 47: 6-58.

Yanikkaya, Halit. 2003. "Trade openness and economic growth: a cross-country empirical investigation." *Journal of Development Economics* 72: 57-89.