

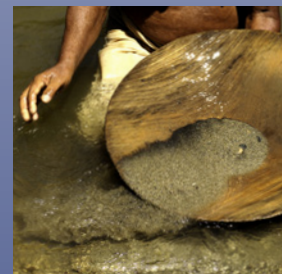
Studies in Mining Policy



July 2009

Institutions, Economic Growth, and the “Curse” of Natural Resources

by Amela Karabegović



Series Editor: Fred McMahon



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Executive summary

The impact of natural resources on economic growth has been a subject of intense debate over the past couple of decades. At the heart of the debate is a controversial finding: some empirical studies show that natural resources, instead of stimulating the economy like physical and human capital, have a negative impact on economic growth. This negative effect on economic growth is termed the “curse” of natural resources.

The importance of this research cannot be emphasized enough. It has the potential to shape the development policies of nations across the globe. Many developing nations, including those in sub-Saharan Africa, are rich in natural resources and, thus, this line of research may play a role in their future prosperity. The goal of this paper is to assess where the literature about the natural-resource curse is at this point and ask if it is cohesive and persuasive enough to affect critical policy decisions designed to enhance economic growth and relieve poverty.

At one point, it appeared that the literature was coming to a consensus: the curse of natural resources was both statistically and economically significant. These empirical findings were supported by the numerous examples of developing nations such as oil-rich Nigeria and Venezuela and diamond-rich Sierra Leone that experienced lower, and at times negative, rates of economic growth compared to nations that lack natural resources.

There are two explanations for the negative impact of natural resources on economic growth. First, natural resources could lead to a shrinking of the manufacturing sector, which would lead to lower economic growth, a phenomenon called the Dutch Disease. The second argument used to explain the resource curse is that natural resources have an indirect impact on economic growth because they weaken governance and economic institutions. This, in turn, leads to poor economic performance.

A number of recent papers, however, have questioned the findings of the earlier studies, including the seminal work by Sachs and Warner (1995). One of the first things to be criticized was the measure of natural resources. Recent research has found that, if one uses a more precise measure of natural resources such as natural capital per population instead of primary exports as a percentage of the economy, which more closely measures resource dependence rather than resource abundance, the natural-resource curse disappears. The second criticism was that the econometric approach—in particular, using cross-sectional rather than panel data—can change the results. Moreover, some natural resources appear to have much stronger effects than others. The primary commodities include a wide range of resources, agriculture, fuels,

and minerals, all of which consist of subgroups. Resources such as diamonds, fuel, and non-fuel minerals that have high yields or high rents tend to be more likely to have a negative impact on economic growth and the quality of institutions than agricultural resources.

The most important finding was that economic institutions—such as the rule of law, which leads to transparency and accountability—matter whether natural resources are a curse or a blessing. That is, early studies overlooked the role of economic institutions and the possible interaction between natural resources and the quality of institutions. Nations with economic institutions of higher quality are more capable of managing their resource revenue and turning it into positive economic growth. Institutional quality increases efficiency by eliminating barriers to entrepreneurial activity and establishing a rule of law that is crucial for economic activity. Institutions also reduce incentives for rent-seeking and corruption, further mitigating the resource curse. The research into this question is still in its preliminary stages but the importance of economic institutions is a key finding in that it enables resource-rich nations to have control over their destiny by shaping policies that are likely to be most effective in promoting economic growth.

Institutions, economic growth, and the “curse” of natural resources

Does the “curse” of natural resources have policy implications?

The proposition that natural resources, like physical and human capital, would spur economic growth would not seem to be controversial. So in the 1990s, when Jeffrey Sachs and Andrew Warner (1995) showed empirical evidence of a “natural resource curse”—the *negative* impact of natural resources on economic growth¹—it is no surprise that their finding inspired a large body of new empirical research.

This research has the potential to shape the development policies of nations across the globe. A large number of developing nations, including those in sub-Saharan Africa, are rich in natural resources and, thus, this research may play a role in their future prosperity. The goal of this paper is to assess whether the literature on the “curse” of natural resources that has been published in the decade and a half since Sachs and Warner (1995) is cohesive and persuasive enough that policy makers in resource-rich nations can rely upon it when framing public policy intended to enhance economic growth and relieve poverty.

In a nutshell, here is the paper’s main conclusion. In the first stages of research, it appeared that the literature was coming to a consensus: the natural resource curse was both statistically and economically significant. More recent research taking advantage of new data sets and more appropriate econometric analysis suggests that such a consensus may have been too hasty. In hindsight, it is safe to assert that, while many countries have floundered because they were rich in natural resources, such countries are by no means doomed to failure and poor economic performance; at least so the empirical and evidence from case studies would suggest. Nations with other characteristics—stronger institutions and openness to trade, for example—are likely to grow and prosper, even if they possess natural resources.

1 In the literature, the term “natural resource curse” has come to mean the underperformance of resource-rich nations in terms of economic growth when compared to resource-poor nations. Similarly, the term “natural resource blessing” means that nations that are rich in natural resources have a higher level of economic growth than nations with limited natural resources. This paper uses these terms as well. In addition, throughout this paper, we refer to natural resource wealth or endowment as “natural resources.” Later in the paper, the idea of “natural resource abundance” will be distinguished from “natural resource dependence.”

Questions to be answered

- 1 Why might natural resources be a curse?
- 2 What did Sachs and Warner find?
- 3 Do natural resources have a direct impact on economic growth?
- 4 Do natural resources have an indirect impact on economic growth?
- 5 How can countries overcome the curse of natural resources?
- 6 What is the evidence from case studies?
- 7 What is to be done?

1 Why might natural resources be a curse?

The literature discussing Sachs and Warner’s claim that natural resources are a curse takes off from what would seem to be self-evident: that access to more natural resources—non-renewables like coal, oil, and minerals and renewables like forests and fish—should help countries grow. And indeed, many authors have reviewed the historic evidence to document the decisive positive role of natural resources in economic growth. Mikesell (1997) argues that natural resources have been an initial source of *nearly all* development. Mehlum et al. (2006a) point to Australia, Canada, the United States, New Zealand, Iceland, and the Scandinavian nations as primary examples. Kronenberg (2004) argues that, during the Industrial Revolution and the nineteenth century, natural resources, especially natural resources such as coal that supply energy, were necessary for economic growth. Crafts (1998) argues that United States out-performed Great Britain during the early nineteenth century mainly because of the natural resources with which the United States was endowed.

Sachs and Warner (1995), however, began by noting the ambiguity of the historical record: natural resources were never a guarantee of economic success: resource-poor Netherlands grew at a higher rate than Spain, which was flooded with gold and silver from the Spanish colonies; Switzerland and Japan out-performed resource-rich Russia in the nineteenth and twentieth centuries. Natural resources certainly do not seem to have played a crucial role in many of the economic successes of the past century. South Korea, Taiwan, Hong Kong, and Singapore are some of the best performers of the past few decades and yet all of them are nations poor in natural resources (Sachs and Warner, 1995). In addition, some of present world’s richest nations, such as Japan, Luxemburg, and Switzerland, are resource-poor nations (Gylfason and Zoega, 2006).

But, even if natural resources are no longer an advantage, why would they have a *negative* impact on economic growth? The literature discussing the curse of natural resources suggests both economic channels, mechanisms that have a direct impact on economic growth, and political and institutional channels, which have an indirect effect, primarily through the quality of governance and institutions.

Economic channels

The most prominent economic channel is the “Dutch Disease,” which received its name from the Netherlands’ experience of the 1960s and 1970s, when large increases in natural-gas exports led to an appreciation in the real exchange rate and contraction of the non-hydrocarbon tradable sector (Corden and Neary, 1982; Stevens, 2003; Gylfason, 2001a).

The Dutch Disease works this way. A natural resource boom, caused often by discoveries of new natural resources, results first in a “spending effect” (Auty, 2001), in which the expansion of the export-oriented tradable resource increases demand for both tradable and non-tradable goods and services. This raises prices of non-tradables but not of tradables (whose prices are determined in international markets). An increase in exports also leads to an appreciation of the real exchange rate: with more exports, the supply of foreign exchange increases, decreasing the relative price of foreign exchange and appreciating the value of the domestic currency (Gylfason, 2001a). Critically, this increase in the relative value of domestic currency decreases the competitiveness of the “booming” country’s manufacturing sector.²

That’s not all. The Dutch Disease also entails a “resource movement effect” (Auty, 2001), a shift of both labor and capital from the manufacturing sector to the resource sector and the non-tradable sector (which also expands as a result of the resource boom.) The manufacturing sector may also be harmed through wage increases (Gylfason, 2001a): if the booming natural resource sector has significant “rents” (the difference between the price and the production cost), resource firms are able to raise wages to attract an increasing number of employees. This forces the manufacturing sector to bid for employees by offering higher wages, putting it at a competitive disadvantage. A booming resource sector also implies increased competition for capital (Gylfason, 2001a).³

2 A currency appreciation also reduces the economic rents in the booming sector but it may not reduce the output (Auty, 2001).

3 It is important to point out that increased competition for both labor and capital during a resource boom assumes restrictions on labor and capital mobility. That is, a resource boom may increase wages only if the resource sector is prevented or prohibited from bringing in labor from other nations. While it is possible for a resource sector to raise wages in its own country, if there are restrictions on labor mobility, it is unlikely it would have an impact on a global labor market when there are no restrictions on labor mobility. This holds for capital as well. In most nations, though, capital tends to be more mobile than labor since there are usually fewer restrictions on the movement of capital than on the movement of labor across nations. This may explain why in most of the literature the impact of a resource boom on wages is more emphasized than the impact of a resource boom on the competition for capital.

As a result of all of this, the manufacturing sector may shrink, skewing the composition of exports away from manufacturing: in extreme cases, total exports may decrease indicating that the resource boom did not fully compensate for the contraction in the manufacturing sector (Corden and Neary, 1982). And, even if total exports remain the same or increase, the contraction of the manufacturing sector may still hinder economic growth if it is more productive than the natural-resource sector (Stevens, 2003; Sachs and Warner, 1995).⁴

In the comparison between resource-poor and resource-rich countries, other economic effects may also be at play. Kronenberg (2004) suggests that the poor *relative* economic performance of nations with abundant natural resources in the twentieth century could be due in part to falling transportation costs, which reduced dependence on domestic energy sources for all countries. That is, falling transportation costs allowed countries without natural resources to import both fuel and non-fuel minerals and, thus, it allowed them to prosper despite the lack of domestic natural resources.

Political and institutional channels

Nations rich in natural resources may also develop substandard governance and institutions, which become less accountable and slower to reform and thereby lead to poor economic performance. According to Ross (2001), nations that obtain significant revenue from natural resources are able to tax their population less heavily; their population in turn will be less likely to demand greater accountability and representation. Similarly, resource-rich nations may increase spending (by, for example, providing social programs to relieve pressure for political reform) and use resource revenue—often by increasing funding for security services and military—to thwart a civil sector that would otherwise demand political rights. More broadly, overdependence on resource revenue, by delaying urbanization, higher levels of education, and other characteristics of the modern state, may frustrate long-term political and economic change (Ross, 2001). Isham et al. (2005) argue that natural resources can also affect the country’s social structure by creating a wealthy elite who are likely to resist economic and political reforms. In extreme cases,

4 The argument that the manufacturing sector is more productive than the resource sector for economic growth is mainly unproven (Sala-i-Martin and Subramanian, 2003). However, there are studies that point in that direction. For example, Siliverstovs and Herzer (2007) found, using the data for Chile from 1960 to 2001, that even though both manufacturing and mining exports have contributed to Chilean GDP, manufacturing exports seem to be more important for productivity and, therefore, long-run economic growth.

struggles over resource revenue can spark civil wars that destroy physical and institutional infrastructure (Mehlum et al., 2006a; Gylfason and Zoega, 2006).

In addition, natural-resource sectors tend to be less competitive than the manufacturing and non-tradable sectors due to a number of factors, such as high entry costs and various restrictions on access to the resources, all of which increase the value of the resources and thus the rents (Kronenberg, 2004; Gylfason, 2001a). Also, since the extraction of natural resources requires permits or concession from state authorities, there are usually close ties between the companies requesting a permit and state authorities authorized to give permits (Kronenberg, 2004). When state authorities are tasked with granting high-value permissions for the extraction of natural resources in nations with a low level of transparency and weak rule of law, this can create incentives for bribes and abuse of power since the chances of getting caught and penalized may be low. “Rent-seeking,” that is, efforts and resources spent on securing wealth through wealth redistribution (Sobel, 2008), can take two different forms: legal and illegal. Legal rent seeking refers to activities such as lobbying and may, for example, result in import restrictions in the tradable resource sector (Gylfason, 2001a). Illegal rent seeking refers to activities such as bribes, which lead to corruption, usually defined as “the misuse of public authority to private advantage” (Gylfason, 2001a: 561).

Moreover, the immobility of natural resources increases their vulnerability to rent-seeking.⁵ That is, immobile or fixed resources cannot be moved to other jurisdictions because of changes in tax or regulatory policy. This is not true for other capital such as machinery and equipment and, to a lesser extent, labor. The immobility of natural resources makes them more likely to be heavily taxed and regulated; this, in turn, increases incentives for “unproductive entrepreneurship” as defined by Baumol (1990), who argued that the extent to which a society engages in productive, wealth-creating entrepreneurship or unproductive, wealth redistribution either through legal or illegal rent-seeking, depends on the rates of return of these two activities. In jurisdictions with high taxes and high level of regulation, it may be more profitable to lobby or engage in corruption than to engage in productive entrepreneurship in the private sector.

To test for the existence of the “curse” of natural resources—as well as the presence of these and other mechanisms of causation—requires data and the use of proper estimation techniques. I review these empirical approaches in the rest of this paper, starting with Sachs-Warner (1995).

5 I am grateful to one of the external reviewers for raising this issue.

2 What did Sachs and Warner find?

The literature of the last 15 years about the “curse” of natural resources was sparked by empirical efforts in the early 1990s (Barro, 1991) to test endogenous growth theory, the proposition that economic growth depends on endogenously determined factors such as the level of education and the nature of economic policies (Craft, 1998; Barro and Sala-i-Martin, 1995) as opposed to exogenous inputs like capital and labor.⁶ This research, which began in mid-1980s and was in part made possible by the availability of new cross-country data from Penn World Table and World Bank (Romer, 1994), opened the door for the Sachs-Warner paper (1995) and subsequent research on the natural resource curse. This literature is, thus, an extension of Barro-style, cross-sectional growth regressions, where the dependent variable is economic growth (Barro and Sala-i-Martin, 1995) and the independent variables, while varying from one paper to another (Sala-i-Martin, 1997), typically include the initial level of income, a measure of investment, institutions, education, trade openness, and a host of other control variables (using either their initial value or an average over the time period considered.). For example, by running “two million regressions” with 62 alternative indicators as potential determinants of economic growth, Sala-i-Martin (1997) found that natural resources are in the top 20 most significant indicators where natural resources were found to have a negative impact on economic growth. A couple of years earlier, Sachs and Warner (1995), using cross-country data for a large number of developing nations from 1970 to 1989,⁷ were the first to publish results supporting the existence a resource curse: the goal of their paper was to test whether natural resources were one of the determinants of economic growth and to explore the channels through which this effect might occur.

What did they find? In their first model, growth in per-capita GDP between 1970 and 1989 is the dependent variable; and the key independent variable, natural resources, is measured as the the share of primary exports in GDP in 1971. The other independent variables are the log of real GDP per capita in 1970 (to test for convergence); the fraction of years from 1965 to 1990 in which the country was open (a measure of trade openness); ratio of

6 In endogenous growth models, economic growth is determined within a model by factors such as economic institutions and policies and the accumulation of human capital. In exogenous growth models, on the other hand, the long-run economic growth is determined by factors outside of the model such as the rate of technological progress.

7 The sample size varies from 40 to 95 nations depending on the regression.

real gross domestic investment to real GDP from 1970 to 1989; bureaucratic efficiency from 1980 to 1983 (measured as an average of three indices: efficiency of the judiciary, lack of red tape, and lack of corruption); standard deviation of the log of external terms of trade from 1970 to 1989; and the ratio of the income share of the top 20% of the income distribution to the bottom 20% from 1980 to 1992. They found evidence of what they claimed to be the “curse” of natural resources: the natural-resource measure was a negative determinant of economic growth.⁸

To check the sensitivity of these regression results, the authors excluded Oman, Saudi Arabia, Bahrain, Kuwait, Iraq, United Arab Emirates, and Trinidad and Tobago, countries with incomplete data or data that are considered outliers. They also tried alternative natural-resource measures such as the share of mineral production to GNP in 1971, primary exports intensity (measured as fraction of primary exports to total exports) in 1971, and proportion of natural-resource wealth in total wealth. The basic results were unchanged. To test the model’s sensitivity further, the authors added their measures of natural resources and trade openness to models found in four other well-known growth papers from the early 1990s: Barro (1991), DeLong and Summers (1991), King and Levine (1993), and Mankiw, Romer, and Weil (1992). In all four regressions, the coefficient on natural resources was negative and significant, and the coefficient on trade openness was positive and statistically significant. Sachs and Warner concluded by saying that natural resources and trade openness seemed to be additional determinants of cross-country growth.

Next, the authors tested whether natural resources have an indirect impact on economic growth through investment, trade policy, bureaucratic efficiency, and a price effect. Importantly, they identified an indirect impact through trade openness: Sachs and Warner conclude that, on average, resource-rich nations use protectionist trade policies as a response to the Dutch Disease, that is, as the manufacturing sector gets squeezed out. Interestingly, they found that extremely high levels of natural resources, such as those found in oil-rich nations in the Middle East, promote trade openness. The authors explain that highly endowed nations have such vast natural resources that they are not facing a strong pressure to develop an industrial sector and thus may not engage in protectionist trade policies. In summary, the Sachs and Warner (1995) sensitivity tests seemed to suggest stable results. However, as documented in the rest of the paper, subsequent research tells a more complicated story.

8 Their other results are as follows: the coefficient on initial income was negative (evidence of convergence); the coefficients on trade openness, investment, and bureaucratic efficiency were positive and statistically significant; coefficients on terms of trade and income inequality were insignificant.

In the literature review that follows, I describe the dependent and independent variables used and how they were measured; I focus only on the results of two key independent variables, natural resources, and institutions. The reason, explained in detail later in the paper, is that the quality of institutions—however measured or defined—may be decisive in determining whether natural resources are a blessing or a curse.

3 Do natural resources have a direct impact on economic growth?

Studies reviewed in this section test whether natural resources have a direct impact on economic growth, starting with Sala-i-Martin's omnibus study (1997). The goal of his "two million regressions" paper was to test every variable that was found to matter for economic growth. He found that natural resources and institutions were among the top 20 most important determinants of economic growth. Specifically, he found that the fraction of primary products in total exports, a proxy for natural resources, has a negative impact on economic growth. This negative impact seems to come from *non-mining* natural resources (defined as all natural resources except the mining and quarrying sector), since he found that the fraction of GDP in mining has a *positive* impact on economic growth. Measures of institutional quality such as rule of law, political rights, and civil liberties all have a positive and significant impact on economic growth.

Sachs and Warner (1997, 2001)

In the first of several follow-up studies, Sachs and Warner (1997) tested for the determinants of growth (with cross-country data for 77 countries from 1965 to 1990) using a revised set of independent variables: [1] natural resources (measured as natural resource exports to GDP, where exports of natural resources are the sum of exports of primary agriculture, fuels, and minerals); [2] institutions (measured as an unweighted average of five indexes: rule of law, bureaucratic quality, corruption in government, risk of expropriation and government repudiation of contract); [3] the log of real GDP per economically active population; [4] trade openness; [5] interaction between trade and income; [6] log of life expectancy and its square; [7] government saving rate; [8] inflation rate; [9] ethnolinguistic fractionalization; [10] growth of the economically active population; [11] and a number of geographic indicators, including a landlocked dummy variable. Again they found that natural resources have a negative impact on economic growth; they attribute this result to the Dutch Disease and higher incentives for rent seeking. They also found that weak institutions and poor economic policies—and especially lack of openness to international markets—slow economic growth. They pointed out that the indicators over which societies have control—such as trade policy and quality of institutions—seem to be the most significant for growth. The authors found that nations that have implemented strong economic reforms have seen high rates of economic growth.

In another follow-up study, Sachs and Warner (2001) tested for omitted independent variables and explored in more detail the reasons for the presence of a natural resource curse. In this paper, which used cross-country data for over 90 countries from 1970 to 1989, natural resources were measured as exports of primary products as a percentage of GDP in 1970. Other independent variables include the log of income per capita in 1970, trade policy (i.e., fraction of years between 1965 and 1989 that a country was integrated with a global economy), interaction between trade and income, and several new geographic variables: percent of land area within 100 kilometers of the sea; number of kilometers to the closest major port; the fraction of land area in the geographic tropics; and a malaria index from 1966. Once again, they found that natural resources had a negative and significant effect on growth over this period.

Ding and Field (2005)

Ning Ding and Barry C. Field (2005) began with a different conceptual approach: that resource *dependence* is distinct from resource *abundance* or *endowment*. They point out that United States is resource abundant but not resource dependent, since it has a relatively small primary-resource sector; by contrast, Tanzania and Burundi are heavily dependent on natural resources even though they do not have abundant natural resources. The authors go on to argue that exports of primary resources as a proportion of GDP or of total exports—principal measures of natural resources used in Sachs and Warner and others—measure resource dependence rather than resource abundance or endowment. Using data for 61 countries from 1970 to 1990, the authors constructed two new measures, based on the World Bank’s estimates of natural resource capital including agricultural land, pasture land, forests, protected areas, metals and materials, coal, oil, and natural gas (see also, Kunte et al., 1998). Resource dependence was measured as natural resource capital as a percentage of total capital; resource abundance was measured as natural resource capital per population.

In their first model, which also included now-familiar independent variables like initial GDP per capita, investment rate, trade openness, rule of law, and terms of trade, resource dependence and resource abundance are included as separate independent variables.⁹ Ding and Field found that resource endowment has a *positive* impact on economic growth, whereas resource dependence has a *negative* impact. Coefficients on the rule of law, terms of trade, and trade openness are all positive and significant. They then estimated a three-equation model in which endogeneity of resource dependence was controlled for and which included a measure of human capital

9 For the rest of this paper, I will not list all the independent variables in each paper reviewed, unless their absence or presence is pertinent to my review of the natural-resource curse. Likewise, the dependent variable for all subsequent papers is growth in GDP per capita over the relevant time period, unless otherwise noted.

(the dollar value of per-capita human resources in 1994). In the first equation, human capital is determined by investments in human capital (i.e., educational expenditures as a percentage of GNP, averaged from 1970 to 1990), resource endowment, rule of law, and trade openness. In the second, resource dependence was determined by trade openness, rule of law, resource endowment, and (“endogenously determined”) human capital. The third is the growth equation, where both “endogenously determined” variables—natural resource dependence and human capital—are independent variables. In this specification, they found that neither resource abundance nor resource dependence have a significant impact on economic growth (Ding and Field, 2005).

Theirs is an important empirical contribution. Using the same time period and relatively the same sample size as Sach and Warner (1995), after accounting for the endogeneity of resource dependence and human capital, the purported adverse effects of natural resources disappear.¹⁰

Lederman and Maloney (2003)

The goal of Daniel Lederman and William F. Maloney (2003) was to investigate the impact of trade structure, natural resources, export concentration, and intraindustry trade on economic growth. They not only found that how one measures natural resources matters; they also found that cross-sectional and panel-data results differ. Using cross-country data for 65 nations from 1980 to 1999, they first found that net exports of natural resources per worker have a positive and significant impact on economic growth in panel regressions; the effect is positive but insignificant in cross-sectional models (except for one specification). In another set of models, the coefficient on exports of primary resources as a percentage of GDP—an alternative measure of natural resources—was negative but insignificant when using cross-sectional data; it was *positive* but not always significant when using panel data. By contrast, export concentration (measured by two different variables: exports of natural resources as a share of total exports and a constructed export-concentration index using a 4-digit SITC) appear to have an adverse effect on growth using the cross-sectional approach, with more ambiguous evidence in the panel regressions. The authors concluded that export concentration *per se*, not natural resource endowment, has a negative impact on growth. This is another important paper: Lederman and Maloney (2003) suggest that only a certain type of model that uses selected natural-resource variables with cross-sectional data, as in the original Sachs and Warner paper, may produce results that support the existence of a natural-resource curse.

¹⁰ Beland and Tiagi (forthcoming) also used Ding and Field (2005) measure of natural-resource abundance and found the results to be sensitive to model specifications. It is important to note though that Beland and Tiagi (forthcoming) used a different model and slightly different time period and a set of independent variables than Ding and Field (2005).

Boschini et al. (2003)

The hypothesis of the curse of natural resources was further undermined by other recent papers, many of which looked at the *combined* impact of natural resources and institutional quality. One of the first was Boschini et al. (2003), which had a hypothesis that natural resources have a negative impact on economic development only under poor institutions and that the impact of *certain types* of natural resources are more pronounced: those that are more “technically appropriable” and thus are more prone to rent-seeking and conflict. In other words, resources that are valuable, can be stored, easy to transport or smuggle, and easily sold are more attractive to those interested in illegal activities. Institutions of good quality, the authors argue, make natural resources less appropriable by increasing the costs of rent seeking and non-productive activities.

Using cross-sectional data for 80 nations from 1975 to 1998, Boschini et al. tested models with several measures of natural resources: value of primary exports; value of exports of ores, metals, and fuels; value of mineral production not including fuels; and value of production of gold, silver and diamonds all as a percentage of GNP or GDP. Like the authors of many previous papers, they found that natural resources have a negative impact on economic growth while institutional quality had a positive effect. But here, an interactive term—the product of natural resources and institutional quality—was positive and significant. Adding up, this implies that good institutions can turn natural resources into a blessing. The results also indicate that gold, silver, and diamonds have a stronger negative impact on economic growth. As a robustness test, the authors run a two-stage, least squares model to account for the potentially endogenous nature of institutions (using latitude as an exogenous instrument; the results do not change significantly.¹¹)

In considering the policy implications of the literature on the curse of natural resources, these results—similar in kind to many subsequent papers—are worth emphasizing. They suggest that, even if natural resources have the potential to be a curse, this adverse effect can be turned into a blessing with good institutions. This is a plausible explanation for why resource-rich Norway has done well while resource-rich Nigeria has not and these results offer hope to resource-rich nations: resource wealth may be turned into an advantage by improving the institutional quality.

Mehlum et al. (2006b)

Similarly, Mehlum et al. (2006b) argued that institutional quality is decisive for avoiding the curse of natural resources. Using cross-sectional data for 87

11 Boschini et al. (2003) also tried excluding the developed nations from the sample as well as using different measure of institutional quality such as property rights in 1984, rule of law index in 1984, rule of law in 1998, risk of expropriation in 1984, repudiation of contracts in 1984, and combined polity score but, once again, the results do not change significantly.

nations from 1965 to 1990, they tested a model with an interactive term (the product of institutional quality and natural resources measured as share of exports of primary products in GNP). This model, which survived various robustness tests,¹² also suggests that natural resources are a curse in those nations with weak institutions and a blessing for those with good institutions.

Arezki and van der Ploeg (2007)

Arezki and van der Ploeg (2007) show that these results may be sensitive to the chosen time period. Using cross-country data for 53 to 130 countries (depending on the regression) from 1965 to 1990, they first found that natural resources have a negative impact on economic growth; institutional quality did not have a significant effect in most regressions but the interactive term (the product of natural resources and institutional quality) was positive and significant. However, when the sample period was extended to the year 2000, the interactive measure became insignificant.¹³ To complicate matters further, Boschini et al. (2003) used a similar set of independent variables and yet their results on the combined impact of natural resources and institutional quality differ.^{14, 15} Here again, different time periods may account for this: Boschini et al. (2003) covered the period from 1975 to 1998; Arezki and van der Ploeg (2007) focused on 1965 to 2000.

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- 12 Mehlum et al. tried using an alternative indicator of natural resources measured by the share of mineral production in GNP and the results showed that the direct negative impact of natural resources became stronger, indicating that resources that are easily lootable might be especially harmful to growth. The interactive coefficient also became larger. To test the sensitivity of their results further, the authors also used additional control indicators such as secondary-school enrollment rate, language fractionalization, and ethnic fractionalization. They also excluded Africa to test if a resource curse is solely an African phenomenon but the results did not change significantly.
- 13 As with many of the papers mentioned previously, Arezki and van der Ploeg (2007) found similar conclusions after using various sensitivity tests. In the pursuit of the most parsimonious account of this literature, I do not describe in detail any of these tests from here on, unless this would shed additional light on our question.
- 14 There are three differences in the independent variables between the two papers: [1] Boschini et al. (2003) used the log of trade openness whereas Arezki and van der Ploeg (2007) did not use the log; [2] Boschini et al. (2003) used investment share of GDP per capita and Arezki and van der Ploeg (2007) used investment as a share of GDP; and [3] Arezki and van der Ploeg (2007) added a combined effect of natural resources and trade openness where as Boschini et al. (2003) did not.
- 15 One may argue that trade openness is a proxy for institutional quality and economic policy as well. In Arezki and van der Ploeg (2007), even after the time period was extended to the year 2000, the combined impact of trade openness and natural resources was significant in some of the regression. While this is true, I am comparing the combined impact of natural resources and the institutional quality used in both papers.

Conclusion

Based on the material reviewed here, one cannot reach a definitive conclusion about the direct impact of natural resources on economic growth, although some of the more recent papers are suggestive. Here is a review of findings so far, both on estimation technique and on the results themselves.

- The choice of the measure of natural resources can change the results.
- The econometric approach—in particular, using cross-section data in place of panel data—can change the results.
- Some natural resources may have much stronger effects than others.
- Institutional quality *may* matter: it depends on the specification and the time period.

The next section summarizes the literature on the impact of natural resources on economic growth through political and institutional channels.

4 Do natural resources have an indirect impact on economic growth?

The basic argument explored in this section is that natural resources erode the political system and governance, lead to corruption and, in some cases, civil conflict, and weaken the quality of institutions in general or at least frustrate their development. First, we provide a brief review of the literature that documents the connection between institutional quality and economic growth without reference to the resource curse. Next, we summarize studies that only look at the impact of natural resources on institutional quality. Finally, we explore empirically the full causal chain: the link between both natural resources and institutional quality and between institutional quality and growth.

Institutional quality and economic growth

Economic institutions are important for economic growth since they determine how economic inputs—human, physical, and natural-resource capital—are transformed into economic outputs such as economic growth (Sobel, 2008). By overlooking the role of economic institutions, one assumes that economic activity occurs in a vacuum (Sobel, 2008). Institutions in general can be either informal, such as customs and traditions, or formal, such as laws and regulation, all of which produce the “rules of the game” (North, 1991). It is these rules of the game that provide the incentives in a nation and determine how different economic actors interact and, thus, how economic inputs are used (Sobel, 2008; North, 1991).

Over the last decade, the literature on economic growth has identified the critical importance of institutional quality. Acemoglu et al. (2001), for example, found large effects of institutional quality on income per capita.¹⁶ We will follow the International Monetary Fund’s 2005 report, *World*

¹⁶ To deal with the possibility of simultaneity—since economic growth is likely to lead to better institutions— and omitted variable bias, Acemoglu et al. (2001) used differences in European mortality rates as an econometric instrument for current institutions. They argued that Europeans set up different types of institutions in different colonies, depending on the mortality rate they faced, and that these institutions have persisted up to today. In nations that had high mortality rates, Europeans were hesitant to settle and were likely to set up poor institutions, while, they argue, the opposite is true of colonies that had low mortality rates.

Economic Outlook: Building Institutions, in using the index published in the Fraser Institute’s *Economic Freedom of the World* as the key measure of the quality of institutions.¹⁷ The most recent version of the index (2008) provides a comprehensive measure of economic institutions in 141 nations, enabling researchers to explore the relationship between sound economic institutions and economic growth. The qualities necessary in economic institutions that foster economic freedom are personal choice, voluntary exchange, freedom to compete, and security of private property. The overall measure of economic freedom is based on 42 pieces of data grouped into five categories: [1] size of government; [2] legal structure and security of property rights; [3] access to sound money; [4] freedom to trade internationally; and [5] regulation of credit, labor, and business.

Since its first publication in 1996, over 200 academic articles have used this measure of sound economic institutions; most of these focused on the relationship between economic institutions and economic prosperity and growth. Though detailed analysis of this strand of research is outside the scope of this paper, some of studies are worth mentioning. Easton and Walker (1997) found that changes in economic freedom have a significant impact on the steady-state level of income even after the level of technology, the level of education of the workforce, and the level of investment are taken into account. De Haan and Sturm (2000) showed that positive and negative changes in economic freedom lead to positive and negative changes in rates of economic growth. Dawson (1998) showed that economic freedom directly increases economic growth by increasing the efficiency at which inputs are transformed into outputs; it has an indirect effect by encouraging and attracting investment. Gwartney, Holcombe, and Lawson (2006) found similar results.

Doucouliaagos and Ulubasoglu (2006) examined the literature on the impact of economic freedom on economic growth. The authors used meta-analysis of 45 different studies published over the last decade and concluded that “regardless of the sample of countries, the measure of economic freedom, and the level of aggregation, there is a solid finding of a direct positive association between economic freedom and growth” (2006: 19). Furthermore, they noted that studies of economic growth that fail to include a measure of economic freedom in their analysis will produce biased estimates of the indicators included in the analysis.

These results associated with the index of economic freedom can be generalized: institutions are an important determinant of economic growth

17 The annual reports published as *Economic Freedom of the World* (Gwartney, Lawson, and Block, 1996; Gwartney and Lawson, 1997, 1998, 2000, 2001, 2002, 2003, 2004, 2005, 2006, 2007, 2008) and a sample of literature using a measure of economic freedom provided in these reports is available at <<http://www.freetheworld.com/>>.

and prosperity. This implies that without sound economic institutions, nations may not be able to prosper regardless of how well endowed they are with natural resources. This idea is explored in the rest of this paper.

The adverse impact of natural resources on institutional quality

Ades and Di Tella (1999)

The hypothesis of Ades and Di Tella (1999) is that the existence of high rents in natural-resource sectors, in some cases created by the lack of market competition, leads to corruption. They used both cross-sectional and panel data during two periods, 1980 to 1983 and 1989 to 1990; the number of countries varies from 31 to 52 depending on the model. They examined the level of rents and market structure (both measured by a few indicators: share of imports as a percentage of GDP, fuels and mineral exports as a percentage of total exports, and distance to the world’s major exporters); the authors also use market dominance and effectiveness of antitrust laws as a proxy for market structure. Data on corruption was from the Economist Intelligence Unit (EIU) and World Competitiveness Report (WCR).

They found that the structure of the market matters. Specifically, they found that corruption was higher in nations, where [a] domestic firms were protected from competition, [b] there were barriers to trade, [c] markets were dominated by a few firms, and [d] antitrust laws were ineffective. The results for the natural-resource variables, proxies for resource rents, are more muddled. For instance, when using cross-sectional data from the 1980s, they found that natural resources (measured by fuel and mineral exports as a percentage of total exports) increase corruption (as measured by the EIU); this effect goes away when 1990s data are used, now with the WCR data. When using panel data, the coefficient on natural resources is not statistically significant, regardless of the time period.

Barro (1999)

Barro (1999) explored the impact of natural resources, economic development, and other factors on democracy (measured by electoral rights and civil liberties). With panel data from over 70 nations from 1960 to 1995, he estimated a seemingly unrelated regressions (SUR) model,¹⁸ examining the impact of two different measures of natural resources on democracy: oil

¹⁸ Seemingly unrelated regressions (SURs) are part of the system-of-equations model that takes into account different interdependencies among variables and their error terms across equations, and thus produces more precise coefficient estimates than a simple Ordinary Least Squares (OLS) model.

dependence¹⁹ and the value of the export of primary products as a percentage of total exports. He found that an abundance of oil has a negative impact on democracy but natural resources in general did not.

Ross (2001)

Similarly, Ross (2001) addresses four questions about the impact of oil on democracy. [1] Does oil have an impact on democracy? [2] If yes, is the impact present in certain regions only (that is, does it affect only the Middle East)? [3] Do other types of natural resources have the same impact on democracy? [4] Through what channels do oil and natural resources in general affect democracy? He used pooled time-series data from 113 countries from 1971 to 1997: his resource variables were oil abundance—the export value of mineral-based fuels (petroleum, natural gas, and coal) as a percentage of GDP—mineral abundance—the export value of non-fuel minerals (ores and metals) as a percentage of GDP—as well as food and non-food agricultural exports as a percentage of GDP.

Ross examines three possible channels through which oil resources could impede democratization: [1] the “rentier effect” (using low taxation and high spending to reduce the pressure for democracy); [2] the “repression effect” (increasing internal security to hold off democratic pressures); and [3] the “modernization effect” (postponing or blocking the population from moving into industrial and service-sector employment, which makes them less prone to push for democratization). Their respective measures were: [1] percentage of government revenue collected through taxes, government consumption as a percentage of GDP, and government activity as a share of GDP (the rentier effect); [2] size of military budget as a percentage of GDP and number of military personnel as a percentage of the labor force (the repression effect); and [3] percentages of men and women in industry and services (the modernization effect).

Like Barro (1999), Ross (2001) found that oil has a negative impact on democracy. In addition, he found that the negative influence of oil is not restricted to the Middle East, and sub-Saharan Africa. He also found that non-fuel minerals such as ores and metals, but not agriculture, also impede democratization. Moreover, he found that the negative impact of oil on democracy occurs through all three channels.

Jensen and Wantchekon (2004)

Jensen and Wantchekon (2004) also looked at the potential channels through which resources affect democratization. The authors used panel data from

¹⁹ Oil dependence is a dummy variable that takes the value of one for those nations [a] whose net oil exports represent a minimum of two-thirds of total exports and [b] contribute at least 1% to world exports of oil.

1960 to 1995 for 46 sub-Saharan African nations. Using fuel, mineral, and metal exports as a percentage of merchandise exports, the authors constructed a measure of natural resources from 1 to 4, where nations for which the figure is less than 25% get a score of 1, 2 for 50%, 3 for 75%, and 4 for those nations with a figure over 75%. Jensen and Wantchekon also tested the impact of natural resources on government spending and governance (using indicators on voice and accountability, political stability and lack of violence, governance effectiveness, regulatory framework, rule of law, and control of corruption from Kauffmann et al., 1999a, 1999b). In addition, they examined whether resource-rich nations that are new democracies are more likely to become authoritarian. They found that natural resources lead to regimes that are less democratic, to a higher level of government spending, and to weaker governance. Moreover, they also found that nations with a high level of natural resources regressed toward authoritarian rule.

Collier and Hoeffler (1998, 2005a)

Collier and Hoeffler (1998) examined the determinants of civil war. Using data for 98 nations from 1960 to 1992, they found that the impact of natural resources (share of primary exports in GDP) is non-monotonic: at lower levels, possession of natural resources increases the duration and probability of civil wars; at higher levels, it decreases both. The authors’ explanation is relevant to many of current conflicts in Africa and elsewhere. At first, natural resources attract rebellion but at higher levels they decrease it as a greater abundance of natural resources increases the financial capabilities of the government in power and thus enable it to defend itself through military expenditures.

In a subsequent paper, Collier and Hoeffler (2005a) examined the impact of natural resources on the *risk* of conflict measured by the incidence of war. In their first model, natural resources (primary commodity exports as a percentage of GDP) have a significant and positive impact on the risk of conflict. The results are similar when rents in natural-resource sectors, measured as the sum of resource rents as a percentage of GDP,²⁰ are used as an alternative measure. However, when both measures are used in the same regression, the coefficient is positive and significant for primary commodity exports as a percentage of GDP but not for resource rents.

Conclusion

In sum, these studies support a critical link in the argument that a natural-resource curse exists: that natural resources are detrimental to institutions

20 Resource rents per unit of output were computed by subtracting the extraction costs from natural-resource prices and multiplying this figure by the total volume extracted. Rents from various resources were then added up and divided by the GDP.

and lead to corruption, conflict, and civil war. Once again, there are qualifiers: some of these adverse effects disappear when panel data are used; only some natural resources, particularly oil, may have very detrimental effects.

The impact of natural resources on economic growth through institutions

The studies in this sub-section test for the impact of natural resources on economic growth with system-of-equations models. All of the models discussed below are designed to investigate both the direct and indirect impacts of natural resources on economic growth.

Leite and Weidmann (1999)

Leite and Weidmann (1999) argued that possessing natural resources affects growth indirectly through increases in rent-seeking, measured by the level of corruption, and that corruption in turn has a negative impact on economic growth. They argue that the level of rent-seeking (that is, corruption) is determined within the economic system and thus depends on economic interests and government policy. To test this hypothesis, they used cross-sectional data from 1970 to 1990 for 72 nations.

They first examined the determinants of corruption with an emphasis on the role of natural resources. Specifically, they investigated the impact of economic growth from 1970 to 1990 (where growth was endogenously determined), initial income, rule of law, political instability, several measures of natural resources (fuel, ores, fuel and ores, agriculture, food, and agriculture and food exports, all as a percentage of GNP), trade, a dummy variable for sub-Saharan Africa, and an ethnolinguistic fractionalization index on the level of corruption. Then, they examined the impact of the level of corruption (where corruption was endogenously determined), initial income, exports of natural resources as a percentage of GNP, trade openness, investment as a share of GDP, terms of trade, rule of law, a dummy for sub-Saharan Africa, commodity-price variability in Africa, and commodity-price variability in the rest of the world on economic growth.

Leite and Weidmann found that fuels and ores increase corruption but that agriculture and food, rule of law, and trade openness decrease it. They also found that both natural resources and corruption have a direct, negative, impact on economic growth as well.

Papyrakis and Gerlagh (2004)

Papyrakis and Gerlagh (2004) examine empirically the direct and indirect impact of natural resources on economic growth and the channels through which natural resources affect growth indirectly. Using cross-sectional data,

the authors first tested the direct impact of natural resources on economic growth. Specifically, they examined the impact of the log of GDP per capita in 1975, share of mineral production in GDP in 1971 (that is, a measure of natural resources), the level of corruption, average real gross investment from 1975 to 1996, trade openness, terms of trade, and average secondary schooling from 1970 to 1989 on economic growth from 1975 to 1996. They then tested the impact of natural resources on corruption, investment, trade openness, and terms of trade and schooling.

They found that the negative, direct impact of natural resources on economic growth disappears as control variables are added. They also found that natural resources have a negative impact on investment, trade openness, and schooling and a positive impact on the terms of trade. The impact of natural resources on corruption was not significant.²¹

Sala-i-Martin and Subramanian (2003)

Sala-i-Martin and Subramanian (2003) propose that natural resources affect economic growth through three channels: volatility in terms of trade, overvaluation of the real exchange rate, and institutional quality. With cross-sectional data from 71 countries, they first estimate the determinants of GDP growth: the key independent variables are volatility of prices from 1970 to 1998, overvaluation of exchange rate from 1970 to 1998, share of natural resources in exports in 1970 and 1980, share of natural resources in GDP in 1970 and 1980, and the rule of law. Then, the rule of law was also determined by the same set of independent variables plus two exogenous variables: the fraction of the population speaking English and European languages and the mortality rate of colonial settlers from Hall and Jones, 1998.

Sala-i-Martin and Subramanian’s finding is notable: natural resources do not seem to have a direct impact on economic growth; they do have an indirect, negative impact through the quality of institutions. Rule of law, partially determined by exogenous instruments as well as by natural resources, was found to have a positive and significant impact on economic growth; the coefficient on natural resources in the same equation is not significant.

Furthermore, when these data are disaggregated into different groups of natural resources, fuel and minerals but not food and agricultural raw materials have a negative and significant impact on the institutions. Moreover, none of these disaggregated measures of natural resources had a significant

21 In a similar study, the authors examined the impact of natural resources on economic growth at a subnational level using US state data. They found that natural resources hinder economic growth at a regional level but that the impact is mainly indirect through various transmission channels. Specifically, they found that natural resources decrease investment, schooling, openness, and R&D expenditures, and increase corruption (Papyrakis and Gerlagh, 2007).

direct impact on economic growth, with one exception. A dummy variable for oil had a negative and significant effect in the rule of law equation, but a *positive* and significant effect in the growth equation.^{22, 23}

Isham et al. (2005)

Isham et al. (2005) also argue that natural resources affect the quality of institutions and that institutions in turn have an impact on economic growth. Their hypothesis was that “point source” natural resources (those like oil and minerals extracted from a narrow geographic or economic base) and plantation crops such as coffee and cocoa have a negative impact on institutions; by contrast, “diffuse” natural resources like livestock and agricultural produce from small family farms were less likely to have a negative impact because, among other reasons, they generate lower rents, which makes them less attractive to a narrow elite.²⁴

To test this hypothesis, the authors constructed four indices of natural resources: manufacturing, diffuse, point source, coffee and cocoa. With data for over 60 nations from 1975 to 1997, they first estimate the impact of natural resources, five exogenous instruments (ethnic fractionalization, predicted trade share, latitude, English language, European languages) and a number of standard independent variables on a number of measures of institutional quality: rule of law, political stability and violence, government effectiveness, absence of corruption, regulatory framework, and property rights and rule-based governance. Then the authors estimate the impact of these measures of institutions and the rest of the growth independent variables on economic growth. The estimates confirm their hypothesis: point-source resources have a negative impact on institutions while diffuse resources do not. Natural resources also seem to have a direct impact on economic growth. In their models, the coefficient on the share of primary exports to GDP—the original resource variable in Sachs-Warner (1995)—is *positive* and significant in most of the growth regressions.

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- 22 The authors also tested whether the impact of natural resources is linear by introducing dummy variables for the share of natural resources in total exports over 20%, 30%, 40%, 50%, 60%, 70%, and 80%. The results indicate that the impact of natural resources is indeed non-linear, suggesting that the negative marginal impact of natural resources on the quality of institutions depends on, and increases with, the level of natural resources.
- 23 The authors have not computed the net of both direct and indirect effects of oil but my own computation indicates that oil does have a positive net effect on growth.
- 24 Another explanation for these results could be that the “point source” natural resources are more immobile than diffuse natural resources, which makes them more likely to be taxed and regulated than other natural resources, which increases the incentives for corruption and rent-seeking.

Brunnschweiler and Bulte (2006)

In a similar paper, Brunnschweiler and Bulte (2006) use cross-sectional data from 1970 to 2000, for 29 to 89 countries to examine the impact of natural resources on institutions, resource dependence and economic growth. First, they investigated the impact of resource abundance (measured as the log of total capital per capita in 1994 and log of subsoil assets per capita in 1994), resource dependence (natural resource exports as a percentage of GDP from 1970 to 1980 and mineral exports as a percentage of GDP from 1970 to 1980), regional dummies, and latitude on institutions (measured as the rule of law in 1996 and quality of bureaucracy in 1996). Then they examined the impact of resource abundance, “durable” institutions,²⁵ as well as “changeable” institutions (rule of law and quality of bureaucracy) and trade openness on resource dependence. Dependence upon resources was measured in three ways in this equation: exports of agricultural raw material, exports of minerals, and exports of natural resources, all as a percentage of GDP from 1970 to 1980. Lastly, they estimated the impact of resource dependence (as estimated in the second equation), institutions (estimated in the first equation), resource abundance, and other regressors on growth in GDP per capita from 1970 to 2000.

Here are Brunnschweiler and Bulte’s results. Resource *abundance* has a positive impact on the quality of institutions; resource dependence does not. Resource abundance, openness, and type of regime have a positive impact on the resource dependence; the quality of institutions has a *negative* impact on resource dependence. Lastly, resource dependence has no direct impact on economic growth whereas resource abundance has a positive impact. This complex model, in the end, has one result that compares to the previous papers: at least part of the effect of resources on growth is by way of institutional quality.

Gylfason and Zoega (2006)

Gylfason and Zoega (2006) looked at the impact of natural resources on economic growth through savings and investment. The authors maintained that natural resources reduce savings and investment through five channels: [1] a fixed amount of natural resources limits growth potential and leads to diminishing returns on growing labor and capital; [2] rent-seeking and potential for violent conflict; [3] Dutch Disease; [4] weakening of private and public incentives for investment in human capital due to a high level of non-wage income from resource revenue; and [5] diversion of focus away from institutions and other policies due to revenue from natural resources. They further argue that natural resources will have a direct impact on growth as well as an indirect effect through education, investment, and social capital

25 The authors designed two dummy variables for durable institutions. They assigned values of one to countries (a) that have a presidential rather than a parliamentary regime, and (b) that have majoritarian rather than proportional electoral rules.

(measured by the level of civil liberties.) Like Brunnschweiler and Bulte, they distinguish resource dependence (share of natural-resource capital as a percentage of total capital) and resource abundance (supply of natural-resource capital per capita.)

With cross-country data for 85 countries from 1965 to 1998, Gylfason and Zoega found that resource dependence has a negative impact on accumulation of physical capital, human capital (measured by secondary education), and social capital (measured by civil liberties), all of which have a positive impact on economic growth. Aside from this indirect negative effect on growth, they also found that resource dependence had a direct negative effect. On the other hand, an abundance of natural resources measured as the supply of natural capital per capita has a positive and direct impact on economic growth. It also has an indirect and positive impact on economic growth through physical, human, and social capital.

Beck and Laeven (2006)

Beck and Laeven (2006) looked at the impact of natural resources on economic institutions in 24 transition economies in eastern Europe and central Asia from 1992 to 2004, the first years of their transition from centrally planned economies to free market. They argued that the socialist elite remained a powerful interest group at the beginning of transition period but its power differed from one transition economy to another. The incumbent socialist elite had fewer incentives to create institutions that encourage competition since competition would reduce their economic power. In addition, natural resources provide incentives for the elite to extract rents and, thus, they have much less incentive to create property rights. Therefore, the longer the socialist elite was in power and the more natural resources a nation has, the more likely it is that the transition process is “extractive” rather than “catalytic.” Those nations that experienced a “catalytic transition” had an elite that encouraged the development of institutions such as property rights and rule of law. On the other hand, those nations that experienced “extractive transition” had an elite that was primarily concerned with securing a part of formerly state-owned enterprises for themselves so they could extract rents and secure their economic and political power.

In their cross-country two-stage estimates, institutions were measured with the six indicators: voice and accountability, government effectiveness, rule of law, regulatory quality, absence of corruption, and political stability from Kaufmann et al. (2004). Socialist entrenchment is measured as the number of years under a socialist regime. The first equation estimates the effect on institutions of years under socialism, share of natural-resource exports as a percentage of GDP, gas reserves per capita, and Executive Constraints 1930, measuring the degree of political independence of the chief executive of a country. In the second equation, economic growth depends on institutions (from the first

equation), the log of GDP per capita, change in rule of law, change in corruption, and the degree of reform in the various sectors of the economy.

Beck and Laeven found that nations that had been longer under a socialist government, had more natural resources, or both, saw less development of institutions over the first decade of transition. The results do not change even when they add various other control indicators.

Kronenberg (2004)

Similarly, Kronenberg (2004) looked at whether the curse of natural resources was present in transition economies. He examined the impact of natural resources (share of primary goods in total exports) on economic growth in 20 transition countries in eastern Europe from 1989 to 1999. Using cross-country data, he first looked at the direct impact on economic growth of access to open seas, distance from Moscow, distance from Paris, a measure of corruption, and other regressors. The author then examined possible reasons for the natural-resource curse and then tested the relationship between natural resources and corruption. Like the authors of papers already examined in this section, he found that the curse of natural resources operates indirectly: natural resources lead to corruption; corruption lowers economic growth. He also examined the relationship between enrolment rates and natural resources and found that natural resources have a negative impact on education (that is, investment in human capital). Lastly, he looked at the relationship between relative price level and natural resources to test for the Dutch Disease but found that the Dutch Disease did not play a role in the natural-resource curse (that is, natural resources did not have a significant impact on the relative price level) in the transition economies. The author concluded that the main reasons for the resource curse in the transition economies were corruption and neglect of education because natural resources lead to higher levels of corruption and neglect of education, both of which in turn have a negative impact on economic growth.

Gylfason (2001b)

Gylfason (2001b) also found a similar relationship between natural resources and education. Using data for 85 nations from 1965 to 1998, economic growth was partially determined by rate of enrolment in secondary school (from 1980 to 1997); enrollment rates, in turn, depended on natural-resource capital (share of total wealth in 1994) and initial per-capita income in 1965. Natural resources, he argued, not only reduce growth through the Dutch Disease, rent-seeking, and “overconfidence” (which he argued reduce the quality of economic institutions), but also lead to the neglect of public and private incentives to accumulate human capital. This is an important argument, consistent with endogenous growth theory: that industries based upon natural resources (with the exception of modern agriculture and high-tech

oil-drilling operations) make more use of less-skilled labor than manufacturing industries. As a result, primary exports tend to hinder both learning through experience and technological advances, which lead to economic growth. He found that natural resources have a negative impact on economic growth that is both direct and, through education, indirect.

Conclusion

In this section, most studies showed that natural resources have a negative impact on the quality of institutions. Again it's important to qualify. Not all natural resources have the same impact: fuels and minerals appear to be driving many of the results. Furthermore, how natural resources are measured matters: the distinction between dependence upon natural resources and natural-resource abundance is often important.

Discussion

What can be learned from all of these papers considered so far? As Mehlum et al. (2006a) pointed out, literature on natural resources and the role of institutions can be divided into three different groups. The first group argues that natural resources cause the quality of institutions to decay and this, in turn, leads to poor economic performance. A number of studies summarized in this paper (Barro, 1999; Sala-i-Martin and Subramanian, 2003; Jensen and Wantchekon, 2004; Ross, 2001; Isham et al., 2005; Gylfason and Zoega, 2006; Leite and Weidmann, 1999; Kronenberg, 2004; Gylfason, 2001b; and Beck and Laeven, 2006) show that natural resources may lead to a decline in institutional quality by delaying democratization, reducing the level of civil liberties, and weakening of the rule of law and some governance indicators. Furthermore, Collier and Hoeffler (1998, 2005a) show that natural resources can destroy the quality of institutions through civil wars.

The second group of studies claims that institutions play a neutral role (Mehlum et al., 2006a). Natural resources do not affect the quality of institutions nor do institutions have a direct impact on economic growth. Sachs and Warner (1995), for example, found evidence for the former; Arezki and van der Ploeg (2007) provide evidence for the later.

The third group of studies maintain that natural resources interact with the quality of institutions and that it is the quality of institutions, which determines how natural resources are used, that ultimately ascertain whether natural resources turn into a blessing or a curse (see, for example, Boschini et al., 2003; Mehlum et al., 2006b). In other words, the quality of institutions determines if natural resources are channeled into positive economic growth.

What might the difference across this body of work be attributed to? It is important to note that the measures used to gauge institutional quality

differ substantially. For example, Isham et al. (2005) uses six different measures to gauge institutional quality, based on Kaufmann et al. (2002). Boschini et al. (2003), Mehlum et al. (2006b), and Arezki and van der Ploeg (2007) measure institutional quality as an unweighted average of five indices from the International Country Risk Guide (ICRG). Sachs and Warner (1995) measured institutions with government efficiency, an average of three indices: efficiency of the judiciary, lack of red tape, and lack of corruption from Business International (Economist Intelligence Unit). Gylfason and Zoega (2006) measure institutional quality as the level of civil liberties.

The literature summarized so far does shed light on this paper's research question: there is nothing to suggest that nations with natural resources cannot control their destiny through economic policies and institutions: trade policy and institutional quality in general may be decisive in determining whether a wealth of natural resources turns into a curse or a blessing (Sachs and Warner, 1995; Sachs and Warner, 1997; Boschini et al., 2003; Mehlum et al., 2006b). These findings, however preliminary, are indeed crucial since they point towards areas where many resource-rich nations that are doing poorly could improve. Studies that look at various approaches to warding off the curse of natural resources are examined in the next section.

5 How can countries overcome the curse of natural resources?

In this section, we review an important subset of the literature on the curse of natural resources, papers that examine proposed solutions to help nations with natural resources to manage their revenue from natural resources better, turning it into a positive contributor to economic growth.

Weinthal and Luong (2006) looked at the most commonly proposed solutions in the literature for combating the resource curse: emphasizing macroeconomic policies (i.e., fiscal and monetary policy); economic diversification characterized by state-led investment and the encouragement of the non-resource sector; natural-resource funds such as stabilization and savings funds to stabilize spending and leave part of the revenue from natural resources for future generations; transparency and accountability in the management of revenue from natural resources; and direct distribution of such revenue to the population. They concluded that none of the proposed solutions seems to be working: strong economic institutions, absent from most developing countries, are the missing ingredient.

For instance, the existence of funds from natural resources in countries without sound economic institutions, instead of stabilizing the budget and preventing corruption, can strengthen the concentration of power of the ruling elite who, directly or indirectly, manages these funds (Weinthal and Luong, 2006). The authors argued for private ownership of natural resources and development of economic institutions as a solution to resource curse (Weinthal and Luong, 2006). Nations with sound, well-developed economic institutions may be better equipped to deal with large amounts of revenue from natural resources. Those nations that have the appropriate institutions such as the rule of law, property rights, independent judiciary and impartial judges, low taxation, low level of tariffs and import barriers, and low level of red tape may be able to ease and, in some cases, eliminate certain pressures from natural resources.²⁶

26 Given that the term “Dutch Disease” received its name from the experience of the Netherlands, a nation with well-developed economic institutions, with large increases in exports of natural gas, one might question that developed institutions may limit or eliminate the pressures from possessing abundant natural resources. Because of the Netherlands’ developed institutions, however, the Dutch avoided some of the consequences of a resource boom such as corruption and, over time, were able to implement reforms that mitigated the effects of the Dutch Disease (see, for example, McMahon, 2000).

Increased competition, for instance, would decrease incentives for corruption and other inappropriate behavior. In a booming industry, high profits would attract additional firms to the sector until the profits decrease to normal competitive levels (Gylfason, 2001a). This typically does not happen in the natural-resource sector because of restrictions on the access to those resources through quotas, exploration licenses, and other policy measures (Gylfason, 2001a). It is the restrictions on access that produce rents in excess of normal profit (Gylfason, 2001a).²⁷ Given high rents in this sector, those who are tasked with giving licences for exploration have higher incentives to engage in inappropriate behavior such as corruption (Ades and Di Tella, 1999). Allowing foreign firms to compete with domestic firms and eliminating the barriers to trade may reduce the rent in the domestic market and thus corruption (Ades and Di Tella, 1999).²⁸

Similarly, Tornell and Lane (1999) argue that in an economy with weak legal and political institutions and where multiple powerful groups are present, a resource boom increases the “voracity effect” that leads each group to grab for a greater share of national wealth by demanding more transfers. The authors concluded that “[i]t also follows that procompetitive policies—for example, making easier market entry or exposing domestic behemoths to foreign competition—may be as important in terms of altering a country’s propensity to arbitrarily appropriate private wealth as in their direct impact on efficiency” (1999: 42).

Most of the mineral-rich nations had state ownership of their natural resources from the late 1960s to the early 1990s, the period that was the main focus of the most recent literature on the natural-resource curse (Weinthal and Luong, 2006). Weinthal and Luong (2006) argue that in most developing nations petroleum resources are managed by a state oil company and thus bureaucrats are assigned to run the company. State bureaucrats running the state firms do not have strong incentives to make the firm profitable because they have no direct claim to profits but have access to state revenue (i.e., soft budget constraints) regardless of whether the firm is profitable (Weinthal and Luong, 2006).²⁹ The combination of not being compensated for the company’s performance and being responsible for issuing high-value permissions or extraction licences increases the incentive of bureaucrats running the state-owned firms to engage in corruption.

27 It is important to mention that high rents from natural resources could be a result of both restrictions on access and the type of natural resource. Rents tend to be higher in oil and mineral sector than in agriculture (Sachs and Warner, 1997) due to high cost of extraction and initial investment in machinery and skills.

28 Mauro (1995), e.g., found corruption lowers the level of investment and economic growth.

29 For additional information on soft budget constraints, see Clemens and Esmail, 2002a and 2002b.

Weinthal and Luong (2006) also argue that state ownership of natural resources reduces the incentives to improve the quality of institutions. Both the state elite who run a nation and the bureaucrats managing the state-owned firms have incentives for maintaining weak economic institutions since this gives them more discretionary power and does not require transparency about how the resources are managed and how resource revenue is spent (Weinthal and Luong, 2006). On the other hand, private actors who benefit directly from production and export of natural resources have an incentive to improve the quality of institutions by protecting and improving the property rights and efficient use of resources (Weinthal and Luong, 2006).

In addition, strong economic institutions such as rule of law (including impartial judges, independent judiciary, and enforcement of contracts) and a low level of red tape would both decrease the incentives for corruption, as the likelihood of getting caught increases, and eliminate some of the bureaucratic obstacles that tempt individuals to engage in corruption in the first place. More generally, these institutions reduce the rate of return on the so-called unproductive entrepreneurship (Baumol, 1990), that is, legal or illegal rent-seeking such as lobbying or corruption. Secure property rights, an independent judiciary and fair and efficient enforcement of contracts, and limits on the government's ability to transfer wealth through taxation and regulation in effect reduce the rate of return on unproductive entrepreneurial activity (Sobel, 2008). That is, these institutions make it more profitable for individuals to engage in the creation of wealth through productive entrepreneurship (Sobel, 2008). In many ways, Baumol's (1990) theory of productive and unproductive entrepreneurship explains why nations with good institutions experience higher level of economic growth than those with poor institutions.

Institutions that foster competitive markets may also reduce the probability of conflict. Gartzke (2005) found that economic institutions are about 50 times more effective than democracy in diminishing violent conflict. He argues that, in nations with open markets and appropriate institutions, wealth and power are created by competitive markets and the efficient production that arises from them, not by conquest of land or raw materials.

Sound economic institutions may also ease some aspects of the Dutch Disease by decreasing the pressure on competition for wages and capital through reduction or elimination of the restrictions on the movement of labor and capital. Furthermore, nations such as Malaysia that have a relatively open trade policy encouraged the development of the non-resource sector, which can contribute to their ability to escape the curse of natural resources.

On the other hand, discovery of natural resources in nations that have weak economic institutions and are still at an initial stage of economic development may indeed put those institutions to test and, in some instances, degrade them. Baland and Francois (2000) suggest that nations with a small

industrial base and a low level of entrepreneurship use revenues from natural resources to increase consumption and engage in rent-seeking where nations with broader industrial base do not.

Needless to say, the role of institutions in determining the impact of natural resources on economic growth requires additional research. So far, some of the research indicates that nations with better economic institutions are more capable of managing the revenue from natural resources and decreasing, if not eliminating, the adverse economic and political consequence of a resource boom. It is true that even those nations with sound, well-developed economic institutions may find it challenging to have a prudent fiscal policy due to the volatility of resource revenue (Stevens, 2003) but these challenges are more manageable for nations that have high-quality institutions. Nations with sound, well-developed economic institutions have often managed to use their natural resources to their advantage whereas nations with weak institutions appear to have turned their natural resources into a curse.

6 What is the evidence from case studies?

Regardless of the weaknesses in the econometric literature discussed in previous sections, studies that indicate that natural resources are a curse find their complements in a range of country-specific case studies. Oil-rich Nigeria and Venezuela and diamond-rich Sierra Leone are typical examples (Mehlum et al., 2006a). From 1965 to 1998, Iran’s GNP per capita declined by –1%, Libya’s by –2%, and Iraq and Kuwait’s by –3% (Gylfason, 2001b). OPEC nations, on average, declined by –1.3% over this period in terms of GDP per capita (Gylfason, 2001b). Similarly, African countries such as Chad, Guinea-Bissau, Madagascar, Mali, Niger, and Zambia have each experienced negative per-capita growth in GDP since 1965 (Gylfason and Zoega, 2006).

However, there are also nations with natural resources that have had respectable economic growth and managed to turn their natural resources into a blessing. Diamond-rich Botswana, for instance, had the world’s highest rate of economic growth since 1960 (Mehlum et al., 2006a). Chile, Brazil, Peru, Malaysia, and Thailand have all turned their natural resources into an advantage (Mehlum et al., 2006a). So, in addition to the econometric analyses, it is worthwhile to look at the evidence from case studies. While case studies have their own limitations, they do shed light on how certain nations have used natural resources to their advantage while others have failed to do so.

Mikesell (1997)

Mikesell (1997), for instance, explored the reasons for the relatively poor economic performance of mineral-exporting nations by examining eight developing countries that are major exporters of oil and minerals (Papua New Guinea, Botswana, Jamaica, Peru, Venezuela, Chile, Indonesia, and Oman) from 1960 to 1993. He concluded that the Dutch Disease was not a major factor in explaining economic growth in more than half of this sample. He also found that economic structure, such as diversification, did not seem to matter. The most important factor seemed to be “how government disposes of the windfalls and the policies it adopts to avoid inflation and maintain incentives for investment and production in the tradable sectors” (1997: 198). Mikesell also argued that democracy does not necessarily translate into good governance, implying that the form of government does not explain the presence or absence of a natural-resource curse. In other words, it is the economic, and not the political, policies and institutions that matter. He concluded by

saying that “[w]ithout the policy conditions for endogenous growth, including free trade, incentives for investment, technical advance, and stable prices, sustained growth will not take place.” (page 199).

Rodriguez and Sachs (1999)

Rodriguez and Sachs (1999) tested an alternative hypothesis: they argue that countries rich in natural resources live beyond their means by overspending and overinvesting during resource booms. After resource booms are over, nations decrease their spending and investment, resulting in negative growth rates during the transition.³⁰ The authors cite an exemplary case: the performance of the Venezuelan economy over the oil boom years from 1972 to 1993.

Sachs and Warner (1999)

Sachs and Warner (1999) used case studies to examine whether natural resource booms could be a potential catalyst for economic growth and development. That is, could they act as a “big push” for nations in the “low-income trap”?³¹ Studying 11 Latin American nations (Argentina, Bolivia, Brazil, Chile, Colombia, Equator, Mexico, Paraguay, Peru, Uruguay, and Venezuela) from 1960 to 1994, they concluded that “resource booms seem to have done little to generate long-term growth, and may in fact have hindered growth on average” (1999: 63). These cases, in other words, also suggest a prevalent natural-resource curse.

Wright and Czelusta (2004)

More recently, Wright and Czelusta (2004) looked at the performance of seven resource-rich nations: Australia, Brazil, Chile, Norway, Peru, United States, and Venezuela. They found that the resource-rich nations that have performed poorly failed to develop their mineral potential through appropriate policies, such as investment in education and research related to mineral exploration.

30 The authors made two assumptions: first, natural-resource industries are non-renewable industries and thus they cannot expand at the same rate as other industries; second, nations would have to invest their revenues from natural resources in domestic, and not international, markets due either to internal politics or to the lower rate of return in international markets. The investment in the domestic market would create temporary booms in consumption and production and, given that the booms are temporary, they will at some point lead to lower consumption and production. In other words, resource economies grow more slowly because they have unsustainably high levels of income.

31 The “poverty trap” or “low-income trap” refers to low levels of saving and low levels of capital, which lead to poor productivity in nations that are in the initial stages of economic development. The argument is that these countries are unable to lift themselves out poverty since their citizens are too poor to save and invest. Those advocating the “low-income trap” theory claim that such countries need a large injection of capital to set them on a path of sustainable economic growth.

Larsen (2006)

Larsen (2006) looked at how and why Norway escaped both the curse of natural resources and the Dutch Disease from 1960 to 2002 by comparing its performance to those of neighbors Denmark and Sweden. The author argued that Norway avoided the Dutch Disease by, among other tactics, exercising fiscal discipline and preventing a general wage increase by having wages set through negotiations between employers and unions at a national or industry level. The natural-resource curse was avoided by having a good legal system in place and transparency that allowed the public and media to scrutinize and monitor public agencies.

Olsson (2006)

Similarly, Olsson (2006) examined why diamonds have a negative impact on social and economic progress in Angola and Sierra Leone and a positive impact in Botswana and Namibia (from 1990 to 1999). The author identified two factors as the main explanation for the difference in economic performance: the strength of economic institutions such as property rights and the method of extraction. Olsson argued that alluvial mining, mainly used in Sierra Leone and Angola, is a simple but labor-intensive process that almost anyone can master and, thus, armed groups can extract diamonds using this method without investment in machinery or skills. Kimberlitic mining, which is a highly capital-intensive method of extraction, is practiced in Botswana and Namibia.³² The author also argued that Botswana had sound, well-developed economic institutions before diamonds were found in the early 1970s and that these prevented the elite from expropriating rents from the diamond mines.

In sum

The case-studies described here—except Rodriguez and Sachs (1999) and Sachs and Warner (1999)—point to policies and institutions as critical means for turning natural resources into a blessing. This evidence complements much of the econometric literature.

32 In general, alluvial mining is carried on by digging and sieving of river silt whereas kimberlite mining involves drilling through diamondiferous rock on certain locations of the kimberlite pipe.

7 What is to be done?

Consensus in the literature?

There is no consensus in the literature on the curse of natural resources. At one point, a consensus was emerging: that natural resources have a negative impact on economic growth and other desirable outcomes, either directly or indirectly, by inducing Dutch Disease, weakening the incentives for investment in human capital, reducing the quality of institutions, increasing corruption, slowing progress towards democracy, and increasing the risk of civil war. Some recent studies, however, have questioned the measurement of natural resources in the literature and the type of analysis used (cross-sectional rather than panel data). First, the mismeasurement of natural-resources endowment in these studies makes their results less reliable and even questionable. The abundance of natural resources is typically measured in the literature as primary exports as a percentage of GDP or total exports, which gauges dependence upon natural resources and not their abundance. Some authors suggested natural-resource capital per population as a more appropriate measure of the abundance of natural resources. These studies demonstrate that, when one uses a more precise measurement of resource abundance or endowment, the negative impact of natural resources on economic growth disappears.

The literature also indicates that not all natural resources have the same impact on economic growth or institutions. The primary commodities include a wide range of natural resources: agriculture, fuels, and minerals, all of which consist of subgroups. Resources such as diamonds, fuel, and non-fuel minerals tend to have high rents and are more likely to have a negative impact on economic growth and the quality of economic institutions than agricultural resources.

Needless to say, more research is needed to confirm the existence and the characteristics of the curse of natural resources, especially in comparing the different measures of natural resources and institutions, the type of analysis used (cross-sectional or panel), and the role institutions play in mitigating the adverse impact of natural resources. That is, more research is needed to confirm the findings of some of the recent literature on the resource curse and to shed some light on why different econometrics models and different measures of natural resources are producing completely different results.

The importance of sound economic institutions

Perhaps the strongest criticism of the early literature on the natural-resource curse is that many of the studies overlooked the role of economic institutions and the possibility of an interaction between natural resources and the quality of economic institutions. An increasing number of studies indicate that sound economic institutions do matter for economic growth and that, in most cases, these institutions are decisive in determining whether natural resources are a curse or a blessing. That is, nations with sound economic institutions are more capable of managing the revenue from their natural resources and turning it into positive economic growth. Sound economic institutions also increase efficiency by eliminating barriers to entrepreneurial activity and establishing a rule of law, which is crucial for economic activity. In addition, such institutions mitigate the curse of natural resources by reducing incentives for rent-seeking and corruption. Though the research is preliminary, this finding is crucial: it enables nations richly endowed with natural resources to have control over their destiny by identifying and then shaping the factors that are likely to be most important for economic growth.

The literature has proposed a number of solutions tailored to helping resource-rich nations manage revenue from their natural resources better. Unfortunately, too many of these solutions do not seem to be working because prerequisite strong economic institutions are not found in most of the developing nations. For instance, when sound economic institutions are absent, funds coming from natural resources, instead of stabilizing the budget and preventing corruption, can strengthen the concentration of power of the ruling elite who, directly or indirectly, manage these funds.

Even though the results of the research on the role of institutions in mitigating the resources curse need to be refined, national leaders would be wise to focus, as a matter of policy, on building sound economic institutions—rule of law, property rights, an independent judiciary and impartial judges, low taxation, a low level of tariffs and import barriers, and a low level of red tape—that will increase prosperity and help their country avoid the curse of natural resources.

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Institutions, economic growth, and the “curse” of natural resources

About this publication

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Acknowledgments

I would like to thank the Aurea Foundation for generously supporting this research. Special thanks go to Jonathan Isham, Luce Professor of International Environmental Economics at Middlebury College, for his tremendous help in reviewing and editing the paper. I would also like to thank Fred McMahon for his valuable comments and insights as well as Steve Easton, Raaj Tiagi, and the two anonymous referees for reviewing the paper. Any errors, omissions, or mistakes remain the sole responsibility of the author.

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ISSN

ISSN 1920-3314 Studies in Mining Policy (print version)

ISSN 1920-3322 Studies in Mining Policy (online version)

Date of issue

July 2009

Editing and design

Kristin McCahon and Lindsey Thomas Martin.

Cover design

Bill Ray

Images for cover

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تتمثل رؤيتنا في وجود عالم حر ومزدهر يستفيد فيه الأفراد من القدرة على الاختيار بشكل أكبر، والأسواق التنافسية، والمسؤولية الشخصية. أما رسالتنا فهي قياس، ودراسة، وتوصيل تأثير الأسواق التنافسية والتدخلات الحكومية

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