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Corruption in natural resource management: Implications for policy makers

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ABSTRACT

Corruption is the main reason why resource-rich countries perform badly in economic terms. Corruption in resource-rich countries takes two main forms, rent-seeking and patronage. Resource rents induce rent-seeking as individuals compete for a share of the rents rather than use their time and skills more productively. And resource revenues induce patronage as governments pay off supporters to stay in power, resulting in reduced accountability and an inferior allocation of public funds. This paper systematically reviews the literature on natural resources and corruption, and outlines the main policy implications for donors and domestic policy makers. A main conclusion is that priority should be given to policies that address rent-seeking and patronage. In other words, policy in resource-rich countries should be less about macro-economic management and more about institutions to prevent rent-seeking and patronage, and about giving the right incentives to players in the resource sector. Moreover, all policies need to take into account their impact on rent-seeking and patronage, and some current policies may actually be harmful in this respect.

Introduction

Nigeria and Angola are the two largest oil-producing countries in Africa. At the same time, corruption is rampant in both countries. The two countries share 147th position on the Transparency International Corruption Perceptions Index for 2007.[2] The chairman of Nigeria's Economic and Financial Crimes Commission has estimated that more than $380 bn of public funds have been stolen or wasted by various governments since independence in 1960.[3] By some accounts, more than $1 bn of Angolan oil revenues disappeared due to corruption each year in the early 2000s (McMillan, 2005). These two oil-rich countries are by no means atypical, there is considerable evidence that natural resource-rich countries on average suffer from higher levels of corruption (Leite and Weidmann, 1999; Aslaksen, 2007; Petermann et al., 2007).

Resource-rich countries also suffer more generally from a phenomenon termed "the resource curse". Paradoxically, wealth in the form of natural resources appears to be detrimental to the economic development of a country. Resource-rich countries on average have lower growth rates, lower levels of human development, and more inequality and poverty (Sachs and Warner, 1995; Bulte et al., 2005; Gylfason, 2001a). It is estimated that a 13% increase in primary exports to GDP decreases annual growth by about 1% (Sachs and Warner, 1995). This may not sound like a lot, but given the low growth rates and high reliance on primary exports of many developing countries, compounded over a number of years, the impact is substantial. Nigeria is a case in point, where GDP per capita (in PPP terms) currently is at about the same level as in 1970, and where the share of the population living on less than $1 a day has doubled to about 70% in the same period (Sala-i-Martin and Subramanian, 2003; UNDP, 2007).[4]

Corruption is the main reason why resource-rich countries perform badly in economic terms. This is an implication of current theories and evidence on the resource curse. This suggests that corruption is *the* development problem in resource-rich countries, rather than just one of a number of problems. In particular, corruption in resource-rich countries takes two main forms, rent-seeking and patronage, both of which are economically costly. Firstly, large resource rents make rent-seeking a profitable strategy. Hence individuals and groups compete for a share of

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[2] http://www.transparency.org/policy_research/surveys_indices/cpi/2007

[3] http://news.bbc.co.uk/2/hi/africa/6069230.stm

[4] PPP means power purchasing parity, where GDP has been adjusted for relative costs of living in different countries.

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Table 1
Ten most resource-dependent countries (for fuels, ores and metals, and agricultural raw materials, 2002–2006).

Country	Fuels exports/GDP	Control of corruption	Country	Ores and metals exports/GDP	Control of corruption	Country	Agricultural raw materials exports/GDP	Control of corruption
Saudi Arabia	0.45	0.30	Mongolia	0.24	−0.36	Gabon	0.08	−0.58
Algeria	0.38	−0.59	Zambia	0.19	−0.85	Mongolia	0.06	−0.36
Trinidad and Tobago	0.38	−0.01	Chile	0.17	1.37	Latvia	0.06	0.24
Gabon	0.37	−0.58	Mozambique	0.15	−0.78	Guyana	0.05	−0.48
Yemen, Rep.	0.34	−0.73	Peru	0.09	−0.36	Kyrgyz Republic	0.04	−0.95
Kazakhstan	0.30	−1.07	Kazakhstan	0.06	−1.07	Estonia	0.04	0.81
Azerbaijan	0.30	−1.09	Bulgaria	0.06	−0.09	Cote d'Ivoire	0.04	−1.11
Venezuela, RB	0.29	−1.02	Guyana	0.06	−0.48	Thailand	0.03	−0.30
Iran, Islamic Rep.	0.21	−0.48	Namibia	0.05	0.08	Malaysia	0.03	0.31
Norway	0.21	2.03	Jordan	0.05	0.26	New Zealand	0.03	2.33

Source: Authors' calculations based on data from World Development Indicators 2008 and the Quality of Government Institute.

the resource rents rather than use their time and skills more productively. Secondly, resource revenues induce patronage as governments pay off supporters to stay in power, resulting in reduced accountability and a worse allocation of public funds. In various guises, these two mechanisms are at the core of current resource curse thinking.

Identifying corruption as the main problem in resource-rich countries has clear policy implications. The main contribution of this paper is to systematically review the literature on natural resources and corruption, and to outline the main policy implications for donors and domestic policy makers. Though a number of articles and books have been written on the subject, such a focused yet comprehensive analysis has to our knowledge not been previously conducted. A main conclusion of the paper is that priority should be given to policies that address rent-seeking and patronage. In other words, policy in resource-rich countries should be less about macro-economic management and more about institutions to prevent rent-seeking and patronage, and about giving the right incentives to players in the resource sector. This is contrary to current policy priorities in this area. Moreover, for all policies we need to take into account their impact on rent-seeking and patronage, and we will argue that some current policies may actually be harmful in this respect.

These policy implications are of relevance to a large number of countries. In empirical studies, such as the seminal study by Sachs and Warner (1995), resource intensity or dependence is commonly proxied by the ratio of primary product exports to GDP. Primary exports include fuels, ores and metals, and agricultural raw materials.[5] How many countries would qualify as highly resource dependent depends on one's cut-off point. However, averaged over the period 2002–2006, 44 countries had ratios of primary exports to GDP of more than 5%, 29 countries had ratios above 10%, and 14 countries above 20%.[6] Table 1 presents a more disaggregate picture and lists the 10 countries in the world that are most dependent on fuels, ores and metals, and agricultural raw materials. The leftmost panel of the table shows the most fuel-export-dependent countries, their ratios of fuel dependence, and their level of corruption. The middle panel provides similar information for the most ores and metal-dependent economies, and the rightmost panel does the same for agricultural raw materials. Resource-dependence ratios are averaged for the period 2002–2006, and the corruption index used is that of the World Bank Institute (averaged 2002–2005), which runs from −2.5 to +2.5 and where higher numbers signify less corruption (cf. Kaufmann et al., 2008).

At least two broad observations can be made from the table. First, the degree of dependence or specialization in natural resources seems the highest for fuel-dependent economies and the lowest for agriculture. Second, the number of highly corrupt countries appears greater in the group of fuel-dependent economies than for economies dependent on ores and metals or agriculture.[7] The table thus illustrates a more general finding that the resource curse relates mainly to the extraction of so-called point source resources extracted from a narrow geographical or economic base, such as petroleum (Sala-i-Martin and Subramanian, 2003). In drawing out policy implications, it is therefore important to note that different resource sectors give rise to different challenges, the challenges in forestry differ, e.g., from those in petroleum, a fact that policies need to reflect.

The rest of the paper is structured as follows. The section 'Corruption and the resource curse' takes an overarching, macro perspective on the effect of natural resource rents on the behaviour of skilled individuals and governments, and resulting economic inefficiencies. The focus will be on the mechanisms through which resource rents produce unfavourable development outcomes, which allows us to identify key policies to counteract these negative effects. The section 'How natural resource management is corrupted' looks more specifically at the natural resource sector of a country, analyzing the main players and their incentives and opportunities in relation to corruption. Policy implications in terms of reducing incentives and opportunities are then explored. The 'Concluding remarks' section discusses results and their implications.

Corruption and the resource curse

Should Nigerian policy priorities reflect Dutch experiences?

Natural resources can be a curse rather than a blessing for a country. From the resource curse literature, there is ample

[5] In the World Development Indicators 2008, the category fuels correspond to the Standard International Trade Classification (SITC) section 'How natural resource management is corrupted' (mineral fuels which include coal, oil, gas, and electric current). Ores and metals correspond to SITC divisions 27 (crude fertilizers and minerals), 28 (metalliferous ores and scrap), and 68 (nonferrous metals). Agricultural raw materials correspond to SITC section 'Corruption and the resource curse' (inedible crude materials except fuels) excluding divisions 22, 27, and 28. Agricultural raw materials thus include products from forestry but not fisheries. *Source*: World Bank (2008).

[6] Calculations based on data from the World Development Indicators 2008, from which data on the relevant variables are available for a total of 102 countries for the period 2002–2006.

[7] Though not apparent in the table, highly corrupt countries in the latter categories such as Kazakhstan, Cote d'Ivoire and the Kyrgyz Republic actually have higher fuel dependence ratios than ratios of ores/metals or agriculture dependence.

evidence that countries rich in natural resources, on average, grow more slowly than countries without such resources (Sachs and Warner, 1995, 1997; Sala-i-Martin and Subramanian, 2003). Natural resources have also been found to reduce human development and increase inequality and poverty (Bulte et al., 2005; Gylfason, 2001a). Although supported by a number of studies, the existence of a resource curse has remained controversial. Where the aforementioned studies use export intensity as a proxy for resource dependence, other recent studies instead use measures of resource abundance (how much is in the ground) and do not find a negative effect on growth (Stijns, 2005) or even a positive effect (Brunnschweiler, 2008). Some therefore suggest that the resource curse is "elusive" (Lederman and Maloney, 2008) or a "red herring" (Brunnschweiler and Bulte, 2008). However, as argued by Kolstad and Wiig (2008) and as will become apparent below, the key mechanisms behind the curse revolve around resource rents, for which resource abundance is a poor proxy. The studies that have attempted to call the resource curse into question by using alternative measures of resources therefore fail to convincingly do so.

Early explanations of the resource curse phenomenon tended to focus on Dutch disease effects (Van Wijnbergen, 1984; Sachs and Warner, 1995, 1999, 2001; Torvik, 2001; Matsuyama, 1992). According to these explanations, natural resource exploitation leads to the appreciation of a country's currency, resulting in deterioration in the terms of trade and a contraction of the manufacturing sector. If there are learning or spill-over effects in manufacturing that are forgone when this sector contracts, this leaves the country at a disadvantage once the resource runs out. The assumption of superior learning effects in manufacturing is, however, largely unproven (Sala-i-Martin and Subramanian, 2003). And even in the presence of such effects, some level of Dutch disease is optimal since resource extraction allows higher consumption (Davis, 1995; Matsen and Torvik, 2005).

The main point, however, is that other factors explain the resource curse much better than Dutch disease effects. Increasingly, the resource curse has been identified as a problem of natural resources leading to dysfunctional behaviour in a poor institutional context (Sala-i-Martin and Subramanian, 2003; Bulte et al., 2005; Mehlum et al., 2006; Robinson et al., 2006; Collier and Goderis, 2007). This is particularly pertinent in the context of resource-rich developing countries, where the institutional framework is often weak to begin with. Moreover, in this respect resource-rich developing countries are likely to differ substantially from a developed country such as Holland, where institutions were more fully in place prior to resource extraction. Basing Nigerian policy priorities on Dutch experiences is therefore a highly questionable approach. Instead, policy in resource-rich developing countries should address dysfunctional behaviour, in particular corruption, and institutional failure.

How natural resources corrupt

As noted in the introduction, current analytical models of the resource curse emphasize the effect of resource rents on corruption. Corruption is here conventionally defined as *the misuse of public or entrusted authority for personal gain*.[8] The models differ according to the type of corruption that is viewed as central. One set of models argues that natural resource rents lead to *rent-seeking*, which can be defined as the socially costly pursuit of rents (Svensson, 2005, p. 21). Though rent-seeking and corruption do not overlap perfectly, some forms of rent-seeking qualify as corruption. Another set of models explores the effect of natural resource rents on *patronage*, which is defined here as the use of public resources to secure political power.[9] Below, we review these two types of analytical perspectives in turn.

Rent-seeking

"This is not about production, but about a cake to fight for", Shaxson (2007, p. 215) quotes a former Angolan planning minister. Shaxson at length illustrates how oil wealth in Nigeria and Angola has produced a scramble from various factions and interest groups to appropriate their share of the rents. The main problem with this type of *rent-seeking* is not the fight for rents in itself, but the fact that the resources (skills, time, energy) that people expend to acquire a larger share of the rents have alternative uses. In resource-rich economies, skilled agents can benefit more from becoming, for instance, oil bureaucrats or lobbyists, than from starting a business in another field. Since this entails the redistribution of an existing cake, rather than an expansion of the cake, this is socially costly. Or in other words, since each agent does not take into account the fact that a larger share for him entails a reduced share for others, too many skilled agents become rent-seekers in natural resource-rich economies.

Mehlum et al. (2006) studied formally an economy where skilled entrepreneurs can choose between rent-seeking and productive activities such as starting a firm. They show that when resource rents are high and institutional quality low, the outcome is that a number of entrepreneurs choose to be rent-seekers. In this situation, an increase in natural resource rents will result in more entrepreneurs becoming rent-seekers. If there are externalities in production (i.e. profitability increases in the number of producers), an increase in resource rents causes so many entrepreneurs to shift into rent-seeking that total national income is reduced. In other words, the loss in production that results from entrepreneurs moving out of this sector exceeds the increase in income that natural resource rents represent. Hence, rent-seeking makes the size of the cake smaller, or an economy worse off, even though it has received an additional infusion of income through natural resources.

This rent-seeking perspective thus suggests that countries that have bad *institutions* suffer a resource curse, whereas those with good institutions do not. Institutions in this setting are institutions governing the private sector, such as the rule of law, which influence the relative profitability of productive activities, and hence whether agents choose to be producers rather than rent-seekers. Besides institutions, other rent-seeking models suggest that additional factors may determine whether natural resources lead to increased rent-seeking. The effect of resources on rent-seeking may depend on the *initial level of rent-seeking* when resource rents become available. Where corruption is widespread, e.g. at the start of oil extraction, the rent-seeking effect of resource revenues can be more negative (Baland and Francois, 2000). *Ethnic fractionalization* in a country can exacerbate rent-seeking problems. In ethnically divided countries, resource rents cause more intense fighting between groups to appropriate rents, which undermines productive activities and property rights (Hodler, 2006). As an illustration, consider the relative prosperity of diamond-rich and homogeneous Botswana, versus the stagnation of oil-rich but heterogeneous Nigeria.

Patronage

The phenomenon of *patronage* can be exemplified with developments in Nigeria after 1979. "The new civilian leaders … felt more need to shore up their political support by doling out contracts and favors", including "pushing ahead with the giant

[8] See e.g. World Bank/IMF 2006, www.transparency.org

[9] http://www.u4.no/document/glossary.cfm#patronage

Ajaokuta steel project, a classic white elephant … consuming billions of dollars without producing any steel" (Shaxson, 2007, p. 22). The basic problem here is that increased natural resource rents offer governments both more opportunities and greater incentives to pay off political supporters to stay in power. Since being in power tomorrow means having access to greater resource rents, politicians are willing to spend more today to stay in power. Public funds used on patronage could alternatively have been spent in more socially productive ways, which means that patronage implies an inefficient allocation of public resources.

These effects are studied formally by Robinson et al. (2006). They analyze the decision of an incumbent politician who can choose between consuming resource rents today, or spend them on providing public sector employment for his supporters in order to increase the probability of being re-elected next term, and hence have access to future resource rents. In this setting an increase in natural resource rents has three effects. It increases income directly and indirectly by making the extraction path more efficient. But the incumbent also has a greater incentive to provide his supporters public sectors jobs, which draws them out of more productive employment, thus reducing national income. The analysis of Robinson et al. shows that if institutions are sufficiently bad, the latter effect dominates the two former. In other words, increased natural resource revenues cause national income to fall, i.e. a resource curse.

Hence, the extent of patronage and hence the detrimental effect of natural resources depend on the quality of *institutions* of a country. Countries with bad institutions experience a resource curse; those with good institutions do not. This appears similar to the rent-seeking perspective, but note that the institutions in question are different. In a patronage perspective, the critical institutions are institutions that govern the allocation of public resources, not private sector profitability. In other words, what matters here are institutions through which a politician is held accountable for the use of public resources, i.e. institutions that constrain his ability to secure political power through public funds. In addition to institutions, other models suggest that additional factors may matter for the effect of natural resources on patronage. The presence of *political competition* is one factor that can discipline politicians from inefficiently redistributing rents in this manner. If a government is challenged by a political opponent, this implies that there are limits to how far it can go in supporting one sector or social group over others (Damania and Bulte, 2003).

There is an important relation to the *rentier state* perspective here, which argues that natural resource rents may weaken accountability of governments to citizens. By controlling substantial oil revenues, governments can reduce pressures for accountability and democratization. Resource revenues may reduce the need for domestic taxes, and the public is in turn less likely to demand government accountability. Resource revenues may be used directly to oppress a population or prevent the formation of social groups independent of the state (Ross, 2001). Moreover, the largely unskilled working class and large income disparities engendered by a resource-driven economy may create conflict and reduce effective pressure for democratization (Auty, 2001a; Woolcock et al., 2001). Natural resources may also crowd out investment in human capital, i.e. schooling and *education* (Gylfason, 2001b), whereas an informed and educated electorate is important for government accountability.

Addressing the resource curse: policy implications

Not all resource-rich countries suffer a resource curse. Botswana and Chile are frequently mentioned as examples of developing countries benefiting from resources. Resources have historically been important to the development of countries such as Australia, Canada, and the US (Davis, 1995; Auty, 2001b; Gylfason, 2008). To weaken or prevent a resource curse from occurring, it is important to know the precise mechanisms through which natural resource rents affect development. As shown above, rent-seeking and patronage can explain the negative effect of natural resources on many economies, and there are also a number of examples that these phenomena occur in natural resource-rich countries. The centrality of rent-seeking and patronage to the resource curse is based on more than theory and anecdotal evidence, however. There is also considerable empirical evidence that corruption in the form of rent-seeking and patronage is at the core of the resource curse phenomenon.

The importance of rent-seeking and institutions governing the private sector is tested by Mehlum et al. (2006). Performing a regression analysis on cross-country data for 87 countries, they show that while there is a significant negative relation between natural resource abundance and economic growth, the interaction of resource abundance and institutions is significantly positive. This implies that while resources reduce growth, they do so to a smaller extent the better a country's institutions are, and if institutions are sufficiently good no resource curse occurs.

A similar test is performed on the importance of patronage and institutions of democratic accountability, by Damania and Bulte (2003). They similarly find that the interacted term of resource abundance and institutions is significantly positive, suggesting that the resource curse depends on the quality of institutions. Note that while the two studies reach similar conclusions, the institutional indices they use are different: Mehlum et al. use an index of producer-friendly institutions (which includes the rule of law) and Damania and Bulte use an index of democracy. We therefore have evidence that rent-seeking and institutions governing the private sector, and patronage and institutions of democratic accountability, determine whether countries suffer a resource curse or not. Collier and Goderis (2007) provide further empirical evidence that avoiding the resource curse is predominantly a matter of institutions curbing patronage and rent-seeking.

Policy in resource-rich countries should reflect the available evidence on what causes the resource curse. This means that policy priorities in resource-rich countries should be to reduce corruption in the form of rent-seeking and patronage. Current policy initiatives do not appear to reflect this. Initiatives to build capacity in resource-rich developing countries tend to be informed by experiences from resource-rich developed countries. This may lead to too much emphasis on macro-economic management, rather than on improving institutions that may reduce corruption. Specifically, an initiative such as the Extractive Industries Transparency Initiative (EITI) has sought to increase transparency on how much governments receive in resource revenues.[10] However, from a patronage perspective, what matters is public expenditures more than revenues. So even initiatives that do to some extent aim to address corruption are not informed by the basic perspectives on what causes the resource curse (Kolstad and Wiig, 2009). A lack of focus on the relevant institutions and on corruption is also a general problem for petroleum-related aid initiatives (Kolstad et al., 2009).

There is even a possibility that some initiatives may make things worse by not explicitly taking into account their effect on rent-seeking and corruption. For instance, an important part of the EITI is the creation of a multi-stakeholder committee to oversee the process. The multi-stakeholder group is appointed by

[10] See http://eitransparency.org/ for more information.

the government, which could make it just another arena for patronage politics (Kolstad and Wiig, 2009). Fractionalistic stakeholder groups may use their potential leverage in the committee to acquire a greater proportion of resource rents. A government may also use its power of appointment to undermine the existence of social groups independent of the government, confer the rentier state argument. There is thus a chance that this initiative increases patronage and reduces government accountability, which would be contrary to its basic purpose.

Domestic and international policy in resource-rich countries should primarily focus on improving institutions, and in other ways reducing opportunities and incentives for rent-seeking and patronage. Improving the institutional environment is not necessarily easy, and it is particularly difficult where key players benefit from dysfunctional institutions. It is unlikely that corrupt government officials would support or implement reform significantly reducing their take. Experience from African countries suggests instead a 'partial reform syndrome' where implementation has been uneven and instrumentalised by leaders who understood that it 'would provide them with new kinds of rents, as well as with discretion over the evolution of rents within the economy' (Van de Walle, 2001, p. 159). And Ross (2001) has suggested that in several resource-abundant countries, political elites have shaped institutions to get more control over resource rents.

This implies that the political economy of reform in resource-rich countries needs to be taken into account. Building institutions that improve democratic accountability and reduce patronage is particularly likely to meet with great opposition from corrupt government officials. In one sense, it may be easier to improve institutions for the private sector to reduce rent-seeking, as this would make outside options more attractive for those currently involved in rent-seeking. In other words, institutions for the private sector amount to a carrot whereas institutions of democratic accountability amount to a stick. There is also empirical evidence that the former type of institutions are more important in avoiding the resource curse, than the latter. Kolstad (2009) extends the analysis of Mehlum et al. (2006), and finds that when indices of both types of institutions are included at the same time, only the interaction term featuring institutions for the private sector is statistically significant. In other words, private sector institutions are more important in averting the resource curse than institutions of democratic accountability.

As noted, not all countries suffer a resource curse, and such a curse is conditional on the level of institutions a country has. In addition, the resource curse is also conditional on the type of resources a country has. Many of the examples used above relate to extractive industries such as oil, which is not coincidental. Empirical studies that disaggregate resources show that the resource curse is more of a problem for some types of resources than for others. Fuels, notably petroleum resources, are strongly and consistently related to corruption and reduced growth (Leite and Weidmann, 1999; Sala-i-Martin and Subramanian, 2003; Petermann et al., 2007). Ores and metals also appear to produce a resource curse in countries with bad institutions. Some nuances are important here, as certain high-value commodities such as diamonds and gold have a particularly negative effect (Boschini et al., 2007; Petermann et al., 2007).[11] Agricultural commodities, on the other hand, do not have a negative effect on corruption or growth (Leite and Weidmann, 1999; Sala-i-Martin and Subramanian, 2003).

These results reflect the initial observations made in relation to Table 1, where high levels of corruption appear to be a problem mainly in fuel, and possibly ores- and metals-dependent countries. Some effort has gone into classifying more closely which resources promote a resource curse. One suggested distinction is between point source resources, i.e. resources "extracted from a narrow geographical or economic base" such as petroleum, minerals, and possibly plantation crops, and diffuse resources which are less concentrated resources such as agricultural products, livestock, and fisheries (Isham et al., 2004; Sala-i-Martin and Subramanian, 2003; Leite and Weidmann, 1999). Others distinguish between high-value commodities, which "generate sizeable economic rents", and low-value commodities (Petermann et al., 2007). A third distinction suggested is between more or less appropriable resources, i.e. resources more or less likely to cause appropriative behaviour (Boschini et al., 2007).

Two points need to be addressed in making these forms of distinctions. First, classification should focus on characteristics of resources rather than standard nominal resource categories. It has been suggested that offshore oil is less vulnerable to appropriative behaviour than onshore oil, and may generate opportunities for technological development (Torvik, 2007). Similarly, the easily mined alluvial diamonds of Sierra Leone may be more lootable than diamonds deep in the ground in Botswana, which require more advanced equipment to mine (Gylfason, 2008). In other words, diamonds are not simply diamonds, and oil is not simply oil, one has to distinguish the characteristics of resources. Second, conceptual distinctions between resources should be related more closely and explicitly to prevailing resource curse theories, to tie in with the mechanisms central to these. The concept of appropriable resources is perhaps the one most closely related to current theory, and in particular the rent-seeking perspective, but more work is needed on the exact theoretical foundations of resource typologies.

How natural resource management is corrupted

As argued in the preceding section, the main reason why natural resources harm economic development is that they increase corruption in the form of rent-seeking and patronage (at governance levels and more broadly in the economy). In other words, the detrimental effect on economic growth is due to the economywide incentives that resource rents have tended to generate and which result in misallocation of talent and public resources. There are differences across natural resource industries in how much they are associated with a resource curse. These differences have more to do with the pursuit of rents and grabbing at governance levels than the day-to-day management of the sectors. This means that even if corruption problems within a resource sector severely influence the optimization of production, environmental challenges, or revenue collection, these may still not be the main reasons as to why growth is reduced in the economy.

Though policy priorities should be to address the forms of corruption that have the most severe economic consequences, the sector-specific challenges must be understood and handled for the country to maximize revenues and positive impacts of the sector. This section therefore takes a more detailed look at the players and their incentives within the natural resource sectors. In general, the extent of corruption in resource sectors is influenced by both structural factors and the agency of the main players in the sector. Below, we consider these two sets of factors in turn.

Structural features of resource sectors and corruption

The following three structural preconditions have to be met for there to be corruption in a sector: (i) rents: a benefit of some kind

[11] Petermann et al. (2007) also suggest that non-fuel mineral wealth only increase corruption in developing countries, which likely just reflects differences in institutional levels, a variable their study does not control for.

motivates the act; (ii) authority: corruption requires influence on decisions; and (iii) opportunity: the quality of institutions determines the risk of being sanctioned. One can argue that all of these preconditions are particularly evident in natural resource sectors.

Rents

The rents from natural resources, non-renewable resources in particular, are said to constitute windfall gains to an economy, or referred to as foreign-exchange gifts. In this sense, the natural resource sectors differ conceptually from other sectors, where rents depend on some form of market failure.[12] The rents from resources are determined by a number of factors, however, including scarcity and geographic specificity of resources, levels of demand and international price-levels, as well as the costs of identifying resources, preparing for production, and the production itself. A lack of competition in many resource markets increases profits in the sectors, the OPEC oil cartel being a case in point. In several industries, there are a limited number of intermediate companies, exhibiting oligopsonistic behaviour towards extracting countries, and oligopolistic behaviour in end markets, cf. for instance the position of De Beers in the diamond industry. In sum, this means that there may be huge rents to be reaped, and this inspires corrupt acts from agents eager to appropriate part of the rents.

Authority

Natural resources are frequently and typically under state ownership (though at times delegated to local levels). This implies that decision on licenses to extract the resources, and distribution of rents, are commonly under the authority of top officials in the resource-rich states. Natural resource exploitation is often heavily politicized and decisions are made with reference to national interests or diplomatic concerns. In some countries the incumbent President or government holds exclusive discretionary influence on all important decisions in the sector. In Ghana, for example, this authority of the Presidency is vested in the constitution. In contrast, the degree of sector authority at the district level will often be limited, although the districts will often receive extra direct transfers or indirect returns production. If representatives of mining communities, for example, complain to their local authorities about pollution of rivers, limited employment opportunities in the sector, or private sector failure to meet responsibilities at mine closure, the districts will typically be told that the issue for complaint is under the authority of the government. The concentrated level of authority requires bureaucratic structures for the development of regulatory tools and management, as well as revenue collection and control. This brings up principal-agent challenges since there have to be in place bureaucratic structures with some degree of authority – and hence discretion – to award contracts and influence the operating conditions of private agents. The authority to make frequently highly valuable sector decisions is distributed between the political and bureaucratic levels. The more blurred this allocation of authority is and the wider the room for discretion, the more difficult it is to place responsibility and hence corruption becomes less risky for those involved. Even small modifications in sector-management decisions may have significant impact on the allocation of rents from the sector. The incentives to sell decisions in exchange for bribes or let them be steered by opportunities for theft will obviously depend also on the risk.

Opportunity

Industrial natural resource exploitation and extraction, either we refer to fish, diamonds, timber or petroleum, will usually require complex contractual and financial arrangements and advanced technology. Contractual and technological complexity will complicate prevention and control of corruption since it makes it difficult to establish standardized procedures and identify whether important decisions have been unduly influenced. Opportunities to conceal corruption will thus be greater in natural resource extraction than in many other industries. There is also considerable and repeated interaction of private agents and public officials as resource licenses are exercised, which provides substantial scope for corruption (Svensson, 2003). Moreover, since a number of the resource-rich developing countries are located in tropical areas, their institutional legacy is often extremely poor (Acemoglu et al., 2001), resulting in limited control of corruption.

Given the potentially significant impact on profits combined with the many ways of hiding transfers, the incentives – and risk – for grand and bureaucratic corruption are present in most resource-rich countries. In extreme cases, misuse of authority has become systemic in the sense that these institutional norms dominate decision-making procedures, whereas the guidance of a legal formal framework is being ignored. Honest officials may leave their institution when they are not able to enforce their authority, and thus the institution increasingly reflects an adverse selection of officials. Eventually, the equilibrium situation resembles a *kleptocracy*, where authority is misused to privately appropriate as much of the rents as possible. This strong terminology is not only used to describe Nigeria under Sani Abacha, the Zaire under Mobutu Sese Seko, or Suharto's Indonesia, but is seen on a daily basis in the media around the world when journalists discuss severe governance failure in natural resource management.[13]

The agents and their incentives

The most important players in the natural resource sectors are government officials, bureaucracies and producers, often private sector operators. Where corruption in the sectors exist, these parties are more than likely to be involved. There might be other categories of players with indirect influence on decisions, however, including sub-contractors and consultants, banks, insurance companies, export credit agencies, donors, development banks, and foreign governments. Although professional natural resource governance is supposed to prevent informal solutions, there are strong incentives for different players to collaborate in their influence, make secret agreements, boost their bargaining powers, or collude in open or hidden ways to get a better 'package solution.' Corruption, when such crime occurs in important decisions, can thus be initiated, condoned or facilitated by a larger set of players than those directly involved.

The players' possible involvement in corruption can be understood by identifying their interests and incentives and consider their opportunities in the light of various costs and risks if detected or if counter-parts happen to be honest.[14] The net benefit is not straightforward since the calculation of risks will depend on uncertain parameters, as well as the players' willingness to take risk. Given a high level of corruption, for example, a risk-averse private sector manager may be more inclined to offer bribes than a risk-neutral manager since high levels of corruption undeniably

[12] For a discussion about corruption in utility politics and regulation, see Kenny and Søreide (2008)

[13] Shaxson (2007, p. 140) recounts how in Equatorial Guinea, the son of the president made millions on timber concessions while being minister of forestry, stating that "*I am a business man first and a politician second.*"

[14] For an overview of the literature, see Aidt (2003), Rose-Ackerman (1999) or Bardhan (1997).

Table 2
Stages and risks of corruption in natural resource exploitation.

Prior to Operation					During operation	
Phase	Surveys Identification. Estimation	Public decision Public/private solution • Tender • Negotiations	Access Contracts • Cooperation • Finance • Insurance	Preparation Development Construction Infrastructure	Resource extraction Monitoring Export/certificates Revenue management	Evaluation Renegotiations Property rights
Risks	Surveyors have private information, sell to highest bidder Firms want access to areas where resources are likely to be valuable	Influence on concession terms Tender manipulation, pre-selection, misuse of secret information Diplomatic influence from foreign governments[a]	Third party interference: Consultants, planners, engineers. Banks and other financial institutions. Insurance companies	Corruption problems in construction of required utilities and infrastructure Private–private corruption Export agreements	Bureaucratic corruption in monitoring Customs corruption and facilitation payments Fraud or corruption in revenue handling	Lack of compliance with agreed upon terms Opportunistic renegotiation of concessions Illegal expropriation and lost private investments
Examples	*Logging* high-level corruption, due to unreliable estimation of the resources. Papua New Guinea	British firms in lucrative gas deals Equatorial Guinea	Bank in London rebuked over secret Liberian diamond deal	Chad-Cameroon pipeline. Corruption and double standards	Corruption reduces safety in mining, China. Angola's oil revenues and money laundering, at least $1 billion missing last year	Nationalization of forests created opportunities for state control and corruption, Nepal

[a] See Transparency International's Bribe Payers' Survey 2002. Diplomatic influence on international tenders is a problem with consequences similar to those of corruption, http://www.transparency.org/policy_research/surveys_indices/bpi/bpi_2002/complete_report_bpi_2002. All resource-rich countries are not victims in this respect. Note for instance how Russia has manipulated oil companies during concession rounds to obtain information about production technology, and now applies the energy resources as a means to influence governments in countries with less resources. See *Houston Chronicle*, November 27, 2006, http://www.chron.com/disp/story.mpl/ap/fn/4362549.html and *The Washington Post*, October 10, 2006, http://www.washingtonpost.com/wp-dyn/content/article/2006/10/09/AR2006100901184.html.

imply a higher risk of losing contracts by choosing an honest business approach (Søreide, 2009). Since corruption is such a hidden phenomenon, the players' perception of corruption may be more important in their calculation of risks and benefits than their actual experience. Eventually, the net benefit may also depend on complex mechanisms such as group practice. A player may be more inclined to be corrupt when others are. While this generic understanding of what underlies corruption cuts across sectors, a number of the implications it generates are of particular relevance to the natural resource sectors, as will be illustrated in the following.[15]

The players' incentives to be involved in corruption vary across stages in the process of extracting resources. Table 2 presents the main stages of natural resource exploration and exploitation, with a number of examples of the corruption risks each stage entails, as well as concrete examples from individual countries on these phenomena. These examples refer to characteristic challenges. In Equatorial Guinea British firms managed to obtain lucrative gas deals while the government received a very low share, which is common in many developing countries. By facilitating investments and the movement of cash, the London International Bank (LIB) made possible a 10-year monopoly diamond contract with the Liberian government, in spite of UN sanctions on the diamond industry. The mining case in China refers to a case where 123 miners died. Corruption was blamed because it increases local government's tolerance of overproduction, mismanagement and safety lapses.[16]

The main distinction in Table 2 is between (i) phases *prior to exploitation* of a resource (which includes exploration of the resource, designing of regulations and contractual terms, awarding of licenses to operate, and initial construction of infrastructure) and (ii) phases *during exploitation* (including extraction and monitoring, revenue collection, and renegotiations). Importantly, corruption problems in one phase of natural resource extraction depend on decisions taken in other phases. The next two sections follow this logics of Table 1, focusing first on major corruption risks in the planning and concession awarding phases prior to extraction (in 'Corruption risk – prior to operation'), and then the monitoring and enforcement phases and revenue handling during extraction (in 'Corruption risk – during operation').

Corruption risk – prior to operation

During the initial stages of the resource exploitation process, the rules of the game are defined, such as basic regulations and specifications of operator selection processes and contractual terms. This has substantial implications for the opportunities for corrupt gains that different agents face in subsequent phases. In particular, public officials (politicians and top bureaucrats) may attempt to shape the basic rules and processes in ways to facilitate bribe-taking in subsequent phases. Private firms may see substantial scope for increased profitability in later stages, by influencing terms and processes to their advantage. The early stages are also characterized by substantial uncertainty and

[15] In general, incentives will depend on the institutional context, the hierarchy of decision-making institutions, characteristics of the firms and the industrial structure in the sectors. Incentives will also depend on regulatory solutions in the sector and opportunities to get away with corruption. The constitutional context and the risk of political corruption will influence companies' trust in institutions and contractual terms, and hence their incentives to search for informal solutions to protect their business, such as corruption. See Mishra (2006) on how corruption depends on hierarchies, and Beato and Laffont (2002) for a discussion about corruption and competition in regulated industries, while Ades and Di Tella (1999) and Bliss and Di Tella (1997) offer results on the relationship between corruption and competition.

[16] Sources of these examples: Forest Trends (2006); *The Guardian*, June 2 and 3, 2005; *The Guardian*, June 2, 2005; Gary and Reisch (2004); *The Washington Post*, August 13, 2005; *Reuters Foundation*, September 9, 2006; and Iversen et al. (2006).

asymmetric information between parties, about the value of the resource, costs of extraction and so on. Information asymmetries problems are important to understand opportunities for corruption, and particularly relevant in the areas of regulation, concessional requirements, and the awarding of licenses and concessions.

Regulatory regime

Regulation is required in natural resource sectors since the privately beneficial choices commonly deviate from the collectively optimal. These sectors are frequently characterized by firms that are likely to gain strong market power, such as in the exploitation of minerals or oil. There are also substantial externalities involved in resource extraction, such as environmental impacts of mining, or tragedy of the commons problems, such as in the logging or fisheries industries. Governmental involvement and control will entail a risk of corruption, and the choice of regulatory solution, such as the degree of privatization, control mechanisms, or the award of licenses, is very important to understand and reduce this risk. Since regulations are an attempt to restrict privately beneficial options, private agents may want to undermine their effectiveness. For instance, a dominant firm would prefer limited competition in the industry, and not having to implement costly environmental standards. Attempting to influence the basic regulatory regime of a sector through corruption may therefore appear as an attractive option. The debate on American influence on Iraqi petroleum laws underscore the reality of these challenges.[17]

Concessional requirements

Regulation is very much about how the cooperation between governments and private firms should take place in a sector. Some form of license agreement is the most common form in natural resource exploitation, although the name of the arrangements varies across countries. A license is a revocable permission granted by a country's regulatory body (either a sector-specific institution or the political level) to operate a concession. The concession is the legal contract arrangement about extraction or exploitation of natural resources for a determined period of time. The many legal details of such arrangements are described in the literature on concession law. The agreements vary significantly in their transfer of control and ownership to private firms, awarded exploitation time, and the revenue shares of private firms and the government (Rasband et al., 2004). What is common across the industries is that the requirements determined by the concessions are subject to corruption risk. In exchange for bribes, firms may seek to influence the length of operation, environmental concerns, rate of exploitation, area of exploitation, contractual obligations of all sorts, and report commitments.

The design of the revenue sharing system, rules about cost recovery, and industrial tax allowances are particularly vulnerable to corruption. There is an important difference between sectors in this respect: between sectors where resources to a large extent are known and observable, such as a forestry and fisheries, and sectors where they are not identified prior to the issuance of licenses, such as oil and minerals. The more difficult to estimate the presence of the natural resources in question, the higher the risk associated with exploitation. Firms operating under a cost recovery basis may benefit significantly from influence on details. Hence, there is a risk of corruption associated with the regulations about how costs should be determined. The pre-operation design of the revenue system is exposed to undue influence and corruption in all natural resource industries, however, and is also an area particularly exposed to diplomatic pressures from foreign governments with commercial interests in the sectors.

The awarding of concessions

The pre-operation risk of corruption is probably highest during the award processes of licenses for natural resource extraction, however. There has been significant attention to corruption cases in the award of oil concessions, including for example the former French state-owned oil company Elf which offered bribes to gain concessions in several African countries; and the Norwegian oil company Statoil, which paid bribes in Iran to get access to petroleum fields.[18] There are, however, many examples of tender-related corruption also in the other natural resource industries. Standing (2008) informs about the various ways in which access agreements in fishing are being influenced by corruption. In particular, he points to how big countries or the EU has managed to achieve contractual terms for fishing that violate conditions about sustainability and are also significantly more profitable than what local producers achieve. Søreide (2008) lists examples and practices of corruption in forestry, explaining why the introduction of auctions has not always had the intended effect.

It still happens that the award of licenses and concessions are carried out on the basis of direct negotiations with certain firms. Yet some form of auction, following professional auction procedures, has become the norm in most countries. Proper auction procedures are important to select the most suited company for the exploitation. The design of the rules will be important to reduce the risk of corruption, but will seldom be a sufficient obstacle to corruption. Corruption can occur in different ways. First, it can occur as a *direct violation* of the procedures, for instance by violating rules of communication by providing confidential information to one of the bidders about bids or criteria in exchange for bribes. Second, it can occur as a misuse of rules that allow for legitimate *deviations* from the procedures, to award contracts on the basis of direct negotiations with one of the bidders by falsely referring to extraordinary circumstances of some sort, or diplomatic or environmental concerns, for instance. Third, corruption can motivate *creative award procedures*. In Nigeria for example, some bidders for oil concessions have been given a "right of first refusal" which means that they could get an opportunity to overbid whatever the size of the winning bid. They could thus overbid with $1 and get the concession, while other companies could not tell why some bidders had managed to obtain such a "right" (whether it was corruption or not, was not proven). Eventually, there have been a number of cases where concessions have been awarded according to the size of signature bonuses, and then the payment of the bonuses have not been made.[19]

As this discussion has shown, firms will have a number of reasons to offer or accept demands for bribes to influence political decisions – even before operation has started. The forms of influence include various (honest) marketing efforts, grey-zone practices, and clear-cut corruption. Through the use of corruption or grey-zone practices the firms may influence tender criteria, obtain information that can be important to offer a winning bid, or acquire support at political levels. Firms may even offer bribes

[17] The war in Iraq represents perhaps the most extreme example of pressures from foreign governments on the design of regulation and revenue system. See comment by Matthew Engel, for instance, *Financial Times*, November 17, 2007, on how the USA has succeeded in influencing the Iraqi petroleum law.

[18] For more examples: The UNICORN web site (www.againstcorruption.org) lists cases of corruption by sector and other categorization.

[19] For more information about manipulation of new tender procedures in Nigeria's oil sector, see newspaper articles by the journalist Bassey Udo in the Nigerian newspaper *This Day* in the period 2005–2007.

prior to operation merely to build commitment to signed contracts, which leads us to corruption in the operative phases.

Corruption risk – during operation

Once operation of a concession – or the natural resource exploitation in general – has started, there might still be risks of corruption, yet in different ways than those discussed above. Although decisions are made on how much of a resource to extract and who has been given the right to extract it, it is not necessarily the case that these decisions are respected by those granting the concession or those receiving it. During operation, there are in particular three areas where the risk of corruption is substantial: monitoring and enforcement of the contractual obligations, renegotiation of contractual terms, and revenues from NR exploitation. The risks and predominant forms of corruption vary substantially across the natural resource sectors, however. This is discussed in the box below which compares oil and forestry.

Monitoring and enforcement

The terms of a concession contract can be violated in various more or less illegal ways. Violation of concession terms may include extracting more resources than authorized, extracting resources in prohibited areas, extract resources others than those agreed upon, duplicate licenses, misreport the volumes, and misrepresent values, and more. Institutions are therefore established to monitor the use of resources, and enforce the basic regulations and contracts. However, also in this setting there are combinations of rents, authority and opportunities that suggest significant risk of corruption. Corruption in monitoring institutions can usually be separated from political decisions, and thus we focus on bureaucratic corruption in this context, in contrast to political – or grand – corruption.

There are many examples of substantial bureaucratic corruption in resource management (see for instance Iversen et al (2006) and Robbins (2000) on forestry). Complicated, untransparent, and sometimes contradictory regulations – which provide great scope for bureaucratic discretion – add to the risk.[20] Low pay and non-meritocratic hiring, firing and promotion, implies that there is little to lose from taking bribes. Appointments can be political and/or based on patronage. If not sufficiently politically independent, the monitoring efforts may be overruled by corruption at political levels. Weak monitoring capacity and sanctioning capability makes illegal practice prevalent. Note that the ability to get away with illegal extraction depends not only on functions within natural resource management bureaucracies, but also in other areas of the public sector, such as customs and the judiciary.

The risk of corruption varies across the industries: comparing oil and forestry

There exist clear differences in the magnitude and manifestation of corruption risk across natural resource sectors. This is because the sectors differ, e.g. in terms of the size of contracts, the level of technological complexity, the firms' potential to obtain market power, etc. A comparison of oil and forestry captures differences along several dimensions of resource characteristics. Whereas oil is a *point source* and non-renewable resource, forests are *diffuse* renewable resources (cf. the section 'Corruption and the resource curse'). While oil resources are (at least sometimes, as in the case of deep-sea reserves) non-extractable for local communities, forests are commonly utilized on a daily basis by such communities. This also illustrates the *technological differences* between sectors; while oil exploitation often requires the specialized expertise of multinational oil firms, forests can be harvested with much simpler technologies. In addition, externalities in exploiting the two resources can be quite different. This has led to differences in emphasis in the corruption literature on these sectors. While concessions are a topic for both sectors, the literature on corruption in oil has focused more on *revenue management* and transparency, whereas local capture and petty corruption in *monitoring and enforcement* have been important topics in relation to forestry.

Oil resources are typically geographically concentrated, to certain areas of a country. Management of these resources similarly tend to be centralized at the government level. A major problem is corruption in the *allocation of contracts*, licenses and concessions to private companies. In some countries, exclusive rights to explore, negotiate deals on behalf of the government, or to exploit oil blocks, have been awarded to private companies through highly untransparent processes that often are not competitive. The *contract terms* for private companies are in some cases extremely beneficial, beyond what one would expect even if taking into account the relative competence of poor country governments compared to professional multinational oil companies. Beneficial contracts are sometimes also awarded to domestic or regional firms with close ties to the political establishment. In return for concessions, private firms pay signature bonuses, license fees, and government revenue shares and taxes into central government coffers. In many countries, there is little transparency in how much revenues the state receives and what it spends it on, and the government is in effect not accountable to anyone. These characteristics in turn imply that there is substantial scope for corruption, as it is difficult to discover and punish corrupt acts.

Corruption is a huge problem in forestry management, and has been shown to increase deforestation and land conversion. To illustrate, *illegal harvesting* in the Amazon is estimated at 80%, it stands to reason that this would be impossible without substantial bribery taking place. Despite the scale of the problem, very little research has been done on corruption in forestry. As for oil, concessions to exploit forestry resources have been an important topic. For instance, it has been pointed out that forestry concessions in many countries are allocated administratively rather than competitively, inviting bribery, patronage, and inefficiency. In addition, issues of decentralization, and institutional weaknesses at the monitoring and enforcement level, are predominant. *Decentralization* of forestry management has in some cases led to local elite capture, as elites appropriate rents from excess and unregistered exploitation. *Petty corruption* at the monitoring and enforcement level is a prevalent problem in forestry, with forest rangers getting bribes for not addressing illegal or unconcessional exploitation, from firms, local officials, or members of the local population.

References: The arguments in this box are based on Barbier et al. (2005), Amacher (2006), Iversen et al. (2006), and Robbins (2000). See Frynas et al. (2003) for an example of untransparent and uncompetitive processes of oil concessions in São Tomé e Principe and see Al-Kasim et al. (2008) for a broader discussion about corruption in oil regulation and the award of contracts. See Contreras-Hermosilla (2002) for further estimates of the costs of illegal practices in forestry, and examples from a number of other regions and countries. See Traffic (2006) for an analysis of forestry in Tanzania, and Iversen et al. (2006) for an analysis of elite capture in decentralized forestry management in Nepal. More generally, resource management can be centralized or decentralized or joint (which is a combination of the two). The optimal solution depends on properties of the resource (e.g. externalities), properties of local communities (e.g. heterogeneity), and of the state. The problem of elite capture is a general problem in decentralization reforms, see Fjeldstad (2004) for an overview of corruption and decentralization, and

[20] See for instance Contreras-Hermosilla (2002) for a discussion of causes of corruption in forestry management.

Kolstad and Fjeldstad (2006) for an overview of fiscal decentralization and corruption. See also Moody-Stuart (1997) for a discussion about technological complexity and the risk of corruption. The more complex the technology in a given case, the easier it is to cover corruption.

Renegotiation

When resources are extracted by private firms under the framework of a license agreement, there are situations when firms or governments find it optimal to renegotiate the terms of operation. There are a number of legitimate reasons to renegotiate, like unexpected changes in framework conditions. Renegotiation can also be initiated on opportunistic grounds, however. Politicians with sector-oversight responsibility may threaten to revoke a license, to get more beneficial terms or extract bribes for continued operation. The firms, on the other hand, can demand lower taxes, adjustments on the annual concession fees, or extensions of the contracts. The opportunity for renegotiation have sometimes been common knowledge among players in natural resource sectors. An oil lobbyist in São Tomé, commenting on a particularly beneficial deal, said that "We always understood from day one that there would be, as likely as not, renegotiation" (Shaxson 2007, p. 152).

Renegotiations can often be justified on the basis of contingencies not included in the contract (by purpose or not). Combined with the wide discretion in the renegotiated decisions, renegotiation may be an effective way for those involved to hide a corrupt decision (Guasch, 2004). Either initiated by governments or firms, the renegotiation implies a lack of compliance with agreed-upon terms. If encouraged by the private sector, the outcome will usually imply reductions in expected state revenues.

Renegotiation is far more common when the regulatory governance is weak, or when regulatory bodies are not in existence at all. Thanks to its monopoly on jurisdiction, a government can alter the terms of a contract without significant risk of sanctions. Another factor influencing the incidence of renegotiation is whether the regulatory framework is embedded in the contract, rather than in decrees or the law. The opportunities for changed concession terms are stronger with contract-based regulation. In some countries firms make efforts to diminish such risk by investing in 'good contacts.'[21] However, firms can reduce the risk of being exploited through renegotiation by getting arbitration clauses included in their contracts and acquire political risk insurance.

Revenues from natural resource exploitation

The extraction of certain resources provides central governments with substantial revenues. As in other areas of taxation or revenue collection, this creates incentives for embezzlement of revenues by government officials, or collusion on tax evasion by private firms or individuals. The size of resource revenues make them particularly attractive targets for these kinds of activities. These types of corruption will in general be less prevalent where public officials can be held accountable for their actions, meaning that the risk of being detected and punished is sufficiently high. One aspect that will promote accountability is the access to facts about resource revenues, i.e. what sums are received and how do these compare to what should have been paid. However, transparency is not sufficient in itself for reducing corruption; credible sanctions of corrupt officials are also required. In countries where democratic institutions are weak, and the ability of other agents to sanction or punish the misappropriation of funds is low, more information is in itself unlikely to result in improvements in the behaviour of public officials.

Reducing the risk of corruption in NR exploitation

We have very limited knowledge about the extent to which various anti-corruption initiatives work. It takes time for new rules to have a bearing and it is difficult to estimate progress when we have no reliable estimates of the magnitude of the problem before and after an anti-corruption initiative has been initiated. In 2008 the World Bank's Independent Evaluation Unit conducted a study of the impact of World Bank initiatives on public sector reform, including on anti-corruption (IEG, 2008). They found (i) that anti-corruption initiatives that have been tailor-made for the specific country and based on an understanding of the specific incentive problems in the country were significantly more likely to succeed compared to more standardized approaches; (ii) direct measures to reduce corruption – such as anti-corruption laws – rarely succeeded, partly because they often lacked support from political elites; (iii) efforts have been more likely to sustain when including components to increase access to information and mechanisms to reduce the opportunities for corruption for decision-makers (Fjeldstad and Isaksen, 2008).

These results are in accordance with the findings in this review. An analysis of agents and their incentives in the natural resource sectors are important to understand how rules and institutions should be designed to reduce the risk of corruption. As noted in the section 'Corruption and the resource curse', however, it is not enough to know which formal institutions should be in place. This knowledge does not in itself provide a recipe on how these institutions can be introduced. The challenge is rather to change a system where politicians and public officials receive substantial income from corrupt acts, and where many are interested in maintaining the status quo. Analysis of the political economy of reform is therefore required in resource-rich developing countries to gain the insights needed to strengthen reform efforts.

In the following we will outline some key institutional reforms to reduce corruption in natural resource management, and then we turn to the question of whether current policy initiatives provide the necessary incentives to make governments introduce the institutional reform in question.

Good concession and negotiation practices are essential

The award of licenses to extract or exploit natural resources should follow professional concession rules, which are established to prevent favouritism and ad hoc governmental or bureaucratic decisions. In developing countries, this often raises questions of legal capacity. Concessions laws and tender rules must not only meet international standards formally, but must also be enforceable, and their effectiveness against corruption depends on their support from an efficient judiciary and administration. Unless the capacity of legal institutions ensures a certain possibility of sanctions when the rules are not followed, we cannot expect the rules to be efficient (EBRD, 2005). And unless the capacity of the administration ensures an ability to determine the most welfare enhancing outcome of a concession round, there is predictably a risk of manipulation.

Experience from public procurement suggests that tender rules can be manipulated in many different ways and corruption can fairly easily be concealed, while procedures appear to have been respected.[22] Grey-zone practices and hidden forms of influence make it difficult to identify proof and determine the legal status of

[21] See Wells and Ahmed (2007) for a discussion about corruption and property rights in foreign direct investments.

[22] For information about how corruption is carried out, see Della Porta and Vannucci (1999), Stainsbury (2005), Søreide (2006), Rose-Ackerman (1999), and Moody-Stuart (1997).

the acts. Rather than searching for corruption per se, these challenges can sometimes be met by addressing framework conditions relating to competition, regulation, welfare, and state revenues. These are aspects that require independent regulatory bodies, as well as qualified competition authorities. A certain extent of independence is essential to ensure commitment and compliance, and is yet the critical challenge in countries where opportunism disturbs political decisions.

There is a lack of legal capacity in many developing countries and this may reduce their bargaining powers or make them vulnerable to undue influence in meetings with strong multinationals. There might be a need to import capacity – by making use international professional lawyers, for example, or collaborate with cheaper or free expertise in development banks or donor agencies. Rather than working independently, advisory bodies should operate in close cooperation with domestic regulatory bodies and concession authorities so that local bodies accumulate skills. Nevertheless, the combination of large revenues and weak domestic judicial bodies suggests that there will sometimes be a need to settle concessions and contracts under international or foreign law.[23] Cases of corruption and disputes should sometimes be pursued outside the host country. In addition, cases of natural resource corruption may involve multinationals with resources for a long court case and may require substantial financial resources. Pursuing cases, even when time consuming and expensive, is critically important to raising the legal standards, and this could be a fruitful area of support from donor agencies.

Petty corruption in monitoring/enforcement should be addressed

Reducing petty corruption in the monitoring and enforcement of resource regulations and contracts requires a bureaucratic system which has sufficient capacity, is independent, and whose officials face the right incentives. If *monitoring* capacity is the constraint there can be substantial scope in improving monitoring through new and simple technologies, which could be donor funded. Several cases have proven that there is scope for involving NGOs in monitoring efforts. In Mongolia, for example, the rapid expansion of the mining sector combined with a lack of regulatory enforcement became a source of corruption and environmental crime. A project initiated by the World Wildlife Fund (WWF) Mongolia aimed at reducing corruption by monitoring the implementation of the laws, informing the public of their rights, and promoting advocacy for further improvements of the legislation of the mining sector (WWF Mongolia, 2007).

Simplification of regulations and bureaucratic procedures is important to monitor decisions. If too simple, however, bureaucratic discretion will increase, and this might be a difficult balance. An efficient *organization* of bureaucracies based on meritocratic hiring and promotion and with incentives for uncovering illegal practices is likely to reduce the risk of corruption. Increased pay to bureaucrats is often suggested, but will not necessarily be an efficient way of approaching the problem (Besley and McLaren, 1993; Svensson, 2005). *Greater punishment* of illegal extraction and corruption can be effective, but requires an adequate system of enforcement within the bureaucracy and up to the level of the judiciary. *Unbundling* parts of the management into several institutions and outside may reduce risk of corruption, particularly if there are horizontal accountability mechanisms between them, but this will depend on the nature of the corruption problem. In the case where the current bureaucracy is highly corrupt and dysfunctional, an alternative (at least in the short run) is to hire international *firms to monitor resource use*. A number of such firms do in fact exist. The degree of *autonomy* may signal the commitment of governments to sound resource management, though the need for parallel governmental institutions may reduce the government's possibilities to build trust in bureaucratic structures.

Concession systems and revenue management: the importance of accountability

The concession system should be open to public scrutiny, and it is particularly important to be open about the criteria behind the awarding of concessions. Databases with comprehensive information about tender participants, prices, royalties, conditions, concession period and area, etc. should be established and kept updated. This is important to strengthening the role of stakeholders, NGOs, local communities, and the media in the control of the natural resource sectors. In addition, to build trust and commitment the government should encourage independent monitoring systems.[24]

Revenue transparency has become an important topic, and led to initiatives such as the Extractive Industries Transparency Initiative (EITI), and the development of standards such as the IMF Guide on Resource Revenue Transparency (see EITI (2006) for EITI guidelines, and IMF (2005) for resource revenue standards). The EITI for instance attempts to facilitate a comparison of the incomes declared by the government and the payments made by the private sector, to identify embezzlement of received funds. Whether a country accedes to EITI, and whether and how it implements EITI requirements, says something about the commitment of partner country governments to reform. For instance, validation under EITI is to be governed by a multi-stakeholder group (see EITI (2006) for details). Analyzing the composition of this group suggests whether a government is committed to real reform, as would not be the case if the group consists of government cronies and clients.

More transparency is very often suggested as a tool to reduce the risk of corruption. The opportunity for the public to identify potential governance failure, obviously depends on insights into decisions. Nevertheless, transparency is not sufficient for reducing corruption. For access to information to have an impact on the conduct of government officials, the officials must face some sort of sanction where misconduct is detected. In many resource-rich developing countries, opposition parties or other groups or institutions that would be able to punish a government for corruption, are missing or weak, or have been co-opted by the government (cf. the rentier state argument). In other words, accountability is the important issue, and transparency is only one aspect of this.

Voluntary initiatives will not be sufficient

To effect the necessary reforms in formal institutions that are needed to reduce corruption, the necessary incentives must be given to the agents governing implementation of reforms. Highly corrupt governments are unlikely to implement formal institutions that significantly reduce their payoffs. It follows that voluntary initiatives; i.e. initiatives that simply leave it to government of resource-rich developing countries to introduce the key institutions, will have little success as they do not change the incentives of governments in any significant way. In other words, they do not significantly affect governments' benefits or costs of implementing institutional reform. The exclusively

[23] Arbitration clauses and contracts under a foreign law are no guarantees against the risk of corruption, since the practical enforcement will depend on the jurisdiction where a violation of the terms have been committed. In many cases it has been important to enforce contracts, however, and the cases under such clauses will be important to make the corruption more visible.

[24] See Global Witness (2005) for a suggestion about monitoring systems in the forest sector.

voluntary approach of, e.g. the EITI, is therefore unlikely to produce a significant anti-corruption effect. The same in true of initiatives directed towards the private sector. Many of the initiatives promoting corporate social responsibility, such as Global Compact or OECD guidelines, are voluntary for companies to accede and to observe. These initiatives present principles corporations may choose to observe, on matters such as labour standards, human rights, the environment, and corruption.[25] However, they do not make it costly for corporations to be involved in corruption. New and innovative approaches that would affect the incentives of key players in the natural resource sectors need to be explored.

Concluding remarks

This paper has reviewed the available evidence on natural resources and corruption, and explored the implications for resource-rich developing countries. The evidence suggests that corruption, in the form of rent-seeking and patronage, is at the core of the resource curse phenomenon. This implies that lessons and institutional arrangements from developed countries may not be successfully transferred to a developing country context. Instead, policies to improve the impact of natural resources on developing economies, need to target the mechanisms of rent-seeking and patronage that currently prevent favourable impacts from being attained. And to target corruption in any particular resource sector, a thorough understanding of key structural features, and the incentives of key agents, is needed. The positive experiences of resource-rich developing countries such as Botswana suggest that the resource curse is not an inevitable outcome, but we also need to be mindful of the fact that not every developing country is like Botswana.

While existing evidence identifies some of the key problems that plague resource-rich economies, there is still considerable research that needs to be performed in this area. In particular, corrupt gains and vested interests in the status quo, are likely to prevent any easy transition to a more favourable institutional environment in most countries. There is therefore a need to better understand the political economy of institutional reform in resource-rich countries in order to identify potential opportunities for putting their economies on more favourable trajectories (Stevens and Dietsche, 2008; Kolstad and Wiig, 2008). In other words, we need to develop a better understanding of the interests and incentives of the key players in resource-rich economies, and what can be done to alter incentives and hence behaviour in a more favourable direction.

One solution to the resource curse problem which is frequently suggested, is the direct distribution of resource revenues to citizens (see Sala-i-Martin and Subramanian (2003) who discuss this option for Nigeria). This is done in some developed countries, for instance in the US state of Alaska. Though this might reduce the appropriability of rents, and hence the problem of corruption, it is unclear whether this is a realistic option in developing countries. This kind of approach naturally begs the question as to why it would be in the interest of a government awash in resource rents to introduce this kind of distributional scheme in the first place, cf. the political economy arguments made above. Moreover, there are a number of practical challenges in introducing these kinds of schemes in a developing country context. More analytical work is needed to establish the conditions under which this and other proposed remedies are appropriate priorities in addressing the resource curse.

[25] For more information on these initiatives, see http://www.unglobalcompact.org/ and http://www.oecd.org/department/0,3355,en_2649_34889_1_1_1_1_1,00.html.

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