



**UNIVERSITA' DEGLI STUDI DI PADOVA**

**DIPARTIMENTO DI SCIENZE ECONOMICHE ED AZIENDALI  
"M. FANNO"**

**CORSO DI LAUREA IN  
SCIENZE DELL'ECONOMIA E DELLA GESTIONE AZIENDALE**

**PROVA FINALE**

**RESOURCE CURSE AND CORRUPTION:  
HOW NATURAL RESOURCES MAY INCREASE  
CORRUPTION IN DEVELOPING COUNTRIES**

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**ANNO ACCADEMICO 2020 – 2021**

## Abstract

*L'abbondanza di risorse naturali rappresenta una grande opportunità per numerosi paesi in via di sviluppo. Tuttavia, gli ultimi decenni hanno mostrato come questa abbondanza, anziché favorire lo sviluppo economico, abbia spesso avuto l'effetto opposto, accrescendo la disuguaglianza tra i cittadini di questi paesi ed arrivando persino a costituire una vera e propria maledizione. Paesi come la Nigeria, l'Angola o il Venezuela non sono che alcuni casi eclatanti di questo fenomeno. D'altra parte, vi sono anche alcune eccezioni come la Norvegia, il Botswana o il Cile che invece sono riusciti a sfruttare i ricchi giacimenti di risorse naturali a loro disposizione. La domanda che sorge spontanea è perché alcuni paesi siano riusciti a sfruttare questa opportunità mentre altri non abbiano avuto lo stesso successo. Di questo argomento si è occupata una vasta letteratura economica ed è tutt'oggi argomento di dibattito. Le prime spiegazioni economiche proposte dagli accademici hanno suggerito diversi canali attraverso i quali le risorse naturali affliggono la crescita economica di un paese dipendente dall'estrazione di risorse naturali, tra cui l'apprezzamento del tasso di cambio reale o la tendenza alla deindustrializzazione. Eppure, questi canali da soli non possono spiegare l'incostante crescita economica di Paesi che guadagnano centinaia di miliardi di dollari di profitto dall'esportazione di risorse naturali. Per questo motivo l'attenzione degli studi si è gradualmente spostata sugli effetti politici e istituzionali attraverso i quali la cosiddetta "maledizione delle risorse naturali" potrebbe operare. Questa tesi si propone, per l'appunto, di analizzare la letteratura economica che ha studiato le correlazioni tra l'abbondanza di risorse naturali ed i fenomeni di corruzione. In particolare, i maggiori studi empirici transnazionali e subnazionali di questa letteratura identificano la creazione di sistemi clientelari per ottenere vantaggi politici e la ricerca di profitto come i principali canali per spiegare la paradossale maledizione che le risorse naturali rappresentano per molti paesi in via di sviluppo.*

# Resource curse and corruption: how natural resources may increase corruption in developing countries

*Natural resource abundance represents a great opportunity, but even if it may seem paradoxical it is often a curse rather than a blessing. Nigeria, Angola, and Venezuela are only the most known cases of countries harmed by the effects led by the abundance of natural resources, but there are also some exceptions such as Chile, Botswana or Norway which have escaped from the resource curse; hence the spontaneous question is why sometimes natural resources can lead to worse political and economic output? A wide literature has tried to answer to this question identifying different channels that can explain this paradox but for completeness it is reasonable to take a step back and start from the birth of the resource curse debate and the first economic explanations of this paradox. Instead, in the second part of the paper we will focus on the sub-literature about the link between corruption and natural resources reviewing the main studies. Finally, in the last part we will see the implication of the political resource curse debate for policy making.*

## **Summary**

*n. of words 9996*

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## [1] Introduction: The Resource Curse

Since the early 1950s most development economists<sup>1</sup> suggested that even if developing countries had a **lack of capital**, they could utilize resources to overcome these capital shortages exporting primary commodities and attracting foreign investors, thus stimulating a rapid economic growth. As reported from Ross (1999) and Rosser (2006) a number of radical economists challenged these view for example Singer (1950) and Prebisch (1950), argued that resource abundant countries had suffered from declining terms of trade over time, constraining their prospects for economic growth and development. Other scholars such as Nurske (1958) and Joshua (1960) argued that the problem for resource abundant countries was that the international commodity markets were subject to unusually sharp price fluctuations and states relied on commodity exports would find these fluctuation transferred to their domestic economies making private investment risky. Hirschman (1958) suggested that the problem was that resource industries were unlikely to stimulate economic development in the rest of the economy especially if foreign multinationals rule the resource extraction sector and they were allowed to repatriate their profits instead of investing them locally. In the early 1980s, several analysts argued that resource abundant countries were susceptible to the so-called ‘Dutch disease’ (Corden & Neary, 1982); (Bruno & Sachs, 1982) a combined influence of two effects that commonly follow resource booms. The first effect is the appreciation of a state’s real exchange rate caused by the sharp rise in exports, the second is the tendency of a booming resource sector to draw capital and labor away from country’s manufacturing and agricultural sectors raising their production costs. Each of this four economics effect can create adversity for resource exporter countries. Sachs & Warner (1995) conducted a pioneering study spreading the concept of resource curse giving the start to a literature that explores the cited concepts and identifies new channels through which natural windfall affect economic output of resource-rich developing countries. All the early related literature<sup>2</sup> focused on Dutch disease trying to explain trough the

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<sup>1</sup> For example: W. Rostow the Stages of Economic Growth: A Non-communist Manifesto, Cambridge University Press (1961)  
Jacob Viner, International Trade and Economic Development Glencoe Press (1952)  
W. Arthur Lewis, The Theory of Economic Growth Homewood (1955)

<sup>2</sup> For example: Collier, P. and A. Hoeffler, 1998. On Economic causes of Civil War, Oxford Economics Papers 50: 563-573  
Tornell and Lane 1999. The Voracity Effect, American Economic Review 89: 22-46  
Baland and Francois 2000. Rent Seeking and Resource Booms. Journal of Development Economics 61: 527-542

rent seeking concept why natural resource negatively affect economic growth. The early main explanation was that after a resource windfall each powerful groups in the state that has open access to resources attempts to acquire a greater share of production by demanding more transfers. Hence, an increase of rents in the primary sector causes a reallocation of factors of production from manufacturing towards the booming primary sector. Since an expanding primary sector does not need a high-skilled labor force and natural resource windfalls lead to a decline in the manufacturing sector for which human capital is crucial, thus the level of spending on **education** need not to increase, harming the long-term economic growth (Gylfason, 2001). Furthermore, since the manufacturing sector is often characterized by increasing returns to scale and positive externalities, a decline in scale of manufacturing sector decreases the productivity and profitability of investment, which accelerates further the **reduction in investment** (Sachs & Warner, 1995). Dutch disease can also induce real exchange rate volatility which creates uncertainty for investors in these natural resource economies and thus to less investment in physical capital, harming the long-term productivity growth, especially in countries with low levels of financial development (Aghion, Bacchetta, Rancière , & Rogoff, 2009).

However, Governments play an exceptionally large role in the resource sectors, and they can curb the Dutch disease by maintaining tight fiscal policies funding their agricultural and manufacturing sectors and placing the resource rents in foreign currency to avoid the exchange rate appreciation (Ross, 1999). Since these studies also highlight that governments can take action to address these problems, they suggest that these negative effects may operate more through **political** than economic **mechanisms**. For this reason, most recent work on the relationship between natural resource abundance and economic performance has given much greater attention to the role of political variables and institutions in linking this relationship. For example, Sala-i-Martin and Subramanian (2013) demonstrate that natural resources, oil, and minerals, exert a negative impact on growth via their deleterious impact on institutional quality rather than through worsening of competitiveness of the non-resource export sectors. Another interesting finding was done by Andersen and Aslaksen (2008) that using a cross-country sample suggest that the resource curse appears in presidential, not parliamentary democracies because presidential systems are less **accountable** and less **representative** and thus offer more scope for resource rent seeking. Especially countries with a lot of fighting about natural resources suffer from corruption and erosion of the quality of the legal system, consequently discouraging saving and investment in productive capital and often attracting **short-sighted** politicians. Natural resource windfalls may bring governments finance public investment projects as an inefficient form of distribution to the own group members or public projects with negative

social surplus<sup>3</sup> (Van der Ploeg, 2011). However, these arguments are the focus of the second part of the paper where they are deeply analyzed.

Another branch of the literature study the major channels through which natural resources magnify the **risk of conflicts**: Collier and Hoeffler (1998) conducted the first cross-national study and discovered for instance, that natural resource abundance is a strong and significant determinant of the beginning of civil war. Since then, other studies such as the one conducted by Sanchez de la Sierra (2019) or Smits et. Al. (2016) pointed out that resources improve rebellion feasibility, in fact, through looting and extortion of resource rents it is easier to establish and sustain a rebel movement. Another explanation is that when a state can rely on resource rents, do not develop enough state capacity and **good institutions**, making them less effective in counterinsurgency and eventually more unstable Berman et. Al. (2017). Furthermore, because natural resource production is **capital-intensive**, a resource price spike will boost capital-intensive production and shrink labor-intensive sectors, releasing cheap labor for rebellion. Natural resources are the only constant that can explain the multitude of variable issues that extremely affect the development of the of natural resources rich countries. Natural resources harm the economy, erode trust and cooperation norms, incentivize corruption and individualism, increase the risk of conflicts and the instability of the institutions. Several extremely harmful issues can be reconducted to natural resources windfall and that is why still nowadays the resource curse is object of study and debate. It is fundamental to identify all the channels through which this curse operate for trying to counteract these negative effects and establish a system which benefit all the citizens, and not only a narrow elite, and stimulate development.

In the next section after presenting a general overview about corruption we will proceed to the specific analysis of the topic of the paper: the link between resource abundance and corruption in developing countries.

## **[2] Do Natural Resources Increase Corruption?**

As anticipated in the introduction a new branch of the resource curse literature has taken place looking at the relationship between resource wealth and the quality of institutions, meaning the effectiveness of the government bureaucracy, the incidence of corruption and the rule of law (Ross, 2015). In this part we focus on corruption, firstly describing the event and when

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<sup>3</sup> defined white elephants- Robinson & Torvik (2005)

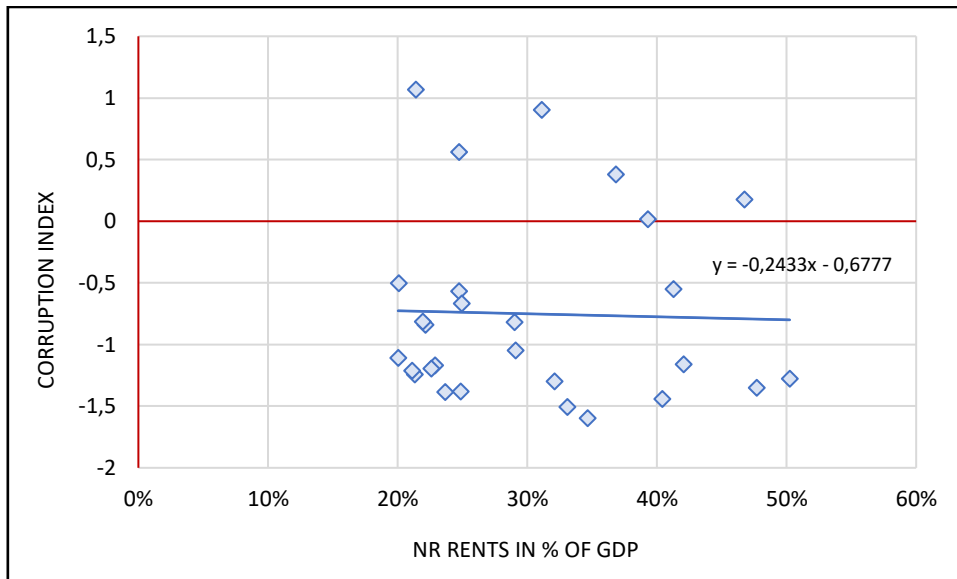
it can occur then reviewing the relevant literature divided between cross-national and sub-national studies.

## [2.1] Main Feature of Corruption

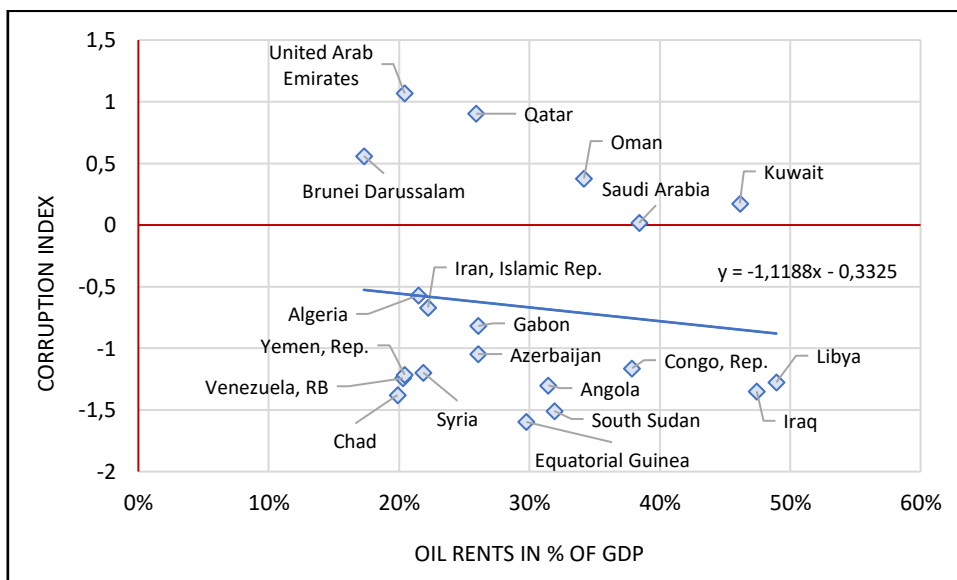
Before reviewing the relevant literature may be useful make some clarification and give some definitions. Corruption in resource rich countries takes two main forms, rent seeking and patronage both of which are economically costly and correlated (Kolstad & Søreide, 2009). To help understand what rent seeking means firstly in economics, the term rent is defined as an income that is higher than the minimum that an individual or firm would have accepted given alternative opportunities (Zúñiga, 2017). Rents might come from different sources, such as monopoly profits, import and export quotas. Khan (2000) define **rent seeking** as: ‘the activities seeking to create, maintain or change the rights and institutions on which particular rents are based’. The extra income incorporated in the concept of rents could motivate different actors to corrupt or incentive illegal behavior to maintain those rents. Corruption in the most of studies is defined as the misuse of public or entrusted authority for personal gain (Transparency International definition) then rent-seeking and corruption do not overlap perfectly in fact, only some forms of rent-seeking qualify as corruption. Hence the relationship between corruption and rent-seeking depends on if there is personal gain by public officials from the rent-seeking activity and if there is transfer of income or unproductive use of resources. Instead, **patronage** is defined as the use of public resources to secure political power. If governments to secure political support incentive the creation of rents they induce rent-seeking organization to take place within patron-client networks. Hence rent seeking and patronage, even if they are different problems, are really **interrelated**. It is now clear that in the analysis of corruption, institutional frameworks and power structures are crucial elements that must be taken in account in explaining why the impact of resource windfall could foster corruption, especially in developing countries which the most suffer from weak institutions.

It can be useful as first approach to comment the below graphs where we can see ac-costed two data: resource-dependence ratios averaged from 2002 to 2019 (World bank dataset) and the control of corruption index taken from the Worldwide Governance Indicators (WGI) dataset which runs from -2.5 to +2.5 where higher numbers indicate less corruption (Kaufmann, Kraay, & Mastruzzi, 2010). This indicator capture perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests (World Bank definition). At least two

broad observations can be made from the graphs. First, the **degree of dependence** or specialization in natural resources seems the highest for oil-dependent economies. Second, the number of highly **corrupt countries** appears greater than the ones that shows a positive result. For the regressions we took the most dependent countries from natural resources and even if the results are insignificant and do not capture a causal channel, they show a negative tendence of highly dependent countries to be corrupted. For more information about the regression see the appendix.



	S.E.
Intercepts	0,5018
Variable X	1,5822
Observations	28



	S.E.
Intercepts	0,6250
Variable X	2,0200
Observations	20

*I: The control of corruption index is averaged for the period 2002-2019 such as the measure of dependence from natural resource. For more information see Appendix*

Another clarification must be done before commenting the relevant studies: there are three principal classifications used in the literature to regroup natural resources. The first distinction is



between point source resources, extracted from a narrow geographical economic base such as petroleum or minerals and diffuse resources which are less concentrated resources such as agricultural products and fisheries (Leite & Weidman, 1999). Others distinguish between high-value commodities, which generate sizeable economic rents, and low-value commodities (Petermann, Guzmán, & Tilton, 2007). A third distinction suggested is between more or less **appropriable resources**, hence resources more or less likely to cause appropriative behavior. The concept of appropriable resources is perhaps the one most closely related to current theory, and in particular the rent-seeking perspective. (Boschini, Petterson, & Roine, 2007).

To better understand when rent seeking or patronage behavior may occur Kolstad and Søreide (2009) delineated in their study which are the prerequisites of corruption in natural resource management and all the phases of the resource exploitation where corruption can find some scope. The **prerequisites** in accordance with them are rents, authority, and opportunity. Obviously rents represent the loot that inspires corrupt acts and the more blurred is the allocation of authority, the wider is the room for discretion, because demarcating responsibility and hence corruption becomes more difficult and so less risky incentivizing the opportunity of corruption behavior. The first phase when corruption could happen is the one antecedent oil or mineral exploitation, the **awarding of concession**. To operate a concession country's regulatory body, need to concede a license and the major time this procedure take place in the form of a tender. In this phase a bidder could pay bribes to obtain confidential information about selection criteria or other bidders. Another hypothetical scenario could occur if rules allow for legitimate deviations from the procedures of a standard tender to award contracts based on direct negotiations with one specific bidder by falsely referring to extraordinary circumstances, or diplomatic or environmental concerns in exchange of bribes. Sometimes corruption could lead to creative solution to adjudicate the concession. In Nigeria for example, some bidders for oil concessions have been given a "**right of first refusal**" which means they can overbid whatever the size of the winning bid. Hence, they could overbid with \$1 and get the concession<sup>4</sup>. Even the requirements determined by the concessions could be subject of corrupt acts in fact, paying bribes, firms may try to influence the length of operation, area of exploitation and in general all sorts of contractual obligations. During operation, there is still the risk of corruption and can affect particularly three areas: monitoring and enforcement of the contractual obligations, renegotiation of contractual terms, and revenues from exploitation. First, institutions in charge of **monitoring** the extraction of resources may accept a bribe for letting concession terms violated

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<sup>4</sup> For instance, look at: [ex10-2.htm](#)

so the firm could extract more resources than authorized or misreport the volumes. Second when resources are extracted by private firms the government may find advantageous to **rene-gotiate** the terms of concession. Politicians with sector-oversight responsibility may threaten to revoke a license to extort money. Third the taxation or **revenue collection**, creates incentives for embezzlement by government officials or collusion on tax evasion. These types of corruption will in general be less prevalent where public officials can be held accountable for their actions because the risk of being detected and punished increase. One element that could promote accountability is the access to information about resource revenues especially what sums are received by the government and how these are spent.

We have introduced a lot of definition and theoretical hypothesis about the functioning of corruption in natural resource management. In the next paragraph we will review the most important papers of the last decades that studied the corruption phenomenon with a cross national approach.

## **[2.2] Cross-National Literature**

One of the first pioneering study that focused on the linking between natural resource and corruption was conducted by Leite & Weidman (1999). They developed a theoretical model that highlight the fundamental role of institutions demonstrating the harmful effect of increase in corruption on the economy growth rate. In the model corrupt activities takes the form of rent seeking and they are positively related to the incidence of high rent activities such as oil or mineral extraction and negatively related to monitoring system. The obvious explanation of why resources may increase corruption is that large resource windfalls increase economic opportunities as well as temptations for corrupt behaviors by government officials. They tested empirically their model on cross national regression, and they found a **positive correlation** between fuel production/GDP or mineral production/GDP and corruption. The main conclusion proposed to explain this result is that capital intensive nature of the natural resources industry is a major determinant of the increasing corruption because the economic costs for governments of accepting bribes are lower when the economy is dominated by those sectors in which capital investments are **less price-sensitive** hence, less bribe-sensitive. Economies dependent from natural resources disincentives government in investing in control institutions for detecting and punishing corruption especially in developing countries where institutions are weak ex ante. Therefore, both theoretical and empirical results stress the importance of **strong institutions** in natural resource discoveries to curb the associated negative growth effects of corruption.

Another pioneering study was conducted by Robins et. Al. (2006) inspired by the previous work of Gelb (1986) that after analyzing six oil exporting countries' case studies suggested that the spending level of the government should have been regulated to sharp rises in income level and that inefficiencies may arise from government spending of rent income. On this line the authors built a theoretical political model of resource extraction in which they demonstrate that natural resource windfall, by raising the **value of being in power** and by providing politicians more resources they may use to influence the outcome of elections, increase resource misallocation in the rest of the economy. The resources considered are those that are publicly owned such as oil, gas and other minerals. According to this model the political incumbent facing reelection can consume the resource rent or he can distribute it to influence the outcome of the election. **Patronage** in this study is considered as the offer of employment in the public sector. Patronage influences voting behavior because individuals are part of groups or social networks, and politicians make offers to individuals from their own group or network. Hence a politician can credibly offer to clients from within their group things that people from outside the group could not offer such as job. Furthermore, they demonstrate that **offers of employment** may be more credible than offers of income. Basically, this is because employment can be decided in advance of an election and is costly to reverse. Spending huge number of resources on improving the likelihood of being elected through employment in the public service, that is relatively inefficient, cause a resource misallocation in the economy leading to a lower economic growth. Another important result of this study is that politicians because they only care about the future stock of resources if they are in power, they tend to over-extract natural resources. Hence politicians discount the **future** by the probability of being in power which is socially irrelevant. These results are in line with some observational studies for instance like the one conducted by Gavin (1993) that observed a contraction in all sectors except the public service from 1973 to 1987 during the oil boom in Nigeria. Venezuela is yet another example where public employment increased with the oil boom (Gelb, 1988) or Zambia under the president Kenneth Kaunda who in 1972 banned other political parties and to put in place a system that offered employment only to the member of his party (Bates & Collier, 1993). This study highlights the importance of institutions that should promote the accountability of politicians for a more appropriate allocation of public resources.

Another similar study conducted by the same researcher focused on another channel of redistribution to political supporters to gain a strategic political advantage: **white elephants**. With this term we define public investment projects particularly expensive, with negative social surplus. A wide literature testified some clear examples such as Nkurunziza & Ngaruko (2002)

case study about Burundi, which highlights that when the government was controlled by a faction of Tutsi's from Bururi province (early 1970s), huge amounts of resources were targeted at Bururi including schools, roads, and public sector investments. More importantly they documented that, even though Tutsi's represented only about 14% of the population, 60% of the managers of public corporations were Bururi Tutsis and even if these companies made huge losses, the government funded them for long period. Another detailed study was conducted by Killick (1978) who affirmed about Ghana that "much of the investment in the first half of the sixties was actually a form of consumption yielding few, if any, returns in the longer run". Furthermore, he clarifies that cost benefit calculations of economic advisers were ignored, in fact the investment took place even when their negative implications were fully understood. This literature has not been able to explain why **redistribution** should take place in such an inefficient **form** but certainly connects them to part of an exchange relationship between politicians and voters, hence to clientelist policies. Robinson and Torvik (2005) to answer why redistribution take this form suggested that is because only some politicians can promise to fund such projects and then represent a **credible way** of vote buying. Specifically, when politicians represent groups, a particular politician may find optimal to fund these projects because he values the welfare of the beneficiaries of such investment when contrary a politician from a different group, who only values the revenues, cannot. Especially, when the **value of being in power** is higher, such as when government is directly involved in natural resources extraction, these loss-making projects can be politically attractive because they affect voting behavior.

A more recent study conducted by Bhattacharyya & Holder (2010) demonstrated that resources increase corruption only in countries without **democratic institutions**. To begin, they provided a theoretical model in which there are some "good" politicians who operate in the best interests of the people and probably many more "bad" politicians who are concerned with the profits that corrupt acts can create. To maximize the probability of being reelected a bad incumbent has incentive to imitate a good politician and not engage in corruption activities because the people prefer to have a good president. A bad incumbent, on the other hand, imitates a good incumbent if and only if there is a sufficiently substantial gap between the chance that he can continue in office with people's support and the probability that he can stay in office without people's support. If this difference is small, a bad incumbent engages in corrupt activities more probably. As a result, the model predicts that in countries with weak democratic institutions, resource abundance increases corruption. The specification model they wanted to test, takes as dependent variable the corruption index measured from the Political Risk Services (**PRS**). This index captures several forms of corruption such as financial corruption, bribery in

connection with import and export permits, exchange controls, excessive patronage, or nepotism. This index is widely used because the advantages are multiple. For instance, it covers a large gamma of notion of corruption, and it covers the time 1980–2004 which has the largest number of observations. Hence it suits perfectly to use panel data and to minimize the sample selection bias both across countries and over time. The PRS corruption index ranges from 0 to 6, with lower values indicating less corruption. Two examples over the sample period to make in perspective are the Democratic Republic of Congo which was the most corrupt country with a value of 0.6, and Finland which was the least corrupt country with a value of 6.0 (averaged). They find empirical support for their theoretical **prediction** using panel data covering one hundred and twenty-four countries from 1980 to 2004, in particular resource rents are positively associated with corruption only in countries that have POLITY2 scores of about **8.5** or less. The **POLITY2** which measure democracy, is calculated using the Polity IV database, described by Marshall and Jaggers (2002). This database reports democracy and autocracy scores, which both vary between 0 and 10 with 10 being the most democratic or most autocratic. The democracy score captures competition and openness in the electoral process, and the autocracy score captures suppression of competitiveness over executive recruitment, lack of constraints on the executive, and regulation of participation. The POLITY2 score is the difference between the democracy and autocracy score. To make in prospect the result is helpful to make some examples: in 2004 the resource-rich country Nigeria had a POLITY2 score of 7, Mexico of 8, Botswana of 9 and Norway of 10. These results are also robust to various alternative measures of corruption, natural resources and quality of democratic institutions and denote that resource-rich countries with **weak institutions** are inclined to be corrupt because resource windfalls incentivize their governments to engage in **rent-seeking** activities. Contrary in healthy democracies such as Botswana and Norway, this inclination can be checked by **sound democratic institutions** that keep governments accountable to the people. However, these results do not hold if the authors employ country fixed effects in their analysis, suggesting that the results are mainly driven by cross-country variations in the data, but this not totally invalidate the results because it is a standard issue in the resource curse analysis.

An empirical analysis that differs from these existing cross-sectional studies, emphasizing fixed effects in a specification that link **within-country** variation in natural resource rents to within-country variation in corruption and state stability, was conducted by Arezki & Brückne (2011). This study is a part of a sub literature that focus principally on oil. In particular they tested with rigorous panel data techniques, the theoretical discoveries made by Karl (2007) that countries dependent on oil are often characterized by corruption and exceptionally poor governance leaving the government vulnerable to rent-seeking, and unable to develop sound

economic policies, increasing the probability of incidences of civil conflict and interstate war. The main finding of Arezki & Brückne is that increases in oil rents significantly increase corruption, deteriorate political rights, but have no significant effects on measures of state instability. At the same time, they find that increases in oil rents significantly improve civil liberties. First, they tested empirically the effect of country-specific changes in oil rents on country-specific changes in corruption. As a proxy for oil rents, they use the **oil export unit value** taken from Vilafuerte (2008). The oil export unit value is accessible for 30 oil-producing countries during the period 1992-2005. Specifically, the unit export value of oil was constructed using the international crude oil price interacted with a country-specific discount factor that captures the quality of oil in each country. The oil export unit value can therefore be split into two components: the international oil price that is common to all the countries considered, and the country-specific discount factor that captures the quality of the crude oil. It is important to make clear that in the empirical analysis they control for common year fixed effects. Hence in the study of the impact of oil rents on corruption any variation in oil rents that are exclusively due to variation in the international oil price are fully captured by the common year fixed effect. In contrast, the country-specific quality of oil that drives the discount factor used to construct the oil revenue measure is determined by geology which influences the chemical properties of the oil, which in turn determines the price at which it can be sold on the international oil market. As a result, country -specific geological factors influence country-specific oil rents by influencing the unit price at which domestic oil production can be sold. Thus, country fixed effects as well as year fixed effect are the control variable. The OLS regression estimate an interaction coefficient of resource rent on corruption statistically significant at the 5% level. Specifically, a 1 standard deviation. increase in the **unit export value** of oil increases corruption by about 0.32 standard deviations. This adverse link between oil rents and corruption remains statistically significant when controlling for within-country variation in non-oil per capita income. Even after accounting for the lagged corruption as a right-hand-side regressor and oil production the estimate effect of within-country increases in oil rents remains a significant determinant of corruption levels. Another important discovery is that using an instrumental variables approach, increases in corruption are associated with significantly lower levels of **oil production** (lagged corruption and the POLITY2 score are the instrument for the level of corruption). The significant negative response of **oil production** to corruption is an important finding because it indicates a **reverse causality** bias, which could explain why cross-national least squares esti-

mation such as the one conducted by Bhattacharyya (2010) loose significance when implementing fixed effects<sup>5</sup>. They also tested the effect of oil rents on political institutions by examining how a variety of polity measures respond to changes in country-specific oil rents. Specifically, that find that while increases in oil rents significantly deteriorate **political rights** they lead to significant improvements in civil liberties. The explanation for this is that in the presence of oil windfalls the political elite have an incentive to reduce political rights to avoid a loss of the rent income. Reduced political rights, on the other hand, potentially increases the likelihood of violent conflict, as the masses may attempt to capture a portion of the rents through violence. Hence, one of the tools accessible to the elite to quell the masses in is to extend **civil liberties**. The last discovery is that in countries where the share of state participation in oil production is relatively low, within country variation in oil rents does not have a significant effect on corruption, political rights, or civil liberties. This finding fits well with the suggestion of Ross (1999) that the **state ownership** of natural resources is one of the explanations for the resource curse because rent income increasing government budget create incentives for the political elite for embezzlement. To sum up the results we can affirm that increases in oil rents are associated with a significant increase in corruption, lower political rights, greater civil liberties and no overall increase in the risk of civil conflict.

Another study that has established a negative impact of natural resources on corruption in a fixed effects regression analysis that controls for reverse causality is the one conducted by Busse & Gröning (2013). They re-examine the effects of natural resources on corruption in a panel setting bigger than the one of Arezki with nearly 130 countries and an extended period (1984 to 2007) controlling for both country fixed effects and endogeneity of the variables under consideration. As measure of the dependent variable, they decided to use the corruption index from the Political Risk Services (**PRS**) the same used by Bhattacharyya for the same advantage already explained. Instead as their principal resource variable they use **Exports of Natural Resources**, a measure weaker than the one used by Arezki but, doing so they can count on a bigger panel of country data. They found an estimated coefficient of interaction between exports of natural resources and corruption positive and highly significant at the 1% level. In this model the quantitative within country variation of natural resource exports on corruption is modest, but **absolutely not negligible**. Specifically, an increase in the GDP share of resource exports by 14.01 percentage points would lead to a decrease in the corruption score by 0.221. At first glance this could seem a little result but if we consider that corruption index varies

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<sup>5</sup> Other examples of insignificant results are Ades and Di Tella (1999), Serra (2006), Treisman (2000)

from zero to six, we could reconsider it. To put the results into perspective, if we apply the estimates to Nigeria and hypothesize for the moment that the state stops to export any natural resources because their reserves are depleted, *ceteris paribus* the corruption score for Nigeria in the last period 2004–2007 would increase by 1.41 points from 1.33 to 2.74, almost reaching the score of Estonia (3.0) or even Botswana (3.28) in the same period. The conclusion that natural resources provide opportunities for corruption is robust to different model specifications or resource variable. Instead, the impact of natural resources on a wider set of institutional variables cannot be estimated due to a lack of data for an extended period. Hence, we can easily affirm that the **resource curse** with respect to **governance** is mostly limited to **corruption**. As theoretical channel for explaining their empirical results they suggested the one gave by Ross (2001) that if government earns direct and substantial revenues from resource extraction, the need for the government to tax the population is reduced, which may **hinder the development** of a representative political system because the political elite is able to alleviate dissent among the population, for example, by **spending on patronage**. The consequence of consistent resource rents is a smaller latent pressure for democratization.

The last cross-national study here mentioned is the one conducted by Arezki & Gylfason (2013): this study is significant because sum up a lot of concepts previously mentioned in particular, they tested whether political system affect good governance in resource management. The set of countries for the panel estimation limits to Sub-Saharan countries. Although those countries are quite homogenous because of their shared history and geography, they also diverge importantly in terms of the quality of their political institutions. Theoretically they hypothesize that the mechanisms through which resource rents affect corruption tend to differ depending on their **political systems**. As independent variable of resource rent, they use the World Bank dataset's ratio of Resource rent to GDP in percentage. This measure is weaker than the one used from Arezki & Brückne (2011). In fact, the OLS model with country fixed effects and year fixed effects as control variables, estimate an insignificant coefficient of interaction between resource rent and corruption, due to reverse causality. Instead, when they used the system-GMM (Blundell & Bond, 1998) the estimates of the negative effect of resource rents on corruption become significant at the 10% level, while remaining quantitatively like previous estimates. Just to make it clear in this model an increase in the corruption index (**PRS**) means less corruption. The quality of POLITY2 remains always statistically significant and positive suggesting that higher resource rents are favorable to more corruption and that the effect is significantly stronger in **less democratic** countries. They even tested the interaction between resource rents and both scores of executive constraints and political competition finding it positive and statistically significant at least at the 5% level (these scores are a sub-score determinant



of the POLITY2). The explanation for these results is that stronger political institutions through limiting **executive power** and enhancing **political competition** do attenuate the negative effect of resource rents on corruption. In addition, like the discovery of Bhattacharya they found that higher resource rents lead to **more** (less) government **spending in less** (more) democratic countries explaining why, while corruption resulting from an increase in resource rents is lower in more democratic countries, the likelihood of conflicts increases in such countries. In fact, this is because more democratic countries are less able to redistribute to the public because of the level of scrutiny they face. In contrast, less democratic countries are better able to dispense **pork-barrel spending** to disguise redistribution and smooth the masses. It is established that weaker political institutions aggravate the impact of higher resource rents on corruption. Democratic institutions may in fact effectively reduce rent seeking activities, through strong checks and balances that are not yet in place in many countries (Collier & Hoeffler, 2009).

We have highlighted that some of the inconclusive evidence of the various studies that investigated the impact of natural resources on corruption can be attributed either to differences in the econometric techniques applied or to the indicators chosen such as the period under consideration. Even if some of the findings of the cross-national literature are debated, several well-designed studies provide clear evidence that resource wealth has an impact on corruption, implying that resource wealth, at least in some circumstances, can harm government institutions and thus economic growth. The disparities about whether and how natural resources breed corruption necessitate more research to uncover and validate this link.

### [2.3] Sub-National Literature

A growing body of literature has started to examine the socioeconomic and political impacts of natural resources at subnational level. Indeed, subnational comparative analysis can be a very useful approach to improve the study of the resource curse, because within countries analysis help alleviate, though may not eliminate, the institutional heterogeneity issues in cross-national comparisons. Focusing on the local conditions allows more accurate estimation of the causal effects of natural resources on economic, political and social outcomes.

Caselli & Micheals (2013) conducted one of the first relevant subnational studies, with the goal of understanding why oil windfalls in Brazilian municipalities result in little improvement in the provision of public goods or the population's living standards. Substantially they wanted to understand where the oil revenues are going. The first finding is that increased oil revenues raise the size of municipal workers' homes but not the size of other citizens' homes.

No matter what the mechanism is, municipal workers just seem to be able to acquire for themselves relatively more spacious properties in oil-rich municipalities. To shed more light on the “**missing money**” question, they investigated the frequency with which different municipalities are cited in the news media in connection with corruption. The conclusion is that high oil output per capita does not make a municipality more likely to be cited for irregularities in the news, but more oil output per mayor does. Quantitatively they tested the if the rent seeking and patronage channels find support in the context of Brazilian municipalities (Robinson, Torvik, & Verdier, 2006). About rent seeking there was not enough data to test the empirical significance of such suggestion. Instead, they found a small increase in patronage. They expected an increasing of unproductive spending aimed at consolidating the political power of the incumbent, through an expansion public employment to reward political supporter. However, they found a very modest increase in public employment suggesting that this mechanism does not appear to be of first-order importance. Instead, they suggested that because larger resource windfalls make controlling the local government more attractive, political incumbents may face more aggressive challenges for their position. The greater probability of losing power may led incumbents to adopt a **shorter planning horizon** that increase the **embezzlement** of public revenues. To explain why senior municipal employees may have believed they could "get away" with large-scale theft of public funds in a country where local elections are held on a regular basis, they noted that a survey in the largest oil producing municipality found considerable ignorance among residents regarding the scale of the municipal oil windfall. Because oil revenues are intrinsically less transparent rather than for example revenues from taxation, citizens do not have a precise estimate of how much money the government has earned and cannot accurately evaluate the amount of diversion to private uses by government officials. Hence, resource revenues are **easier to embezzle** than non-resource revenue, leading to an increase in corruption. The ease-of-stealing story appears to be the principal driver of corruption, and this is consistent with the empirical results.

Another interesting sub national experiment was conducted by Vicente (2010). In particular he wanted to test the hypothesis suggested by Robinson and Torvik (2006) that oil discoveries increase the **value to politicians of being in power** leading to more resources being spent on raising the probability of being elected and to resource misallocation in the rest of the economy. To do so he compared Sao tome and Principe, where oil was discovered in nineties, with Capo Verde. He chose the west African island to conduct his experiment because both countries were under Portuguese colonial rule until 1975 when they become independent. Additionally, these nations had remarkably similar political and economic shocks after independence, in both their first regime was socialist until 1991 when the first free elections were run.

He chose these two countries to control for the different effects of macro-level post-independence shocks because of these shared factors. Using an adapted household survey, Vicente showed that the discovery of oil on Sao Tome and Principe's island was linked to a significant increase in perceived corruption, particularly in the areas of vote buying, education, and customs. The impact on vote buying confirms that the announcement of an oil discovery increased competition for state resources, encouraging corruption. Instead, the effect on education can be explained by the fact that the desire for political positions may also increase corruption in the allocation of resources or privileges that may lead to political elite status, such as educational opportunities. Finally, the effect on customs corruption could be a sign of increased private consumption by the Sao Tomean elite, which is positively correlated with higher oil rents.

A fundamental contribution to the sub-national literature was given by Brollo et. Al (2013) who created a theoretical model focusing on the electoral competition between an incumbent and a group of challengers, each with different political abilities and opportunity costs for entering politics. The incumbent faces a choice between using public resources for personal gains or maximizing the probability of election. The model highlights three specific channels through which windfall revenues could affect the political process. First, an increase in resources accessible to a government leads to an increase in corruption of the incumbent because a larger **budget size** allows the incumbent to grab more rents without disappointing rational but imperfectly informed voters (a moral hazard effect in line with the finding of Caselli & Michaels). Second, a higher budget reduces the average ability of the pool of persons involved in politics. This is due to the first channel, in which rents increase the size of the government budget and the assumption that rents are more valuable for political candidates of lower ability. In fact, a highly educated or very talented politician has more valuable opportunities outside of politics because for such a politician the reputation cost of being caught in an act of corruption is higher than for someone with lower opportunity costs from being in politics (selection effect). Third, an incumbent facing less able opponents can marginally **grab more** rents without hurting his reelection prospects. This is the result of the interaction between the first two channels shown., that contribute to increase together the harmful consequences of a windfall on political corruption. The idea that the voters' **imperfect information** about the incumbent's true competence creates an incentive for the incumbent to please the voters through public good provision is not new in fact was already suggested by Robinson et. Al. (2006). Anyway, the crucial discovery of this study is how the **quality** of political candidates is affected by the size of the government budget or by transfers from higher levels of government. They supported these theoretical discoveries through an empirical analysis of the impact of external funds supplied

by the federal government on corruption levels in Brazilian municipalities. The Brazilian federal government, in particular, launched a major anti-corruption program in 2003. Since then, municipalities have been chosen at random by lottery to undergo monthly inspections. Inspectors examined the use of federal transfers at the local level to produce a report that contains information of the transfers audited and a list that describes the full details of the irregularities found by the inspector and the related sector. To make clearer the results Broilo et. Al. introduced two definitions of corruption: broad corruption, which includes irregularities that could also be interpreted as bad administration rather than as explicit corruption; and narrow corruption, which only includes serious irregularities. The empirical results support the theoretical model. In fact, they estimated that a 10% increase in the federal transfers to municipal governments increases local corruption by 17% (broad definition including bad administration) or by 24% (narrow definition, with only severe violation episodes). Furthermore, such a fiscal windfall increases the incumbent's mayor probability of reelection by 7% and shrinks the fraction of his opponents with a college degree by 7%. These findings imply that a windfall of resources may harm the functioning of government institutions through various channels. Especially when institutions are already weak, the risk that a windfall of rents could be harmful is more extended.

Since it is consolidated that natural resources promote corruption because plentiful resource rents provide economic incentives for corruption, it is valuable now to explore the suggestion that the lack of market competition for rents and ill-defined property rights over resources are also a consistent issue in the resource curse debate (Ades & Di Tella, 1999; Gylfason, 2001). To do so an important study was conducted by Zhan (2017) which provides empirical evidence from China with a sub national approach. While China overall does not rely on resource exports for the national economy, many Chinese localities host rich mineral resources, including fuels such as coal, oil and natural gas, metals such as iron and copper, and other nonmetallic minerals. A high number of localities are heavily economically reliant on the mining industries especially from the fiscal point of view. Like many other developing countries, China suffers uncontrolled corruption including embezzlement, bribery, negligence of official duties and other offences by state employees that involve the abuse of public power for private gains (IT definition of corruption). The statistical evidence pointed out by Zhan confirm a positive correlation between resources and corruption. In particular, the relevant findings are that **bureaucratic size** appears to positively affect the occurrence of corruption because a larger bureaucracy creates longer procedures and motivates more people to avoid the many administrative barriers present. Moreover, the **weight of the state** in the extractive sector is statistically

positively correlated with corruption rates, while contrary openness to trade is negatively correlated. These results confirm that the state's heavy intervention in the economy provides non-negligible opportunities for corruption, especially in a quite transparent sector as the extractive one and that the development of market economy and openness to international trade can be effective tools for combating corruption. China even if is not dependent from natural resources shares similar institutional deficiencies with many other resource rich developing countries. The abundance of resource rents only magnifies these institutional deficiencies by giving people more incentives to take bureaucracy short cuts and for corrupt behavior. For example, the **state's monopoly** over mineral property rights and intervention in the resource management provide the structural opportunities through which corruption take form. In addition, the fiscal system's decentralized and undisciplined nature encourages a variety of economically corrupt activities in the fiscal departments. Another deficiency that could create more scope for corruption is the nontransparent and nondemocratic Chinese **political system** where, such as other developing countries, value of political positions increases with resource wealth and could induces to vote buying and office selling.

Knutsen et. Al. (2016) instead adopted a different strategy to explore the link between corruption and mining rent. Specifically, they used micro-level data, connecting Afro barometer survey respondents to spatial data on 496 industrial mines exploring the mechanism at a **local level**. They wanted to test if mining activity enhances corruption only through local growth or if there is even a mining-specific feature that engender more corruption than other activities. To do so they ran a difference in difference regression strategy using the answer of survey for police bribes and permit bribes as dependent variable and the presence of an active mine or an inactive mine that must open in the future as dummy. To test the possibility that corruption increases only due to local growth they used as a proxy for local income, satellite retrieved image of nighttime light emission (Pinkovskiy & Sala-i-Martin demonstrate that this proxy is consistent, 2014) and they discovered that local income increased because of the mine's opening, but that the light coefficient of correlation between nighttime lights and police bribe is not significant. Instead, they discovered that active mines are significantly linked to both police bribes and permit bribes. Because there is no evidence that mine openings induce an influx of police this suggests that present police officers simply take **more bribes**. The main problem is that local mining establishments could even engender local "cultures of corruption" (Fisman & Miguel, 2007) making bribe requests and payments socially more acceptable potentially inducing increased local corruption also in non-mining sectors.

### [3] Policy Implications and Conclusion

The studies presented here prove the existence of the resource curse, especially at a political level highlighting the importance of strong institutions. The purpose of the reviewed literature is the identification of transmission channels which harm natural resource rich-countries' economies but more importantly to inform policy makers of this issue and of the possible resolution. Since institutions of these countries are still too weak, the problem took an **international** dimension which led to the creation of international organization and initiatives to contrast the resource curse. Transparency International is the world's largest anti-corruption non-governmental organization, and it has had a significant influence on the World Bank's thinking about corruption. One of the key themes on which the battle against corruption is focused is the role of transparency but does transparency really matter? The basic idea about transparency is that by facilitating information about government actions, citizens can better **monitor** government officials and require greater electoral accountability (Olken & Pande, 2012). transparency can help to reduce bureaucratic corruption by making corrupt acts riskier, restoring good incentives for public officials, and making it easier to find honest and efficient people to work for the government. More generally, transparency can **promote cooperation** over opportunistic rent-seeking and help maintain norms of integrity and trust (Kolstad & Wiig, 2009). However, agents whose access to information is increased due to transparency effort, must also have an ability to process the information, and the ability and incentives to act on that information. The impact of transparency therefore seems to depend on the level of **education** of an electorate and on **credible sanctions**. Hence, the size to which other agents can hold public officials to account is therefore a **condition** for more information to result in reduced corruption (Lindstedt & Naurin, 2010). The effect of transparency is a priori unclear and since governments may have the incentive to maintain informational advantages, transparency reforms may be hard to be applied.

The Extractive Industries Transparency Initiative, founded by TI, is a major international effort to promote transparency. In particular, the **EITI** is a voluntary initiative that stimulates better governance in resource-rich countries and try to reduce resource curse issues through the certification and full publication of company payments and government revenues from oil, gas, and mining. In any case, it is too early to say whether such international policy initiatives will be successful. One of the main concerns about this initiative is that it provides highly aggregate macroeconomic information on oil revenues on which individual incentives to act are too weak. A plausible alternative would be to make information about district public, increasing the possibility of a real collective act. Furthermore, there is even a possibility that this initiative may make things **worse** by not explicitly considering their effect on rent-seeking

and corruption. For instance, an important part of the EITI is the creation of a multi-stakeholder committee to participate to the validation process, but this group is selected by the government, which could make it just **another arena for patronage** policies (Kolstad & Wiig, 2009). Another possible concern is pointed out by Bac (2001) in fact, while transparency facilitate the identification of corrupt officials, it can also **identify** the relevant **officials to bribe**. In other words, transparency reveals to potential bribers who they need to establish contact with in. For instance, a more transparent bureaucracy may make it easier for an oil company to identify the bureaucrats it needs to bribe to circumvent, for example, environmental regulations. The presented information suggest that transparency needs to be complemented by other types of reforms. In particular, the transparency initiatives should focus on the most important areas to curb the resource curse. The reviewed literature provides evidence that **rent seeking** and **patronage** are the key problems hence, the emphasis of the EITI on revenues rather than on expenditures, which are central in patronage policies, appears misplaced. The focus on revenues is not necessarily the most effective one in addressing corruption and seems like the policy makers are not informed by the basic perspectives of what are the **causes** of the resource curse.

Another criticism about TI was given by Shaxson (2007), about its core definition of corruption as ‘the misuse of entrusted power for private gain’ in according with him too narrow and too focused on bribery. His suggestion is that international organization should focus more on **systems** and processes, and less on behavior because breaking the analysis of corruption into discrete countries, hence considering corruption in one country as being separate from corruption in another misses an essential part of the story: the **global aspect** of the problem. Shaxson to support his thesis firstly described the **Elf Affair**, one of biggest corruption investigation of the last century. Specifically, political leaders in Gabon and nearby countries received between 20 and 60 cents for each barrel of oil produced by Elf in their countries. The funds were channeled through the French Intercontinental Bank for Africa, set up for this purpose by Gabon’s president Omar Bongo, and then on personal accounts in fiscal havens. This found secretly provided money for financing French political parties and intelligence services, and other corrupt acts around the world in pursuit of Elf ’s political, diplomatic and commercial interests. The main provocation of Shaxson is asking if the Extractive Industries Transparency Initiative could have helped to expose the Elf affair. This example demonstrate that an **international aspect** could reasonably exist and should not be ignored by the international actors.

On this line another confirmation was pointed out by Anderson et. Al. (2017) who discovered that exogenous shocks to petroleum income are associated with significant increases in **hidden wealth** but only when institutional checks and balances are weak. Specifically, using unique data on bank deposits in offshore financial centers that specialize in secrecy and asset

protection they estimate that a doubling of the oil price causes a 22% increase in haven deposits owned by petroleum-rich autocracies. Since a doubling of the oil price is associated with an estimated 10% increase in the GDP of petroleum-rich countries, the result suggests that around **15%** of the windfall gains is **diverted to offshore** accounts from autocratic rulers. Furthermore, they find no relationship between the International Country Risk Guide (ICRG) corruption measure, which is widely used in many studies, suggesting that they identified a novel channel of political rent diversion. Another interesting finding is that haven deposits owned by autocracies start significantly increasing a **before elections** suggesting that political elites anticipate the political risk inherent to elections and respond by hiding wealth in offshore havens. The anticipation effect is more pronounced in autocracies with significant petroleum production suggesting that the increases in hidden wealth derive exactly from the political elites who control the petroleum sector rather than households and local firms.

More research is needed to understand the role of tax havens and the international infrastructure that provides a favorable environment for corruption. One first step could be the change the definition of corruption from the TI's narrow definition too focused on bribes to one that captures the systemic aspects of corruption and the processes involved. One proposes comes from Shaxson, according with him it be more meaningful to think about corruption following the principle that whatever abuses the public good and undermines public faith in the integrity of rules, systems and institutions is corrupting. The reviewed literature reveal that the resource curse debate is not a closed chapter, suggesting that we should expect in the next future several studies that deepen the topic to better understand the functioning of a so complicated paradox.



# Appendix

**Definition of the variable and data sources:** For the construction of the regression presented in the section [2.1] The corruption measure is taken from the WGI which define corruption as the perceptions of the extent to which public power is exercised for private gain, including both petty and grand forms of corruption, as well as "capture" of the state by elites and private interests. Instead, the measure of economic dependence from oil and natural resources are taken from the World Bank Group data set.

WGI-control for corruption: <https://info.worldbank.org/governance/wgi/Home/Reports>

NR/GDP in %: <https://databank.worldbank.org/reports.aspx?source=2&series=NY.GDP.TOTL.RT.ZS>

Oil/GDP in %: <https://databank.worldbank.org/reports.aspx?source=2&series=NY.GDP.PETR.RT.ZS>

First regression results:

Regression statistics			
Multiple R	0,0301		
R squared	0,0009		
R squared correctly	-0,0375		
Standard error	0,7682		
N. of observations	28		
Variance Analysis			
	gdl	SQ	MQ
Regression	1	0,0140	0,0140
Residue	26	15,3418	0,5901
Total	27	15,3557	
Ols equation			
	Coefficient	S.E.	Stat t
Intercept	-0,6777	0,5018	-1,3506
Variable X1	-0,2433	1,5822	-0,1538

**Country sample of the first regression:** Algeria, Angola, Azerbaijan, Brunei Darussalam, Burundi Chad, Congo Dem. Rep., Congo Rep., Equatorial Guinea, Gabon, Iran, Iraq, Kazakhstan, Kuwait, Liberia, Libya, Mongolia, Oman, Qatar, Saudi Arabia, South Sudan, Syrian Arab Republic, Timor-Leste, Turkmenistan, United Arab Emirates, Uzbekistan, Venezuela, Yemen

Second regression results:

Regression statistics			
Multiple R	0,1295		
R squared	0,0168		
R squared correctly	-0,0379		
Standard error	0,8713		
N. of observations	20		
Variance Analysis			
	gdl	SQ	MQ
Regression	1	0,2329	0,2329
Residue	18	13,6659	0,7592
Total	19	13,8988	
Ols equation			
	Coefficient	S.E.	Stat t
Intercept	-0,3325	0,6250	-0,5320
Variable X1	-1,1188	2,0200	-0,5539

**Country sample of the second regression:** Algeria, Angola, Azerbaijan, Brunei Darussalam, Chad, Congo Rep. Equatorial Guinea, Gabon, Iran, Iraq, Kuwait, Libya, Oman, Qatar, Saudi Arabia South Sudan, Syrian Arab Republic, United Arab Emirates, Venezuela, Yemen.

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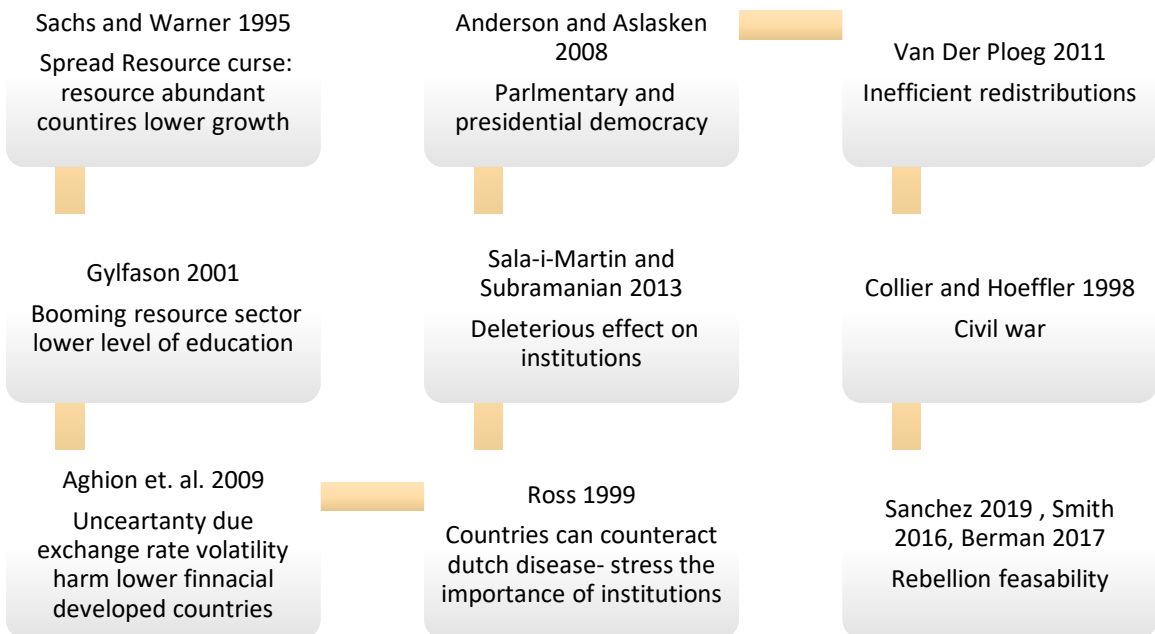
# Conceptual Maps of References

## [1] INTRODUCTION: THE RESOURCE CURSE

### The Early Literature

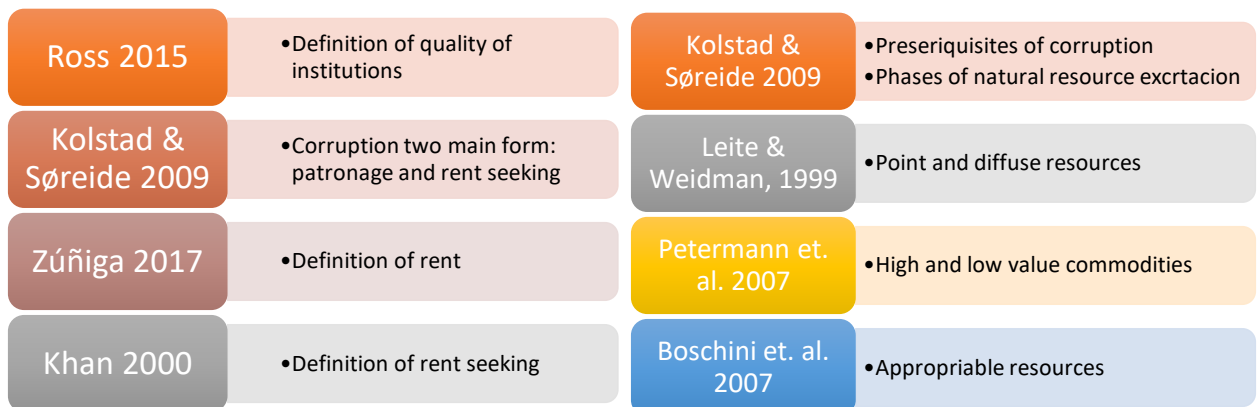


### The Resource Curse Literature

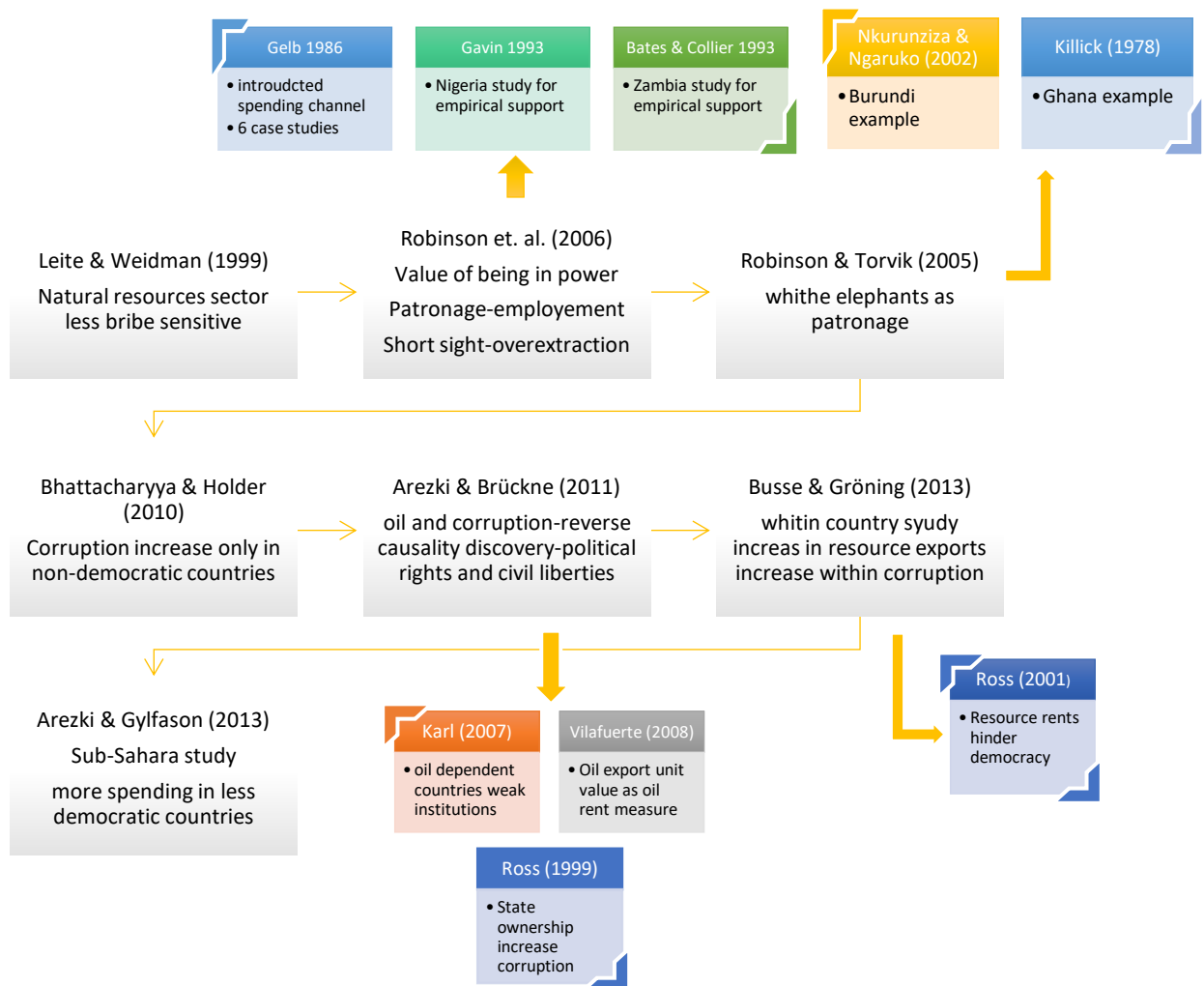


## [2] DO NATURAL RESOURCES INCREASE CORRUPTION?

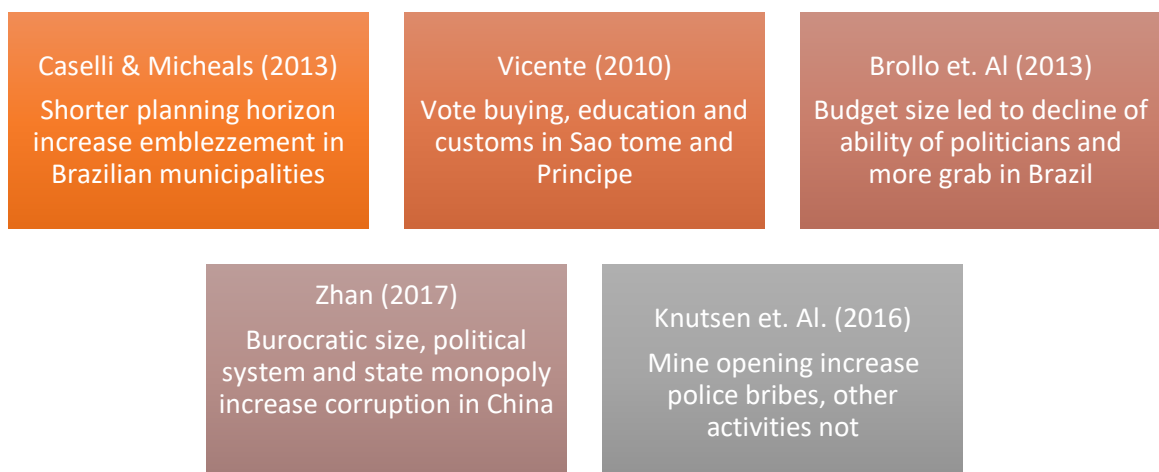
### [2.1] The Main Feature of Corruption



## [2.2] Cross-National Literature



## [2.3] Sub-National Literature





### [3] POLICY IMPLICATIONS AND CONCLUSION

