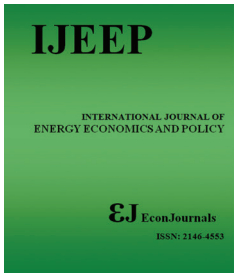

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A Note on Revenue Distribution Patterns and Rent-Seeking Incentive

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ABSTRACT

This paper presents a simple model of rent-seeking incentive to explain the emergence and dominance of the rapacious rent-seeking policies in a number of oil abundant developing and transition economies. The Hubbertian distribution of the commodity exports over time, the magnitude of these revenues, and the availability of offshore havens for the illicitly appropriated rent explain the shift from productive public policies to rapacious rent-seeking. In addition, we show that the existence of the well-functioning democratic institutions prior to the revenue boom precludes the emergence of rapacious rent-seeking institutions due to prohibitively high costs of rent-seeking. The paper complements the existing literature by delivering a novel theoretical rationale for the predisposition of the oil-rich countries to the resource curse.

Keywords: Rent-Seeking, Illicit Appropriation, Hubbert Curve, Point-Source Resources, Institutions, Offshore Havens
JEL Classifications: D72, D73, L72, O13

"A rogue once stolen his 100 000 thalers can live the rest of his life as an honest man."
— Georg Christoph Lichtenberg —

1. DIFFERENT RESOURCE TYPES AND RENT-SEEKING

In April 2003 Jonathan Isham from Middlebury College together with Michael Woolcock and Lant Pritchett from Harvard University and Gwen Busby from Cornell University published a survey on the nexus between the structure of the natural resource exports and the resource curse. The authors did not just detect the causal chain that runs from the relative share of natural resource exports to the choice of development strategies and economic growth but differentiated between different types of natural resource revenues. Isham et al. (2003) wanted to find out whether different type resources have diverging effects on economic growth and found out that "point-source" resources such as oil increase the probability of the resource curse. According to them "point-source" resources affect economic growth negatively mainly over inferior institutional quality. The reason for a higher vulnerability of the countries which are abundant in oil and gas is explained by a higher degree of the spatial concentration of the export revenues and a more lootable nature of such resources, i.e. they can be easily appropriated by the ruling politicians.[1] Van der Ploeg (2010. p. 2f.) in his model of "rapacious resource depletion" generalizes the problems related to extractive industries mentioned in Isham et al. (2003) as the problems caused by the insecurity of property rights.

The investigation conducted by Isham et al. (2003) was nothing but a revival of the basic principles of the export base theory that suggests that plantation agriculture was less conductive to economic growth than the peasant economy because of the weaker linkage effects to the rest of the economy. In the resource base theory, Baldwin (1956) concentrates mainly on the growth effect of different agricultural staples and explains the differences in lacking linkage effects and the enclave character of certain types of agricultural production. According

1 The term "point-source resources" was introduced by Isham et al. (2003). For more on the classification of the resources including "point-source resources" see Bavinck et al. (2014). p. 57 and Mavrotas et al. (2011). p. 124-125.

to them capital intensive staples like cotton and minerals contribute less to economic growth and development because of their lacking linkages with the domestic economy and predominantly enclave character that enables the transfer of the rent mainly to overseas rather than investing in the homeland. Lewis (1978) offered an alternative explanation for the relatively weak growth effects of the nineteenth century plantocracy in the southern states of the USA and similar colonial tropical regions. He argued that cheap labor supply and especially slave labor reduced redistribution of income and did not have the effect that could be observed in temperate frontier regions confronting wage pressure and better redistribution. Boschini et al. (2007) demonstrate that the effect of resources is not determined by resource endowments alone, but rather by the interaction between the type of resources that a country possesses, and the quality of its institutions. Further, the authors negate their institutional hypothesis during their discussion on the appropriation of a resource and show that resources that are very valuable, that can be stored, easily transported and sold, are, for obvious reasons, more attractive to anyone interested in short-term illicit gains. They find out that resources such as petroleum, diamonds or precious metals are potentially more problematic than agricultural products. This is a latent negation of their institutions hypothesis because they discover that the source of the institutional failure is in the type of the resources: If they are very valuable and can be appropriated in the short run, then the institutions tend to deteriorate. Institutions do matter but the primary reason is the type of the resource.

We agree with the above mentioned literature whereby we tend more to the line of argumentation in Lewis (1978) expressing the importance of geographical determinants in combination with institutions whereby we accept the primacy of the features of the resources (geographic, natural and technical aspects) over the pure institutions argument. Following this line, we suggest an alternative theoretical explanation for the perverse effects of the oil abundance empirically detected by Isham et al. (2003). It is not just the spatial and/or sectoral concentration of the resources in one sector and the ability to appropriate these resources. We argue that the large magnitude and positive skew of the oil revenues over time is one of the reasons of the so called resource curse resulting in lacking fiscal linkages, capital flight and strategic behavior of the incumbent government translating itself into low growth rates. This does not mean that these are the only or the most important causes which contain the positive growth effects of oil revenues on the manufacturing sector but at least from a theoretical point of view they seem to be fundamental ones.

Of course, the theory of Isham et al. (2003) makes sense regarding spatial concentration leading to enclave extractive industries. In addition, most of the developing and in all the oil-exporting economies in transition, oil revenues flow directly into the state budget. If one isolates the non-oil sectors of the economy from the oil sector, the output of the oil sector would not be affected significantly in a number of developing and transition economies. Nevertheless, a contrary argument from our side is the question of why the cocoa, rice, aluminum or flower production do not have the analogous adverse effects on rent-seeking and economic growth. The arguments in Isham et al. (2003) are more related to the backward and forward linkage effects of the oil and gas industries. These sectors are probably less integrated in the domestic economy than non-enclave agriculture. If so then it is a theoretical approach explaining rather production linkage effects than rapacious rent-seeking[2]. Of course production linkages encompassing both backward and forward linkages in the enclave industries could be a possible explanation of the economic failure of the oil-abundant countries(Hirschman, 2013). Nonetheless, especially in the case of the petroleum abundant countries production and consumption linkages are less important than fiscal linkages (Morris et al., 2011. p. 19-21). That is why the theoretical explanation in Isham et al. (2003) can only be a partial explanation of the resource curse or sluggish economic growth in the context of petroleum rich countries as production linkages do not capture the major, i.e. the fiscal aspect, of the oil-based economic development.

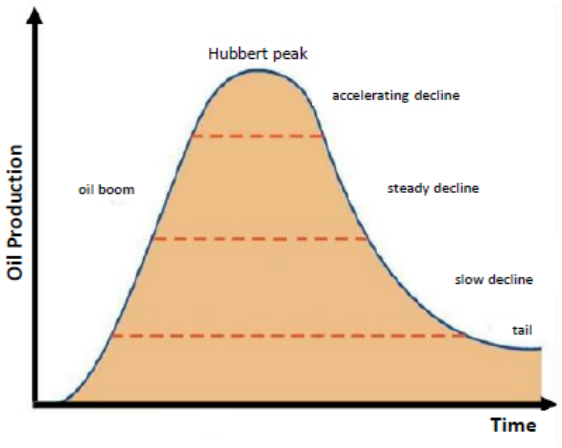
The reason why oil boom is associated with inferior institutions much more than with cocoa, rice or zinc is not the chemical formula of oil, and not the production function mainly reliant on imported technology but the large magnitude of these revenues and their positively skewed revenue generation pattern over time. An oil bonanza even in the years of low oil prices yields much more revenue than other revenue sources in a number of oil abundant countries. Especially in the first decade after commensuration of oil explorations and exports petroleum revenues create a huge intersectoral misbalance, especially in the countries with initially low GDP. For example, in Azerbaijan 1991 oil exports constituted only 6,5% of GDP, in 2006, the year of big oil exports after opening of the Baku-Tbilisi-Ceyhan pipeline, this number jumped to 41,7%. Oil revenues constituted just 0,1% of the Iraqi GDP in 1970 and in 1974 this number was 40%. Oil exploitation and also oil price fluctuations, for instance, in 1979 after Iranian Revolution change the intersectoral revenue structure significantly. Empirical observations show that in most of the oil exporting developing countries this shift towards the oil sector has a durable character and is not a temporary phenomenon. The asymmetric flow of the petrodollars whereby on the one side we have a tiny non-oil sector with labor surplus economy and on the other hand a highly capital-intensive huge oil sector changes the relative importance of the economic sectors and as shall be shown later, also the incentive structure of the ruling elites too.

Hydrocarbons cannot be recycled and they vanish in the process of consumption or production. It is a nonrenewable resource which is available only for a limited time span. Studies on the oil decline curve analysis initiated in Arps (1945) and generalized in Hubbert peak theory considering both discovered oil deposits and future discoveries suggested in Hubbert (1956) show that especially the crude oil production quantity over time (both in singular and multiple oil fields cases) approximate a bell curve (Figure 1). Oil reserves reach relatively quickly peak production and as soon as the extraction has reached its peak, the oil extraction shifts relatively fast to the phase of exponential decline[3]. In the case of other minerals and even gas the decline

2 The terms rapacious rent-seeking, corruption, and grabbing are used interchangeably in the discussion here.

3 For the difference between decline curves of oil and gas see Bentley (2002)

Figure 1: Hubbert curve



rate of resource extraction after the peak is much lower than in the case of oil (Höök, 2009. p. 26).

Despite criticism the Hubbert theory seems to hold for the most large oil-producing regions on the planet (Brandt, 2007). In the next subsections we shall try to analyze the impact of the asymmetric Hubbertian distribution model of oil production (and consequent revenue generation) on the incentive structure of the politically powerful groups. As we conduct this analysis in the framework of an infinite horizon, in the next subsection we shall discuss the theoretical rationale behind the infinite time horizon in the microeconomic modeling.

2. THE MICROECONOMIC FOUNDATIONS OF THE INFINITE HORIZON

In microeconomics there are models with finitely-lived agents and models that have an infinite planning horizon. Despite the fact that individuals do not live forever, modeling with an assumption of infinite horizon has convincing microeconomic foundations. The first justification for the infinite planning horizon is the so-called Poisson death model (PDM) and the second one is the so-called bequest motive rising from intergenerational altruism. In PDM, the utility maximization of a finitely living individual converges with the maximization model identical to that in the model with infinitely living households. Despite wide applications in applied social science and epidemiology the central assumption of PDM, the assumption of the constant probability of death, v, for each year of life, is not realistic: Death probability is a function of age. This is why it is not straightforward to assume v to be constant (Acemoglu, 2009. p. 156f).

The second and more persuasive explanation, the so-called bequest motive or the model of intergenerational altruism assumes that the individuals live for a finite time and care about the utility of their offsprings and keep in mind that in turn their offspring will care about the utility of their offspring, and so on. Thus the individual internalizes the utility of all future offspring infinitely. This utility mechanism explains dynastic preferences whereby decision makers act as if they had an infinite planning horizon.

and Brandt (2006). For the discussion on the hyperbolic and harmonic decline patterns of oil resources see Höök (2008. p. 30-31).

3. UTILITY MAXIMIZATION OF THE STATE ELITE

In this section we shall assume that the state elite maximizes its utility through maximization of its gross income (I^{gross}) which consists of legally determined fixed income I_t^{fix} and illicit income I_t^{var} [4]. I_t^{fix} is the legally determined salary of the head of the state and other elite members in period t. I_t^{var} is illicitly appropriated rent seeking revenue in period t. We denote the sum of I_t^{var} and I_t^{fix} as the gross income of the state elite in t, $I_t^{gross}=I_t^{fix}+I_t^{var}$.

In the periods before the discovery of the oil reserves and the oil boom the economy consists of the manufacturing sector that operates under constant returns to scale and under conditions of perfect competition. Output in the manufacturing sector equals Y_m and the tax rate imposed on the manufacturing output is τ. Tax revenue generated in the manufacturing sector, $(Y_M\tau)$, is the only revenue source of the government. Throughout the model we assume that tax revenue generated in the manufacturing sector is constant, e.g., $Y_M\tau$ does not change as a reaction to the changing behavior of the state elite and oil windfalls. This has no impact on the level of generality and simplifies the presentation[5].

The government has to cover constant expenditure, $\bar{C}$. This is the total and minimized expenditure of the government and covers the basic needs of its citizens and payments for major state institutions for the maintenance of the political power and stability. If the incumbent government does not cover $\bar{C}$ then a regime change takes place. The next assumption and starting point of our analysis is that the roughly simplified hypothetical budget before discovery of oil fields and the beginning of oil exports is always balanced $(\text{Surplus/Deficit}=\tau\cdot Y_m-\bar{C}-I^{fix}=0)$ [6].

4 The state elite is a small and politically dominant group of persons. The notion of the state elite could imply different social structures in different sociopolitical milieus. For example in Eastern Europe this could be relatives or friends of the head of the state, in the Central Asian countries, clan or family members, in some Arab or African states, families and tribes[3]. Nevertheless, the constitutive feature of all types of the state elite is their political dominance translating into economic power. Werenfels (2004. p. 173-200) in the context of Algeria labels these elites as a *core elite* having direct ties to presidency. Abdelnasser (2004. p. 118-123) describes in the context of Egypt the core elite as the first-circle technocrats, the president and major party politicians of the incumbent government. For Higley and Gunther (1992) elites are groups of persons shaping political outcomes in the most resource-rich organizations. The elites play a decisive role in the institutionalization of the distributive rules of the game and act as an active moment in the process of transformation (Rustow, 1970. p. 355).

5 For the assessment of the sensitivity of the manufacturing sector see Sadik-Zada (2016): 57-68.

6 We include I^{fix} to the expenditure side due to the fact that it is being paid from the hypothesized state budget.

This implies that before the resource windfalls, tax revenue from the manufacturing sector is just enough for the necessary state expenditure. The elite due to a constrained financial latitude has to endure a balanced state budget by intruducing and maintaining an efficient revenue and expenditure management. This argument is in line with the latitude and voice proposition of Albert Hirschman (1963. p. 1984), one of the luminaries of development economics, who argued that lack of latitude, i.e., constrained financial leeway of the elite in our context "… *brings powerful pressures for efficiency, quality performance, good maintenance habits, and so on. It thus substitutes for inadequately formed motivations and attitudes, which will be induced and generated the narrow-latitude task instead of presiding over it*." The regime change assumption if $\bar{C}$ is not covered was also mentioned by Albert Hirschman in "*Exit, Voice, and Loyalty*," a treatise on the social responsiveness on the public governance, whereby narrow-latitude tasks[7] correspond with covering of $\bar{C}$ in our context, he writes: "*Narrow-latitude tasks will, if performed poorly and (ex hypothesi) disastrously, give rise to strong public concern and outcry – to voice…. a narrow-latitude task that, if neglected, is likely to give rapid rise to strong voice (the results of poor performance being intolerable)."*[8] Under such circumstances the government has no possibility of illicit private appropriation from the hypothetical budget: Illicit appropriation would cause a coup due to the uncovered basic needs of the population ($\tau Ym - C - I^{fix}$ −illicit appropriation<0). Under such circumstances the state elite earn only I^{fix} and has an infinite tenure.[9]

A sudden discovery of oil reserves and subsequent oil exports cause a budget surplus because of additional revenue sources. We denote oil revenues by R. If the elite decides to introduce institutions prioritizing no more efficiency but rather rent-seeking targets[10] then this causes additional costs. Appropriation of the illicit income, I^{var}, requires a change of the institutional setting from production friendly to rent seeking/grabbing institutions. This requires additional costs like expenses of political bargaining, costs for registration and management of offshore companies for the organization of capital flight and political bargain which imply the creation of public sector jobs with very low or no productivity etc. (Sadik-Zada, 2016).

We denote these costs as $C_{rent-seeking}$ and call them transaction costs of rent seeking. As a result the hypothetic budget has now the following structure if rapacious rent-seeking takes place:[11]

$$Surplus = \tau Y_m + R - C_{rent\text{-}seeking} - \bar{C} - I_0^{fixed} \quad (1)$$

The state elite following rent seeking aims by establishing grabbing institutions entirely appropriates the surplus in Equation (1). An alternative to grabbing, e.g., illicit appropriation of the budget surplus is re-investment of the surplus in the manufacturing sector. In this paper we do not consider here the adverse effect of rent-seeking on growth. This issue comes under scrutiny in a number of other papers (Anderson and Boettke, 1997).

Confronted with oil windfalls, the politically influential elite get an additional option. If before the oil boom the government was forced to sustain economic efficiency and consequent growth or at least maintain the achieved level of tax revenue, now with additional oil revenue, R, and the resulting budget surplus, the elite is not confronted with the previous pressure and has even the resources for illicit personal enrichment.[12] The feasibility of illicit personal enrichment depends also on the institutional setting prior the boom. If the boom happens in a mature democracy with production oriented institutions and a high level of transparency then inducing rapacious institutions could have prohibitive transaction costs, $C_{rent-seeking}$. In contrast, in countries with inferior political and economic institutions, in face of a low level of accountability and transparency, these costs would be much lower than in mature democracies. For the oil-and gas-rich countries of the former USSR with high level of concentration of political power in the hands of a strong executive and weak legislative and judicative powers, weak transparency and accountability, there are favorable preconditions for the prosperity of grabbing

7 A narrow-latitude task is a task that has to be performed just right; otherwise there is a serious risk connected to public outrage and social unrest. One example from a different context is the example with the engine of an airplane. The producer has to produce a well-functioning engine; this is a minimum that is expected from an airplane producer. If this condition is not fulfilled, then protests are inevitable. Cf. Hirschman (1984. p. 99).

8 Hirschman (1984). p. 100.

9 The assumption of infinite tenure could sound as being too unrealistic. Nevertheless, if we take the countries with working (mature) democracy as an example, this assumption is not that unrealistic. Let us take the case of a working democracy with two parties that form the government, e.g., the Republican and Democratic Parties in the United States, the Christian Democratic Union and Social Democratic Parties in Germany, the Labour and Conservative Parties in Great Britain. If we can assume that these parties would continue forever, then for how long would last the tenure of each of these two parties? Even if we consider the fact that the Democrats in the United States systematically have won less in the elections than the Republicans have and that is why they have different probabilities of being elected then in an abstract sense the time span of being in power for both of the parties equals infinity. This is a mathematical result on the basis of the assumption of the further existence of the respective parties. Let us assume that the probability that the Democrats would win the elections equals 0.3 and the probability that the Republicans would win the elections equals 0.7 then the total duration of the tenure equals$(0.3 \times \infty)$ for Democrats and $(0.7 \times \infty)$ for Republicans. If we take into account that $(0.3 \times \infty) = \infty$ and $(0.7 \times \infty) = \infty$ then both of the political parties at least theoretically have an estimated tenure of ∞. This result would be the same also with three or more parties. The same result holds if we take the examples of other mature democracies with established large political parties and consider a whole party and not particular individuals as the holders of power. There are a number of studies on longevity of tenure suggesting that the longevity of the governments is longer in the oil-rich developing countries (Andersen and Silje (2012), Ombga (2009)). Nevertheless, if we redefine longevity not as an uninterrupted tenure of a personified political group but as the sum of the tenure of the not personified political force with interruptions then we would see that on average in the mature democracies the longevity of the tenure of a political party is much higher than in the oil-, gas-, diamond- or gold-rich autocracies.

10 Mehlum et al. (2006) denote rent-seeking activities and installation of the institutions enabling rent-seeking as "grabbing." In the following, we shall use the grabbing as a notion describing the sum of rent-seeking activities.

11 Without grabbing $C_{rent-seeking} = 0$.

12 This argument is in line with the arguments in Hirschman (1967) regarding latitude conjecture and somehow with Lewis (1978) whereby the adverse effects of plantocracy and slavery in the southern states of the United States were explained by relatively low wage pressure in these areas. Northern states without abundant labor were forced to increase the efficiency due to wage pressure and that's why they developed a more effective and innovative economy than the south of the United States.

institutions favoring inefficient rent-seeking targets of the ruling elite (Anderson and Boetke, 1997. p. 37-53).

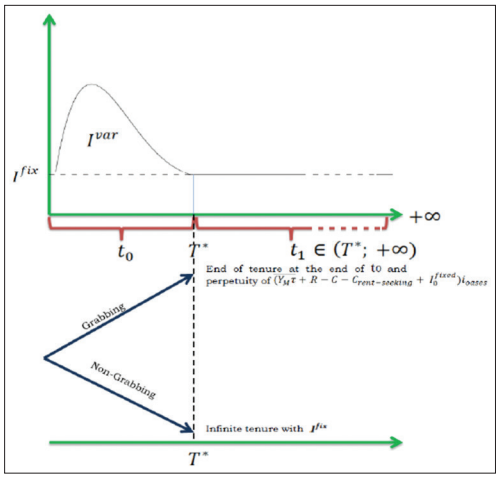
If in the absence of oil fields, the political and economic institutions had to be led by the target of efficiency increase and were productive, now after the discovery of oil fields, as have to be proven in the following, under some conditions, illicit appropriation starts to be the major target of the incumbent government. With the oil boom the satisfaction of the required expenditure $\overline{C}$ is no more dependent on the quality of public management and institutional framework provided to the private manufacturing. Even with an inferior institutional quality the elites can continue their tenure. Like Lewis (1978) but in a different context, abundance of one of the production factors decreases the pressure imposed by scarcity that leads to higher efficiency.

After a commodity boom there is a more inefficient cost structure and a share, $\chi \in [0;1]$, of $C_{rent-seeking}$ has to be maintained. χ represents costs of political bargain such as artificially created jobs and wages over marginal productivity in the public sector that cannot not be adjusted immediately. Hence, the condition of the balanced budget after depletion of oil reserves shall not be given, i.e. $(\tau \times Y_m - C - \chi C_{rent-seeking} - I_0^{fixed} < 0)$.

This implies that after depletion of oil reserves a LDC has the same level of tax revenues ($\tau \cdot Y_m$) but higher costs increased by $\chi C_{rent-seekig}$. The elite shall not be able to stay in office after a commodity boom is over because the revenue side, τY_m, does not cover the costs side and implies a deterioration of the standard of living increased during the boom by means of artificial employment and other forms of political bargaining. Of course, if the increased inefficiency in public spending due to political bargaining, $\chi C_{rent-seekig}$, is eliminated then the tenure could continue. Nevertheless, it is difficult to imagine that immediately after the boom the government could easily reduce the social standards, eliminate artificial employment in the public sector, cheap water, electricity and gasoline provided during the boom. All these steps would create public unrest and regime change. This assumption of a sticky political bargain is an analogue to sticky wages concept of Keynes but in a different context[13] and in line with the results of empirical analysis of Ponticelli and Voth (2011) on the causational relationship between social unrest and budget cuts in Europe between 1919 and 2009.[14]

Hence, establishing grabbing institutions implies the limitation of tenure that was assumed to be infinite under efficient institutions without rent seeking: Announcement of an austerity package after depletion of oil reserves would be unavoidable. Nevertheless, the state elite would not be able to convince the disillusioned population to support the tenure of the old elite and would with a high probability require a regime and elite change (Haggard and Kaufman, 1995).

Figure 2: Decision diagram of the state elite after the discovery of oil fields



Confronted with an oil boom, the state elite have to make its decision about the management of oil revenues and consequently about its political future. The decision diagram of the state elite with two following options is illustrated in Figure 2:

1. Continuation of the old efficient economic policy with productive institutions, or
2. Inducing grabbing institutions damaging economic efficiency.

The first option implies infinite tenure with a fixed legal income, I^{fix}. And the second option implies the limitation of the tenure to the time span of an oil boom but extension of the fixed legal income by the illicit (rent-seeking) income, I^{var}, as long as there are essential oil exports generating budget surplus.[15] In order to choose between these two options, they have to be compared in monetary terms over an assumed time horizon of infinity. To do this, we shall use a technique introduced by the founder of dynamic optimization Richard Bellman and divide infinity in two parts (Bellman, 1957). Part one is the period with oil and part two is the rest of the time till infinity. By dividing infinity into the oil phase, $(0; t_0)$, and the after-oil phase, $(t_0; +\infty)$, we are able to scrutinize the consequences of the concentration of the oil revenues in time, e.g., positively skewed distribution of oil windfalls over time as shown in the upper graph of Figure 2. We have a maximization problem with an infinite horizon, whereby the elite has to choose between the above mentioned options.

13 Sticky wages is an economic hypothesis that the pay of employed workers tends to respond slowly to the changes in a company's or the broader economy's performance. When unemployment rises, the wages of those workers who remain employed tend to stay the same or grow at a slower rate than before rather than falling with the decrease in demand for labor. Specifically, wages are said to be "sticky-down" since they can move up easily but move down only with difficulty.

14 As an indicator of social unrest Ponticelli and Voth (2011) choose the sum of demonstrations, riots, assassinations and general strikes.

15 Of course there are also other benefits like prestige, power and many other immaterial benefits of staying in power which are differently weighted by different political leaders depending on the matrices of their personality. We do not consider this aspect in our model. In addition, we do not consider the law of diminishing marginal utility of wealth. Studies on happiness show that the personal fortune after achieving the threshold of 50 million USD brings no additional utility to its owner. This is also a limitation of our model. Nevertheless, if we would make an assumption that the grown-up offspring of the elite members also enter to the group and the number of elite members is growing then the issue of diminishing marginal utility would be partly solved. This is especially straightforward for the dynastically organized elites.

If the elite chooses the option without rent-seeking (non-grabbing) then they would earn I^{fix} infinitely period after period. Otherwise if they choose the first option (grabbing) then the gross income, I_0^{gross}, in the boom period, t_0, is determined in accordance with Equation (2):

$$I_0^{gross} = \underbrace{Y_M\tau + R - \bar{C} - I_0^{fixed} - C_{rent\text{-}seeking}}_{\text{Budget Surplus} \Rightarrow 0} + I_0^{fixed} \quad (2)$$

$$\Leftrightarrow I_0^{gross} = Y_M\tau + R - \bar{C} - C_{rent\text{-}seeking} > I_0^{fixed} \quad (3)$$

I_0^{gross} with grabbing institutions in (2) is larger than the total income of the state elite without grabbing institutions (the positive difference equals the budget surplus generated in the oil phase which is assumed to last for only one period). Because it is hard to imagine that the legal remuneration of the state elite members could be greater than the budget surplus in the oil bonanza period, t_0 Illicit appropriation of budget surplus causes the end of the tenure of the state elite with the end of t_0. In all of the following periods, the state elite separated from tenure would not have the fixed remuneration I_0^{fixed}. Nevertheless, they could receive the interest for investing I_0^{gross} in the foreign offshore havens providing security in form of banking secrecy and asset protection for the illicitly appropriated rent and having negligible or no capital income taxation. The high risk of expropriation of the illicit income after revolution is the major reason for investing I^{var} in the offshore havens.

The next important question is the question regarding the interest rate of the mentioned hypothetical deposit of the elite. Is this the domestic interest rate? This is with a high probability not the case. The data on capital flight and tax evasion shows that the illicit money from the developing and transformational economies flow mainly to the financial havens like Cyprus, British Virgin Islands, Panama, etc. Data provided by the International Consortium of Investigative Journalists shows that Europe, the UAE and offshore financial oases are the major destination of the illicit petrodollars from the petroleum exporting developing and transition economies.[16] Nevertheless, the interest rates in these havens are much lower than in the developing or transition economies. Due to safety provided in the financial oases, the state elite applies the interest rate in the oases, i_{oases}, that is lower than the domestic interest rate i_{dom} for the comparison of the options illustrated in Figure 2.[17] This implies that the elite despite residing in its home country has an orientation interest rate of a foreign jurisdiction. For the comparison, the elite employs the following decision rule: If the net present value (NPV) of the fixed income which is nothing but perpetuity (annuity with no end) is larger than the gross income, I_0^{gross}, then the elite does not choose grabbing policy, e.g., economic course prioritizing rent-seeking targets and neglecting long-run sustainability. The NPV of a perpetuity, I^{fix}, equals the perpetuity divided by the relevant interest rate:

$$NPV(I^{fix}) = \frac{I^{fix}}{i_{oases}} \quad (4)$$

And if $\frac{I^{fix}}{i_{oasis}} > I_0^{gross} = Y_M\tau + R - \bar{C} - C_{rent\text{-}seeking}$ then the government continues a non-grabbing course because staying in power for infinity brings more utility than grabbing in t_0 yields.

Otherwise if the NPV of the fixed income paid as perpetuity is less than the gross income in t_0 then there is an incentive to induce grabbing institutions:

$$\frac{I^{fix}}{i_{oases}} < I_0^{gross} = Y_M\tau + R - \bar{C} - C_{rent\text{-}seeking} \quad (5)$$

As can be seen from the Equation (4) a higher resource revenue, R, brings the elite closer to the threshold from where grabbing starts to be optimal for the profit maximizing elite. The transaction costs of rent-seeking, $C_{rent\text{–}seeking}$, take the elite apart from this threshold. Nevertheless, in the countries encountered with the black gold bonanza with inferior institutions before the discovery of oil fields, the probability that $C_{rent\text{–}seeking}$ could overcompensate the effect of R is usually not that high due to lack of well-functioning democratic institutions leading to public transparency and accountability.[18] Both equations show that the magnitude of oil revenues, R, and the institutional quality prior to oil boom, which determine the amount of $C_{rent\text{–}seeking}$, play a central role in the decision regarding inducing grabbing institutions or relinquishing them. Black gold bonanza generates large windfalls and leads to abrupt but tempotaty rise of of the budget revenues. The revenue generation path of the agricultural commodities like cacao, maize, rice etc. do not lead to this kind of abrupt revenue increases and do have a long-lasting impact on the revenue structure of the respective developing nations. This could be an explanation for the corresponce of oil revenues with inferior institutional quality and the resource curse more than other commodity exports with a more even and sustainable revenue generation trajectory.

4. TIMING OF EXPLOITATION

Another question is the timing of the exploitation. When does the ruling elite start to explore and exploit the reserves? In the framework of our model the incumbent government could also start the exploitation as latest as possible because there could be financial rationale behind such a strategy if the price of the reserves increases with the interest rate as expected by the Hotelling model. This implies that the ruling elite gets I^{fix} for a very long time and then starts to exploit the reserves. Doing so they could increase their total income.

However, there are also factors that make the immediate exploitation more probable. First, the continuation of the public governance with restricted financial resources contributes to the development of progressive political and economic institutions and makes the ruling elite more accountable in its public finance and

16 For diverse articles on this issue see www.icij.org .

17 This assumption is based on the observation that industrialized, relatively capital-rich countries and offshore oases have in the rule lower interest rates than capital scarce developing or transitional economies.

18 Traditionally low open budget index values of the oil- and gas-rich states also vindicate this expectation. Despite membership in the *Extractive Industries Transparency Initiative* of a number of the oil abundant countries, these countries still do not have a good level of transparency and civil society participation in revenue and expenditure management.

economic policy. The strengthening of the civil society challenges the assumption of infinite duration for the rule of the incumbent government. Another risk connected to the conservation strategy is the competition of different political groups. Further, small developing or transition economies, are often urged my external factors like large oil companies supporting political forces that promote rash exploitation rather than conservation (Browne, 2010). Most developing and all transition economies have not had any intentional delays in the exploitation of its oil- and gas deposits.

5. THE EFFECT OF A MORE EVEN DISTRIBUTION OF THE OIL WEALTH OVER TIME

In the previous subsection, we have shown that nonrenewable resource revenues could give an incentive to induce rent-seeking activities. This subsection is a sophisticated version of the presented model which shows the impact of the scale of the positive skewness of the distribution of the resource revenues in time on the incentive structure. Concretely in our context, the increase (decrease) of the scale parameter of distribution of oil revenues in time means that a given stock of oil is extracted in more (less) time periods. For instance, assume that a given petroleum stock of 1000 million barrels could be extracted and sold in one period. If the scale parameter of the distribution of oil revenue in time doubles, then the given 1000 million barrels of petroleum would be extracted in two periods implying that the same oil revenue flow in the hypothetical state budget would take place not in one but in two subsequent years. Analysis of these two scenarios enables the comparison of the effect of higher concentration of oil income on rent-seeking incentive. Whereby in contrast to Isham et al. (2003) we do not scrutinize the spatial concentration of resources in one province or concentration of revenue influx in one hand but in time.

Suppose that the resources concentrated in one period in the previous model (Figure 3a) are distributed over two periods (Figure 3b). The difference between a case where all the nonrenewable revenues are concentrated in just one period and a case whereby the revenues flow into the budget over many periods is:

1. In the time value of these revenues, and
2. Transaction costs of rent–seeking, $C_{rent–seeking}$.

In the previous model we assumed that if the elite chose the rent seeking course then they appropriate the whole surplus in period t_0 whereby the surplus equals $\left[Y_M\tau+R-\bar{C}-C_{rent\text{-}seeking}-I^{fix}\right]$. Now we assume that the same oil deposit, R, can be extracted in two time periods, in t_0 and t_1.

The half of R flows in the hypothetical budget in t_0 and the rest (R/2) in t_1. In addition to this, we assume that the potential rent seeking revenue cannot be illicitly privatized by the elite without transaction costs, $C_{rent–seeking}$. We assume that if the elite continues rent-seeking course in t_1 then the economy will have transaction costs, $C_{rent–seeking}$, both in t_0 and t_1. In Figure 3B we illustrate only the case whereby transaction costs in t_1 are the same as in t_0. Nevertheless, these costs could vary. The costs of political bargaining, payments for overseas company management and registration, fake directorship fees, costs of increased repression, etc. could have both increasing and decreasing forms depending on the concrete situation in the developing or transformational country. In addition to this, $C_{rent–seeking}$ could vary over time due to changing external factors like anticorruption legislature in the countries where the parent company of the oil extracting company resides, or due to the introduction of anti-corruption legislature by supranational organizations like the European Council. One could suggest that these costs could decrease due to the creation of the rent seeking institutions in the previous period, e.g., in t_1. For instance the elite could use the offshore company or bank account created in, t_0 or increase expenditures due to increasing social pressure of the population foreseeing an economic collapse after the resource boom. This could be the case especially in the countries with a high level of education, social networks and developed civil society freedoms. Hence, the assumption of constant transaction costs of rent-seeking is a rough simplification that could be abolished in the more sophisticated models focusing on the dynamics of $C_{rent–seeking}$.

Based on constant $C_{rent–seeking}$, the NPV of the gross income of the elite, $I^{gross-t}$, for the case where all the revenue flows just in one period, t_0 $I^{gross-1}$ and the case where the same revenue flows over two periods, t_0 and t_1, $I^{gross-2}$ shall be compared.

The NPV of the gross income of the elite in the two period model, $I^{gross-2}$, can be determined as follows:

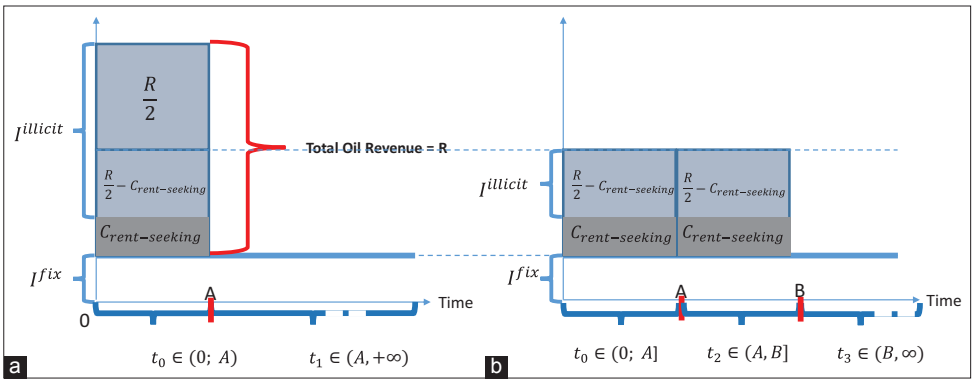
$$I^{gross-2}=I^{fix}+\left(\frac{R}{2}+\left(\overline{Y_M\tau}\right)-\bar{C}-C_{rent\text{-}seeking}-I^{fix}\right)+\frac{\left(I^{fix}+\left(\frac{R}{2}+\left(\overline{Y_M\tau}\right)-\bar{C}-C_{rent\text{-}seeking1}-I^{fix}\right)\right)}{1+r}$$
$$=\left(\frac{R}{2}+\left(\overline{Y_M\tau}\right)-\bar{C}-C_{rent\text{-}seeking}\right)+\frac{\frac{R}{2}+\left(\overline{Y_M\tau}\right)-\bar{C}-C_{rent\text{-}seeking}}{1+r} \quad (6)$$

We denote in (5) and in the following equations the tax revenue generated in the manufacturing sector, $Y_M\tau$, assumed to be constant with a roof as $\overline{Y_M\tau}$ in order to avoid confusion regarding the impact of the tax revenue on I^{gross}. For comparison, $I^{total-1}$ for the case where all the resource revenue flows just in one period was determined as follows:

$$I^{gross\ 1}=I^{fix}+\overline{Y_M}+R-\bar{C}-C_{rent\text{-}seeking}-I^{fix})=\overline{Y_M}+R-\bar{C}-C_{rent\text{-}ssking} \quad (7)$$

Now let us compare the NPV of $I^{gross-2}$ and $I^{gross-1}$ in (6) and (7). For this we subtract (6) from (7). The difference shows whether grabbing or efficient resource management is more advantageous for the state elite. In both cases, $\overline{Y_M\tau}$ is constant. The fourth and

Figure 3: Variations of the scale parameters of the distribution of the oil revenues over time. In A oil revenue, R, flows into hypothetical budget in one and in B in two periods in two equal rates, R/2. In B we illustrate only the case whereby - $C_{rent-seeking}$ in t_0 and in t_1 is the same. Nevertheless, cases with decreasing of increasing transaction costs are also thinkable



fifth terms in (6) and (7), $\overline{C}$ and $C_{rent-seeking}$ are also equal. This yields the following result in Equation (8):

$$I^{gross-1} - I^{gross-2} = R - \frac{R}{2} - \frac{I^{fix} + (\frac{R}{2} + \overline{Y_M \tau} - \overline{C} - C_{rent\text{-}seeking1} - I^{fix})}{1+r}$$

$$\Leftrightarrow I^{gross-1} - I^{gross-2} = \frac{R}{2} - \frac{(\frac{R}{2} + \overline{Y_M \tau} - \overline{C} - C_{rent\text{-}seeking1})}{1+r}$$

$$= \frac{R}{2} - \frac{\frac{R}{2}}{1+r} - \frac{\overline{Y_M \tau} - \overline{C}}{1+r} + \frac{C_{rent\text{-}seeking1}}{1+r} \quad (8)$$

As we know from the introducing assumptions of the model, in a situation without oil revenues, the conditions for the balanced hypothetical budget were assumed to be given $surplus = Y_M \tau - \overline{C} - I^{fix} = 0)$. This implies that $Y_M \tau - \overline{C} = I^{fix}$ and we can rewrite the third term on the RHS of (6), $\frac{\overline{Y_M \tau} - \overline{C}}{1+r}$, as $\frac{I^{fix}}{1+r}$. This means that (6) can be reduced to the following form:

$$I_1^{gross-1} - I_2^{gross-2} = \left[\frac{R}{2} - \frac{\frac{R}{2}}{1+r}\right] - \frac{I^{fix}}{1+r} + \frac{C_{rent\text{-}seeking}}{1+r} \quad (9)$$

The difference between $\left[\frac{R}{2}\right]$ and $\left[-\frac{\frac{R}{2}}{1+r}\right]$ is positive because the discount factor is greater than the unity, (1+r) > 1. The last term in (8), $\left[\frac{C_{rent\text{-}seeking}}{1+r}\right]$ has a positive sign. This implies that due to the time value of the oil revenues $\left[\frac{R}{2} - \frac{\frac{R}{2}}{1+r}\right]$ and additional costs of rent seeking incurring the second year, the NPV of the gross income of the elite is less in the case of a stretched two-period oil boom. Translating the decision rule expressed in Equation (4), $\left(\frac{I^{fix}}{i_{oases}} < NPV(I^{gross})\right)$, the result implies that with a more even distribution of the revenue the NPV (I^{gross}) tends to diminish and in the theoretical extreme case if $n \to \infty$ then $\frac{R}{n} \to 0$. Under such conditions, efficiency oriented public management is the dominant strategy and rent-seeking makes no sense for the state elite.

Nevertheless, as seen from (8), the second term on the RHS, $\frac{I^{fix}}{1+r}$, has an opposite impact on the difference between $I_1^{(gross-1)}$ and $I_2^{(gross-2)}$. By equating the RHS of (8) to zero, we could find the condition where the interest and transaction cost effects of revenue stretching can be compensated by I^{fix} in t_1 which is provided due to an additional year of tenure.

$$\frac{R}{2} - \frac{I^{fix}}{1+r} - \frac{\frac{R}{2}}{1+r} + \frac{C_{rent\text{-}seeking}}{1+r} = 0 \quad (10)$$

$$\Leftrightarrow \frac{I^{fix}}{1+r} = \frac{R}{2} - \frac{\frac{R}{2} - C_{rent\text{-}seeking}}{1+r} \quad (11)$$

Multiplying both sides of (10) by (1−r) yields the following expression:

$$I^{fix} = (1+r)R - R + 2 \cdot C_{rent\text{-}seeking} \Leftrightarrow I^{fix} = \frac{rR}{2} + C_{rent\text{-}seeking} \quad (12)$$

The last equation sets the condition for indifference and implies that if the fixed income of one additional year in power compensates the loss of interest due to discounting of $\frac{R}{2}$ and transaction costs for rent seeking for one additional year then the elite is indifferent. However, in the rule the legal income of the elites in the transformational and developing countries is relatively small. Hence, it is probable that the bigger concentration of the revenues creates larger gross revenue for the elites. Thus we could

show that it is more advantageous for the elites if the revenues have a high degree of concentration in time.

We can conclude that a more even, e.g., stretched distribution of the revenue from the same oil stock, R, implies a smaller NPV of the gross income. A further stretching of the resource stock over time means a decrease of the NPV of the gross income and in the theoretical extreme case if the given stock of resources R is stretched over infinity then condition of choosing the grabbing course $\frac{I^{fix}}{i_{oasis}} < I_0^{gross}$, overturns and efficiency oriented public management turns to be the dominant strategy of the politically powerful utility maximizing elite.

6. CONCLUSION

We have suggested a novel theoretical rationale for the emergence of the rapacious rent-seeking in the oil abundant countries. Based on a simple multiple-period model in the tradition of positive economics, we have shown that a large magnitude of oil windfalls, the nonrenewable character of these revenues expressed Hubbertian distribution, the availability of the financial havens and the level of democracy prior to the oil revenue boom could explain the emergence of rapacious rent-seeking in a number oil-rich countries. In addition, we could show that in the societies with good institutional preconditions the implementation of grabbing strategies is less probable due to the high transaction costs of rent-seeking, $C_{rent\text{-}seeking}$. Alongside $C_{rent\text{-}seeking}$, the level of the legal remuneration of the incumbent state elite, I_t^{fix}, could also play decisive a role in the strategy choice of the state elite. In Equation (12) we derive I_t^{fix} that overweighs the factors contributing to rent-seeking incentives. We conclude that at least in the context of the presented theoretical model the revenue distribution patterns are able to determine incentive structure of the state elite and explain the deterioration of the quality of public policy in the absence of prohibitive costs of rapacious rent-seeking.

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