Bad Wealth – Retesting the Relationship between Natural Resource Abundance and Democracy

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Abstract

How does natural resource abundance influence state and society? Since the late
1980s, a number of scholars have confronted the widespread predisposition to view
resources overly optimistically, as a blessing. They claim instead that resources are in
fact a *curse* that affects economical, as well as social and political institutions in a
decidedly negative manner. The aim of this paper is to retest the negative correlation
between resource abundance and democracy presented by Michael L. Ross in his
article *Does Oil Hinder Democracy?* from 2001. This is done with an arguably
improved measure of natural resource wealth, based on *rents*, not sales value. In line
with Ross, I use a cross-sectional time-series data set where observations from all
sovereign states are compiled over thirty-five years, and analyze them using a *feasible
generalized least squares* method. The results reinforce Ross' main conclusion that oil
wealth harms democracy and that this effect is valid all over the globe. His claim that
this property is shared by hard mineral wealth receives only mixed support, however.
On the whole, these findings serve to strenghten the notion of a curse of natural
resources and further advances the generality of this theory.

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1. Introduction

Confounded by his strange misfortune—rich and wretched—he was anxious to escape from his unhappy wealth. […] Lifting his hands and shining arms to heaven, he moaned. "Oh pardon me, father Lenaeus! I have done wrong, but pity me, I pray, and save me from this curse that looked so fair."

–King Midas[1]

For a long time natural resource abundance has been viewed by scholars and common people alike as a blessing for state and society, especially for developing ones. It is argued that wealth extracted from nature constitutes a convenient, and perhaps even necessary, steppingstone from poverty into economic development and social welfare, two processes that will eventually lead to democratization, if one are to believe the persistent modernization theory. In the last two decades, however, a growing body of literature has emerged that confronts this "widespread popular impression", to use Jeffrey Sachs' and Andrew Warner's choice of words. [2001:832] This literature points out that not only have resource-intensive states in general failed to perform in line with expectations, but they seem to have in fact fared even worse than resource-poor ones. A rivalling hypothesis has therefore been promoted: *Problems in resource-rich countries arise, not despite natural endowments, but rather because of them.* This is most reminiscent of the Midas myth, although in a modern context. Just like the blessed golden touch of the king turned out to be a curse in disguise, resource wealth is found to be a possible cause behind distinctly negative outcomes. The discourse have accordingly often been called 'the curse of natural resources'.

It was in the late 1980s when economists, most notably Gelb [1988] and Auty [1990], first started emphasizing the counterintuitive performance of resource-intensive nations. Revenues generated by resource extraction[2] were found to largely wither away and even have a pronounced *negative* impact on the domestic economy. Sachs & Warner [1995:16] later reinforced these findings by showing that these states have actually been economically outperformed by resource-poor ones. Among the eighteen developing countries that experienced growth rates of 2% or more per annum between 1970 and 1992, they distinguish only *two* as being resource intensive.[3] Another much-cited scholar, Terry Lynn Karl [1997], fittingly describes this situation as *a paradox of plenty.*

A second aspect of the curse is that resources seem to influence the onset, as well as the duration and intensity of civil war. One of the seminal studies, made by Paul Collier and Anke Hoeffler [1998], for example found the relationship between natural resource wealth and twenty-seven civil wars to be strong and curvilinear: Natural riches increase the risk of conflict up to the level where they, measured as primary commodity exports, constitute about a third of GDP. The risk then drops, presumably because the governments in these nations become rich enough to either deter violent opposition or defend themselves if it arises. Several scholars also stress the *dysfunctionality* of these wars, since they are often driven by greed rather than grievance. (See e.g. Le Billon [2001:562], Collier & Hoeffler [2004] and Weinstein [2005].)

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[1] Cited from Ovid's *Metamorphosis,* book 11 (http://www.theoi.com/Text/OvidMetamorphoses11.html).
[2] It should be noted that the discourse does not provide an agreed-upon definition of natural resources. Primary commodities, such as petroleum, hard minerals and gemstones, do however attract most interest by far while agricultural goods are most often ignored or excluded. (Although some focus on e.g. forestry (Ross [2001a]), plantation crops (Isham *et al.* [2002]), or agricultural dependency (Humphreys [2005]).)
[3] They note that Botswana would have qualified also, if data had not been missing.

It is however a third sub literature that is in the focus of this paper, and this is also the newest and least investigated one. A handful of publications have put forward yet another, equally adverse, claim: Natural riches also seem to be harmful for *democracy*.

Michael L. Ross' article *Does Oil Hinder Democracy?* from 2001 is arguably the most influential contribution to this field of study.[4] Initially he presents the *theory of the rentier state*, which has traditionally been applied only to Mideastern petro-states and states that democracy may be inhibited in countries where the state controls substantial revenues, so called *rents*. This is most often the case in countries rich in natural resources. He then employs a pooled cross-country data set over all sovereign states from 1971 to 1997 and statistically tests the generality of this claim using export figures for hydrocarbon and hard minerals. Other potentially important variables, such as per capita GDP, are controlled to ensure greater confidence that it is actually resources that cause harm. In summary, Ross finds robust support for several propositions, most notably the following three:

- Oil *does* hurt democracy. A one standard deviation rise in his Oil variable predicts a .49 drop in an eleven point democracy index, over a five-year period. [:342]
- This attribute is shared by hard minerals, although to a lesser degree.
- The phenomenon is not strictly regional: Oil and minerals have anti-democratic effects all over the globe.

The aim of this paper is to retest the findings of Ross' analysis but with one decisive modification: I replace his export-based measure of natural resource abundance with a rent-based one. A theoretical, as well as empirical, argument as to why this modification is essential is provided in section 3 below. Replicating Ross' research, I employ cross-sectional time-series data over all sovereign states between 1970 and 2004 in search for answers to three questions:

> *1.) Does hydrocarbons hinder democracy?*
> *2.) Does hard minerals hinder democracy?*
> *3.) Is this effect regional or global?*

The paper also has a broader aim. While most studies of the resource curse phenomenon search for, and test, key conditioning circumstances that could possibly influence the effects, this paper intentionally retreats one level and only retests the principal correlation. In a recent article, Andrew Rosser emphasizes the considerable impact the notion of a resource curse has had on the 'old' attitude that resources constitute a blessing: "So influential has this literature been that the conventional wisdom now is arguably the exact opposite of what it was prior to the late 1980s." [2006:268] I partly disagree. However influential the resource curse scholars have been, their findings are hardly "widely accepted" (ibid.), probably because of the controversial policy implications the theory carries. James Mahon's statement from 1992 that "few have argued that there is an advantage in resource poverty" still holds validity. [:252] Instead, common people, officials and politicians alike seem to almost without exception endorse the *possibilities* of resources, rather than the dangers. Former President Bill Clinton claimed for example in 2000 that "[w]ith one-fifth of Africa's people, and vast human and natural resources, a revitalized Nigeria can be the economic and political anchor of West Africa and the leader

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[4] Ross currently works out of UCLA as a associate professor and most of his publications are available at http://www.sscnet.ucla.edu/polisci/faculty/ross/.

of the continent."[5] Even related scholars appear to sometimes view the bonanza of natural riches in an overly optimistic way, such as William Ascher, who seem to have missed the initial findings in the field stating that "[the resource curse] concerns miss a crucial point: natural resources represent potential wealth; without the resources, developing countries would be even poorer." [1999:6][6]

This discrepancy between scholarly findings on the one hand and the widespread predisposition to view resources overly optimistically on the other, calls for more and better knowledge that could influence future policy-making. For while the myth tells that Midas in the end was relieved of his golden curse by the Gods, the same fate is not likely to happen in the real world to countries rich in resources.[7]

The paper continues with a theoretical section in which the theory of the rentier state is presented in detail and then I unravel the reasons as to why it is is important to measure *rents*, not export value as Ross does. Section 4 describes the method and the variables used in this study before section 5 reports the results from the statistical analysis. A concluding chapter summarizes the findings.

2. Natural Resources & Democratic Performance

It matters whether a state relies on taxes from extractive industries, agricultural production, foreign aid, remittances, or international borrowing because these different sources of revenues, whatever their relative economic merits or social import, have powerful (and quite different) impact on the state's institutional development […] *Simply stated, the revenues a state collects, how it collects them, and the uses to which it puts them define its nature.*

Terry Lynn Karl [1997:13] (My italics.)

The budget is the skeleton of the state stripped of all misleading ideologies.

Joseph A. Schumpeter, 1991[8]

The idea that the source of income might have a pronounced effect on the government has only quite recently entered broad comparative studies on development and democratization. In the early 1990s, scholars began to examine the role of broad taxation as a cause of democratic transition and the core assumption, often called the 'no taxation without representation' claim, crudely have the following rationale: In a tax state, revenues from below are assumed to be exchanged for representation and accountability from the top. Taxes thus form a vital democratic leverage in the relationship between citizens and political elites, creating a state-society balance that encourages bargaining and consensus. Empirical proof of this theory is derived from European history.[9]

However, it is possible to turn this theory upside down, change the claim to 'no representation without taxation', and along similar logic explain *the lack* of democratization in states with substantial *non*-tax revenues. This is the rentier state theory. If there is a

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[5] Cited from http://www.ngex.com/nigeria/govt/president/clinton_obasanjospeech.htm
[6] But note the contrasting cynicism of Auty [2001:33]: "One might be forgiven for concluding ... that the faster resource-abundant countries deplete their resource rents, the sooner they can embark on the advantageous path of competitive industrialization."
[7] With due respect towards those who put their faith in divine intervention.
[8] Cited in Moore [2004:298].
[9] For a thorough review see Moore [2004] and [2007]. Ross [2004] tests the claim in a large N statistical analysis.

guaranteed external source of income, i.e. rents, why should any political leader pursue democracy or promote broad development, and thereby create conflicting interests within the state? The most effective strategy to ensure continuous rule in such states is by buying off and beating down, thus making bad policies good politics.

The economist Hazem Beblawi is most often credited with defining the characteristics of a rentier state. In such a state, he contends, a rentier situation predominate the governmental revenue structure in which (i) rents are acquired from foreign sources, (ii) they accrue directly to the government, and (iii) very few citizens are actually participants in the rent-generating business, with the majority only being beneficiaries of distribution. (Ross [2001b:329])

The fiscal situation in a rentier state is therefore typified by a dual capacity: the ability to draw sizable rents from external sources and subsequently to discriminately distribute this wealth internally. Political and economical control are thus intertwined and this presumably affects the framework for decision-making. The close links between economic and political power make the rentier state somewhat similar to a socialist one, something that according to Karl [1999:37] eludes most observers.[10]

Before moving on, it should be noted that Beblawi's definition make no claim as to *what* could generate these rents. Oil is indeed the rentier commodity *par excellence*, due to enormous surpluses easily captured by the state, and its capital intensive, rather than labour intensive, extraction. The same may however be true for other so-called point-source commodities, such as hard minerals, as well as for transport fees and even foreign aid in otherwise poor countries. [11] However, with the exception of oil, few rent sources have potential to dominate the state budget.

The benefits of holding power in a rentier state are of course, for any politician bent on self-enrichment, substantial. Large rents make the state a prize to be possessed, rather than a forum for consensual rule, and simultaneously constitute a significant incumbency advantage, by providing the means of maintaining hold of power.[12] That is why Lam & Wantchekon [2003] label the rentier phenomenon 'a political dutch disease'; meaning a political system which tends to suffocate any opposition and indeed all other actors.[13]

In short, rentier wealth creates and perpetuates strong states with weak societies, thus keeping democracy at bay. As presented below, contributors to this theory point to at least three different reasons why democratic transition will not occur in those states.

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[10] Ironically Lenin wrote in 1916: "The rentier state is a state of parasitic, decaying capitalism, and this circumstance cannot fail to influence all the sociopolitical conditions of the countries concerned". (Cited in Ross [2001b:329]).

[11] Note that collecting rents is a non-contributory activity. It is instead characterized by the collector having *control* over other actor's access to certain production opportunities. Since a state *de facto* can exercise this control over just about any branch of industry or commerce, for example through special tariffs or even nationalization, *everything* could theoretically speaking generate rents.

[12] The notion that political actors act only in their own self-interest of course springs from a rational actor-perspective. According to Ascher [1999:ix] this is the "easy" explanation. "The trick", he continues, "is to grapple with the much more complex reality that governmental leaders have complicated programmatic objectives, while not being so naive as to ignore their self-centered political motivation." (ibid. :x) Rosser [2006:21] backs this view, claiming that the rational actor approach is blind to relevant structurality. Nevertheless, there is often a point in analyzing a phenomenon from an aggregate, and perhaps simplified, view. Picturing political leaders autonomous of social pressures makes it easier to perceive the isolated effect of resource rents on their behavior. For example Robinson *et al.* [2005] argue for this stripped perspective in their examination of how resource windfalls lure politicians into patronage politics.

[13] Esanov *et al.* [2001:15] present a striking example of this in the context of former Soviet states.

• Autonomy

According to the 'no taxation without representation'-claim, broad taxation leads to engaged citizens and subsequent formation of civil society groups, either because people resist paying the taxes or because they want to ensure a proper and effective use of them. The rentier scholars adapt this logic and propose that since resource states have no need of taxation their societies lack this engagement. The state is almost a private enterprise providing the citizens with certain benefits without emptying their pockets and relieved from taxation they presumably do not demand anything of the state in return.

This 'democratic apathy' can of course be pursued more or less consciously, e.g. through low-quality educational systems that keep common people sidelined (see Birdsall *et al.* [2001]) or propaganda endorsing the nation as the core of community to hinder civil society development and quell critical voices from opposition or media (see Lowi [2004]). To stay in power, political leaders even employ foreign firms and workforces which keep power concentrated and leaves the population immobilized and locked in poverty. An agreement between Sudan and China has for example brought thousands of Chinese workers to Sudan to open up new oil fields in the oil-rich, though unruly, south. In return Sudan has received substantial military aid, and according to an Amnesty Report even Chinese armed guards.[14]

• Redistribution

Support can also be acquired and consolidated through a comprehensive system of patronage politics and clientelism. Rents serve as a lubricant, insulating governments by dampening dissent and buying off opposition. Oft-cited Giacomo Luciani, has suggested that rentier states do "not need to formulate anything deserving the appellation of economic policy: all [they need] is an expenditure policy."[15]

The rentier state both provides substantial funds easy to misallocate and invites little public scrutiny. An embezzling politician will, once he reaches office, counteract demands for transparency, and eventually patronage becomes 'the only game in town'. In small states, such as Brunei or Qatar, the patronage system can in fact shelter the whole population.

• Repression

If redistribution functions as a carrot, repression works the other way around; as a whip. Similar to other states, resource states can resolve to violent means in quelling dissent. It does not really matter if people actually are pacified (the autonomy claim) or bought off (the redistribution claim) since a powerful police-, military- or security force can step in and suppress any manifestation with democratic intent. However, whereas in a state reliant on tax revenue, too much repression would lead to economical self-strangulation, hard force in a rentier state will not affect governmental funds to the same extent.

Resource states do appear to have large military expenditures, at least as a proportion of GDP.[16] Karl [1999:39] claims that OPEC members on average have spent more than 10% of GNP on defense, a figure that is several times higher than most countries.

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[14] Sources: Human Rights Watch 25/11/03: "China's Involvement in Sudan: Arms and Oil". HRW Index No. 1564322912. Insight on the News 24/07/00: "Chinese Troops Wreak Havoc in Southern Sudan" by Katherine Edwards.
[15] Cited in Rosser [2006:16].
[16] Of course, in total spending the USA outclass everyone. In 2006 their defense budget alone amounted to 46% of world military expenditure, with the second largest spender, the UK, only reaching 5%. Source: The SIPRI Yearbook 2007.

The rentier theory has not, however, escaped criticism. (Indeed, no theory should.) Scholars have in particular challenged the idea that tax breaks and rent-redistribution would actually keep the public politically inactive and even content with an undemocratic regime. Lowi [2004] suggests e.g. that patronage may "camouflage" but seldom "mitigate" societal dissent in these states, making "uninterrupted distribution of rents … the key to their survival." [:98] Okruhlik [1999] asserts that rent revenues for a fact *do not* relieve the state from democratic pressures: "Throughout the Middle East and North Africa, in both have and have-not states, there are demands for social justice, meaningful economic development, and political reform." [:296] She instead emphasizes the counter effect of discriminatory methods, such as patronage and clientelism, suggesting that the very measures to promote, or enforce, continuous rule actually lay the foundation for its own demise. (See also Lam & Wantchekon [2003:5])

Okruhlik [1999] also makes a more basic comment: The Western scholar, she notes, often approaches the rentier situations in Mideastern and North African countries with a largely subconscious bias. He, or she, tends to regard the state with a Weberian conception of statehood, overstating the exchange between state and citizens, and evaluate the society with Marxist eyes, exaggerating the importance of class structure in countries most often defined by other divisions, such as family, tribe, region, and religion. With this biased approach it is not surprising that it is exactly these factors that are found missing. Herb [2003] also delivers a more general blow at the praxis of employing a theory derived from the Western experience to explain a non-Western phenomenon. While taxes may have had a prominent role in the democratic transitions of many Western states, they could very possibly function differently in other places.

The common theme in the critique above is that it highlights potential theoretical hubris. The summarizing verdict of Okruhlik [1999:308], for example, is dire: "The idea of the rentier state has come to imply so much that it has lost its content." Ross' 2001 article acknowledges this hubris, and tries to amend it. The body of empirical evidence underpinning the rentier theory has been coming from selected case studies of Mideast petro-states, and this is problematic, he notes, since "theories of the rentier state [thus] have been applied only to states identified *ex ante* as rentier states, leaving little variation on an independent or dependent variable." [1999:313] This approach also ignores Islam, an important control variable. Meanwhile, more extensive democratization studies have traditionally excluded these rentier states, on the basis of them being *sui generis*. (Ross [2001b:328]) However, the framework of the rentier theory does not limit itself to Muslim petro-states but is arguably valid in all cases of extreme resource-rent dependency and the reasons to exclude the Mideast from general democratization studies are at best thin and bordering on reductionist thinking.

The aim of Ross' research is therefore to test the *generality* of the rentier theory, and to achieve this he uses an all-inclusive sample frame consisting of all sovereign states and he also takes several important control variables into account. The three questions that structure his, and mine, study serve the same purpose.[17] The first question, '*Does hydrocarbons hinder democracy?*', tests the core claim of the rentier theory by regressing hydrocarbon generated rentierism on the democratic performance of a state. Since oil and gas have rentier capabilities *par excellence*, the effect should be visible here if anywhere. Bear in mind though that this test carries a potential bias against the Mideastern region, which houses several huge oil exporters, and also against Islam, since some non-Mideastern petro-states also have a sizable Muslim population (e.g. Malaysia, Indonesia,

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[17] While Ross' questions are not identical to those I use, they are most similar. (See Ross [2001b:325-327].)

Brunei and Nigeria). Having said that, there *are* other petro-states included here that are neither Mideastern nor Muslim and they constitute a variation of great importance.

The second question, '*Does hard minerals hinder democracy?*', expands the original proposition in a sectoral dimension[18] by assessing whether other minerals (e.g. copper, zinc and gold) share the possible properties of hydrocarbons. Since many mineral-reliant states are located outside the Mideast, this test increases the desired variation. It evaluates whether petroleum has some unique effects on the state or if the perpetrator rather could be rentierism *per se*.

The final question, '*Is this effect regional or global?*' , wants to determine if the effects are valid all over the world or if they are somehow tied to one region or another. This geographical expansion is tested by adding regional dummies to the regression, controlling for the regions most correlated with petro-, and mineral states respectively. How does this affect the results? The breaking of sectoral and geographical barriers really put the expanded rentier theory to the test, and arguably increases the generality of the final results.

3. Measuring Natural Resources

All the scholars studying the resource curse phenomenon who want to assert a certain claim one way or the other experience the same predicament: How do I define and measure 'natural resource abundance'? Needless to say, this measure is of profound significance, being the foundation on which all findings will be built. Rosser's [2006] literary review highlights some basic confusion in this aspect, both concerning *how* to measure (the ratio of natural resource export to GDP, the ratio of resource export to total export or a non-export based measure?) as well as *what* to measure (primary commodities, point-source commodities, various minerals or just hydrocarbons?). This is also a focal point for criticism aimed at Ross' study.

Ross has in his mind to evaluate a presumed effect of natural resources on democracy. 'Natural resources' is in his case defined as *rentierism*, since his theoretical foundation is the theory of the rentier state.[19] To construct this measure, his independent variable, he follows the standard procedure, which has been to do a market value approach and in a straightforward manner calculate the face value of oil and mineral exports as a fraction of GDP. One of the reasons most studies used this approach is that until recently it has been the only data readily available. But, as Mick Moore [2007:21] quite firmly states; "these are not the right things to measure. [---] The proper measure of the likely political impact of natural resource wealth should begin with the rents, not sales value." In a more recent article, Ross [2006:266] himself in fact notes that "[t]his 'resource exports to GDP' measure was originally developed by Sachs & Warner (1995) and later adopted by Collier & Hoeffler (1998) and many others—*including, regrettably, me*". (My italics.) So what distinguishes a rent-based measure from an export-based one? While the latter uses simple sales value, i.e. produced quantity multiplied by world market price, the former take *country-specific production costs* into account.[20] Is it e.g. not a reasonable bet that the costs of lifting a barrel of oil from beneath the sand dunes of the Gahwar Field in Saudi

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[18] See Ross [2001b:327].

[19] Note that he also limit himself to examine rentierism generated by hydrocarbons and hard minerals.

[20] With Moore's choice of words, rent is "the proportion of the sales value of a product that remains after all production and marketing costs, including some allowance for 'normal profit', have been accounted for". [2007:21]

Arabia are significantly lower than drilling for one in the Ekofisk Oil Field, on the bottom of the unruly North Sea (and pay Norwegian salaries for having it done to boot)? A rent-based measure therefore presents an arguably more valid estimate of the final size of rents in government than does the 'resource exports to GDP' measure. Moore [2007], along with Wantchekon [1999:20], Herb [2003:2], and Rosser [2006:268] are some of those who support this more appropriate course of action.[21]

The data necessary for constructing this new, arguably improved variable are now available through a World Bank environmental economics project.[22] That this is the ideal data for my purpose is something two of the originators of this project also highlight:

> A particularly appealing topic for further research would be an exploration of the "resource curse" hypothesis. […] The data developed for the genuine savings analysis should permit more precise definitions of resource dependence, permitting the hypothesis to be re-tested.
>
> Hamilton & Clemens [1998:12]

The following example, based on actual data, undeniably demonstrates the importance of measuring rents, not export value.

> In 1982 Namibia produced about 50,000 metric tonnes of copper and Malaysia produced about 30,000 tonnes. The traditional approach would use the market value of these quantities (the average price per tonne in 1982 was $1543) and find that the copper income for Malaysia that year was about three fifths out of Namibia's, or to be more exact; about $46 millions, to Namibia's $77 millions.[23] However, it is important to account for production costs and this basically cuts the rent in half.[24] The next step is however more decisive. As it happens, the rental rates differ quite considerably in between the two countries; Malaysia mined and milled their copper at a strikingly low cost per unit, only about 10% of market price that year, while Namibia produced theirs at an rather high cost, more than 70% of market price. The result is certainly conclusive: Despite Namibia producing 20 000 tonnes more than Malaysia, the rent estimation shows that they only made just about half the profit; $21 million to Malaysia's $41 millions.

In my view, there are few reasons to doubt that the overall result of using a rent-based measure of natural resource abundance provides a considerably more accurate foundation for analyzing it's presumed effect on democracy, than does the old-fashioned approach.

4. Method & Material

The aim of this paper is, as already stated, to retest the findings of Ross' statistical analysis from 2001. Except for one decisive modification, that his export-based measure of natural resource abundance is replaced with a rent-based one, I have more or less tried to copy his approach.[25] (See Ross [2001b:337].) It should be noted though, that it is not in

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[21] It is of interest to note that while Rosser and Moore both have published working papers for the Institute of Development Studies, they reach divergent conclusions regarding the results of using a rent-based measure. While Moore [2007:21] states that the data support the 'resource wealth impedes democracy'-claim, Rosser argue that it so far has "provided only mixed support". (Rosser [2006:268]

[22] See http://go.worldbank.org/3AWKN2ZOY0 for further information.

[23] Of course, it is by all means not certain that they both actually exported all their copper that year.

[24] The average rental rate for copper 1985-94 was 0.49. (Hamilton & Clemens [1998:8])

[25] The study by Ross has in fact already been retested with a rent-based measure. Collier & Hoeffler [2005:17] deal briefly with Ross' claims, and yield affirmative results. Their primary objective is, however, to examine the role of rents in government as an intermediate factor between resources and economic growth.

the scope of this paper to put the proposed causal mechanisms to the test (which Ross does). Figure 1 below illustrates the basic research model used in this study.

Figure 1
Research Model

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┌─────────────────┐   ┌ ─ ─ ─ ─ ┐              ┌─────────────────┐
│   Hydrocarbon   │     Rent          ?         │                 │
│    and Hard     │   │ Value   │ ──────────▶   │   Democratic    │
│     Mineral     │                             │   Performance   │
│   Endowments    │   └ ─ ─ ─ ─ ┘              │                 │
└─────────────────┘                             └─────────────────┘

                    ┌ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┐
                         Under control for:
                    │    Per Capita GDP           │
                              Islam
                    │        Region               │
                               OECD
                    │         Size                │
                       Lagged dependent variable
                    └ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ─ ┘
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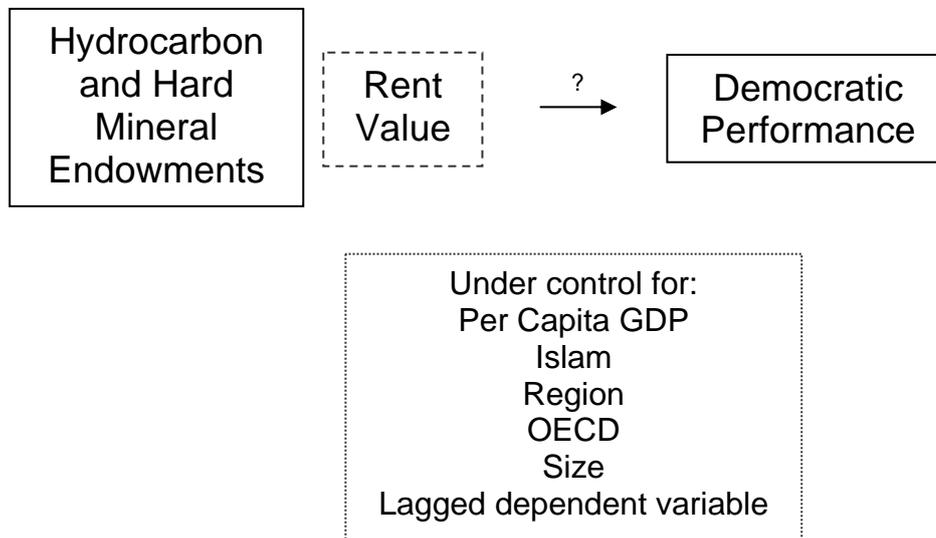
To test the hypotheses regarding rentierism and democracy I follow Ross and use statistical analysis of a cross-sectional time-series (CSTS) data set, in which I have pooled annual data from all sovereign states with a population of more than one hundred thousand, between 1970 and 2004.[26] This approach ensure as much variance on all variables as possible, offering a sample frame that includes not only predefined rentiers, but also non-rentiers, possible rentiers, and everything in between the three. This aspect is of utmost importance when testing generality.

To study a political phenomenon, such as the resource curse hypothesis, using CSTS data with insights from both spatial comparison and from dynamic research over time, may undeniably offer great analytical strength. Even so, this is a design not seldom avoided since using data jointly structured in time and space also presents the analyst with some intricate complications; "the opportunity to be wrong is considerably enhanced when the design is two-dimensional", as Stimson [1985:916] notes.

In short, the statistical assumptions justifying the ordinary least squares (OLS) approach stipulate that the error terms must be uncorrelated with each other and have equal, or constant, variances. In the context of CSTS data three violations of these assumptions are expected to appear: Observations of different panels of units may be correlated to each other, leading to *spatial correlation* of errors[27]; the errors of one single unit probably

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Besides, they use different sample frame, time frame, model, and method. In my view, Ross' findings are of such importance that they are worthy of a less deviating scrutiny.

[26] CSTS data is characterized by its use of fixed units repeatedly observed over time. This distinguishes it from panel data which are built upon randomly selected units, and while the latter are in need of a large N sample frame, the usefulness of CSTS data is dependent on a large T. The thirty-five serial observations of this study are however more than enough. Beck [2001b:274] characterizes $T < 10$ as being problematic.

[27] Although this violation is in fact caused by omitted variables and thus is an error of the observer, it is not always easily corrected for since the researcher sometimes cannot, or maybe does not want to, include more variables. (Beck [2001b:281])

correlate over time, also called *autocorrelation*, and finally, the variances of errors may be unit-specific, not equally distributed, a phenomenon known as *heteroscedasticity*.

These violations would cripple the OLS estimation of errors and as Beck & Katz [1995:2] observe: "Incorrect standard errors will lead us to be either too confident or insufficiently confident about whether our findings might merely be statistical artifacts." OLS is therefore no longer the optimal statistical estimator.

I follow Ross' lead and instead use a *feasible generalized least squares* (FGLS) method, which corrects for the cross-sectional problems of spatial correlation and heteroscedasticity.[28] I counterbalance the problem of autocorrelation over time by adding a lagged dependent variable to the right-hand side of the equation. The regressions are run with Stata 9.1.

I derive my dependent variable[29], *Regime*, from the Polity IV data set[30], constructed by Marshall & Jaggers [2002]. This measure evaluates the democratic performance of a state on an eleven point interval scale that stretches from 0 (perfect authoritarian) to 11 (perfect democratic).

Building upon the argument presented in section 3, which defines rent as the difference between country-specific extraction costs and international market value, and using the World Bank data, I construct a rent-based independent variable with which I replace Ross' export-based one. The natural resources for which rent data are available are oil, gas, hard coal, brown coal, bauxite, copper, iron, lead, nickel, phosphate, tin, zinc, silver, and gold, with the data covering thirty-five years; from 1970 to 2004. For every year, and every country, I divide the oil-, gas-, and coal rents by GDP to construct a *Hydrocarbons* variable, and I divide the ten other mineral rents by GDP to construct a *Hard Minerals* variable. Rentierism is consequently measured between 0 (no rentierism) and 1 (total rentierism).

The World Bank data I employ here carry some possible weaknesses. First, it is important to realize that the adjustment for country-specific extraction costs is not completely accurate. Here follows a few potential drawbacks:[31]

   i) Some commodities, e.g. gas, have no universal world market price. In these cases annual averages have been derived from existing prices.
   ii) The average extraction cost of most countries is in fact *not* country-specific but obtained from a surrogate country with similar conditions. These figures are therefore approximate since small deviations between countries are expected to exist.
   iii) Countries may sell their product for internal consumption for a price well below the international price.[32] This would lead to somewhat overstated resource rents.
   iv) Of course, every cost *not* calculated would induce rent-overestimations.

Secondly, using *only* the World Bank data brings at least two limitations to the fore. First, they provide data on only fourteen different mineral commodities, neglecting others (such as diamonds and aluminum). Second, rents *not* generated by natural resources, e.g.

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[28] Beck & Katz [1995] in fact suggest that the best approach is OLS with panel corrected standard errors. That Ross refers to their article and still chooses the FGLS method is curious. Aware of this I follow Ross' approach.
[29] All variables and their specified sources are more fully presented in Appendix A.
[30] Ross uses the Polity 98 data set.
[31] For a more detailed account see Hamilton & Clemens [1999] and Bolt et al. [2002].
[32] Consider for example the presumably euphoric Venezuelan drivers who pay about $0.07 per gallon gasoline, according to recent figures. Source: The New York Times 30/10/07: *Venezuela's Gas Prices Remain Low, but the Political Costs May Be Rising* by Simon Romero.

various transit fees over land or through canals, are of obvious reasons also absent. Both restrictions result in an undervaluation of rents in some governments, and especially the first one could seriously harm the *Hard Minerals* variable used in this paper. Until data on more minerals are available the validy of this variable is unfortunately undercut and any results must unfortunately be viewed with this in mind.

To simply regress rentierism on a democracy score is certainly not enough, since any correlation between the two might be either spurious or maybe caused by a third underlying variable. It is e.g. possible that it is actually high levels of per capita GDP that correlate with democracy and that rentierism only thrives in relatively poor countries. In such a situation rentierism could be a result of poverty and therefore covariate with authoritarianism but not be a determinant of it. Even though statistical analysis can *never* prove anything else than correlation, we can enhance the *likelihood* that resources actually do play a causal role. For this purpose I include important control variables.

Income is widely held as a powerful predictor of the democracy score of a state. (Ross [2001b:338]) "The more well-to-do nation, the greater the chances it will sustain democracy", as Seymour Martin Lipset [1959:56] stated. I control for *Income*, measured as real per capita GDP. Data are obtained from Penn World Table 6.2 by Heston *et al.* [2006].

Another variable of import is religion. Controlling for religious and cultural influence is called for since Islam both correlates positively with oil and gas and negatively with democracy. (Ross 2001:338) By testing the explanatory power of natural endowments, the sometimes voiced claim that Islam carry an anti-democratic essence are simultaneously scrutinized.[33] *Islam* is measured as the Muslim percentage of the state's population.[34]

Since the strongest predictor of a state's regime often is its own past, I include a five year lagged dependent variable, $Regime_{t-5}$ (where *t* is the year). Apart from diminishing country-specific historical and cultural bias, this method has two additional advantages: It both makes it possible to measure dynamic change over time and corrects for first-order autocorrelation (mentioned above). This process is panel-specific in that it allows the degree of autocorrelation to vary from country to country.

While $Regime_{t-5}$ encapsulates country-specific history, I also want to uncover possible region-specific effects. It is possible that the correlation between rents and authoritarian rule merely reflects the political situation of a region that also happens to be endowed with natural resources. I therefore add three regional dummy variables to the regression, *Mideast, Arabian Peninsula,* and *Sub-Saharan Africa*, to account for the most resource-intensive regions in the set. (In accordance with Ross [2001b:346] I include the *Arabian Peninsula* dummy since the Mideast could be a too encompassing geographical unit.)

Yet one determinant of democratic strength seems to be European heritage. I will not present any theories as to what make 'Western' states susceptible to democracy (or non-Western ones unsusceptible), and I take no position regarding possible causes behind this effect.[35] I merely control for it with *OECD*, a dummy that is coded 1 for the twenty-five high-income members and 0 for all others.

Finally, since several petro-states have small populations and the rentier effects in these could be given overly much influence, I also want to capture the potential importance

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[33] Bear in mind, however, that Catholicism was also negatively correlated with democracy until the mid-1970s. (Ross [2001b:339])

[34] This measure is very likely too quantitative. Consider that Iran had as many muslim citizens 1978 as in 1979. However, in 1979 Khomeyni rose to power, with a significant Islamization of government as a result. In this context, estimating the effect of Islam on the state by using muslim percentage of the population is clearly a non-optimal process. All that said, I follow Ross' debatable approach.

[35] Ross [2001b:339] presents a more extensive argumentation.

of size. *Size* is a dummy, coded 1 if a state has a population of more than one million, and 0 otherwise.

It is possible, and some would say probable, that the causality regarding all the correlations of the resource curse phenomenon is misinterpreted. Instead of being a *cause*, natural resources could in fact be an *effect*. That is:

- An economy in stagnation looses diversity and momentum and therefore becomes ever more reliant on primary commodity exports.
- In a nation struck by civil war the only lucrative economic activity at hand is resource extraction.
- Since an undemocratic regime cannot rely on obedient tax-paying citizens, and does not want to diversify the economy (which could lead to a diffusion of power) natural resources are the autocrat's best friend.

Under all these three conditions, resources (or rather resource-reliance) could have the appearance of causing bad effects when the relationship is actually the other way around.

What came first, the resources or the problems?[36] This, to be sure, is a hotly debated subject.[37] Some scholars stress the importance of institutions as determining the impact of resources (see especially Mehlum *et al.* [2006] and Rosser [2006]), while others argue the other way around (most prominently Sokoloff & Engerman [2000] and Easterly [2002]). Without delving into this dispute, I think that while institutions surely have important influence, it is not reductionistic to put at least some blame on resources *per se*, first and foremost due to the fact that there are simply too few countries on which resource wealth have had a positive influence. Among developing nations, references are invariably made to the same examples; Botswana, Chile, Malaysia, and sometimes Indonesia, and they strike me more as exceptions to a rule than anything else. However, to ensure greater confidence that the causal direction is not reverse I use a five year lag on all independent and control variables. The regressions are run with Stata 9.1.

5. Results

A total of 193 countries over 35 years would yield a theoretical maximum of 6755 observations, but since several states have not existed the full time series and some variables do not cover the full set of observations, the effective number of cases utilized in the regression below is 3395. A first look at a histogram over the *Hydrocarbons* variable reveals a heavily skewed frequency: Most countries by far did either not extract any oil, gas, or coal at all, or did so only in negligible quantities. About 62% of the observations show rentierism rates lower than 0.01, i.e. hydrocarbon rents constituting less than 1% of

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[36] This is of course a simplified question. A phenomenon of this kind of course has a complex causal structure with resources being both cause and effect. In addition a bouncing effect probably occurs between the economical, political and social problems: Democracy is for example inherently fragile in poor countries. Authoritarian politics tend to promote violence as the only decisive means of arbitration and violence then induces even more authoritarian measures, such as martial law and curfews. Civil war is of course disastrous for the economy, and so on. Eventually, low-income resource-states get caught in a catch-22, where poverty and misery forces them to extract bad wealth and this wealth forces them further into misery and poverty.

[37] Neither, according to U.S. Vice President Dick Cheney. "The problem", he claims, "is that the good Lord didn't see fit to put oil and gas reserves where there are democratic governments." (Cited in Ross [2001b:337])

GDP. 15.5%, or 764 cases, display rentierism of more than 0.1.[38] This skewness is even greater when it comes to *Hard Minerals*, with more than 78% of all observations below 0.01, and only 163 above 0.1.[39] The conclusion drawn from this is that relatively very few countries qualify as being rentiers and that the ten hard minerals included here are either not extracted in volumes great enough, or are perhaps not valuable enough, to constitute as large a fraction of state revenues as are hydrocarbons. The top twenty hydrocarbon rentiers, as well as the top ten hard mineral rentiers, of the 1990s are listed in Appendix C.

When looking at the hydrocarbon rentiers in that list, their most prominent feature is that during this period they were all more or less authoritarian, perhaps with the exceptions of Venezuela and Russia.[40] The mean democratic score of these twenty countries between 1990 and 1999, was in fact a mere 1.06, which lends some initial empirical support to the resource curse hypothesis. Below I enhance this support by using a broader time range and including valuable points of comparison. Figure 2 illustrates the mean democratic performance of five groups of observations between 1970 and 2003. "Full Set" self-evidently covers all observations in set (4756 obs.). "High GDP p.c." includes all observations with a GDP per capita of more than $10,000 (1134 obs.), and "Low GDP p.c." includes all observations with a GDP per capita of less than $10,000 GDP per capita (3246 obs.). The group "Hydrocarbon Rentiers" represents all observations where hydrocarbon rents constitute more than 10% of GDP (676 obs.), and finally "Mineral Rentiers" consists of all observations where hard mineral rents constitute more than 5% of GDP (248 obs.).

Figure 2
Democratic Performance in the World 1970-2003

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[38] In 16 cases the rentierism exceeds 1.0. This is possible because rents and GDP are calculated using different measures. Of these sixteen cases thirteen belongs to Turkmenistan, two to Iraq, and one to Kuwait. All are coded as missing.
[39] Three observations display values below zero (se fn. above). They are coded as missing.
[40] Although in both states democracy has without doubt been eroded in recent years.
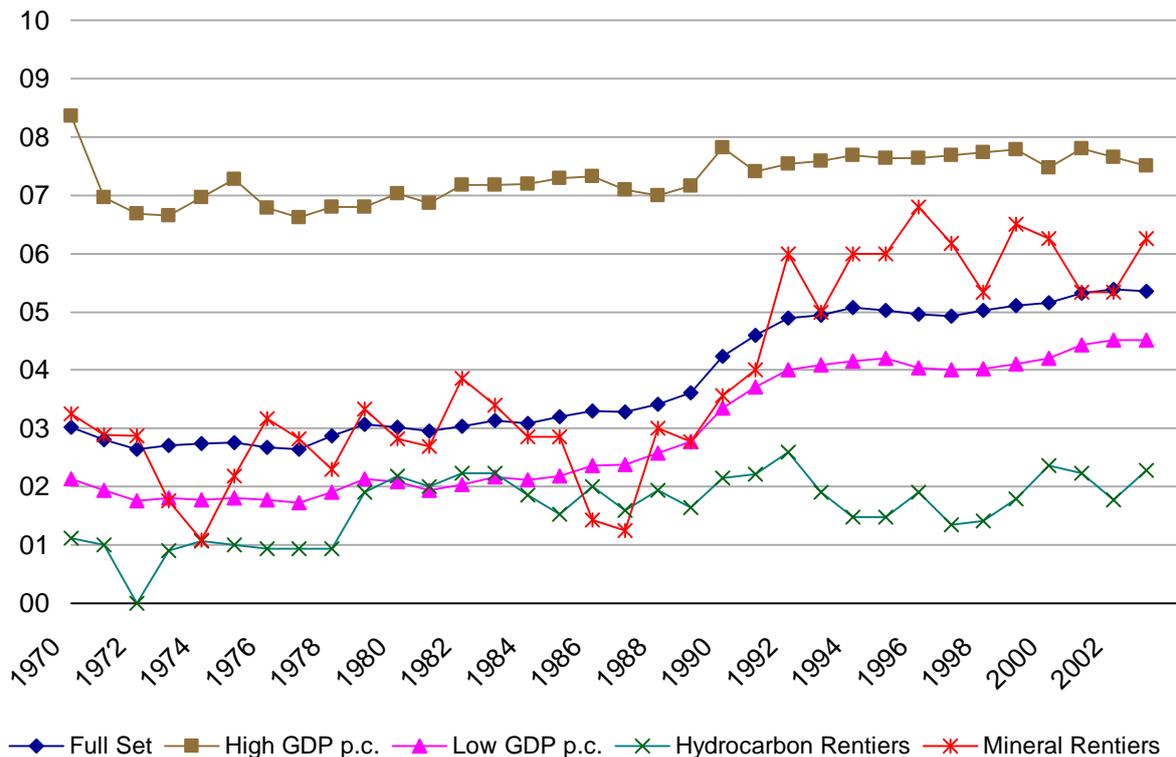
Note: Democratic performance is derived from Polity IV data and presented as means. Data on GDP per capita come from Penn World Table and rent data are brought from the World Bank.

As demonstrated the mean democratic score for hydrocarbon rentiers is strikingly low. While the world as a whole in recent years has become 'more democratic than not', petro-states seem to be permanently stuck in the bottom third. When looking at the graphs above, the close relationship between democracy and GDP per capita is prominent, but even though hydrocarbon rentiers are decisively outperformed by poor countries this is not due to any poverty on their behalf, quite the opposite. The average GDP per capita for the rentiers is $12,568, compared to the scarce $3340 for the "Low GDP p.c." group. Hence, the difference between their scores is even more dramatic than a first glance suggests.

As for hard mineral rentiers, on the other hand, the results are harder to analyze. In comparison with the other groups, the graph is rather unstable, probably due to relatively few observations. Throughout the 1990s they actually achieve higher democratic scores than the overall average, but these results should be taken with a grain of salt since each annual average here is derived from only three to six observations. Of course, the very fact that there are not more mineral rentiers than that does harm the theoretical speculation.[41]

So what do these results tell us? While they certainly cannot prove anything they are, in my opinion, nevertheless suggestive. At least when it comes to hydrocarbon rentiers, the resource curse claim has passed a first test, since their democratic performance is extraordinarily low. In addition, the authoritarian characteristics of many petro-states

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[41] We should, however, be aware of that some authoritarian mineral rentiers, such as Liberia, lack democracy scores for this period, and that faulty GDP figures for others makes it impossible to calculate rentierism in the first place. The observations least likely to be missing is of course those for relatively stable states, e.g. Chile and Papua New Guinea, which score high in democracy.

cannot be explained away with poverty. The *Hydrocarbons* variable actually correlates positively (0.2833) with GDP per capita.[42]

However, the test above is certainly a crude one and neglects some variables that possibly could affect the results. What if the authoritarianism in these states is not due to rentierism but in fact caused by another factor? Since *Hydrocarbons* correlates to a noteworthy degree with *Islam* (0.4312), as well as *Mideast* (0.5718) and *Arabian Peninsula* (0.6606) and each of these variables in turn correlate negatively with democracy (-0.4691, -0.3132, and -0.2349 respectively), it is certainly possible that religion and/or region could undermine the explanatory power so far bestowed on rentierism.

The proper way of handling this kind of data is as mentioned by using a *feasible generalized least squares* method, or FGLS for short. Table 1 reports the outcome of this regression, and while the relative effect of the presented coefficients is intrinsically problematic to estimate, I primarily look for three indicators: First I want to know if the effect is positive or negative. Second, I have to establish whether this effect is statistically significant, and finally I want to see what happens to the magnitude of the coefficients when additional variables are included.

In a first step I regress $Hydrocarbons_{t-5}$ and $Hard\ Minerals_{t-5}$ on *Regime,* under control for only $Regime_{t-5}$ and $Income_{t-5}$. All dependent and control variables are lagged with five years. The outcome of this run is presented in Column 1. Additional control variables are then added to the regression with results reported in Column 2 and onwards.

Table 1

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[42] Even if Herb [2003;8] surely has a point when he claims that poverty, in a sense, causes rentierism.

Rentierism and Democracy
(Dependent variable is *Regime*)

	1.	*2.*	*3.*	*4.*
Regime$_{t-5}$	.8268032***	.7804319***	.7427678***	.7481486***
	(.0095259)	(.0104354)	(.0108961)	(.0108831)
Hydrocarbons$_{t-5}$	-3.17583***	-1.590148***	-1.535748***	-1.521891***
	(.3259647)	(.3596939)	(.3668574)	(.3965848)
Hard Minerals$_{t-5}$	-2.141449**	-1.985129**	-1.166078	-1.069393
	(.7501294)	(.739)	(.7334875)	(.7354017)
Income$_{t-5}$	.0000336***	.0000206***	.0000169**	.000019**
	(4.96e-06)	(5.96e-06)	(5.97e-06)	(6.72e-06)
Islam	–	-.0102649***	-.0075146***	-.0101893***
		(.0010757)	(.0012455)	(.0010893)
OECD	–	.4783686***	.4456037***	.4362086***
		(.1293235)	(.1255417)	(.1284831)
Size	–	-.2824265*	–	–
		(.1308383)		
Mideast	–	–	-.7906065***	–
			(.1569705)	
Sub-Saharan Africa	–	–	-.8974678***	-.7583373***
			(.0881361)	(.0838)
Arabian Peninsula	–	–	–	-.6535271**
				(.2530646)
Observations	3400	3395	3395	3395
Countries	151	150	150	150
Log likelihood	-7130.17	-7061.678	-7011.189	-7020.495

* significant at the 0.05 level; ** significant at the 0.01 level; *** significant at the 0.001 level

Note: Variables attached with "$_{t-5}$" are entered with five-year lags. Standard errors are in parentheses below the coefficients. Regressions run with Feasible Generalized Least Squares, using Stata 9.1. First-order autocorrelation are corrected for using a panel-specific process.

The first regression (Column 1) shows both *Hydrocarbons* and *Hard Minerals* to indeed have a negative relationship to *Regime*, and this relationship is statistically significant at the 0.001 level for the former and at the 0.01 level for the latter. In Column 2 *Islam, OECD,*

and *Size* have been added to the picture and while the coefficient for *Hydrocarbons* are cut in half the results hang on to their significance. This suggests that the 'badness' of oil and mineral wealth is *not* merely dependent upon religion or non-Western status and does *not* only occur in small states.

The final step is to include *Mideast, Arabian Peninsula,* and *Sub-Saharan Africa* and Column 3 and 4 disclose at least three points of interest: i) As expected all three regional dummies correlate negatively with *Regime*. For various reasons these regions are more authoritarian than are other parts of the world. ii) Even with this negative effect accounted for the *Hydrocarbons* coefficient stays negative and significant at the 0.001 level. iii) However, although *Hard Minerals* remains negative the *Sub-Saharan Africa* dummy renders it insignificant.

According to Herb [2003:15] the Polity data set used by Ross and myself, is in this very context perhaps *not* the optimal measure of democracy. He claims that this measure carries a debatable bias against monarchies, and since many petro-rentiers have this type of regime this bias is potentially problematic. He exemplifies with the "bizarre" fact that Qatar in 1999, because of its monarchy, had lower democracy score than Hitler's Germany. [ibid.] In his own analysis he therefore uses democracy scores from Freedom House instead. Following Herb's criticism I check my results by replacing the Polity IV score (*Regime*) with the Freedom House Imputed Polity measure (*Freedom House*).

Figure 3
Democratic Performance in the World 1972-2003
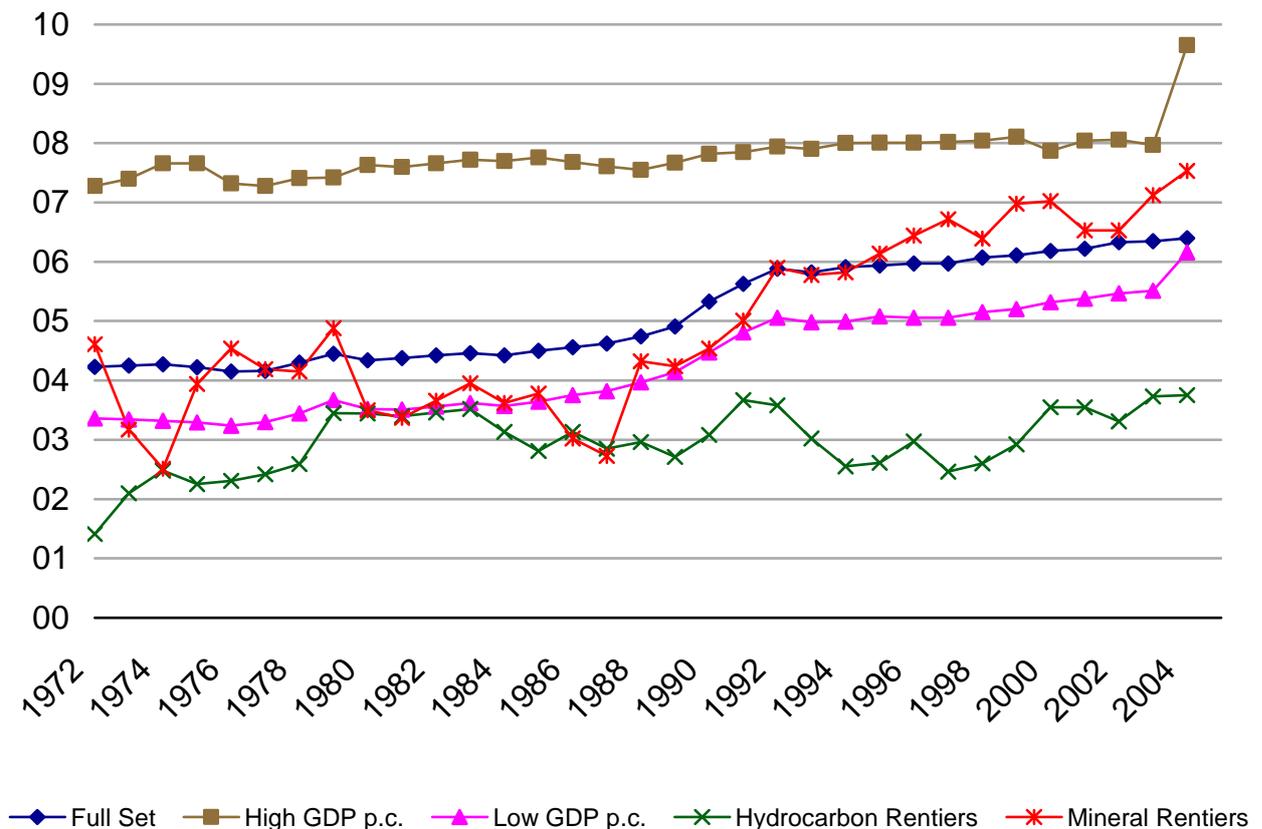
Note: Democratic performance is derived from Freedom House data and presented as means. Values for 1982 are interpolated. Data on GDP per capita come from Penn World Table and rent data are brought from the World Bank.

Table 2

Rentierism and Democracy
(Dependent variable is *Freedom House*)

	1.	2.	3.	4.
Freedom House$_{t-5}$	.813364***	.7588231***	.7322856***	.7352351***
	(.0093588)	(.0102351)	(.0108141)	(.0107754)
Hydrocarbons$_{t-5}$	-2.920312***	-1.564299***	-1.576052***	-1.579584***
	(.2617032)	(.2834751)	(.2909047)	(.3055123)
Hard Minerals$_{t-5}$	-1.928067**	-1.879405**	-1.498316*	-1.455021*
	(.6302201)	(.6174708)	(.6165067)	(.6170341)
Income$_{t-5}$	.0000229***	.0000102*	7.96e-06	9.56e-06
	(3.83e-06)	(4.69e-06)	(4.59e-06)	(4.94e-06)
Islam	–	-.0098405***	-.0086709***	-.009843***
		(.0008711)	(.0009845)	(.0008855)
OECD	–	.4771475***	.4524021***	.4394065***
		(.1027254)	(.0985904)	(.0999977)
Size	–	.0133508	–	–
		(.0805253)		
Mideast	–	–	-.3943838***	–
			(.1214781)	
Sub-Saharan Africa	–	–	-.4798038***	-.4157934***
			(.0698964)	(.066862)
Arabian Peninsula	–	–	–	-.3558369
				(.1851819)
Observations	3467	3461	3461	3461
Countries	165	164	164	164
Log likelihood	-6477.783	-6389.634	-6365.443	-6368.86

* significant at the 0.05 level; ** significant at the 0.01 level; *** significant at the 0.001 level
Note: Variables attached with "$_{t-5}$" are entered with five-year lags. Standard errors are in parentheses below the coefficients. Regressions run with Feasible Generalized Least Squares, using Stata 9.1. First-order autocorrelation are corrected for using a panel-specific process.

A first quick comparison reveals that the simple correlation between the two measures is 0.9721, i.e. extremely high, and the mean-democracy graphs have a most similar appearance. The FGLS regression, however, yields a somewhat different result, but contrary to Herb's premonition, using the Freedom House measure actually lends the theoretical claim *additional* support. In this run *Hard Minerals* in fact manages to stay

significant (at the 0.05 level) even after the inclusion of *Sub-Saharan Africa.* The *Hydrocarbons* coefficient is persistently negative at the 0.001 level of significance throughout this alternative test.

6. Conclusion

The aim of this study has been to retest the findings of Michael L. Ross [2001b] and thereby further investigating the idea of a resource curse affecting governments in resource-rich states. The results largely support this hypothesis. The figures and tables above clearly indicate that extracted wealth *does* seem to represent a harmful impact on democracy. The first and foremost finding is that hydrocarbon abundance, measured as rents by GDP, arguably makes governments more authoritarian in nature, since other potential determinants such as income and country-specific past have been accounted for. That this negative effect keeps its extraordinary significance even after religion and region-specific factors have been brought into the picture is indeed thought-provoking. The 'badness' of oil revenues upon government is consequently not a phenomenon limited to the Mideastern region, nor is it dependent upon Islam. These findings are strongly supportive of Ross' and also of the theoretical claims of rentier state scholars.

As for the supposed effect of hard minerals the results have on the other hand been less conclusive. While hard mineral rents also correlate with authoritarian rule, their 'badness' seem to be to some extent dependent on the performance of African nations south of Sahara. When those are controlled for, statistical significance is lost. On the other hand it is noteworthy that the *Hard Minerals* coefficient *is* significant when using *Freedom House* as an alternative proxy for democracy.

While the effect of mineral wealth therefore is hard to affirm, it is apparent that the hard minerals included in this study have lesser ability to dominate the economy of a state, than does hydrocarbons, and do not seem to affect democracy as badly. I would like to stress though that the hard mineral rentierism of many states arguably is somewhat underevaluated by the simple fact that the data only cover ten different minerals. It is especially unfortunate that figures for gemstones are missing since they are extraordinary valuable and consequently generate substantial rents.

Out of the three questions presented in section 1, this study reinforces two and a half, leaving out only the claim of a hard mineral curse outside Africa. Note however, that my findings do not refute this claim, but weakly support it. The implications these results have for states, especially poor developing ones, that 'decide'[43] to put their hope in extracted wealth, are distinctly negative.

Not only does this study add to the rentier state theory and supports the notion of a curse of natural resources, in fact it also fortifies the persistent modernization theory. Rentier wealth indeed seems to be an exception to the rule that GDP per capita goes hand in hand with democratization. If the bad wealth is accounted for, this theory should gain significant explanatory power. This is however *not* to say that regions rich in resources should be left out of comprehensive democratization studies: it is instead a call for rentierism to be considered a variable of great import.

This research has not been conducted with the aim of finding a panacea for this puzzling phenomenon. I have instead presented the resource curse as an intricate trap, a

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[43] To be sure, it is rarely a free choice.

catch-22, and such a situation may indeed prove problematic to grapple with. Institutional improvement is, for example, most often the adviced treatment for states grappling with the bad influence of natural resource abundance. *But how is a resource rich country supposed to reform economically as well as politically and amend institutions if the problem in the first place is that resource wealth constitutes a significant obstruction to reform and makes institutions dysfunctional?* The proposed solutions are thus often made obsolete by the very symptoms of the curse.

The resource problem becomes even more aggravated by the fact that commodity prices in recent years have hit all-time highs. According to Karl's [1999:48] concluding words the possibility of successful reform is contingent on low prices since windfalls both tend to insulate leadership and cement adverse institutions. She wrote that after the price of oil had collapsed to about $12 per barrel. Today (05/23/2008), nine years later, it has ascended to eleven times that.[44] Gold prices have also experienced a similar hike, climbing from under $40 per ounce in 1970 to over $1000 per ounce in mid-March 2008.[45]

In a Foreign Policy article from 2006, columnist Thomas L. Friedman develops what he calls *the First Law of Petropolitics*, stating that "the price of oil and the pace of freedom always move in opposite directions in oil-rich petrolist states".[46] Even if this correlation hardly should be considered law, nor the curse as inevitable, the findings of this study should markedly lower the expectations of democracy in many natural resource-reliant states around the world.

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[44] Source: New Mexico Tech. http://octane.nmt.edu/gotech/Main.aspx
[45] Source: Kitco. http://www.kitco.com/charts/historicalgold.html
[46] Source: Foreign Policy May/June 2006: "The First Law of Petropolitics" by Thomas L. Friedman.

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Note: All internet home pages listed here were accessible as of May, 2008.

Appendix A

Detailed Presentation of Variables

All data have been accessed through The Quality of Government Data set, Göteborg University (compiled by Teorell *et al.* [2008]), with invaluable assistance from Marcus Samanni.

- *Regime* is an interval variable that measures a country's democratic performance. I derive this measure from the Polity IV data set compiled by Marshall & Jaggers [2002]. Position on an eleven point scale indicates a country's performance regarding three general principles of democracy; i) the effective possibility of political participation, ii) institutionalized constraints on the executive, and iii) guaranteed civil liberties. These three basic concepts are held as the fundamental prerequisites for more specific democratic institutions. Countries are graded between 0 (perfect autocracy) and 10 (perfect democracy).

- *Freedom House* is a similar eleven point variable that also measures democratic performance but is based on the combined Freedom House measure of Civil Liberties and Political Rights. I use the imputed version, which has better coverage. Countries are graded between 0 (perfect autocracy) and 10 (perfect democracy).

- *Income* is based on real GDP per capita measured in constant dollars chain series. Base year is 2000. The data originate from Penn World Table version 6.2, by Heston *et al.* [2006].

- *Hydrocarbons* is a variable measuring the relative size of hydrocarbon rents in government, i.e. rentierism, and it is created in several individual steps. Resource rent is first defined as the collected profit of a commodity, after location-specific production costs have been subtracted. The rent per unit of output is then multiplied with the total amount extracted, which compute the total annual rent. This calculation is done for each mineral, each country, and each year. The rents from oil, gas, hard coal, and

brown coal extraction are then annually added to each other and ultimately divided by the country's GDP. The final measure stretches from 0,00 (no rentierism) to 1,00 (total rentierism). The rent data cover the years 1970-2004, and come from the World Bank Adjusted Net Saving Data Center. The GDP data are in current dollars and come from the World Bank Development Indicators 2007.

- *Hard Minerals* is an identically calculated variable but evaluate the relative size of rent from hard minerals in government. Ten different hard minerals are included: Bauxite, copper, iron, lead, nickel, phosphate, tin, zinc, silver, and gold. The ten rents are added to one another and divided by GDP, creating one measure per year and country, just like above.

The construction of *Hydrocarbons* and *Hard Minerals* have been accompanied by a few practical complications. The data for each mineral do understandably not account for every state, simply because not every single state has extracted, let's say, bauxite. These observations should however not go missing but rather be coded as $0, which indicate that the country received $0 in revenue from that mineral, that year. So far, so good. But what if an observation is missing when the country in question very likely extracted that particular mineral? Take e.g. the data on bauxite rent for Zimbabwe 1998-2004. These observations should, judging from the figures from previous years, be coded as missing, *not* $0. But since *Hard Minerals* are calculated as the sum of bauxite and nine other minerals, this would unfortunately invalidate *all* observations for Zimbabwe during these years. That would clearly be non-optimal because Zimbabwe also extracted several other minerals these years for which data in fact are provided. To interpolate or extrapolate any values would require an in-depth qualitative analysis of each country and year, which is something that cannot be done here and now. I have therefore chosen to keep all original values as they are and code *all* missing values as $0, even those where extraction most likely took place. This is, to be sure, a controversial choice, but note that all minerals *not* included are by default also coded as $0. The combined hard mineral rents for several countries are regrettably already underestimated.

- *Islam* is a variable measuring the Muslim percentage of a state's population in 1980. I use only this year since the proportion of the population with religious affiliation tends not to change much over time. For countries formed more recently, figures of later date have of course been used. Data come from La Porta *et al.* [1999].

- *OECD* is a dummy variable coded 1 for the twenty-five countries defined by the World Bank as high-income OECD members, including; Australia, Austria, Belgium, Canada, Czech Republic, Denmark, Finland, France, Germany, Greece, Iceland, Ireland, Italy, Japan, Korea (Rep.), Luxembourg, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, the U.K., and the U.S.A. All other countries are coded 0.

- *Size* is a dummy variable coded 1 for all countries with a population below one million and 0 otherwise. Population data are obtained from Penn World Table 6.2 and measured every year.

- *Mideast* is a dummy variable coded 1 for the following countries, classified by the World Bank as residing in this region (which include North Africa), and 0 otherwise:

Algeria, Bahrain, Egypt, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Libya, Morocco, Oman, Qatar, Saudi Arabia, Syria, Tunisia, the United Arab Emirates, and Yemen.

- *Arabian Peninsula* is a dummy variable coded 1 for the seven states found on the Saudi Arabian Peninsula; Bahrain, Kuwait, Oman, Qatar, Saudi Arabia, the United Arab Emirates, and Yemen, and 0 otherwise.

- *Sub-Saharan Africa* is a dummy variable coded 1 for the following forty-five countries that, according to the World Bank Country Classification, are located in this region, and 1970 had a population of more than one hundred thousand: Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo (Dem. Rep.), Congo (Rep.), Côte d'Ivoire, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mozambique, Namibia, Niger, Nigeria, Rwanda, Senegal, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Uganda, Zambia, and Zimbabwe. All other countries are coded 0.

Appendix B

Table 3
Summary of Variables

Variable	Obs.	Mean[a]	Std. Dev.	Min.	Max.
Regime	4906	3,93	4,21464	0	10
Regime/FH	5264	5,22	3,51816	0	10
Income	5180	7713	8744,04591	170,55	84408,23
Hydrocarbons	5011	0,0536	0,12614	0	0,9996
Hard Minerals	5024	0,0114	0,04281	0	0,6739889
Islam	6160	24,66	36,29656	0	99,9

[a] The means have all been rounded off.

Appendix C

Table 4
Index of Top 20 Hydrocarbon Rentiers 1990-1999

Country	Rentierism (mean)	Obs.
Iraq	.8740946	3
Turkmenistan	.6111696	5
Kuwait	.3927908	10
Saudi Arabia	.3798523	10
Nigeria	.349137	10
Qatar	.34169	10
Oman	.3382714	10
Bahrain	.2819573	10
Syria	.278025	10
Azerbaijan	.2700923	10
United Arab Emirates	.2679998	10
Yemen	.2652231	10
Iran	.2526117	8
Venezuela	.2506637	10
Libya	.2484708	10
Uzbekistan	.2017763	10
Angola	.1977809	10
Congo (Rep.)	.1913127	10
Russian Federation	.1768083	10
Kazakhstan	.167819	10

Table 5
Index of Top 10 Hard Mineral Rentiers 1990-1999

Country	Rentierism (mean)	Obs.
Mauritania	.1545155	10

Liberia	.150018	10
Papua New Guinea	.1384624	10
Chile	.0650507	10
Guyana	.0647832	10
Zambia	.0569682	10
Mongolia	.0553037	10
Guinea	.0402552	10
Suriname	.038481	10
Jamaica	.0240437	10