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Resource wealth as rent leverage: Rethinking the oil–stability nexus

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Abstract
The study of the "resource curse" has become a major research agenda with multiple outcomes of interest—regime type, regime stability, civil conflict and economic growth to name a few. However, the proliferation of different measurement choices has hamstrung the quest for knowledge accumulation. In this essay I present a new indicator for oil dependence—a concept I term *rent leverage*. It captures the share of individuals' buying power that directly depends on fuel income and that nearly everywhere is controlled by political leaders. I use the new measure alongside fuel income per capita, to capture oil abundance, to explore the effects of oil wealth on political stability. Initial analysis of cross-national data from 1960 to 2009 suggests that rent leverage and fuel income strongly stabilize rulers of all types against regime change and that these effects are largely a function of cross-country differences. The stabilizing effects of oil income are significant but substantially smaller than rent leverage. The analysis further supports recent findings by Ross and Wright et al. that oil income and rent leverage both play stabilizing roles in autocracies, but that this effect is largely a cross-country one. Third, neither rent leverage nor oil income have any substantial or significant impact on civil war onset. Finally, contrary to both the weak state and coercion variants of resource curse theory, oil-producing countries appear to use less repression than others, and to have more durable regimes in part because of stronger states.

Keywords
Conflict, oil, oil wealth, regime failure, rentier state, resource curse

Introduction[1]

The global markets for oil and natural gas account for more than half of the commodity trade in the world today.[2] Accordingly, the study of oil wealth and politics has grown dramatically from a small set of case-driven books to a research program tracking multiple outcomes and employing increasingly sophisticated qualitative and quantitative methods. To date, though, there is little in the way of solid consensus about how to measure oil wealth,

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let alone what its effects are. As a result, both scholarship and policy implications risk drifting from the most recent findings to the ones that follow next. This essay seeks to sort out some reasons for the disagreement and to reconcile current concepts and theories with practical measurements. To my mind, if we can develop measures that are as close as possible to the concepts that are central to rentier state and resource curse theories, and can agree on some best practices for research employing those measures, we can at least be sure that it is not these first-stage differences driving conflicting conclusions. With that in mind, I introduce here a new measure of resource wealth—"rent leverage"—that is arguably closest to these concepts and that is in line with best practices in development economics.

Rent leverage captures the capacity of rulers in oil-rich countries to influence their citizens' everyday lives by virtue of managing oil sector income. It accounts for cross-national differences in purchasing power, thus situating absolute oil and natural gas income in specific economic contexts. By doing so, measuring rent leverage allows us to isolate the concrete economic influence that rulers in command of national fuel sectors have over their populations. The essay builds on this new measure alongside fuel income per capita to revisit the relationship between oil wealth and the political upheavals that are so central to resource curse theory.[3]

I explore these dynamics using global data for the years between 1960 and 2009. Using the new measure, I ask whether the *rent leverage* that rulers deploy over their citizens increases or decreases their long-term durability in power. To foreshadow what I find below, analysis of these data suggests that rent leverage strongly stabilizes rulers against regime change and that this effect is mostly a function of cross-country differences. Moreover, it appears to be largely a function of enabling rulers' spending on non-coercive regime maintenance strategies: regimes that repress less are more durable than those that repress more. Fuel income per capita, a measure of oil abundance, also turns out to be generally stabilizing across countries. Further, in line with recent findings by Andersen and Ross (2014) and Wright et al. (2014), oil income and rent leverage both play cross-country stabilizing roles in shielding autocrats from challenges from would-be autocratic usurpers. Finally, in these analyses neither rent leverage nor oil income per capita significantly affects the risk of civil war. The essay concludes by outlining potential new avenues of research focused on oil's stabilizing role across a range of manifestations.[4]

The article proceeds as follows. In the next section I summarize the current state of research on the politics of resource wealth, highlighting disparities in both measurement choice and in empirical conclusions. Following that, I introduce the rent leverage measure and employ it in a set of analyses of the relationship between resource wealth, on one hand, and regime durability and civil war onset, on the other. In the final section I discuss the implications of these initial findings for future econometric research on the politics of resource wealth.

Oil and stability: concepts and theories

On the one hand, oil wealth is thought to have a strong positive effect on the durability of political regimes, regardless of regime type (Smith, 2004), and appears to lessen other manifestations of instability such as anti-regime collective action and civil conflict as well. More recent scholarship has suggested oil makes authoritarian regimes more durable (Andersen and Ross 2014; Ulfelder 2007; Wright et al., 2014). Subsequent research largely confirmed the stability-inducing effects of oil wealth (Morrison, 2009), but at the same time it also appears (Jensen and Wantchekon, 2004) to undermine the stability of democratic regimes

and to make civil war more likely (Collier and Hoeffler, 1998, 2009; Dixon, 2009; Fjelde, 2009; Humphreys, 2005; Ross, 2006). However, Cotet and Tsui (2013) find no effect for oil wealth on civil war onset once country fixed effects are accounted for. On the other hand, we can imagine autocrats—like Indonesia's Suharto or Iraq's Saddam Hussein—surviving in power for long periods even while their modes of rule provoked periodic failed rebellions. In short, at the same time our current theories contain predictions that go against one another; current findings do the same.

The original statements relating oil to stability came from classic rentier state theory (Beblawi and Luciani, 1987; Delacroix, 1980; Karl, 1997, 1999; Mahdavy, 1970). The earliest versions provided mostly inferential implications, suggesting on one hand that rents could substitute for representation but on the other that the shallow consent engendered, when combined with the volatility of the market for oil, might be destabilizing. These were the foundational points of reference for later work. Perhaps unsurprisingly, the research programs that grew from them—focused respectively on regime maintenance and civil conflict—pointed in two different and seemingly contradictory directions. They arose at the same time, however, as a growing line of formal fiscal sociology that theorized the relationships between rulers and ruled as a function of the sources of state revenues (Bueno de Mesquita and Smith, 2009a, b; DeMerritt and Young, 2013; Gandhi and Przeworski, 2006; Levi, 1988; Snyder, 2006; Thies, 2009, 2010). This latter body of research conceptualized revenues of different types in a single framework, normalizing resource revenues as but one source of funding not derived from extractive bargains with citizens. Theoretically rich though it was, in operational terms this concept of bargain-free rent revenue often took inadequate forms, making the insights less empirically viable than they should have been.[5] Below I detail my strategies both for constructing a measure sensitive to this political dynamic and for accounting for differential buying power across different national contexts.

Despite differing hypothetical expectations, both predictions of the resource curse relied on two mechanisms—rentierism and weak institutions. The first postulated that it was the capacity of rulers to rely on rents rather than on taxes that drove subsequent fiscal state–society relations and allowed rulers to "substitute spending for statecraft" (Karl, 1997: 16, 63). Whether for patronage or coercion, the flexibility of spending made possible by fuel revenues remains a core insight of all theories of oil and politics. The rentierism variant of this thesis suggests that rulers' freedom to dole out fuel rents to important social recipients can prolong their rule, either by creating rent-funded social contracts or by defusing crises through one-time payoffs. The second suggests that fuel wealth weakens state institutions, making instability and civil conflict more likely (see among others Fearon and Laitin, 2003). In recent years this mechanism has come into serious doubt. Brunnschweiler (2008) finds that the causal arrows run counter to it and that in fact it is weak institutions that cause fuel export dependency, not the other way around. Moreover, Ross (2012, chapter 6) and Smith (2012) found in global and Southeast Asian samples, respectively, that fuel wealth is positively related to institutional quality.

The stability theory of oil politics, based as it was on observing countries that were mostly non-democracies, grew into a "yes" answer to the question "Does oil hinder democracy?" (Ross, 2001). In that first exploration Ross suggested some partially confirming findings linking oil and autocracy via stunted modernization, repression and rent patronage. Note that these are effectively stability mechanisms: given a set of prior expectations that under ordinary conditions regimes might become more democratic over time, oil allowed rulers to prevent such changes.

Subsequent work (Morrison, 2009, 2012; Smith, 2004, 2006, 2007) confirmed that the more visible episodes of dramatic political change in oil exporting countries were outliers, but also found that oil's impact was conditional on the timing and circumstances surrounding its entry into a political economy. These effects accrued independently of the kind of regime. Meanwhile Jensen and Wantchekon (2004) found a stabilizing effect for oil among the autocracies of Africa but a destabilizing one for democracies. Tsui (2010) found a long-term democracy-hindering effect for oil discoveries, but one that was dependent on measurement choices.

An array of other plausible mechanisms also may link oil wealth to regime and conflict outcomes. Since in nearly every oil-exporting country in the world the sector is state owned, rulers' allocative authority may privilege incumbency in all types of regimes. Alternately, it may enable expansive spending on coercive force or social spending to coopt potential dissidents or groups in society. In these cases too, we might expect measures of state capacity, or coercion, to either crowd out the statistical significance or to reduce the size of the effect of oil wealth. I detail below my strategies to explore these possibilities.[6]

Ulfelder (2007: 996) suggests that fundamentally different factors drive the destabilization of autocracies and democracies, respectively. These conclusions follow the seminal, and appropriate, observation by O'Donnell and Schmitter (1986: 18) that the factors that bring democracy are not the same ones that bring it down. Geddes et al. (2014), employing an innovative means-deviated approach to separating within-country from cross-country effects of oil wealth, conclude similarly that it stabilizes autocratic rulers against possible power moves by other would-be autocrats. Still, it remains quite plausible that political regimes broadly rise and fall in line with a baseline set of permissive or constraining factors and that oil wealth might be one of them. One main reason has to do with regime type itself: the large number of political regimes in the world that do not fit neatly into either ideal type of democracy of autocracy, but that combine elements of both by intent or by default. This way of looking at the question runs afoul of the broad literature on hybrid regimes, or those that do not fit into either regime box (see e.g. Diamond, 2002; Levitsky and Way, 2010; Schedler, 2002). It is for this reason that in the main analyses below I proceed without prior assumptions about differential effects on different regime types.

Common current measures

How do scholars measure oil wealth or rentierism? The answer is unfortunately disparate. In reviewing econometric work on the resource curse over the last decade or so I tracked down at least a dozen different means of measuring the effect of oil income as an independent variable in quantitative studies (see Table 1). There are a number of dummy variables used as proxies for rentierism, for example, OPEC membership (Fish, 2002, 2005) and dependence on oil exports for more than half of total exports (Gandhi and Przeworski, 2006, 2007: 1285). These dummies have multiple, easily solvable, problems. The first is that today there are many more non-OPEC major oil producers than there are in OPEC,[7] leaving out many of the producing countries arbitrarily. Furthermore, we do not have good reason to believe that OPEC exporters are politically very different than their non-OPEC counterparts, or that at 49.9% and below oil income is politically unimportant or that conversely at 50.1% it becomes important. Given the ease of acquiring continuous data, it is at best a questionable choice to employ dummy variables.

Even some continuous measures are problematic. One common strategy—taking oil exports' share of total exports (see Jensen and Wantchekon, 2004) as either a continuous or a binary variable as discussed above leaves us wondering how to assess the importance of exports in a country's economy. Two countries in which oil exports comprised 50% of total exports might respectively depend on exports for 80% of GDP (in a small country with limited domestic market, for example) and only 10% of GDP (a larger, more prosperous country with a substantial domestic market).

Another such measure, as mentioned above the standard for several prominent works, is oil export revenues as a share of GDP (Morrison, 2009; Ross, 2001; Smith, 2004, 2007). This measure at least has the virtue of capturing the relative importance of export earnings in the economy writ large. Yet it misses two things: how much patronage or coercive boost it gives rulers vis-à-vis each citizen and how much revenue is derived from oil that is consumed at home (see also Ross, 2012: 14–17). Both of these are important questions. The former question is crucial when we compare countries like Nigeria—with 175 million citizens—with Equatorial Guinea, with a population of less than 1 million. The difference in the rents that each regime can put to use in influencing each citizen's political behavior, by whatever means, is massive. The latter issue is equally important when it comes to thinking about countries—Russia, Brazil and Indonesia among them—that by virtue of increasingly diversified economies consume a sizable portion of what they produce. We might also note Tunisia and Egypt, two countries that rarely are described as rentier states or even included in groups of "oil states" because they export relatively little. The reason is that they too consume much of what they produce and import still more. Still a third problem with this measure is that it can be endogenous to oil exports: poorer countries consume less of their oil and gas, thereby inflating the export figure, and Dutch Disease effects can negatively affect non-oil sectors.

A word here on the endogeneity of oil wealth measures to other (mostly political) factors is in order as well. Efforts by scholars to employ instrumental variables they argue are exogenous to politics, to my mind, have yet to accomplish this. Every act of oil exploration by any foreign entity—and today most still are foreign entities—is a gamble that the country's political setting will remain stable enough for that entity to make a profit. As a result, nearly every possible manifestation of the global need for oil is endogenous to politics—the discovery of reserves, the reporting of proven reserves, the surveying of potential new fields—not to mention the actual production in any given time period. In short, we are better off thinking about *how* our measures are endogenous, and accounting for it, rather than trying to find others that are not.

The original benchmark measure—oil export revenues over GDP—was simple and easy to calculate from the World Development Indicators, and a better measure than early alternatives such as oil exports as a share of total exports or dummy variables for OPEC membership. This measure was meaningful in the sense that it allowed us to see the relative importance played by the oil sector in a large number of economies, and to infer that the dynamics would be stronger as a result. Yet it contained a couple of major problems. First, it gave us no relative understanding of what that figure meant for rulers and their relationships to individuals. Rulers in two countries with identical oil export revenues and similar GDPs, but with very different population sizes, would have equally different rent capacities to be employed for patronage or coercion (or modernization). Thus, this measure masked differences in the rentierism capacity of states. Second, the measure left oil wealth endogenous to the size of a country's economy. Poorer countries looked more oil-rich simply because their economies were less developed than others, not because they produced more oil.

Furthermore, recent research has suggested that oil dependence is itself endogenous to the quality of political institutions. Brunnschweiler (2008) found that it is weak institutions—and subsequently poor economic policy—that leads some countries to be more dependent on resource exports over time.

In the last few years a new measure has become predominant: fuel income per capita, which takes the total value of oil and natural gas production (including domestic consumption) and divides it by a country's population.[8] As noted in Ross (2012: 15–17), this measure is publicly available and fairly easy to calculate. Yet it too is imperfect: production is of course endogenous to politics and in particular to political stability, as the recent examples of Iraq, Libya and South Sudan have highlighted so starkly.[9] Nonetheless, it avoids the most obvious kind of endogeneity by not using GDP as the denominator. It also captures a different dimension of oil wealth—that of *abundance* as opposed to dependence, which measures that divide oil income by GDP indicate. Moreover, it is the current benchmark, and in the analyses that follow I include it, both alone in place of rent leverage (presented below) and alongside it presented in a number of ways. Most importantly, as with rent leverage, I take fuel income per capita corrected for purchasing power parity differences, which allows us to ask how a set level of fuel income affects politics across countries with different costs of living.

Rent leverage: a new measure of oil wealth

Another issue, and one that has not yet been addressed, is that even the better measure of fuel income per capita does not allow us to get at the extent to which a regime's ability to deploy oil revenue affects individual citizens. The logic of thinking about the concept this way is that it allows us to measure the importance of rents, and of state leaders' ability to marshal them in different ways, to affect a citizen's everyday life. The data analyses below, therefore, centrally employ a measure of *rent leverage*, which I take as the ratio of fuel income per capita to GDP per capita, corrected for purchasing power parity (PPP). Data for fuel income per capita are drawn from the data outlined in Ross (2012) and for the PPP-corrected GDP per capita are drawn from the Penn World Tables.

The equation is:

$$\text{rent leverage} = \frac{\text{fuel income per capita}}{\text{GDP per capita}_{(\text{PPP})}}$$

Including this statistic in a model asks: *what share of an average citizen's economic life derives directly from state-directed allocation of oil and gas income*? It is both empirically sounder and conceptually closer to the phenomenon on which the rentier and resource curse theses are focused: the ability of rulers to use rents to sway their citizens' political decisions and subsequent actions. The measure presumes, and accounts for, both the overall share of the average citizen's income that derives from fuel production *and* how that share relates to her buying power in a given country.[10] Because nontradable goods are less expensive in poorer countries (owing to lower wages), PPP-corrected income figures more accurately reflect the relationship between prices and income in developing countries. Since it is precisely in these countries—and not in rich oil-producers such as the USA, Canada, Norway or the UK—that we expect instability, this correction is all the more valuable here. Rent leverage is a continuous measure in the sense that a country without a single currency unit's

worth of oil production would be coded "0" whereas a year in a country that produced nothing else would take a value of "1".

Rent leverage gets us analytically closest to the empirical phenomenon we actually wish to explore: how much of an average citizen's livelihood depends on rulers allocating fuel income. This measure allows us to explore cases in which fuel income per capita might be similar but in which the former regime's leverage is much greater over citizens' economic lives. It also accounts for the established bias in absolute GDP per capita numbers that tend to deflate real buying power in poorer countries and inflate it in richer ones. The logic of oil politics suggests that this is much more likely to be the best measure when we are exploring macro-regime outcomes: transitions between democracy and autocracy, less wholesale regime changes (i.e. changes of at least 3 points on the Polity scale but not necessarily full transitions), and coups d'état. During the crises that can threaten changes of these sorts, I would argue that a regime's capacity to leverage rents against dissent is most important, more so than an absolute fuel income figure or the "dependence" captured by oil rents as a share of GDP. Moreover, the correlation between poverty and various forms of political instability also suggests that we need to account for any bias against poor countries.

The rent leverage measure ties this research agenda into a long vein of inquiry drawing from modernization theory. Just as modernization scholars posited that a certain level of income would probably induce changes in citizens' political engagement and behavior, the logic of a PPP-corrected rent leverage measure suggests that the influence state-deployed rents will have on those citizens' political behavior will depend not so much on the absolute value of the rents but rather on the relative buying power they would supply. Uncorrected GDP per capita scores have been shown to exaggerate the buying power differences between citizens of poor and rich countries,[11] and the results I report below suggest that this may be the case for fuel income too. Because instability is more common in poor than in rich countries, and because fuel income generally comprises a larger share of per head income in poor than in rich countries, the effect of fuel income abundance may appear to be more significant than it actually is.

This measure also allows us to think of the political benefit to rulers both in terms of what Ulfelder (2007: 997–998) refers to as the "supply" and "demand" dynamics of oil wealth. Whether fuel income allows rulers to spend without taxing, thereby undercutting extant calls for greater accountability, or whether they allow rulers to placate important social forces during times of crisis, this measure gets to the heart of what we typically think is important about them: namely that they are an unusually fungible source of money for rulers. Their gravity, of course, depends on how many dollars per citizen rulers can dole out, either during hard or easy times, hence the focus here on the per-head value. It depends equally heavily on the buying capacity that a set amount of fuel income engenders, hence the correction for purchasing power parity.

In the analyses that follow I also employ a PPP-corrected version of fuel income per capita. The reason is straightforward. In the same way that US$500 means profoundly different economic things in Manhattan as compared with New Delhi, US$500 in per capita oil income means profoundly different things for politics in Brazzaville as compared with San Francisco. We simply cannot conceptualize the political impact of a set amount of oil income without knowing what it can buy in a given national context.

The resource curse revisited: oil, order and conflict

Data, methods and models

In this section I present results from analysis of data for all countries with populations of more than 500,000 between 1960 and 2009. It builds on publicly available data used in Ross (2012) as well as the Penn World Tables.[12] I employ the data to explore the relationship between various measures of oil wealth, on one hand, and regime durability and civil war, on the other.

Independent variables: measuring the effects of fuel wealth

As discussed above, I take rent leverage as the main measure of oil wealth in the analyses that follow. I also employ fuel income per capita per Ross (2012) in addition to my rent leverage measure, the logic being that conceptually we can then estimate the effects of citizens' dependence on ruler's control of fuel income as well as the absolute abundance of that income. I take the natural logarithm of both statistics.

Just as it is reasonable to ask whether the effect of rent leverage is in part a function of accounting for country-specific purchasing power, it is reasonable too to ask whether fuel income should be adjusted similarly. After all US$300 per citizen in oil/gas revenue will mean much more in South Sudan than it will in still oil-rich but much richer Norway. With that in mind, I experimented with estimating models in which I weighted fuel income per capita according to purchasing power parity variations across countries.[13] To do so I compared absolute GDP per capita figures in constant US dollars in each country-year with their PPP-corrected figures and took the ratio as S (the purchasing power parity ratio). I took the absolute figure from the World Bank's Development Indicators and the PPP figure from the Penn World Tables. The results were substantively identical to those with the uncorrected oil income indicator and, in the interests of both replicability and simplicity of calculation, I present here only the results with the original, uncorrected oil income indicator.[14]

Because oil wealth using either measure is taken here as a time-series cross-section variable—that can vary across countries as well as within them—we face the possible confounding problem of not being able to separate cross-country from within-country effects. To address this, I employ a strategy suggested by Chamberlain (1982) and used by Zorn (2001) and most specifically by Geddes et al. (2014), the last case directly focused on the effects of oil wealth. I calculate each within-country mean in the sample as well as each country-year's deviation from that mean. The first set of statistics allows us to assess cross-country variance by comparing each country mean with the others in the sample, and the second within-country variance by taking each country-year's deviation from the country's own mean. As Geddes et al. (2014) note, this allows us to assess the effects not just of yearly changes but also of new production and global price increases. In the tables that follow the cross-country variation (country mean) is denoted by $_{(cm)}$ while the within-country variation (country-year deviation from country mean) is denoted by $_{(dev)}$.

Dependent variables

The first outcome I explore here is *regime change*. In the interests of knowledge accumulation and comparability of findings I first use the same measure employed in Smith (2004, 2007) and Morrison (2009, 2012), namely regime shifts that result in a change of 3 or more

points on the Polity scale. This measure is agnostic with regard to regime type and simply asks whether oil wealth has a systematic effect on the overall longevity of governments in producing countries. However, recent research (Ross, 2012; Geddes et al., 2014) has suggested that one part of that effect has to do with insulating autocrats from challenges by other would-be autocrats. In such cases the Polity measure could miss these shifts completely. Accordingly, I also use the Geddes–Wright–Frantz measure for regime shifts from one autocracy to another. I also explore the impact of fuel wealth on the likelihood of *civil war*. I use the civil war onset data from the Armed Conflict Dataset, coding country-years "1" for any year in which there is a conflict onset that produces at least 25 battlefield deaths.

Control variables

Given (a) two different outcomes with plausibly different determinants and (b) the existence of two largely separate literatures exploring those two outcomes, I employ two different sets of control variables for the models focused on regime change and civil war, respectively. In general, I have estimated models conservatively, seeking in line with imperatives developed by Ray (2003, 2005), Kadera and Mitchell (2005) and Achen (2002) to account for theoretically developed alternative explanations while also providing a fair assessment of the effects of different aspects of oil wealth.[15] The main models presented in Tables 2–4 include annual growth in GDP per capita (corrected for PPP) and population (logged). A long vein of comparative analysis of regime change has pinpointed economic crises as among the most common catalysts of the demise of regimes of all types, and following this scholarship I hypothesize that stronger economic performance should help to insulate regimes against change. Population size serves as a proxy for the difficulties in extending state authority over large societies, drawing on an equally broad literature on the challenges of building political authority.

In the study of oil politics, however, two additional factors play central roles: state capacity and repression (or its absence). To explore the impact of these factors I report a final set of results in Table 5 that account for them both. First, a long line of inquiry dating back at least to Thomas Hobbes implicates effective government as crucial to the maintenance of order, and just as importantly as one of the key hypothesized mechanisms linking oil wealth to political outcomes. Rentier state theory, beginning with Hossein Mahdavy's seminal article on the late Pahlavi state in Iran, proposed a direct causal link between oil wealth and the relative weakness of the institutions of state. Later iterations of rentier theory proposed further that this weakness would lead to state/regime fragility during crisis. Accordingly, I include a composite measure of state capability from the Relative Political Capacity project. Here I use the variable rpe_agri: a composite of states' ability "to appropriate portions of the national output to advance public goals" (Kugler and Tammen, 2012; TransResearch Consortium, 2013: 11). The hypothesized relationship is a positive one: stronger states should make regime collapses less likely. Additionally, if it is the case that oil wealth has a significant effect on regime durability, including an independent measure of state capacity ought to shrink oil's effect or even crowd it out altogether, if in fact it is a mechanism linking oil to outcomes.

Second, both the broad variant of resource curse theory implicating oil in authoritarianism and the particular hypothesis that oil-rich states use the funds to pay for coercive apparatuses (e.g. Ross, 2001) predict oil to be associated with more coercion (or conversely less respect for human rights). Accordingly here I also include a measure of government

coercion. I use it to test a common hypothesis in the resource curse literature: namely, that oil wealth enables increased spending on coercive capacity. Rather than measure this concept as an input with military spending (which might well be spent on defense against external threats), I use an "output" indicator from the CIRI Human Rights Data Project (2008): the Physical Integrity index, a composite built on the project's Disappearance, Extrajudicial Killings, Political Imprisonment and Torture measures. Theoretically speaking, we should expect greater coerciveness (less respect for human rights) to bolster autocracies. Concretely speaking, if it is an intervening link between oil and outcomes, we might also expect including this measure to shrink or "crowd out" the effect of oil wealth.

Finally, in all models I include a set of indicators to mitigate the time-dependency in these time series data and the subsequent risk involved in using them to estimate the likelihood of discrete (binary) outcomes. Drawing on recommendation by Beck et al. (1998), I include a count variable for the number of years since the last event in question (regime change, autocratic breakdown or civil war onset) and three cubic splines. The count and spline variables are included in all models but not reported here.

Where in the regime change models I hypothesized simply that more coercion ought to insulate rulers, thinking conceptually about civil wars we need also to consider that coercive governments might provoke rebellions. As a result, I include the physical integrity measure, keeping in mind that the extant literature actually predicts two diametrically different effects: grievance and order, the former catalyzing rebellion and the latter undermining it. As with the regime change models, I estimated coefficients and standard errors for a count variable capturing the number of peaceful years and for three cubic splines, but do not report them.

Method

Since all of the dependent variables here are binary (discrete, taking values of either "0" or "1"), I employ logistic regression. Given the cross-sectional time series structure of the data, I cluster observations by country and report odds-ratios and robust standard errors. Interpreting the effect of individual variables using the odds-ratios is intuitive: a unit change in that variable's value produces the change in likelihood indicated by the odds-ratio. For example, an odds-ratio of 0.75 suggests that a unit change in that variable reduces the likelihood of the event by 25%.

Results

Oil wealth and regime durability

Table 2 presents the results of the first set of regime change models using the Polity regime change measure. Model 1 represents the base model with rent leverage as the main explanatory variable, with economic growth and population size as controls. Rent leverage has a statistically significant stabilizing effect and one that is substantial. A unit change in rent leverage lowers the overall risk of regime failure by above 40%. Economic growth is significant at $p < 0.01$, but substantively rather small, with an increase in growth of 1% in any year associated with a roughly 3.5% drop in the risk of regime collapse. Population size is significant and a unit change raises the risk of regime failure by 10%. Model 2 reports the results of the same basic model but with oil income. It is statistically significant, but substantively of smaller import than rent leverage, with a unit change reducing the risk of regime

Table 1. Measuring the resource curse: problems with current measures

Measure	Conceptual/empirical shortcomings	Endogeneity problems
OPEC membership (dummy)	Omits all exporting non-members; no way to account for varying export dependence, population size	None
Oil exports > 50% exports (dummy)	No good analytical reason to start at 50.01%; no way to account for varying export dependence or population size	Countries that export little owing to weak governance will falsely measure higher
Oil revenues > 75% of national income (dummy)	No good analytical reason to start at 75%; no way to know effect per capita or vis-à-vis local buying power	Poorer countries more likely to be highly dependent
Oil exports/total exports	No way to know how important it is in overall economy or to account for population	Countries that export little owing to weak governance will falsely measure higher
Oil export revenues/GDP	No way to account for revenues per capita. Excludes revenue from oil consumed domestically	Poorer countries bias the measure upward
Oil discovery per capita	Discovery of oil leads to no necessary economic gains or political effects	Oil exploration conditioned by political variables often used as DVs
Oil discovery to date	Discovery of oil leads to no necessary economic gains or political effects	Oil exploration conditioned by political variables often used as DVs
Oil export revenues/GNI	No way to account for revenues per capita	GNI is endogenous to economic policy
Energy resource depletion/GNI	No way to account for depletion per capita	GNI is endogenous to economic policy. Bad policy could inflate this measure
Oil and gas income per capita	Absolute measure: no indication of relative socio-political importance by country	Measure is dependent on production, which can depend on political variables used as DVs
Oil deposits per capita	Absolute measure; no way to account for relative importance	Oil exploration conditioned by political variables often used as DVs
Oil value per capita	Absolute measure; no way to account for relative importance	Oil exploration conditioned by political variables often used as DVs

DV, Dependent variable; GNI, gross national income.

failure by just over 4%.[16] Economic growth and population size are similarly significant as in model 1.

Models 3 and 4 present the results shifting now to the between-country and within-country measures of rent leverage and oil income, respectively. Rent leverage plays a strong

Table 2. Oil and regime durability (polity regime change)

	(1)	(2)	(3)	(4)
Rent leverage$_{(ln)}$	0.587**			
	(0.111)			
Economic growth	0.964**	0.965***	0.964***	0.963***
	(0.0108)	(0.0101)	(0.0109)	(0.0103)
Population$_{(ln)}$	1.106*	1.139**	1.103*	1.143**
	(0.0535)	(0.0565)	(0.0535)	(0.0563)
Oil income$_{(ln)}$		0.957*		
		(0.0207)		
Rent leverage$_{(cm)}$			0.558**	
			(0.115)	
Rent leverage$_{(dev)}$			0.737	
			(0.236)	
Oil income$_{(cm)}$				0.935**
				(0.0232)
Oil income$_{(dev)}$				1.090
				(0.0523)
N	5946	6309	5946	6309

Analysis is by logistic regression with odds-ratios (exponentiated coefficients) presented. Robust standard errors in parentheses. Count variable for years since last regime change, and three cubic splines, included but not reported. Rent leverage and oil income per capita taken as natural logarithm. $_{(cm)}$ indicates country means to capture cross-country effects. $_{(dev)}$ indicates country-year deviations from overall country means to capture within-country effects.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Table 3. Oil and autocratic survival (Geddes, Wright and Frantz autocratic breakdown)

	(1)	(2)	(3)	(4)
Rent leverage$_{(ln)}$	0.433*			
	(0.148)			
Economic growth	0.916***	0.917***	0.914***	0.917***
	(0.00906)	(0.00915)	(0.00952)	(0.00927)
Population$_{(ln)}$	1.077	1.137	1.078	1.147
	(0.0853)	(0.0967)	(0.0872)	(0.100)
Oil income$_{(ln)}$		0.909*		
		(0.0355)		
Rent leverage$_{(cm)}$			0.314**	
			(0.131)	
Rent leverage$_{(dev)}$			1.191	
			(0.688)	
Oil income$_{(cm)}$				0.896**
				(0.0379)
Oil income$_{(dev)}$				1.013
				(0.116)
N	2886	3059	2886	3059

Analysis is by logistic regression with odds-ratios (exponentiated coefficients) presented. Robust standard errors in parentheses. Count variable for years since last autocratic breakdown, and three cubic splines, included but not reported. Rent leverage and oil income per capita taken as natural logarithm. $_{(cm)}$ indicates country means to capture cross-country effects. $_{(dev)}$ indicates country-year deviations from overall country means to capture within-country effects.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Table 4. Oil and civil war onset Armed Conflict Dataset onset with >25 battle deaths)

	(1)	(2)	(3)	(4)
Rent leverage$_{(ln)}$	1.000			
	(0.188)			
Economic growth	0.965**	0.965**	0.965**	0.965**
	(0.0108)	(0.0105)	(0.0108)	(0.0106)
Population$_{(ln)}$	1.411***	1.404***	1.409***	1.405***
	(0.0793)	(0.0936)	(0.0792)	(0.0926)
Oil income$_{(ln)}$		1.036		
		(0.0449)		
Rent leverage$_{(cm)}$			0.932	
			(0.239)	
Rent leverage$_{(dev)}$			1.201	
			(0.362)	
Oil income$_{(cm)}$				1.024
				(0.0509)
Oil income$_{(dev)}$				1.103
				(0.0621)
N	5946	6309	5946	6309

Analysis is by logistic regression with odds-ratios (exponentiated coefficients) presented. Robust standard errors in parentheses. Count variable for years since last onset, and three cubic splines, included but not reported. Rent leverage and oil income per capita taken as natural logarithm. $_{(cm)}$ indicates country means to capture cross-country effects. $_{(dev)}$ indicates country-year deviations from overall country means to capture within-country effects.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

Table 5. Accounting for state capacity and repression

	(1)	(2)	(3)	(4)	(5)	(6)
	Regime change		Autocratic breakdown		Civil war onset	
Rent leverage$_{(cm)}$	0.448**		0.105**		1.161	
	(0.118)		(0.0791)		(0.305)	
Rent leverage$_{(dev)}$	1.068		2.398		1.184	
	(0.421)		(1.468)		(0.631)	
State capacity	0.691*	0.677*	0.504*	0.600	0.957	0.984
	(0.113)	(0.110)	(0.172)	(0.193)	(0.396)	(0.377)
Physical integrity	0.777***	0.776***	0.918	0.924	0.716***	0.709***
	(0.0303)	(0.0300)	(0.0598)	(0.0602)	(0.0388)	(0.0388)
Economic growth	0.972*	0.972*	0.934***	0.932***	1.008	1.012
	(0.0118)	(0.0113)	(0.0156)	(0.0155)	(0.0109)	(0.0112)
Population$_{(ln)}$	0.908	0.946	1.047	1.143	1.140	1.121
	(0.0522)	(0.0599)	(0.116)	(0.138)	(0.0842)	(0.102)
Oil income$_{(cm)}$		0.920*		0.849***		1.064
		(0.0328)		(0.0387)		(0.0560)
Oil income$_{(dev)}$		1.024		1.110		0.933
		(0.0821)		(0.157)		(0.111)
N	3677	3835	1608	1690	3677	3835

Analysis is by logistic regression with odds-ratios (exponentiated coefficients) presented. Robust standard errors in parentheses. Count variable for years since last event, and three cubic splines, included but not reported. Rent leverage and oil income per capita taken as natural logarithm. $_{(cm)}$ indicates country means to capture cross-country effects. $_{(dev)}$ indicates country-year deviations from overall country means to capture within-country effects.
*$p < 0.05$, **$p < 0.01$, ***$p < 0.001$.

and substantively large role across countries but not within them over time. Put succinctly, a one-unit difference in rent leverage in two otherwise similar countries renders the one whose rulers enjoy the higher figure nearly 45% less likely to experience regime failure as well as lowering that risk within a given country for the same size increase. Economic growth and population size exert largely the same effects as in previous models. Turning to model 4, we see that oil income remains a significant stabilizing force in cross-country terms, with a substantive impact of roughly 4% lower risk of regime failure. No such premium accrues within countries. On balance, these results suggest two things. First, with another 15 years of data and with more than two dozen new entrants to the population of substantial oil producers worldwide, oil wealth continues to play a stabilizing role for regimes. Moreover, this effect is predominantly a cross-country phenomenon. We see a consistently important role for oil wealth, measured in a way that is contextually sensitive to relative buying power across different national economies. I turn next to discussion of a set of models in which the dependent variable shifts from one autocratic regime to another.

Oil and the survival of dictators

Table 3 presents results from a set of models exploring the determinants of autocratic breakdown. Because here the focus is only on autocratic regime spells, the sample is less than half that of the full regime change models in the previous section, with roughly 60 fewer countries represented. I use the same basic models here, absent any strong consensus yet that the survival in power of autocrats is driven by a fundamentally different set of factors. Accordingly, the same control variables in Table 1 are included in these four models. Because the inclusion of per capita oil income and rent leverage together resulted in no change in the findings from one-measure models, here I present only the results of models with one of the measures.

Model 1 presents the results with the natural logarithm of rent leverage. Again, it is substantial, with a unit change lowering the threat to autocratic rulers of collapse by more than 55%. Economic growth again is significant, lowering collapse risk by nearly 9% for each additional point in GDP per capita growth. However, population in all of the autocratic survival models is insignificant. Model 2 replaces rent leverage with oil income per capita (logged). The size of the effect is similar to that for the full range of regime changes, in this case reducing the threat by just under 9%. The stabilizing effect of economic growth is virtually identical to its effect in model 1. Turning to the separate cross-country and within-country effects in models 3 and 4, we see that both indicators for oil wealth ride on their impact across countries in any given year. Rent leverage (in model 3) reduces that risk substantially, by nearly 70% per unit change, while again oil income's effect is on the order of 10%.

Oil and civil war onset

Table 4 presents the results of four models estimating the effects of oil wealth on civil war onset. Across all four models economic growth and population size are consistently significant and have nearly identical magnitude effects in all estimations. Even in these minimally estimated models, however, we see no significant effect for oil wealth at the national level. Taken solely in the frequent refrain of a conflict resource curse, these uniform results are a little surprising. However, given (a) the minimally controlled models, (b) the considerably larger sample than in many current civil war models, (c) the arguably greater precision (and alternate measurement choices) in capturing oil wealth here, (d) the clearly stabilizing effects

at the national regime level, and (e) the increasing number of studies indicating no effect or even a war-reducing one (Brunnschweiler and Bulte, 2009; Cotet and Tsui, 2013), these results are not so much surprising as accordant. Indeed, in concert with the regime analyses, they suggest a consistent message: oil wealth is not a curse when it comes to predicting a range of instability outcomes. To the contrary it has a pro-regime effect far beyond autocracies and appears to exert no significant effect on national-level conflict onsets.[17]

Exploring causal linkages: the roles of repression and state capacity

As mentioned earlier, two key theorized mechanisms linking oil wealth to instability and/or conflict are oil's putative weakening effect on state capacity and its effect of enabling greater spending on domestic coercion of citizens. With these hypotheses in mind, I turn in Table 5 to a set of models that include new composite indicators for both concepts alongside the oil wealth measures. The state capacity measure, drawn from the Relative Political Capacity data project, is an aggregate indicator capturing various aspects of state ability to collect resources and allocate them to public ends. Higher values reflect stronger state capacity. The physical integrity measurer captures four aspects of state respect for human freedom as described above, and again on a scale of 0–8, higher values indicate greater respect for human rights. Rentier state theory and the resource curse lead us to expect, first, that stronger states will enhance stability and, second, that oil-funded state coercion will enable greater regime longevity.

Models 1 and 2 assess the determinants of regime change broadly speaking, measuring oil wealth first as rent leverage and then as oil income (both logged and separated into cross-country and within-country effects). Both oil wealth measures remain significant and stabilizing at the cross-country level, with rent leverage having an effect whose magnitude is approximately three times that of oil income with unit changes normalized.[18] Both state capacity and physical integrity are strongly stabilizing and significant. Interestingly, physical integrity (a solid proxy for government respect for human rights protection) runs in the opposite direction predicted by the repression thesis in the resource curse agenda. Across the full range of regimes from democratic to hybrid to autocratic, greater respect for human rights lowers the risk of regime collapse.[19]

Models 3 and 4 present the results for the tests of oil's effects on autocratic longevity alone. Whether measured as rent leverage or as oil income, oil wealth's stabilizing effect is solely a cross-country one. State capacity is significant in the rent leverage model (3), but not in the oil income model (4). Whether this suggests that stronger states tend to induce the investments in extraction that produce greater income, or that greater oil income is invested in state building, is not immediately clear, but is a promising path for further inquiry. In particular, findings by Ross (2012) and Smith (2006, 2007, 2012) that oil is associated with more capable states suggest that we need more focused research on the relationship between oil production and state capacities.

If it were the case that more oil funded more coercion, which then stabilized autocracies, we would see a significant negative effect for physical integrity. In practical terms this would imply statistically significant odds-ratios >1. In face we find odds-ratios <1—indicating a stabilizing effect not for coercion but for its absence—but no statistically significant impact. This suggests that—in contrast to studies that employ military/defense spending to capture coercion when that spending might be to protect against foreign threats—we are on more solid ground measuring the actual output of state coercion than its inputs. In any case, the

implication here is that oil-rich autocracies appear to be more durable for reasons other than coercion.

Models 5 and 6 present the results of two analyses of the oil–conflict nexus. Neither measure of oil wealth is significant again, providing no support for the hypothesis linking it to civil war outbreak. Here state capacity is not significant either, while greater respect for human rights is both significant and substantively strong. A one-unit increase on the eight-point scale of physical integrity lowers the risk of conflict onset by 28 or 29% depending on the measure of oil wealth employed (rent leverage and oil income, respectively).

Robustness tests

I conducted a number of robustness tests as well. One set employed a higher threshold for civil war onset—the 1000 battle deaths that is the original Correlates of War threshold and which among other studies is used in Collier and Hoeffler (2009) and Fearon and Laitin (2003). In this set of analyses the effects of oil income per capita were substantively identical to those with the lower threshold presented in Table 4. However, the effects of rent leverage diverged in some ways. Appendix 1 presents these results.[20] Model 1 suggests that countries with higher rent leverage measures by a unit change are about 71% less likely to suffer a major civil war onset. However, the same unit change in any individual country's rent leverage renders it nearly five times as likely to suffer civil war. Because these models control for economic growth, this contradictory finding is not because the denominator in the rent leverage indicator (per capita income) has dropped substantially. Seeking the reason for this, I discovered that it is a function of which time period we are addressing. The contradictory effects discussed above are only apparent during the years between 1960 and 1980: the period during which, as Andersen and Ross (2014) note, oil nationalization had not yet become widespread and producing countries controlled little of the revenue. After 1980, when nearly every oil producer in the world had nationalized its oil sector, the effect vanishes. It is unclear just how this change worked causally, but alongside the later anti-democracy effect outlined by Andersen and Ross suggests a time dynamic for conflict as well.

A second set of robustness tests explore whether there could be non-linear, and in particular inverted U-shaped, relationships between oil wealth and various outcomes. Appendix 2 reports the results of these tests. In short, in only one case does there appear to be a curvilinear relationship at work, and that is in the case of regressing autocratic breakdown on oil abundance. In this case, presented in model 4, Appendix 2, autocratic regimes with lower levels are substantially more prone to breakdown (with the risk increasing by 35% per unit change), while ones at the higher end are less so but with a smaller net stabilizing effect of 6%.[21]

Conclusion

I have endeavored to make two points here. The first is that, by accounting for the context-relative impact of oil-driven political influence, it is possible to construct a better measure of the political effect of oil wealth—what I term *rent leverage*. The measure accounts for numerous dynamics, is sensitive to what different levels of oil wealth mean in different settings, and is conceptually closer to the concepts prevalent in current scholarship. It is also easy to calculate and widely available, qualities whose importance Ross (2012) has to my mind rightly noted. It also focuses our attention on the theorized mechanism linking oil wealth to politics that has substantially stronger support in the extant literature, unlike the weak state or

rentier state variant that has come under wide criticism. The exploration of cross- vs within-country effects of oil income and rent leverage suggests that future research would benefit from a consistent effort to explore these dynamics. Isolating cross-country from within-country effects, for one, promises to help uncover the extent to which oil revenues' entry into particular settings may simply magnify sociopolitical traits already in place vs producing cross-national variation.

Second, rent leverage exerts a strong political stabilizing influence across the board, insulating those at the commanding political heights from substantial regime shifts while having little effect on violent internal conflict outbreaks. That this relationship persists across both autocracies only and regimes more broadly suggests a need to unpack the links further and to broaden our thinking on "regimes" beyond a democracy–autocracy dichotomy. In an era of electoral authoritarian, competitive authoritarian and hybrid regime studies, with many of the world's governments falling into these intermediate categories, my sense is that we are better off looking for systematic links between oil and regime longevity across all regimes than exploring whether different mechanisms link the two under different forms of rule. One powerful implication of the analyses here that account for state capacity and human rights protections is that, even under autocracy, coercion has no significantly stabilizing effect. It implies a need to begin exploring other potential roots of the oil–stability nexus. One of course is in state capabilities. Another is social spending, which could take the form of blunt short-term side payments (viz. Saudi Arabia in early 2011 in response to the Arab Spring uprisings) or longer-term ones (Brunei's cradle-to-grave health care and social services guarantees).

Finally, there appears to be no meaningful relationship between oil wealth—however measured—and the onset of civil war. This finding, based on situating the new measure in a highly robust baseline model as well as on an arguably better measure of oil wealth itself, runs counter to the "resource trap" that Collier (2007) and others have built around the experiences of a few spectacularly (not representatively) conflict-prone oil producers. Pointing this out is not to valorize the impact of an oil-driven economy, however. That oil stabilizes politics means neither that it stabilizes normatively desirable politics nor that it has a positive impact on all political outcomes. Rather, shedding light on this aspect of the politics of oil wealth serves simply to suggest that we may do better in terms of policy relevance if we focus our attention away from assumptions that oil is a destabilizing "curse" and toward improving the transparency surrounding its extraction and sale. Finally, by suggesting an alternative measure to per capita oil income, and making that alternative measure publicly available and easy to calculate, we are better situated to build on the results of other scholars of the politics of resource wealth.

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Notes

1. Replication data, the Appendices to the article, and other replication files data are archived at my page on Harvard's Dataverse (https://dataverse.harvard.edu/dataverse/bensmith).
2. United Nations Conference on Trade and Development (2013). Hereafter when I refer to "oil wealth", I mean both oil and natural gas.
3. For reasons of space I restrict the analyses in this essay to a focus on stability and conflict outcomes, noting below how they may inform ongoing and future research linking oil wealth to regime type, economic performance and other phenomena.
4. There are a number of other possible elements of oil wealth—among them regional location within countries or offshore vs onshore location, and price volatility—that I do not explore here. For that reason these results should be taken not as a final word on the oil–stability relationship but as an effort to explore the national-level effects of both resource abundance and resource dependence. Thanks to an anonymous reviewer for making this case clearly and convincingly.
5. Thanks to an anonymous reviewer for pushing me to be clear on the mismatch between solid theories and concepts and less solid measures for them.
6. Thanks to an anonymous reviewer for encouraging me to explore this further.
7. See for example the table listing 49 substantial oil producers on pp. 20–22 of Ross (2012). OPEC's current membership at one dozen thus leaves out more than three times as many producing countries.
8. There are issues with taking a single natural gas price and applying it globally. See Appendix 3. The more that liquefied natural gas becomes available for export, the more likely it is that prices will converge.
9. To take one causally complex example from Iraq, the ouster of Saddam Hussain's Ba'ath Party regime during the US–British invasion in 2003 led to a regime change that among other things threw Arab–Kurdish relations into disarray. One offshoot of that was a substantial drop in production (fuel rents per capita) in Iraqi Kurdistan for some years, followed by a return to production capacity that has since been subject to center-region politics that halted production entirely for several months in early 2012. The point is simply that recursive causality between production and politics is ubiquitous and inescapable.
10. See Deaton and Heston (2009) for a discussion of the method used to derive the PWT PPP measures.
11. See for example Asea and Corden (1994), Froot and Rogoff (1994), Kim (1990) and Rogoff (1996). Some scholars have shown that the PPP effect has manifested more recently—as of roughly 1970 with the end of Bretton Woods—but this would actually dovetail with what Ross (2012) has demonstrated, namely that the political effects of oil began about then with the wave of oil sector nationalizations in exporting countries.
12. Ross's data are publicly available at http://dvn.iq.harvard.edu/dvn/dv/mlross. I would issue a note of collective gratitude for this gesture and wholeheartedly echo his thoughts on scholarly transparency (Ross, 2012: 23).
13. Thanks to Robert Inklaar of the Penn World Tables project for helpful suggestions on this calculation.
14. Results using the PPP corrected data are available from the author.
15. Thanks to Glenn Palmer for suggestions on this.
16. The range in logged measures here is roughly half for rent leverage what it is for oil income (5.1 as opposed to 11.4) so in comparative terms the magnitude of effect could be halved for rent leverage to obtain a direct comparison to oil income.
17. I limit my conclusions here to national-level results intentionally. Until we employ the same more precise indicators at sub-national levels we will not know whether we can say with confidence that the same dynamics obtain.

18. As noted above, since the effective range of logged oil income is roughly twice that of rent leverage, we normalize their respective effects by doubling the inverse odds-ratio of oil income.
19. It is quite plausible that this relationship reflects some endogeneity—that is, that regimes facing little threat will see little need to use coercion. In any case, the relationship contradicts a main tenet of the oil–repression hypothesis.
20. As mentioned above, the Appendices are archived at https://dataverse.harvard.edu/dataverse/bensmith.
21. Thanks to an anonymous reviewer for encouraging this set of robustness tests.

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