Drill, Baby, Drill: The Political Economy of Oil Exploration

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Abstract

While a great deal of literature evaluates the existence of a resource curse or blessing with respect to democratic outcomes, only recently have scholars paid attention to the natural resource discovery process itself. What drives countries to search for and find resources? Building on recent work touching on this relationship, I model resource discovery effort, operationalized by wildcat oil wells, as a consequence of regime type differences. I examine the effect of autocracy/democracy on attempts to discover oil using event models, finding a robust relationship between drilling activity, autocracy, and oil reserve size. I then explore the effect of basic regime categories of autocracy and democracy, finding no predictable relationship between a rough proxy for regime centralization and wildcat drilling.

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The debate about the existence of a resource curse, or more recently, a resource blessing, on regime type currently rages.[1] Does resource wealth cause autocracy, conflict, and war? The volume of literature on the subject has exploded in recent years, drawing contributions from both sides of the intersection of economics and political science (Ross 2001, Smith 2004, Dunning 2008, Haber & Menaldo 2011, Ramsay 2011, Ross 2012, Andersen & Aslaksen 2013).[2] In general, newer research attempts to achieve cleaner causal inference with their models or seeks to add new data that could enlighten their cross-national panels, with some new work finding a reduced or non-existent role of resources on autocracy (Haber & Menaldo 2011). The specifics of that literature are beyond the scope of this paper, but it suffices to say that there is a huge amount of disagreement on the subject.

By contrast, the resource discovery and exploitation process has, I suggest unjustly, attracted little interest in and of itself. The exception is work by Cotet & Tsui (2013), who use the determinants of resource discovery as an instrument in order to causally identify their equations predicting autocracy/democracy (See also Tsui 2011, Tsui 2013). They model resource discovery in the process, finding that "oil explorations seem to be more successful in more populated and less democratic countries" and that "oil drilling is more common in democracies and during times of peace," and that both occur significantly more often in countries already generating significant oil wealth (Cotet & Tsui 2013, 68,73). The authors, however, are primarily concerned with the main plank of this debate, resource impacts on democracy and conflict. Answering questions about variables associated with resource discovery is largely a sideline. In particular, they find that discovery is in the main a random process generated by exogenous, geologically and world economy determined, country factors. Due to this focus, despite their impressive work and data collection, significant questions remain about the determinants of resource discovery.

Why does the process of resource discovery matter, outside of its potential democ-

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[1]When referring to this general literature in the rest of this paper, I will refer to it as the resource curse literature as a shorthand, while recognizing the possible existence of a research blessing.

[2]Ahmadov (2013) provides an excellent overview of the null and positive findings of this literature.

racy/autocracy effect? I argue that while many current findings go back and forth about the existence of a resource curse on democracy and conflict, the tendency to concentrate on these questions obscures other important political economic consequences of resource discovery. I contend that factors causing the emergence of the rentier state, regardless of its regime type or conflict impact, create wholly altered incentives for domestic political leaders. Political factors inducing resource search effort, therefore, have a profound long term governance and political economic effect, changing the structure of affected governments and economies after initial discoveries. Predicting resource search and success is, therefore, normatively important without reference to any of its democratic or conflict consequences.. Further reinforcing this view is that one of the strongest determinants of resource discovery is, in fact, previous discovery (Cotet & Tsui 2013). This suggests the possibility of a feedback loop in the discovery of resources: countries discovering natural resources will orient themselves towards finding additional resources. It is imperative, therefore, to know how countries get into the rentier state loop in the first place.

My analysis starts by replicating Cotet & Tsui's (2013) findings using wildcat drilling data. These results indicate that rentier states are significantly more likely to search for and find resources but show no effect of regime on drilling. From there, I flesh out the relatively sparse model suggested by the original authors with other variables I expect induce regime efforts to search for resources, combining their model with data used by Haber & Menaldo (2011) to specify a fuller model of resource exploration. With a more robust model, I find that autocratic regimes drill exploratory wells at a higher rate than democratic countries, suggesting that autocrats prioritize the pursuit of resources to divorce their regimes from taxpayers and secure regime stability relatively more than their democratic counterparts. Finally, I explore the role of centralization of regimes on search intensity. As a first cut, I expect that presidential regimes will be significantly more likely than parliamentary regimes to search for oil while monarchies and military rulers will be more likely to pursue resources than civilian authoritarians. My initial results are not promising and suggest a more sophis-

ticated theoretical framework is necessary.[3]

Taken together, my results suggest evidence of an over time path for resource dependent regimes. Autocratic and already resource rich regimes will be more likely to search for resources and, once they have found them, will then further intensify their efforts to find resources. This feedback could change the political economic structure of their economies, having substantial long term consequences. The results are highly preliminary, but imply the beginning of a larger research agenda answering which regimes seek resources.

Rentier States and Resource Discovery

Justifying a focus on the determinants of resource discovery are the profound consequences of resource discovery on the structure of the economy and government incentives, regardless of regime type. The most obvious consequence is a potential reduction in the reliance of rentier states on their populace for financial support. For all regime types, resources generate revenues which make leaders less dependent on taxation of their citizenry (Acemoglu & Robinson 2006, Smith 2008). A lack of reliance on taxpayers has profound effects on the economy, including the growth of property rights, institutions, and the credibility of the government to borrow and pay its debts (Stasavage 2003, Stasavage 2011). From the government's perspective, lessening financial reliance on citizens is desirable for all regimes, providing a baseline incentive to increase resource exploration efforts.

Having already experienced the benefits of reduced citizen reliance, I expect that resource rich states will continue down the path toward becoming a more resource dependent rentier state. Rentier states seek resources more intensely for practical reasons. In general, the cost of exploration is lower in states that already have resource wealth. States already experienced in resource extraction have a proven ability to extract resources. They invested capital in the tools to aid the collection of resources. Since the capital and expertise to drill oil or mine resources is usually durable, rentier states have the material on hand to efficiently search for

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[3]In future tests, I hope to test other regime characteristics such as ideological position of government, electoral cycle, and differentiation in oil industry interest structure.

new finds. As a result, I have a unidirectional positive expectation of the effort made by already dependent states to discover additional resources.

Furthermore, there are theoretical reasons to believe rentier state governing institutions become oriented toward finding, processing and selling resources. Their political survival, in fact, may depend on continued revenue generated by new finds. Taxation institutions, for example, may decay, leaving countries with no choice but to rely on continued resource discovery to function. The political consequences of the taps running out, for highly dependent countries, may be dire, regardless of regime type (Karl 1997). Haber, Razo & Maurer (2003), for example, provide a detailed case account of this phenomenon in early 20th century Mexico. They describe Mexican politician fears of "the political consequences of an empty treasury and of widespread unemployment among an easily mobilized constituency" (Haber, Razo & Maurer 2003, 191). Indeed, they describe an oil industry so central to the economy that oil producers had few concerns about what type of regime could potentially come to power in Mexico, as they all would all equally depend on oil revenue. In this way, rentier states wish to avoid a politically dangerous resource bust. As a consequence, I expect rentier states to devote considerable effort to additional search, ensuring that no stone is left unturned to find natural resource wealth in their borders.

Hypothesis 1. *States relying on resources will search more frequently for resources*

I operationalize this effect in three different ways in the context of petroleum extraction, since its measurement is a source of controversy in the oil curse literature. The first is straightforward: the amount of oil reserves per capita. While it may not be extracted immediately, a country with substantial existing reserves, regardless of the rate at which they are currently being withdrawn, may have already taken on the incentives of a rentier state. Leaders look to the future knowing that once the extraction capabilities come online, they will begin to see their revenues supplemented by resource wealth.

The second builds off the majority of the literature by measuring per capita income derived from resources (e.g. Dunning 2008, Ross 2012). It uses the amount of income drawn

from resources as a proxy for a status as a rentier state. While not perfect, there is often a reasonably correspondence between this measure and dependence on resources. Furthermore, raw income per capita, independent of economic size of the state, may be a more accurate reflection of resource importance to the state.

The concern, of course, is that per capita resource income may be essentially unrelated to actual state dependence on resources. In rich states, even large resource flows may not create dependence. As a consequence, oil income per capita may serve as a poor proxy for the presence of a rentier state. Another measurement strategy is more direct, but with far less case coverage: fiscal reliance (Haber & Menaldo 2011). This measure gathers data from government sources and calculates the percentage of government revenues derived from resources. This reflects the importance of the resource relative to the size of the economy, not simply the raw revenue generated.

Resource Discovery and Regime

While the theoretical expectations of what democratic and authoritarian states ultimately do with "unearned" income should differ, in what follows I outline incentives created by resource revenue on both democratic and authoritarian regimes. I then generate competing hypotheses about resulting impacts on government search behavior.

For authoritarians, resources may enable the regime to become fiscally separated from the need for public resources generated by income taxation, which makes authoritarian rule easier and more predictable (Ross 2001). As a consequence, authoritarian regimes may place exceptional value on the ability to disburse resource rents to their winning coalition while otherwise paying off or ignoring the preferences of the rest of their citizens. Indeed, previous studies indicate that natural resources have a variety of desirable effects for authoritarians. Resource rich authoritarian regimes appear to experience longer political survival, while democracies do not receive similar effects (Andersen & Aslaksen 2013), authoritarians are able to keep populations placid and quell civil tensions (Smith 2004) and they are able to

fuel their own conflicts for longer periods using natural resource revenues (Lujala, Rod & Thieme 2007).

With these potentially significant rewards accruing to authoritarian regimes that discover resources, it is possible that autocrats will make additional efforts to search for resources relative to democrats, devoting more time and energy to the search. Furthermore, authoritarians may also be more capable of finding beneficial resources. Without a general public's preferences to balance against the desire of resource acquisition, authoritarians can ignore potential roadblocks to resource exploitation. Environmental rules may keep more democratic countries from finding and exploiting sources, for example, or authoritarians may be more willing to violate citizen property rights in order to maximize the chance of natural resource discovery than democratic regimes. Potential differences in effort and ability between regime types lead to hypothesis .

Hypothesis 2. *Authoritarian states will search more frequently for resources*

On the other hand, there is also theoretical reason to believe that there is no difference in regime type and the pursuit of natural resources. While authoritarians can take rents directly for themselves, earning private gains without dependence on taxation, democracies are also able to supplement their budgets and potentially reduce taxes with found resources (Dunning 2008). The logic of representative democracy suggests that incumbent governments always consider reelection when making decisions, and that the chances of reelection are conditioned by proposed tax rates and government service levels. Natural resource funds give democracies more budgetary room to work with, potentially cutting taxes or doling out public and private goods to supporters and swing voters in order to ensure reelection (Golden & Min 2013). It is equally possible there is little difference between the benefits accrued to democrats and authoritarians by resources, given the incentives for both to use those resources to ensure government popularity and therefore survival. If this counter-logic holds, there should be no relationship between regime type effort and effort to discover resources.

Hypothesis 3. *Authoritarian and democratic states expend identical effort in the search for resources*

In order to oeprationalize the effect of regime type on the discovery of resources, I use the Unified Democracy Scores, a continuous measure of democracy (**?**). The UDS synthesizes the information from many different democracy measures into a single measure, ranging continuously from approximately -3 to 3. I use mean UDS scores to measure level of democracy and its impact on search effort.

Discovery Effort by Regime Subtype

At this early stage, my theoretical expectations are limited about other valid political characteristics. Unfortunately, my current tests resemble more of a data exploration than a fully fleshed out theory underpinning the commonalities in political characteristics inducing search effort. Nevertheless, I start with a straightforward expectation: countries with power concentrated in the executive should seek resources with greater intensity, and the smaller executive, the greater the incentive to find resource. I suggest that this is due to the increased potential for private benefits for the government. The executive branch generally oversees the day to day operation of most state run and monitored extraction and therefore has the most to gain from discoveries, in both private and public benefits. An executive with power concentrated in a single leader, or a smaller group of authoritarian insiders, stands to benefit more than a less centralized regime power structure. This leads to the following hypotheses, roughly proxying the centralization of power and size of the executive in democratic and authoritarian regimes:

Hypothesis 4. *Among democracies, presidential regimes will search more frequently than parliamentary regimes.*

Hypothesis 5. *Among autocracies, monarchies and military regimes will search more frequently than civilian regimes.*

For these first cut models of political characteristic data, I turn to Cheibub, Gandhi & Vreeland's (2010) coding of regime type from 1946-2008. In particular, I use nominal coding of regime category. Democratic regime types divide into parliamentary, semi-presidential, and presidential democracy while authoritarian regime type is defined by civilian, military and monarchy. I use parliamentary democracy as the excluded category in testing.[4]

Controls

Most of the controls for drilling effort are non-political in nature and specific to the search for oil, the resource type chosen for the analysis. In particular, searching for oil is a function of variables associated with the expected payoff of drilling. The potential payoff is dependent on several measurable considerations, which I include in my models. First, countries may not see any geological reason to search for oil. Petroleum engineers know the general geological conditions that oil deposits occur in, making completely fruitless searching highly unlikely. To measure this effect, I include the log of estimated oil endowment in a given country. ASPO endowment data, described more fully in the data section, is based on geological estimates of discovered and undiscovered initial endowments within the territory of a country. In countries with less estimated oil, there is less incentive to explore. In addition, I include country area in tens of thousands of kilometers and log of population size in specifications. Larger countries with more citizens will have more places to drill, and more potential opportunity to prospect for oil reserves. Finally, price strongly modulates the incentive to drill for oil. When oil price is high, countries around the world should be more open to oil exploration projects and drilling, given its higher potential payoff. Furthermore, as price goes up, exploration of more expensive areas including seabeds or difficult terrain becomes feasible. Finally, I expect that recent new oil finds will encourage additional searches within a country, measured by log of lagged new oil reserves.

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[4]In future testing, I plan to use variables that more precisely measure concepts of centralization and opportunity to siphon private goods, as well as electoral, partisan, and institutional variables in democracies. The results here stand as a placeholder for additional analysis.

In addition, effort is also related to underlying economic characteristics. In particular, expensive, technical, drilling operations may best be executed in regimes with the capacity to support them. While drilling and extraction happens in low infrastructure regimes, it should be most effective in regimes with an environment that facilitates exploration. I proxy this capacity using the log of GDP per capita, expecting that higher GDP per capita countries will perform more wildcat drilling operations.

1 Operationalizing and Modeling Resource Discovery

Most of the data for this paper comes from Haber & Menaldo (2011) and Cotet & Tsui's (2013) generously documented, comprehensive, time series analyses of oil and the resource curse. Much of the operationalization of this data, intentionally, closely mirrors the form that Dunning (2008), Haber & Menaldo (2011) and Andersen & Aslaksen (2013) used in their tests. Oil, as an application of the resource curse, is a good fit because it is known to create huge rents to the government with little necessary participation by citizens, closely mirroring the proposed causal mechanism of the resource curse and the conditions ripe for resource reliance. Furthermore, from a practical perspective, the data on changes in its discovery are exceedingly well documented throughout the 20th century. Descriptive statistics for all variables are contained in Table 1.

In general, the primary divergence between this study and previous authors considering the resource curse is a refocus of the theory and data on an explanation of resource search. Essentially, I am interested in what causes resource reliance rather than the specific consequences of reliance. In order to test the determinants of resource search, I employ recently released data provided by the ASPO, the Association for the Study of Peak Oil (Tsui 2011, Cotet & Tsui 2013). ASPO data provides information about oil production and reserves for 62 of the world's top oil producing countries from 1930-2003. ASPO generates estimates of country oil endowment generated based on geological estimates, giving some

Table 1: Descriptive Statistics

	Mean	Std Deviation	N
Wildcats	46.973	473.134	8814
New Discoveries	0.179	1.878	8814
Total Oil Endowment	14.294	40.909	10320
Log(Oil Reserves/cap)	-0.121	0.095	7006
Crude Oil Price	43.237	33.369	13114
UDS Democracy	0.001	0.976	9850
Oil Income/cap	343.042	2645.721	14729
Fiscal Reliance	21.467	29.619	1817
Log(Population)	0.089	0.015	10033
Log(GDP/capita)	0.079	0.011	9118
Land Area	78.3365	199.2731	13280

exogenous sense of the desirability and likelihood of success for oil exploration in a given country.[5] Furthermore, ASPO provides estimates of amount of oil reserves discovered, in thousand million barrels, that, unlike publically available data, is not country self-reported.

Critically, ASPO provides a useful approximation for country search effort, number of wildcat drilling operations initiated to search for oil in areas without previous drilling. As a result, the variable measures exploration effort directly, omitting small efficiency improvements in current extraction or relatively straightforward exploration of current well areas. Wildcat wells indicate often expensive exploration efforts with a real chance of success and failure. Countries searching harder should attempt, or allow large oil MNCs to attempt, more wildcat drilling. The data is not representative of every country in the world because ASPO data only covers 62 countries. It excludes many non-oil producing countries who would not have bothered with exploration in the first place. This has the potentially beneficial effect of taking a number of countries out of the data that never would have drilled because oil was never realistically going to be found in their countries, reducing overdispersion and the number of meaningless zeros in the data.

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[5]Unfortunately, this value is not updated every year as oil is extracted from the ground, so it remains a proxy. Ideally, I would include an estimated amount remaining in the ground, rather than a static initial endowment.

Using attempts to discover oil (wildcats) as a dependent variable, I seek to determine what types of states are trying harder to find oil. For the purposes of modeling wildcat attempts, a form of events data, I use negative binomial regression.[6] The data's overdispersion, with significant numbers of zeros along with intense drilling, rules out the use of poisson specifications. Finally, reserves and political regime data is available for virtually all countries and years post-1943, so all of my statistical tests will be on a sample from this period.

I control for unobserved static variation in countries in the negative binomial regression using random intercepts for countries. My choice of a random intercept for country specific effects is dictated by the presence of a number of observations that do not wildcat, meaning fixed effects would correlate perfectly with the dependent variable and be dropped. Fixed effects would also not allow for the use of time invariant variables and controls (e.g. institutional variables, endowment). Since this is valuable information, given that the sample contains only countries that are oil producers, I use an alternate statistical solution. All specifications also include 10 region dummies, accounting for regional differences in the importance of oil exploration (e.g. Middle East) and between country learning within regions. All variables are lagged, using previous year information to predict current year wildcat searches.[7]

2 Predicting Country Oil Search Effort

To begin, I replicate the Cotet & Tsui (2013) models predicting drilling effort in Model 1 of Table 2. My models, however, predict number of wildcats drilled rather than a drilled/no drilling country indicator. My negative binomial findings are not fully consistent with their binary models predicting the probability of drilling any exploration wells. While all other variables are the same direction and significance level, my specification suggests that democ-

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[6]Models yielded substantively similar results when logging the events data and using similar specification linear regressions with clustered standard errors.

[7]The exceptions are land area and total oil endowment.

Table 2: Predicting Frequency of Wildcat Drilling

	Model 1	Model 2	Model 3	Model 4
UDS Democracy	-0.044	-0.145***	-0.360***	-0.145***
	(0.035)	(0.046)	(0.069)	(0.046)
Log(Oil Reserves/cap)	11.538***	10.285***	13.032***	10.280***
	(0.764)	(0.780)	(1.555)	(0.799)
Crude Oil Price	0.004***	0.003***	-0.002**	0.003***
	(0.000)	(0.000)	(0.001)	(0.000)
Oil Income/cap		0.000		0.000
		(0.000)		(0.000)
Initial Oil Endowment		-0.006***	-0.008***	-0.005***
		(0.001)	(0.002)	(0.001)
Log(New Oil Finds)			0.292***	0.294***
			(0.051)	(0.034)
Log(GDP/capita)		38.920***	43.741***	36.889***
		(4.082)	(7.956)	(4.177)
Log(Population)		5.054	-10.400	9.742***
		(3.088)	(6.335)	(3.258)
Area		0.001***	0.005***	0.001***
		(0.000)	(0.002)	(0.000)
Fiscal Reliance			0.003*	
			(0.002)	
Semi-Presidential				-0.466***
				(0.110)
Presidential				-0.389***
				(0.105)
Civilian Dictatorship				-0.542***
				(0.108)
Military Dictatorship				-0.219**
				(0.109)
Royal Dictatorship				0.620***
				(0.160)
N	5265	5175	768	5155

Dependent variable number of wildcats drilled. Model estimated using negative binomial regression, including random intercepts for country and dummies for region (coefficients omitted). Coefficients presented and, in parentheses, standard errors.

* p-value less than .10

** p-value less than .05

*** p-value less than .01

racies are less likely to explore rather than more likely, but with no statistical certainty. On the other hand, as they find, states with larger oil reserves drill more wells, and periods with a high oil prices induce more drilling. I argue, however, that this specification is relatively sparse and does not necessarily account for other processes inducing country search effort. The underspecified model understandable given that discovering what modulates country effort to find resources was not the focus of previous scholars' efforts.

In Model 2, I account for the processes hypothesized to generate increased country resource search effort. First, there is a significant and positive effect of possessing existing oil reserves on your probability of drilling more wildcats in previously unexplored areas, supporting hypothesis 1. After accounting for a wide variety of other reasons a country might drill, a standard deviation change in oil reserves predicts a state will drill approximately one additional wildcat well.[8] Interestingly, the inclusion of an additional measure of the extent of rentier state incentives used by Dunning (2008), oil revenue per capita, yields no significant effects in Model 2. This suggests leaders make decisions looking ahead, based on unrealized future gains, because reserves, not current revenue earned from current production, generates additional incentives to find resources. In Model 4, I test this effect using another variable, this one constructed by Haber & Menaldo (2011). They measure the fiscal reliance of the state on resource revenue, weighing the relative importance of resources in the country's economy. Unfortunately, their measure is only available for a limited set of countries, making the sample size quite small for the test. Nevertheless, the variable performs as expected and is statistically associated with increases in government wildcat drilling efforts.

Controlling for other covariates reveals an association between autocracy and rate of wildcat searches. In Figure 1, I graph the predictions generated Model 2 from the minimum (-2.1, Saudi Arabia) and maximum (2.1, Netherlands) UDS democracy scores in the model's sample. Unfortunately, the figure reveals that the predicted effects are substantively modest, at best, with a predicted decrease of wildcat events of around .3 moving from the minimum

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[8]Predictions set all other variables at their means.

Figure 1: Effect of UDS Number of Wildcats
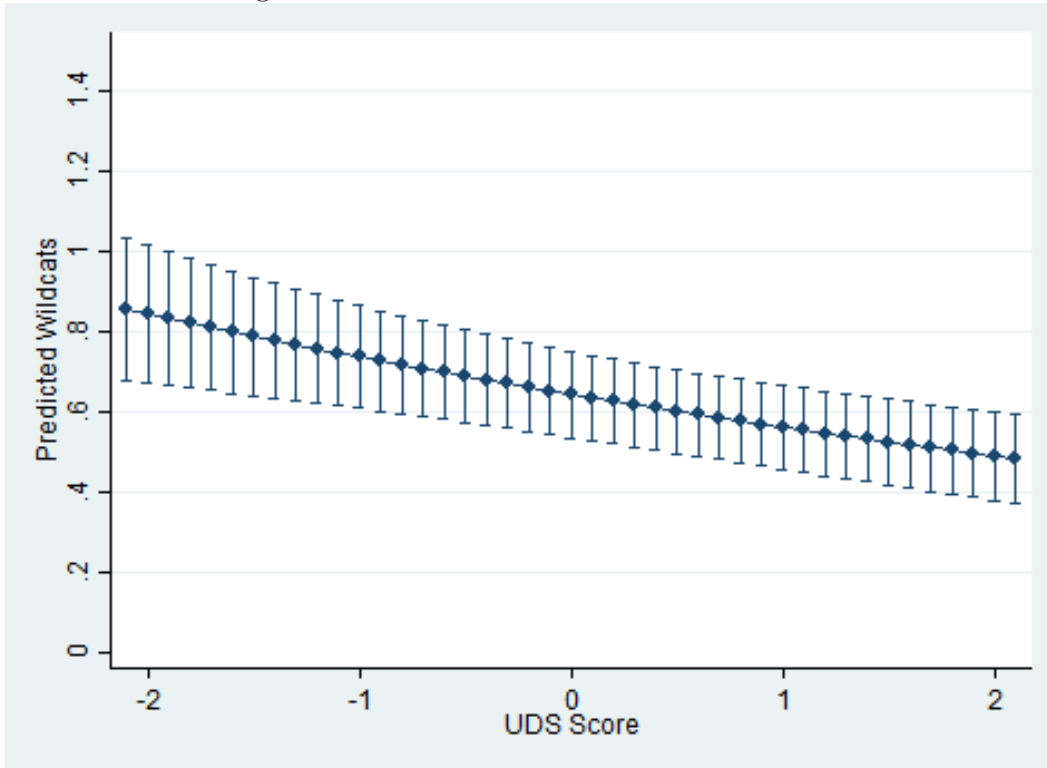
to the maximum UDS scores. While there is statistical support for an autocratic incentive to drill, it is not terribly substantively important given the size of the mean and standard deviation of the wildcat variable. This may not be surprising given the amount of control exerted in the model specificaton (random effects, region dummies, extensive economic controls), but it is disappointing nonetheless.

My controls function as anticipated in Models 2-4. GDP is associated with higher drilling rates and countries with large areas drill more wildcats. The exception, violating my expectations, is the variable representing a geological estimate of the initial endowment of oil. Larger initial endowment predicts lower drilling activity. The measure is intended to proxy for the likelihood of success of drilling, which should be positively associated with wildcats. The interpretation of this result is unclear, as it is possible that countries with a great deal of oil are able to quickly extract large quantities from a few existing wells without the need to continue wildcat exploration. A variable that accounts extraction and calculates current,

14

yearly, amount of oil in the ground is needed.

Finally, as an initial cut at distinguishing regimes from one another according to their centralization, Model 4 includes regime category variables in an otherwise identical specification to Model 2. The results are surprising and certainly not in line with a priori expectations. All coefficients are in relation to the omitted category of parliamentary regimes. It appears that not only presidential regimes but also civilian and military autocratic regimes drill significantly less than parliamentary regimes—my hypothesized lowest seeker of resources.[9] The only result consistent with my expectations is that monarchies appear to be the most likely to engage in oil exploration by a considerable margin. Model 4 makes it is clear that regime type characteristics unrelated to democracy/autocracy requires a great deal more theorizing than this categorical operationalization, as a simple centralization ordering of types does not effectively explain differences.

3   Conclusion

I argue that the processes that generate a rentier state are important and deserve study independent of a potential resource curse. The rentier state represents a reorganization of the traditional role of the state, and as such, stands on its own as a political economy topic. While the traditional focus of resource work centers on the normatively attractive issues of democracy and conflict, that exclusive focus undersells the outstanding underlying theoretical questions related to the generation of resource dependence patterns. In particular, statistical associations explored in this paper raises the possibility of a feedback loop: countries that find oil will have a resulting comparative advantage in the search for oil in the future and may reorient their countries to depend on oil revenues. Country incentives generate increased exploration activity, digging the state deeper into resource dependence, until presumably the taps shut off and political and economic crisis follows. While my re-

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[9]Note that presidential regimes along with civilian and military dictatorships are statistically indistinguishable from one another.

sults do not track such patterns explicitly, the main findings argue for more study of this phenomenon.

In addition, I find a correlation between regime type and resource exploration. While both democrats and autocrats can put resource wealth to good use, it appears to be particularly imperative for authoritarians to divorce themselves from the public in order to ensure their continued survival. Authoritarians therefore have reason to select themselves into the rentier state loop.

On the other hand, there are several reasons to be highly skeptical of the findings presented here, though the main effects appear robust to a variety of specifications. First, the substantive effects generated by the models are small—predicting differences of only a few events on skewed dependent variables with tremendously large extremes. Furthermore, the model lacks a coherent theoretical framework, outside of its exploration of rentier and autocratic incentives, to explain differences between countries in search intensity. The data here is all for producers who at some time or another found oil—why is there such significant difference in search effort between similar types of democratic and authoritarian regimes? I only touch on these questions superficially, leaving a huge theoretical gap open for future work.

Finally, resource search effort only tells part of the story of the development of the rentier state. Factors driving the success of searches must also be accounted for. Unless success of finding oil from an exploratory well is random, something implictly assumed in this paper, wildcat exploration figures could be a highly misleading picture of what creates a dependent states. It is a strong possibility that some regimes are doing more with less. Indeed, perhaps some countries inefficiently sink countless wildcat wells, unlikely to find anything, while other observations in the data sink 20-30 with near certainty. My model suggests that the first type of country is more likely to become a rentier state than the efficient type. While the increasing globalization of expertise in the oil industry suggests that this sort of non-random difference between countries could be unlikely, it is nevertheless possible and would render

16

findings here incomplete, at best.

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