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Publication Date
2014-06-20

Peer reviewed

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Annu. Rev. Polit. Sci. 2015. 18:239–59

First published online as a Review in Advance on December 18, 2014

The *Annual Review of Political Science* is online at polisci.annualreviews.org

This article's doi: 10.1146/annurev-polisci-052213-040359

Keywords

democracy, democratization, civil war, institutions, corruption, natural resources, oil

Abstract

Since 2001, hundreds of academic studies have examined the "political resource curse," meaning the claim that natural resource wealth tends to adversely affect a country's governance. There is now robust evidence that one type of mineral wealth, petroleum, has at least three harmful effects: It tends to make authoritarian regimes more durable, to increase certain types of corruption, and to help trigger violent conflict in low- and middle-income countries. Scholars have also made progress toward understanding the mechanisms that lead to these outcomes and the conditions that make them more likely. This essay reviews the evidence behind these claims, the debates over their validity, and some of the unresolved puzzles for future research.

INTRODUCTION

Does natural resource wealth lead to political dysfunction? From 2001 to 2013, hundreds of academic studies addressed this question. There is now considerable evidence that under certain conditions one type of resource wealth—petroleum—tends to produce a "political resource curse."

The resource curse might be defined as the adverse effects of a country's natural resource wealth on its economic, social, or political well-being.[1] The term was first used in print by economic geographer Richard Auty in 1993 (Auty 1993). Over the last decade it has been used by both scholars and policymakers to explain a wide range of maladies in resource-rich countries, particularly in Africa, the Middle East, Latin America, and the former Soviet Union. New initiatives to stop the resource curse have been launched by the World Bank, the G20, and the United Nations Development Program. Two multistakeholder agreements—the Kimberley Process Certification Scheme and the Extractive Industries Transparency Initiative—have been forged. Both the United States and the European Union have adopted new transparency laws that are explicitly designed to alleviate the curse in resource-exporting countries. Dozens of nongovernmental organizations, new and old, have devoted themselves to this issue.

The idea of a resource curse has also influenced many debates in political science—for example, on the causes of democratic transitions (Gassebner et al. 2012), the role of taxation in state-building (Brautigam et al. 2008, Smith 2008), the consequences of foreign aid (Bermeo 2011, Ahmed 2012) and the factors affecting the onset, duration, and severity of civil war (Fearon & Laitin 2003, Weinstein 2007). A large literature in economics asks how natural resource wealth affects economic growth (Wick & Bulte 2009, van der Ploeg 2011, Frankel 2012).

This review examines the political effects of resource endowments, particularly on government accountability, the quality of state institutions, and the incidence of civil war. It addresses three questions:

- What are the most robust findings on these issues?
- What are the major challenges to these findings, and how valid are they?
- What are the most important gaps in our knowledge?

I argue below there is strong evidence that one type of resource wealth—petroleum—has at least three important effects: It tends to make authoritarian regimes more durable; it leads to heightened corruption; and it helps trigger violent conflict in low- and middle-income countries, particularly when it is located in the territory of marginalized ethnic groups. The effects on authoritarianism and conflict appear to be recent phenomena, emerging after the 1970s.

There are three main debates about these effects. The first is about the conditions under which oil has these effects. Scholars generally agree that these effects are conditional and hence limited in scope, but there is no consensus over what those conditions are. A large fraction of the hypothesized conditions are measured in ways that are collinear, making it hard to distinguish among them. A second, related debate is over the mechanisms that generate these conditional effects, although on one issue—the relationship between petroleum and civil conflict—many studies now point to a similar underlying process.

The third debate is over whether the resource curse is real or illusory. Although most studies report evidence of some type of resource curse, a significant minority suggest that the appearance of a resource curse is a statistical artifact created by either endogeneity or omitted-variable bias. Others raise a second objection: that petroleum's damaging effects may be real but are counterbalanced by beneficial effects that are commonly overlooked.

[1] I use "oil" to refer to both oil and natural gas, and "resource (or oil) wealth" and "resource (or oil) abundance" to refer to the value of a country's natural resource (or petroleum) production, on a per capita basis.

Almost all research on the resource curse is based on observational data, which makes it hard to settle these disputes. It is also hard to adjudicate claims about phenomena that are poorly measured (such as the quality of institutions) or infrequently observed (such as civil wars). Still, I argue that the first objection (that the appearance of a resource curse is due to endogenous or omitted variables) is contradicted by a large body of evidence, whereas the second objection (that harmful effects are offset by beneficial ones) may sometimes be valid.

Some scholars have argued there is a fourth debate under way, in which those who believe resource wealth is unconditionally harmful and damages all states equally oppose those who suggest it is harmful only under certain conditions (Smith 2007, Morrison 2013, Waldner & Smith 2015). Yet it is difficult to find any academic study that defends the first position. It would be more accurate to note that there has been a shift in emphasis: Studies in the late 1990s and early 2000s paid more attention to identifying the average treatment effect of natural resource wealth on a population of states; more recent studies seek to explain why outcomes vary in the treated population. The two questions, however, are complementary parts of the same research agenda.

This essay points to issues that are still unresolved. These include the scope of the resource effect, the conditions under which it occurs, the mechanisms that explain it, and how it can best be remedied. Much attention has been lavished on the problem but virtually none on identifying solutions.

Most studies of the resource curse are constrained by the paucity of high-quality data. Some of the data that scholars most fervently covet—for example, on the true size and disposition of natural resource revenues, or the operation of state-owned petroleum companies—are often concealed or misreported by governments. Until recently, most studies have been based on the statistical analysis of large datasets with a single observation for each country and year—datasets that have been mined up to (and perhaps beyond) the point of diminishing returns. There is a promising trend toward subnational research, where the data are often better and identification strategies more convincing. Yet not all questions are amenable to subnational tests; the effect of resource wealth on authoritarian durability, for example, is exceedingly hard to test with subnational data.

The next section looks at how studies of this issue define and measure the "resource" part of the "resource curse." The following three sections summarize research on the ways that natural resources affect key outcomes: democracy and democratization, the quality of government institutions, and the incidence of civil war. The final section looks at important puzzles for future research.

WHAT ARE NATURAL RESOURCES AND HOW ARE THEY MEASURED?

Over the past two decades, scholars who study the resource curse have defined "natural resources" in dozens of ways. This is both good and bad: It means researchers have explored many potentially consequential dimensions of resource wealth, but it has also made it easy for them to shop among alternative measures to generate a given outcome.

There are three components to most definitions of "natural resources." The first is the type of resource. Early studies by Sachs & Warner (1995) and Collier & Hoeffler (1998) looked at broad measures of resources that included petroleum, other minerals, and agricultural commodities. Today, agricultural products are rarely seen as part of the resource curse—both because they are produced, not extracted (and hence fail to meet standard definitions of natural resources), and because they are seldom correlated with unfavorable outcomes. Relatively few studies have looked closely at the effects of nonfuel minerals (Sorens 2011), forest products (Price 2003, Harwell et al. 2011), and commodities more generally (Besley & Persson 2011, Bazzi & Blattman 2013).

Only one type of resource has been consistently correlated with less democracy and worse institutions: petroleum, which is the key variable in the vast majority of the studies that identify

some type of curse. A wider range of resources—including petroleum, gemstones, and other types of high-value minerals—have been linked to civil conflict. Several studies have tried to explain why different resources seem to have different political consequences, but no explanation has been subject to careful testing (Le Billon 2001, 2012; Ross 2003).

The second component identifies the salient quality of the resource. Common choices include the quantity of production, the value of production, the rents generated by production, and the value of exports. A smaller number of studies have looked at the value of petroleum or mineral reserves, petroleum discoveries, the number of workers employed in the resource sector, the depletion of the resource, and the government revenues it generates.

The final component is the method used to normalize these values. The analyst chooses whether to express the measured quantity as a fraction of GDP, a fraction of total exports, a fraction of total government revenues, by land area, or on a per capita basis.

These three components can be combined in dozens of ways to generate alternative measures of a country's natural resource endowment. There is no single "best" measure; different indicators focus on different kinds of resources and different properties of these resources, and hence can be used to evaluate different theories.

Some measures are endogenous to the outcomes they purportedly explain. For example, one common measure—oil export dependence, meaning petroleum exports as a fraction of GDP—is probably biased upward in poorer and more conflict-prone countries because they are typically too impoverished to consume the fuel they produce, causing them to export more than they otherwise would. On a per capita basis, the United States produces more oil than Nigeria, but Nigeria is an exporter whereas the United States is not because the United States is wealthier and consumes all of its oil domestically. This makes it hard to interpret, for example, correlations between oil export dependence and the frequency of violent conflict; both might be independently boosted by a country's poverty.

One of the most potentially important measures is also among the most difficult to obtain: government revenues from the extractive sector. States collect these revenues in a variety of ways: through royalties, corporate taxes, concession fees, transit fees, signing bonuses, in-kind payments, and revenues from state-owned companies. Different types of revenues may accrue to different arms of the state—such as oil and finance ministries, state-owned oil companies, and local governments—and may or may not be transferred to a central account. Governments can also hide their revenues in a variety of ways—for example, by understating the value of the fuel they sell domestically. Even second-best indicators, including the World Bank's nontax revenue measure, typically fail to capture much of this revenue.[2]

To circumvent these problems, scholars have turned to alternative measures. The value of oil production per capita (Ross 2008, 2012; Haber & Menaldo 2011), global price shocks (Besley & Persson 2011, Ramsay 2011), and the discovery of large oil fields (Cotet & Tsui 2013, Lei & Michaels 2014) have served as instruments or direct measures of resource wealth. Others have used data on oil reserves, oil depletion, or the number of drilling rigs in place, although these data are both poorly measured and often endogenous to the outcomes of interest (Laherrère 2003, Tsui 2011).

Resource curse skeptics suggest that any measures that are influenced by local decisions about resource extraction—like the value of oil production, oil exports, oil revenues, or oil reserves—might be endogenous to the outcomes we care about, such as authoritarian rule, state weakness,

[2]A major new dataset developed by the International Center for Taxation and Development on natural resource revenues, released in mid-2014, is designed to surmount several of these problems (Prichard et al. 2014).

or violent conflict. If any of these maladies cause countries to discover more oil, or extract their existing reserves more quickly, observers could make biased estimates of the effects of oil wealth and receive the incorrect impression of a resource curse (Haber & Menaldo 2011, Wacziarg 2012).

Yet empirical studies consistently show that the opposite is true: Bad political conditions lead to less oil exploration and production, not more. Bohn & Deacon (2000) demonstrate that countries with undemocratic institutions and endemic conflict tend to be poor investment risks for extractive firms; hence these countries tend to have both less exploration and slower extraction rates, a finding consistently echoed by later studies (Cotet & Tsui 2013, Cust & Harding 2013, Poelhekke & van der Ploeg 2013, Metcalf & Wolfram 2014).

The rich democracies have about ten times more foreign investment in all types of mining, per square kilometer, than either the developing world or the countries of the former Soviet Union (Ross 2012). Thanks to these larger investments, recorded mineral assets are about 12 times greater per capita in the high-income democracies than in the low-income countries (van der Ploeg 2011).

Hence oil discoveries, reserves, and production tend to be biased downward in countries with less democracy and more conflict. If there were no resource curse, we should observe less oil wealth, not more oil wealth, in politically troubled countries.

RESOURCE WEALTH AND DEMOCRACY

Many books and articles have analyzed the relationship between resource wealth, especially petroleum wealth, and government accountability. Most are broadly consistent with the claim that higher levels of oil wealth make autocratic governments more stable, and hence less likely to transition to democracy.

Figure 1 summarizes the global relationship between oil wealth and democratic transitions between 1960 and 2008. The pattern suggests that the greater a country's oil income, the less likely it has been to transit to democracy. Countries that became democratic early and remained democratic—e.g., the Dominican Republic, Turkey, Portugal, and Spain—had little or no oil. A handful of countries with modest oil and gas wealth, like Bolivia, Romania, and Mexico, had more recent (and sometimes more erratic) transitions to democracy; but no country with more oil and gas income than Mexico has successfully become democratic since 1960. Most countries on the far right edge of the horizontal axis—states with lots of oil and no democratic transitions—are in the Middle East and North Africa; but the group also includes Russia, Angola, Gabon, Brunei, and Malaysia.

The connection between petroleum wealth and autocratic rule has long been described by scholars of resource-rich countries, particularly in the Middle East (Mahdavy 1970, Beblawi 1987, Crystal 1990, Bellin 1994, Gause 1994, Yates 1996, Chaudhry 1997, Vandewalle 1998). Early cross-national quantitative studies include Barro (1999) and Ross (2001a).

The core finding that more oil wealth is associated with less democracy has been replicated many times, using better data and increasingly sophisticated methods; recent studies report it is robust to the use of country fixed effects (Aslaksen 2010, Tsui 2011, Andersen & Ross 2014) and instrumental variables (Ramsay 2011, Tsui 2011). An extreme bounds analysis identified oil dependence as one of the few robust correlates of regime types (Gassebner et al. 2012). A statistical meta-analysis of the oil–democracy question, which integrated the results of 29 studies and 246 empirical estimates, concluded that oil had a negative, nontrivial, and robust effect on democracy (Ahmadov 2014). Prichard et al. (2014) revisit this issue, using a new and much-improved cross-national dataset on resource revenues and a wide range of econometric tests; they report that government revenues from natural resources have a large, statistically robust effect on autocratic persistence.

Much of this research has tried to clarify the conditions under which petroleum wealth has these antidemocratic effects. There are two broad possibilities: Oil could strengthen authoritarian

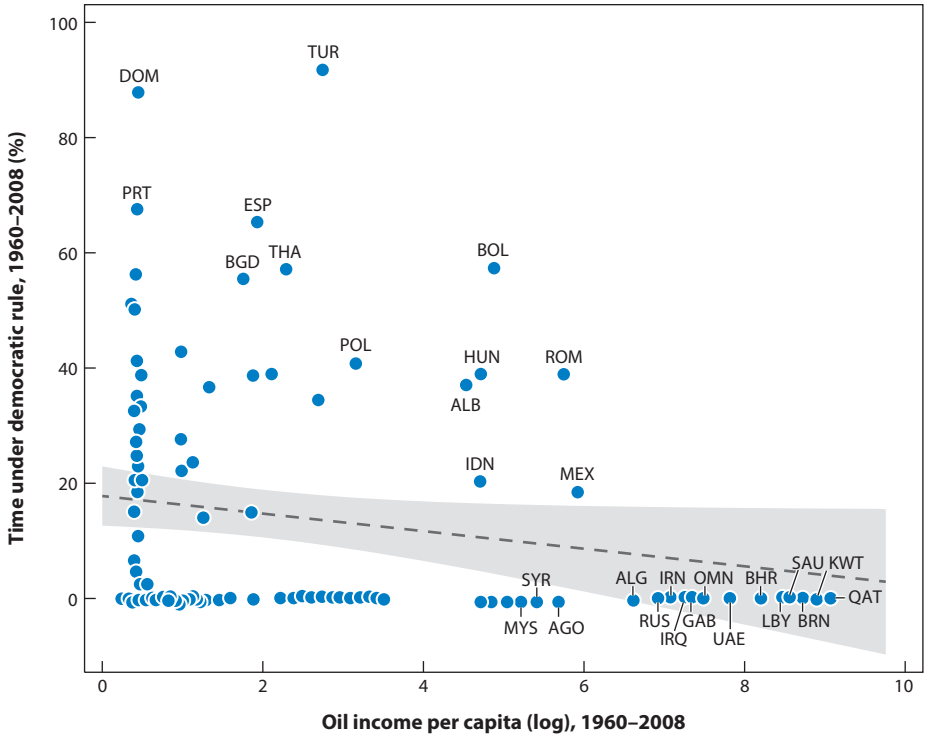

Figure 1

Oil and transitions to democracy, 1960–2008. The figure shows all countries that could have made transitions from authoritarianism to democracy during the period—including the 61 countries that were under authoritarian rule in 1960 plus the 43 countries that became independent after 1960 and were under authoritarian rule in their first year of independence. The values on the horizontal axis represent each country's mean oil income per capita between 1960 and 2008; the values on the vertical axis denote the percentage of the time (since either 1960 or the first year of independence) that these initially authoritarian countries dwelt under a democratic government. Those that were continuously authoritarian have scores of 0%, whereas those that transitioned to democracy early and stayed democratic have scores approaching 100%. The dotted line shows the predicted values from a linear regression, and the shaded area represents the 95% confidence interval. Data on oil income per capita are from Ross (2012), and data on democratic transitions are from Cheibub et al. (2010). Abbreviations: AGO, Angola; ALB, Albania; ALG, Algeria; BGD, Bangladesh; BHR, Bahrain; BOL, Bolivia; BRN, Brunei Darussalam; DOM, Dominican Republic; ESP, Spain; GAB, Gabon; HUN, Hungary; IDN, Indonesia; IRN, Islamic Republic of Iran; IRQ, Iraq; KWT, Kuwait; LBY, Libya; MEX, Mexico; MYS, Malaysia; OMN, Oman; POL, Poland; PRT, Portugal; QAT, Qatar; ROM, Romania; RUS, Russian Federation; SAU, Saudi Arabia; SYR, Syria; THA, Thailand; TUR, Turkey; UAE, United Arab Emirates.

governments and prevent them from transiting to democracy; and it could weaken democratic governments and push them toward authoritarianism. Most studies of this issue find support for the first condition, but results are mixed on the second condition.

The first condition is also consistent with research on the survival in office of authoritarian leaders, rather than authoritarian regimes. Both Cuaresma et al. (2010) and Andersen & Aslaksen (2013) show that oil wealth prolongs the survival in office of authoritarian rulers; Andersen & Aslaksen also find that kimberlite diamonds have a similar effect, while alluvial diamonds and other types of minerals can reduce the longevity of authoritarian leaders and parties. Looking

exclusively at African states, Omgba (2009) finds that oil, but not other mineral resources, helps incumbents remain in office. Bueno de Mesquita & Smith (2010) report that natural resource rents help authoritarian leaders both avoid revolutionary threats and survive them when they occur.

Several studies also conclude that oil makes autocracies more autocratic, by reducing media freedom (Egorov et al. 2009) and forestalling the emergence of an authoritarian legislature (Gandhi & Przeworski 2007). According to Wright et al. (2015), increases in oil wealth help autocratic regimes ward off other autocratic challengers.

The impact of oil wealth on democracies is more ambiguous. One set of studies reports that oil has prodemocratic effects in democracies, either by making the governments more stable (and hence less likely to become autocracies) or by improving their democracy scores (Smith 2004, Dunning 2008, Morrison 2009, Tsui 2011).[3] Hence Smith (2004) argues that oil might be better characterized as "pro-regime stability" than "anti-democratic" as it helps both autocracies and democracies survive.

But a second group of studies finds no evidence that oil helps stabilize democratic regimes (Ulfelder 2007, Caselli & Tesei 2011, Al-Ubaydli 2012, Wiens et al. 2014) or rulers (Andersen & Aslaksen 2013). And a smaller, third group suggests that the effect of oil on democratic stability is conditional: It may stabilize democracies that are wealthy and have strong institutions but foster the breakdown of accountability in democracies that are poorer or have weaker institutions (Jensen & Wantchekon 2004, Ross 2012).

New insights on this issue have emerged from subnational studies in democracies and semidemocracies, including Argentina (Gervasoni 2010), Brazil (Brollo et al. 2013, Monteiro & Ferraz 2010), India (Asher & Novosad 2014), Iran (Mahdavi 2015), and the United States (Goldberg et al. 2008, Wolfers 2009). All these studies find that oil windfalls (or, in the Brollo et al. and Gervasoni studies, windfall-like federal transfers) tend to lengthen the terms in office of elected local officials.

Two of these studies also suggest that the heightened incumbency advantage is accompanied by a drop in the quality of candidates. In Brazil, Brollo et al. (2013) find that windfall-like federal transfers that are plausibly exogenous to local conditions simultaneously boost re-election rates and reduce the education levels of mayoral candidates. In mineral-rich regions of India, Asher & Novosad (2014) report that global price shocks lead to both incumbency advantages in local elections and more frequent victories by candidates with criminal records.

All seven subnational studies suggest that windfalls in democratic or semidemocratic settings have proincumbent effects. Whether this should be seen as stabilizing democracy or undermining it is, in part, a matter of interpretation.

Researchers have also tried to identify further conditions among autocracies that either temper or exacerbate the effects of oil. Several studies argue that much depends on a ruler's ability to capture the available resource rents (Snyder & Bhavnani 2005, Boschini et al. 2007, Greene 2010). Ross (2012) makes a similar argument and places it in a historical context. His work suggests that oil only gained strong antidemocratic powers in the late 1970s after most oil-rich developing countries nationalized their petroleum industries, which gave political leaders far greater access to the rents. From 1960 to 1979, oil states and nonoil states were equally likely to transition to democracy; after 1979, nonoil states were almost three times more likely to make democratic transitions (Ross 2012).

Dunning (2008) argues for a different type of conditional influence, suggesting that oil impedes democratization in countries with low levels of inequality, but hastens democratization

[3] Morrison (2009) does not focus on petroleum but a broader class of nontax revenues.

in countries with high inequality levels by alleviating the concern of wealthy elites that democracy will lead to the expropriation of their private assets. This is why, according to Dunning, oil had prodemocratic effects in Latin America but antidemocratic effects in the rest of the world. According to Smith (2007), the key intervening variable is the timing of the oil boom. If it occurs before an authoritarian regime has developed a strong ruling party or coalition, it is unlikely to create stability; if it arrives after the creation of a strong ruling party or coalition, it becomes more likely to foster authoritarian stability.

Many studies seek to identify the mechanisms that link more oil to less democracy. Perhaps the most common argument is for the "rentier effect": An abundant flow of oil revenues enables incumbents to both reduce taxes and increase patronage and public goods, making it possible for them to buy off a larger set of potential challengers and reduce dissent (Mahdavy 1970, Crystal 1990, Ross 2001a). An important assumption is that tax revenues and nontax revenues have different effects on authoritarian stability. When undemocratic governments impose heavier taxes (or reduce subsidies), they are often met with demands for greater accountability; when they gain higher nontax revenues, they are able to reduce taxation and hence attenuate these demands (Bates & Lien 1985, Ross 2004a, Brautigam et al. 2008).

Several studies have tested versions of the rentier mechanism with cross-national data. Morrison (2009) reports that nontax revenue is associated with enhanced regime stability in both autocracies and democracies, but through somewhat different avenues: It leads to greater social spending in autocracies but the reduced taxation of elites in democracies. According to Ross (2012), there is statistical support for the rentier mechanism in the available cross-national data, but the correlations are somewhat fragile, perhaps due to inaccurate and missing data.

A handful of studies have scrutinized the rentier effect with subnational data. McGuirk (2013) uses micro-level survey data from 15 sub-Saharan countries and finds strong within-country correlations between increased sums of natural resource rents, decreases in the (perceived) enforcement of taxation, and declines in the demand for democratic governance. One of the few field experiments on the resource curse, involving 1,863 villagers in Indonesia's Blora district, found that a "taxation" treatment led to increased monitoring of public officials but a "windfall" treatment did not (Paler 2013).

The rentier model assumes that resource wealth does not affect the preferences of rulers, only their fiscal capacity to act on these preferences. An alternative set of approaches—explored formally by Robinson et al. (2006), Morrison (2007), and Caselli & Cunningham (2009), and informally by Fish (2005)—suggests that resources affect the value that leaders place on remaining in office, rather than their capabilities. According to these models, the availability of resource rents makes incumbency more valuable, inducing a ruler to invest more in regime-preserving activities.

Many additional theories connect oil to either autocracy or incumbency. Oil-rich autocrats may invest more heavily in repression (Ross 2001a, Cotet & Tsui 2013) or spend more on the military to keep it loyal if an uprising should occur (Wright et al. 2015). Oil might help undemocratic leaders gain the foreign support they need to fend off challengers (Rajan 2011). The fixed quality of mineral resources could make it harder for elites in authoritarian states to transfer their wealth abroad, which could lead them to more vigorously oppose democratic reforms (Boix 2003). Oil rents could spur immigration, which may enhance the government's capacity to block democratic movements (Bearce & Hutnick 2011).

There have been three types of challenges to the claim that oil prolongs autocracies. The first comes from studies that test an alternative version of the resource curse. Most claims about the effects of oil focus on levels: Higher *levels* of oil wealth lead to more durable authoritarian regimes. Yet an equally interesting question is whether *changes* in levels of oil wealth lead to changes in levels of democracy. There is no reason to assume that levels and changes have identical effects.

For example, higher income levels are associated with an increase in the likelihood of a democratic transition, but changes in these levels (i.e., economic growth) have the opposite effect (Miller 2012, Treisman 2013).

Several recent studies use statistical approaches that focus on changes in oil wealth. All report that these changes are uncorrelated with subsequent changes in democratic accountability (Haber & Menaldo 2011, Brückner et al. 2012, Wacziarg 2012, Liou & Musgrave 2013). Several interpret these findings as evidence that there is no resource curse. Yet subsequent studies that simultaneously model the effects of levels of oil wealth and changes in oil wealth suggest that both sides may be right. Higher levels tend to hinder democracy, whereas short-term increases in these levels have no consistent effect (Andersen & Ross 2014, Wright et al. 2015).

One way to reconcile these findings with the rest of the literature is to distinguish between the short-term effects of oil (which are represented by changes) and the long-term effects (which are represented by levels). Temporary revenue windfalls might make a dictator more popular in the short run but be insufficient to protect him from democratic forces when revenues fall; Monteiro & Ferraz (2010), for example, found that municipal-level oil windfalls in Brazil helped incumbents remain in power, but only through a single election cycle.

Perhaps autocrats who wish to solidify their regimes need at least several years of high oil revenues to develop durable and effective rent-distributing institutions. They might also need time to build up a revenue surplus in their stabilization or sovereign wealth funds, which will allow them to maintain support when they face strong challengers—a process modeled by Bueno de Mesquita & Smith (2010). If so, short-term revenue fluctuations would matter little, whereas levels of oil revenue would matter a lot. This would be consistent with the findings of Wiens et al. (2014), who report that resource dependence has a modest short-term effect but a large long-term effect on the survival of autocracies. Such a conclusion would also be supported by Prichard et al. (2014), who find that estimators that rely on first differences (and hence capture short-term effects) show relatively weak correlations between resource revenues and autocracy,[4] whereas estimators that focus on differences in levels (and hence capture longer-term effects) find much stronger correlations.[5]

The second challenge to claims of an oil–autocracy link is causal identification. Conceivably, the correlation between oil wealth and autocratic governance might be endogenous or driven by omitted variables. Haber & Menaldo (2011), Gurses (2011), and Wacziarg (2012) all use this argument to explain why changes in oil income appear to have no effect on democracy.

Yet there are other ways to interpret these analyses. Andersen & Ross (2014) argue that Haber & Menaldo decline to test the most widely supported version of the resource curse hypothesis (i.e., that higher levels of oil revenue help autocracies stay in power); that they draw invalid inferences from their longitudinal data; and that they fail to account for changes over time in the global distribution of petroleum rents. According to Andersen & Ross, oil wealth only became a hindrance to democratic transitions after the expropriations of the 1970s, which enabled developing-country governments to capture the oil rents that were previously siphoned off by foreign-owned firms. They show that the Haber & Menaldo statistical results—which employ data that cover the period from 1800 through 2006—can be overturned by simply adding to the models a dummy variable for the post-1980 period. Wright et al. (2015) confirm this finding, reporting that higher levels of oil wealth deterred democratic transitions between 1980 and 2007 but not between 1947 and

[4]These include the difference GMM (generalized method of moments) estimator and the error-correction model favored by Haber & Menaldo (2011).

[5]Examples include the system GMM estimator, a mean group-common correlated effects estimator, and a logit estimator.

1979. Wright et al. also show that a critical piece of the Haber & Menaldo analysis was biased by the use of a sample that excluded 51 autocratic countries, including all of the oil-rich states that have never made democratic transitions.

The final challenge raises questions about the net impact of petroleum wealth. Even if oil has a negative direct effect on democratic transitions, this might be counterbalanced by a positive indirect effect brought about through the higher incomes that oil wealth tends to bring. Herb (2005) first discussed this possibility and suggested that these two effects may cancel each other out, leaving oil with no net effect on a country's regime type. Alexeev & Conrad (2009, 2011) address the same problem but use a different empirical strategy to estimate the size of the indirect effect; unlike Herb, they conclude that oil's direct antidemocratic effects are stronger than its indirect prodemocratic effects, suggesting that the net effect remains antidemocratic.

Resolving this issue is difficult because the impact of oil wealth on incomes is not straightforward. Many argue it is conditional on the ex ante quality of the government's institutions (Mehlum et al. 2006), the type of democratic institutions (Andersen & Aslaksen 2008), openness to trade (Arezki & van der Ploeg 2011), the level of human capital (Kurtz & Brooks 2011), the "survival function" of political leaders (Caselli & Cunningham 2009), or other factors (Torvik 2009). Oil could also have other indirect effects—positive or negative—that further complicate our ability to determine its net impact on income levels. There is little doubt that countries with extreme concentrations of petroleum wealth (e.g., Saudi Arabia) are far richer than they would otherwise be; but the net effect of more moderate levels of oil wealth (e.g., Nigeria's) on country incomes is not obvious.

In short, there is strong evidence that higher levels of oil wealth help authoritarian regimes, and authoritarian rulers, ward off democratic pressures. These effects are commonly attributed to a rentier mechanism, although other mechanisms and conditions might also matter. Short-term revenue fluctuations seem to make little difference. Although several studies have challenged these patterns, both a meta-analysis and an extreme-bounds test seem to confirm the robustnss of the oil–autocracy relationship. And even the models of skeptics such as Haber & Menaldo (2011) seem to indicate the existence of a resource curse in the post-1979 period.

RESOURCES AND INSTITUTIONS

The second branch of the resource curse literature looks at the relationship between resource wealth and the quality of institutions, meaning the effectiveness of the government bureaucracy, the incidence of corruption, the rule of law, and more broadly, the state's capacity to promote economic development. Once again, petroleum is often associated with harmful outcomes, whereas other mineral resources typically are not. Most of this research falls in one of two categories.

The first looks at the ways that institutional quality may condition the effects of resource wealth on economic growth. Tornell & Lane (1999) develop a model showing how a state with weak institutions, upon receiving a positive fiscal shock (such as a resource boom), may suffer from a "voracity effect" in which powerful groups compete for the windfall, leading ultimately to reduced growth. Mehlum et al. (2006) argue that the effects of natural resources on economic performance are conditional on the quality of state institutions: Where institutions are "grabber friendly" (and more prone to corruption), resource wealth tends to lower aggregate income; where they are "producer friendly" (and less prone to corruption), it raises aggregate income. Robinson et al. (2006) develop a parallel argument, suggesting that when institutions are weak ex ante, resource booms are dissipated through excessive public employment and patronage; but when institutions foster accountable and competent governance, resource booms are beneficial.

The second body of research asks whether natural resource wealth can damage, or stunt the beneficial evolution of, institutions themselves; in other words, it treats institutional quality as endogenous to resource endowments. Many studies in this second group report that oil wealth or aggregated measures of resource wealth are inversely correlated with measures of institutional quality (Bulte et al. 2005, Isham et al. 2005, Beck & Laeven 2006, Knack 2009, Anthonsen et al. 2012, Sala-i-Martin & Subramanian 2013). Wiens (2013) develops a formal model that combines the exogenous and endogenous perspectives, showing how bad institutions can lead to a resource curse, which in turn causes low-quality institutions to persist.

There are many theories about how resource wealth could hurt institutional quality. High levels of resource revenues could, for example, forestall a state's capacity to extract taxes from its citizens, leaving the government "weak," vulnerable to rent-seeking, and unable to develop sound economic policies (Beblawi 1987, Chaudhry 1989, Karl 1997); discourage politicians from investing in the state's bureaucratic capacity (Besley & Persson 2010); encourage lower-quality candidates to compete for public office (Brollo et al. 2013); and induce politicians to dismantle well-functioning institutions that govern the use of natural resources, in order to gain access to the rents (Ross 2001b). The volatility of these revenues could shorten a government's planning horizon and subvert major investments (Karl 1997), while windfalls could cause a government's revenues to expand more quickly than its capacity to efficiently manage them (Hertog 2007, Ross 2012).

Scholars have made special efforts to scrutinize the association between natural resources and corruption. Several studies, using either cross-national or panel regressions, find strong correlations between natural resource dependence and perceptions of corruption (Leite & Weidmann 1999, Arezki & Brückner 2011, Sala-i-Martin & Subramanian 2013). To better measure corruption, Andersen et al. (2012) uses a unique dataset that tracks foreign deposits into the banks of tax havens; it shows that when autocracies (but not democracies) experience a rise in oil and gas rents, there is a corresponding rise in transfers to these tax havens.

Subnational studies also find evidence of an oil–corruption link. Using household surveys, Vicente (2010) reports that the discovery of oil in São Tomé and Príncipe was followed by a large increase in perceived corruption across many public services. Brollo et al. (2013) employ a regression discontinuity design to identify the effects of transfers from the federal government in Brazil to municipal governments; they conclude that a 10% rise in these windfall-like transfers is associated with a rise of 10 to 12 percentage points in the corruption found by the federal government's random audit program. A second study of Brazilian municipalities (Caselli & Michaels 2013) found that plausibly exogenous increases in oil revenues were associated with increased spending on public goods and services; yet much of this money went missing and was most likely absorbed by a combination of increased patronage and embezzlement by top officials. Zhu & Wu (2014) find that mining firms in China make corrupt payments to public officials with unusual frequency.

The impact of resource wealth on institutions may also be conditional. Andersen et al. (2012), Bhattacharya & Hodler (2010), and Arezki & Gylfason (2013) offer evidence that natural resources are more likely to lead to corruption in autocracies than democracies. Government ownership might also be important. Luong & Weinthal (2010) study five petroleum-rich states of the former Soviet Union (Russia, Azerbaijan, Kazakhstan, Turkmenistan, and Uzbekistan) and conclude that oil wealth leads to weakened state institutions only when the government has a dominant role in the petroleum industry; when the private sector and foreign investors have a more prominent role, governments are likely to have stronger fiscal institutions.

Claims about oil wealth and institutions have faced the same two questions as the rest of the resource curse literature: whether the observed correlations are truly causal; and whether the direct, harmful effects of resource wealth are offset by indirect, beneficial ones. Busse & Gröning (2013) focus on the first problem. Using instrumental variables to address endogeneity

and country fixed effects to account for omitted variables, they report that resource wealth is associated with heightened corruption but not other indicators of institutional quality. Alexeev & Conrad (2009, 2011) focus on the second problem and report that once the countervailing effects of oil on income have been fully accounted for, the detrimental impact of resource wealth on most measures of institutional quality disappears; only the perverse effects of oil wealth on democracy remain. Kennedy & Tiede (2013) also look at the problem of net effects, carrying out an extreme bounds analysis and employing 19 indicators of institutional quality. They find little evidence that oil is harmful to institutional quality.

The relationship between resource wealth and institutional quality is exceptionally hard to disentangle. Institutional quality is often poorly measured, and institutions could simultaneously affect and be affected by resource wealth. Yet even if the findings of the cross-national literature are discarded, several well-designed subnational studies offer compelling evidence that resource windfalls have led to heightened corruption, suggesting that at least under some conditions, resource wealth can hurt government institutions.

This finding has worrisome policy implications. Many practitioners agree—implicitly or explicitly—with the Mehlum et al. (2006) argument that developing countries need strong and effective institutions to turn their natural resource wealth into broad-based, sustainable growth. Yet if these mediating institutions are themselves damaged by resource windfalls, escaping a resource curse becomes far more difficult.

RESOURCES AND CIVIL WAR

The third major branch of research looks at the effects of natural resource wealth on civil war. In some ways it resembles the other branches: It brings together cross-national quantitative work and qualitative, theoretically informed case studies (Collier & Sambanis 2005, Kaldor et al. 2007, Omeje 2008); most published studies identify a harmful effect, albeit a conditional one; and there is no consensus about the causal mechanisms.[6]

There are three important differences, however, between this and the other two branches. First, other kinds of natural resources seem to matter. Only petroleum is consistently correlated with less democracy and more corruption, but both petroleum and other mineral resources have been statistically associated with the onset or duration of civil war. These resources include alluvial diamonds (Ross 2003, 2006; Lujala et al. 2005), other alluvial gemstones (Fearon 2004), other nonfuel minerals (Collier et al. 2009, Besley & Persson 2011, Sorens 2011), and "contraband" goods such as coca leaves (Angrist & Kugler 2008). The role of timber in several violent conflicts has been explored at the case study level (Price 2003, Harwell et al. 2011). Still, the salience of nonfuel resources is far from settled; Ross (2006) notes that the correlation between alluvial diamonds and civil war is based on a handful of conflicts from the 1990s and is statistically fragile.

The second difference is that the effects of resource wealth on civil war appear to be nonmonotonic. The effects of oil wealth on authoritarian rule and corruption seem to be approximately linear: More petroleum leads to worse outcomes. But the relationship between natural resource wealth and the onset of violent conflict instead resembles an inverted U: As the value of resource wealth increases, the risk of conflict first rises, then falls (Collier & Hoeffler 1998, Basedau & Lay 2009, Collier et al. 2009, Bjorvatn & Naghavi 2011).[7] Interpretations of this pattern vary, but

[6]For other reviews of this literature, see Ross (2004b, 2006), Koubi et al. (2013), and Cuvelier et al. (2013). There is also a separate body of research asking whether scarcity of renewable resources can trigger violent conflict (e.g., Gleditsch 2012, Koubi et al. 2013).

[7]Not everyone agrees (Humphreys 2005).

most bear a close resemblance to Collier & Hoeffler's (1998) original argument that when resource wealth reaches very high levels it becomes a stabilizing force, enabling the central government to either buy off or repress potential rebels.

The third difference is that the location of the resource matters. When studies do not take location into account, they sometimes fail to find meaningful correlations between oil and conflict (Bazzi & Blattman 2013, Cotet & Tsui 2013). When they do account for location, the results often change. When oil is found offshore, it has no robust effect on a country's conflict risk; when it is onshore, it appears to have a large effect (Lujala 2010, Ross 2012). The precise onshore location also makes a difference: Oil is more likely to spark conflict when it is found in regions that are poor relative to the national average (Østby et al. 2009) and populated by marginalized ethnic groups (Basedau & Richter 2014, Hunziker & Cederman 2012); when it is located in a region with a highly concentrated ethnic group (Morelli & Rohner 2014); and when ethnic minority entrepreneurs use it to promote collective resistance to the central government (Aspinall 2007).

Some of these findings also apply to alluvial diamonds, and all appear consistent with Esteban et al. (2012), who report that resource wealth is more likely to trigger conflict in countries characterized by heightened ethnic fractionalization and polarization. When conflicts take place near regions with petroleum or alluvial diamond wealth, they also appear to last longer (Lujala et al. 2005, Buhaug et al. 2009, Lujala 2010) and become more severe (Weinstein 2007, Lujala 2009, Maystadt et al. 2014).[8]

The salience of location has made it easier for scholars to explore the relationship between resources and conflict on a subnational level and employ more satisfying identification strategies. One study found that during Sierra Leone's civil war, chiefdoms with diamond mines experienced more frequent attacks and battles (Bellows & Miguel 2009). A second study showed that global shocks to the price of tantalum were followed by increased violence in Africa near tantalum mines (Miner 2013). A third study used municipal-level data from Colombia to estimate the effects of both coffee and petroleum price shocks on the severity of rebel and paramilitary violence; it found that coffee price shocks tend to reduce violence in the coffee-producing regions (perhaps by drawing labor out of the conflict and into the coffee sector), whereas oil price shocks tend to boost violence in oil-rich regions (possibly by creating more lucrative opportunities for predation) (Dube & Vargas 2013). These latter findings closely match the implications of a model by Dal Bó & Dal Bó (2011) in which exogenous shocks can raise or lower conflict risks, depending on whether they occur in labor-intensive or capital-intensive sectors.

The importance of location has also made it easier to distinguish among competing explanations for the resource–conflict correlation. One set of theories suggests that natural resource wealth leads to violence by affecting the government—either making it administratively weaker and hence less able to prevent rebellions, or increasing the value of capturing the state and hence inducing new rebellions (de Soysa 2002, Fearon & Laitin 2003, Le Billon 2005).

A second set of theories holds that natural resources lead to conflict by affecting insurgents, not governments: Rebels from an ethnically marginalized region could be motivated by the prospect of establishing an independent state, so that locally generated resource revenues would not be shared with the rest of the country; or rebels could finance the costs of rebellion by either looting the resource itself or extorting money from companies and workers who operate in their territory (Collier et al. 2009, Dal Bó & Dal Bó 2011, Ross 2012).

[8]Other conditions might also be germane. Resource wealth may only heighten the danger of civil war in nondemocracies (Besley & Persson 2011, Basedau & Richter 2011); when rebel groups are credit constrained (Janus 2012); or in low- and middle-income countries, particularly since the 1980s (Ross 2012).

There is also a third set of theories, which focus on the interactions between governments and rebels. The model developed by Besley & Persson (2011) suggests that resource rents increase the likelihood of conflict, conditional on the inability of the state to facilitate peaceful transactions between groups. Fearon's (2004) model of civil war duration suggests that resource-dependent governments cannot make credible commitments to redistribute resource wealth to local communities, because the volatility of resource prices causes the state's strength to wax and wane; this makes it harder for them to reach peaceful agreements with insurgent groups, particularly when rebels can fund themselves by capturing contraband.

If the first set of theories is right, then both onshore and offshore petroleum wealth should have the same conflict-inducing effects—weakening the state's ability to defend itself or enlarging the size of its honeypot. If either the second or third set is correct, oil should lead to conflict only when it is found onshore, where it can be claimed by local separatists or attacked by cash-hungry rebels. Because only onshore oil is associated with higher conflict risks, the first approach appears to be wrong. Oil leads to civil war, at least in part, through its effects on insurgent groups. Both Glynn (2009) and Kennedy & Tiede (2013) also report that the "state weakness" pathway cannot explain the link between oil and civil war.

Once again, several studies raise questions about whether the resources–conflict correlation is truly causal and whether the harmful effects of resource abundance are mitigated by the helpful ones. Brunnschweiler & Bulte (2009) address both issues. Using the World Bank's measure of total natural capital stock to instrument for resource dependence, they find no correlation with conflict onsets. Yet their instrument is only available for two years and 100 countries, and their approach has been challenged (Van der Ploeg & Poelhekke 2010).

Cotet & Tsui (2013) also instrument for resource wealth, using a unique measure of oil discoveries, with much better coverage of countries and years. They report that instrumented oil wealth is associated with conflict onsets in a simple pooled cross-sectional and time series setting but loses significance in most (although not all) specifications once country fixed effects are included.

By contrast, Lei & Michaels (2014) consider the effects of discovering giant oil fields, using models that include country and year fixed effects. They find that these major oil discoveries increase the incidence of armed conflict by about 5–8 percentage points compared to a baseline probability of about 10 percentage points. In countries with recent histories of political violence, the effect is much stronger.

The cross-national correlation between oil and civil conflict remains contested. Yet studies that incorporate subnational data on the location of resource deposits consistently report a strong link between oil (and sometimes other minerals) and conflict onsets—particularly when they focus on low- and middle-income countries and account for the U-shaped relationship first suggested by Collier & Hoeffler (1998).

LOOKING AHEAD

There is considerable evidence to support three broad claims about the conditional effects of natural resource wealth: that higher levels of petroleum income lead to more durable authoritarian rulers and regimes; that more petroleum income increases the likelihood of certain types of government corruption; and that moderately high levels of petroleum wealth, and possibly other types of resource wealth, tend to trigger or sustain conflict when they are found in regions dominated by marginalized ethnic groups, particularly in low- and middle-income countries.

It is standard practice in the social sciences to raise questions about the validity of causal claims that rely on observational data. It is also possible to specify conditions under which a measure

of resource wealth—or for that matter, any independent variable—loses statistical significance. Still, it is difficult to find empirically supported alternative explanations for the strong correlations between more oil and less democracy, more corruption, and more civil conflict. There is little evidence that these outcomes would lead to greater resource wealth; on the contrary, they almost certainly reduce a country's income from its extractive sector, making it *less* resource abundant.

There are at least three unsolved puzzles about the resource curse. The first is the scope of the resource effect. Most researchers have focused on the effects of resource wealth on either economic growth or the three outcomes mentioned above; but a country's natural resource base might also be affecting other dimensions of political and social life, such as the status of women (Assaad 2004, Ross 2008, Do et al. 2011), demographic trends (Bearce & Hutnick 2011), the spread of HIV/AIDS (de Soysa & Gizelis 2013), international conflict and cooperation (Ross & Voeten 2012, Caselli et al. 2013, Colgan 2013), and levels of government transparency (Egorov et al. 2009, Kolstad & Wiig 2009, Williams 2011).

Scholars who pursue these issues should be liberated from the narrow question of whether there is a "curse." There are many interesting questions about the consequences of a country's resource base besides whether the regression coefficient on a "resource wealth" variable carries a negative sign. Social scientists who study the effects of other important phenomena—ethnic diversity, colonial legacies, parliamentary institutions, etc.—typically seek knowledge about the full range of outcomes, whether beneficial, detrimental, or neither. The study of resource wealth should be equally broad-minded about what constitutes an interesting outcome.

A second puzzle concerns mechanisms and conditions. Many studies offer theories about the processes that link resources to different outcomes, or the conditions under which they are most likely to occur. Yet few have tried to distinguish among these mechanisms and conditions to see which are valid. Distinguishing among these conditions and mechanisms is empirically challenging because they often have similar observable implications.

One way to gain leverage over this question would be to investigate why different minerals appear to have different effects—or more narrowly, why petroleum appears to have certain effects whereas other minerals do not. Because minerals vary in many potentially consequential ways—for example, in their physical characteristics, the revenues they generate, the volatility of their markets, the degree to which they are controlled by state-owned companies, and the labor intensity of their extraction processes—these comparisons could help researchers develop more general theories that explain why different types of resources, with different characteristics, lead to different outcomes.

The final puzzle is what should be done. Many scholars have developed ideas about policy interventions, including greater transparency, stabilization and savings funds, community participation, cash payments to citizens, and alternative tax and royalty systems (Humphreys et al. 2007, Collier 2010, Barma et al. 2011, Moss 2012, Ross 2012). We have little systematic knowledge, however, about which policies work and under what conditions. In the last decade, research on the impact of policies in other domains—such as education and health care—has made rapid advances; yet there is virtually no comparable work on the impact of policies in the extractive sector. In the next five years, a large number of low- and middle-income countries, particularly in Africa, may turn into oil or natural gas exporters. The need for evidence-based policy advice is more urgent than ever.

DISCLOSURE STATEMENT

The author is not aware of any affiliations, memberships, funding, or financial holdings that might be perceived as affecting the objectivity of this review.

ACKNOWLEDGMENTS

Special thanks to Wilson Prichard and to the *Annual Review of Political Science* editors for their helpful suggestions.

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Political Science
Volume 18, 2015

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