Institutions and the ‘resource curse’: Evidence from cases of oil-related bribery

Abstract

While some oil-rich countries are highly corrupt, others have transparent and well-functioning governments. What explains this wide variation in so-called ‘resource-cursed’ states? I show that these differences result from domestic institutional choices over how oil extraction is governed. Some governments grant procurement authority—the ability to award contracts for production rights—to national oil companies (NOCs), while others place this authority in ministries. Building upon agency theory, I argue that this choice matters: the relative political autonomy of NOCs compared to ministries fosters an opaque regulatory environment that incentivizes malfeasance. Using new data on transnational bribes in 59 oil-producing countries, I show evidence for a robust link between oil-related institutions and bribery, even after addressing the endogeneity of institutional choice via instrumental variables analysis. This research has implications not only for the political economy of the resource curse hypothesis, but also for existing theories on transnational bribery and regulatory independence.

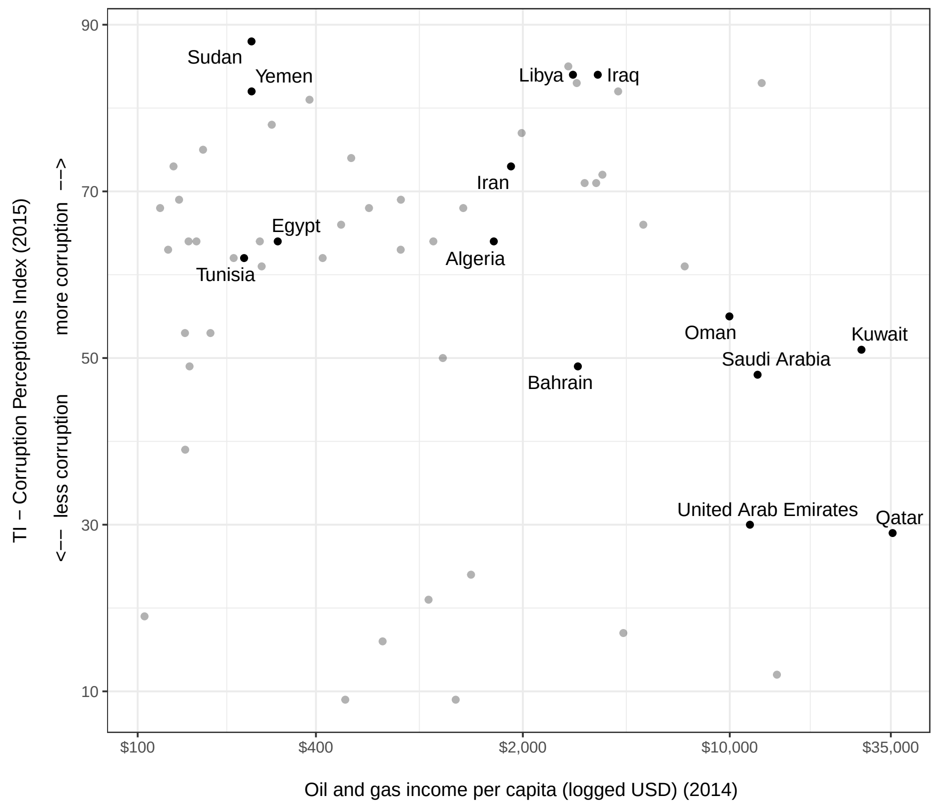
Within the past two years, the oil industries of major Middle Eastern producers such as Kuwait, Iran, Iraq, and the UAE have been rocked by transnational bribery scandals, while the oil industries of Bahrain, Qatar, Oman, and Saudi Arabia have been relatively unscathed.[1] Why do oil-rich countries exhibit such variation in corruption? What specific factors explain why some countries seem 'cursed' by oil while others seem 'blessed' by it? Figure 1 provides a more systematic basis for this puzzle across all sixty major oil-producing countries: more oil wealth does not necessarily mean more corruption.[2] Despite this high variance, some scholars suggest a positive linear relationship between oil and corruption (Karl, 1997; Bhattacharyya and Hodler, 2010; Vicente, 2010; Arezki and Brückner, 2012; Brollo et al., 2013), while others find no such relationship (Ades and Di Tella, 1999; Leite and Weidmann, 1999; Aslaksen, 2007; Treisman, 2007). The general perception is that indeed oil *causes* corruption—to the point that there are several policy initiatives and NGOs with the stated objective of reducing oil's corrupting effects. Yet even if there were a causal relationship between oil and corruption, why does the effect vary so greatly across countries?

This paper builds on the broader literature on whether oil hinders good governance (Smith, 2004, 2007; Dunning, 2008; Ross, 2012; Haber and Menaldo, 2011; Brooks and Kurtz, 2016), but looks to unearth the specific mechanisms linking oil production to corrupt outcomes. In the last decade, scholars have averred that the impact of oil on the quality of government is mediated by political institutions (Mehlum et al., 2006; Robinson et al., 2006; Wright, 2008; Jones Luong and Weinthal, 2010; Menaldo, 2016). The separate literature on political corruption has similarly shown that rent-seeking is exacerbated by so-called "bad"

[1]See, for instance, "The Bribe Factory Part 1, Unaoil: The Company that Bribed the World." *The Age*. 30 Mar 2016, accessed 8 May 2016 from `http://www.theage.com.au/interactive/2016/the-bribe-factory/`.

[2]I use the term "oil" to refer to both oil and natural gas. A major producer is defined as having at least $100 of annual oil and gas income per capita averaged across 1997-2013. See Ross (2012) for a discussion of this threshold. This list is similar if I use a production level threshold of 1 million metric tonnes per year. Countries included: Algeria, Angola, Argentina, Australia, Azerbaijan, Bahrain, Barbados, Belize, Bolivia, Brazil, Brunei, Cameroon, Canada, Chad, Colombia, Congo, Croatia, Cuba, Denmark, East Timor, Ecuador, Egypt, Equatorial Guinea, Gabon, Hungary, Indonesia, Iran, Iraq, Kazakhstan, Kuwait, Libya, Malaysia, Mexico, Netherlands, New Zealand, Nigeria, Norway, Oman, Papua New Guinea, Peru, Qatar, Romania, Russia, Saudi Arabia, Senegal, Sudan, Suriname, Syria, Thailand, Trinidad, Tunisia, Turkmenistan, UAE, UK, Ukraine, USA, Uzbekistan, Venezuela, Vietnam, Yemen.

Figure 1: Oil and perceptions of corruption in 2014-15



Scatterplot of oil and gas income per capita (exponentiated from the log scale) and Transparency International's Corruption Perceptions Index (transformed so that higher values represent more corruption) for major oil producers. Countries in the Middle East and North Africa are highlighted and labeled.

institutions (Krueger, 1974; Rose-Ackerman, 1975, 1999). "Good" institutions on the other hand foster accountability, transparency, and therefore low levels of corruption. Yet these institutions often remain vague scholarly constructs, with little attention to what specific institutions promote or prevent corruption. In addition, what has made the question of whether institutions matter for corruption difficult to answer is the lack of theory-building on how these institutions emerged in the first place.

The main goals of this paper are to provide a theoretically-informed explanation for why oil wealth affects corruption in some states but not others, and to test implications of this argument using new measures of oil-related institutions and corruption. I argue that domestic institutions governing petroleum wealth explain much of the variation in corrupt outcomes across oil-producing countries. I claim not only that institutions matter—a long-held view in political economy—but also which specific institutions are relevant to the study of the resource curse and corruption and *why* they matter.

Specifically, I argue that when the oil sector is regulated by national oil companies (NOCs) instead of government ministries, there are greater incentives for malfeasance by state officials. The argument is rooted in agency theory: all regulatory entities serve as agents on behalf of the state, but have differing incentive structures to act in the state's best interests (Weingast, 1984; Banks and Weingast, 1992). In particular, the degree of regulatory autonomy plays an important role in shaping these incentives (Levy and Spiller, 1994; Thatcher, 2004). On the one hand, state-owned enterprises (SOEs) in extractive resources sectors operate in opaque institutional environments that lack oversight by other layers of government, driven in large part by the financial independence of SOEs. On the other hand, extractive resource ministries are subject to greater requirements for transparency and regulatory oversight due to their formal ties to governing institutions and fiscal reliance on the state. While both types of regulatory entities have incentives to act opportunistically, SOEs will be relatively less constrained when compared to ministries due to the larger informational asymmetries between the government and its SOE. One implication of the argument that I examine is in the context of public procurement—the process of bidding for and winning government contracts—given this activity's high vulnerability to corruption (Golden and Picci, 2005). The argument implies that vesting contract-awarding authority in SOEs rather than ministries will reduce the visibility of how bids are decided, thereby incentivizing officials to solicit bribes.

Separating regulation from production may appear at first to be an obvious solution to mitigate corruption. But this perspective challenges the conventional notion that ministry-level "bureaucrats with control rights over firms can create mechanisms to extract... rents through bribes," no different than managers at state-owned enterprises (Ades and Tella, 1997, 1024). In addition, bureaucrats may face greater pressures from higher-level politicians to solicit bribes than SOE managers. Bureaucrats are holders of "direct control" over awarding contracts but politicians with power over bureaucrats have "indirect control", thus leveraging their position to "extract rents from corruption in which the [bureaucrat] is engaged" (Bussell, 2015, 39). Politicians lack this indirect control when regulatory authority is vested in SOEs given their relative political autonomy, leading to the characterization of extractive resource SOEs as "states within a state" (Stevens, 2008). This suggests that in the context of a rent-seeking government, bureaucrat-centered theories would suggest that granting procurement authority to ministries instead of SOEs would *increase* the level of corruption, because bribes will be demanded not only by bureaucrats but also by their bosses. This runs parallel to the discussion of government fragmentation and the "grabbing hand": with more people in the decision chain, there are more people to bribe—and hence a larger overall sum of bribery (Shleifer and Vishny, 1998).

The question remains as to the origins of these different institutional pathways. While nationalization in general is a highly political process (Albertus and Menaldo, 2012; Wilson and Wright, 2017), the choice of which type of SOE to establish after nationalization also depends on timing and geology. When resources are relatively easier to extract at the time of nationalization, the government expects that a newly-established SOE can regulate firms without concerns over underbidding for contracts, misreporting of costs, or identifying appropriate contractors. In other words, easy geology narrows informational asymmetries between regulators and firms, such that a state entity can effectively oversee the contract-awarding process while simultaneously handling a variety of non-regulatory activities (such as exploration and production). On the other hand, when geological complexities are high, then informational asymmetries between operating firms and regulatory SOEs will be large. This leads to the government granting contract-awarding authority to an agency or ministry whose sole purpose is to regulate firms. That these institutional choices were typically made several decades in the past—most oil producers nationalized in the 1970s—offers some exogenous leverage to identify the effect of institutions on corruption in the present.

The argument yields several empirical implications, three of which are tested here. First, drawing on an original database of regulatory institutions, I show with panel regressions that there is weaker government oversight and lower public disclosure of contracts in sectors where the procurement process is regulated by SOEs as opposed to ministries. Second, I use new cross-sectional data on transnational bribery to find that corruption is higher in countries where NOCs award contracts. This finding is confirmed when I instead employ a conventional measure of corruption, broadly construed to include perceptions of bribery, graft, and the general use of public office for private gain. Third, I find support for the claim that geology determines SOE choice, conditional on the political drivers of nationalization. In countries with easy petroleum geology, nationalization results in the formation of NOCs with regulatory authority; in contexts of tough geology, NOCs are established without this authority. Given the potential endogeneity of oil-related institutions to corrupt outcomes, I leverage this relationship to instrument for NOC choice using a proxy for historical geology to find further evidence supporting the institutional determinants of present-day corruption. A case study of regulatory reform in Kazakhstan corroborates the statistical analysis for each of these three tests.

These findings suggest that institutional choices over how extractive sectors are managed help to explain the variation in corruption outcomes across oil-producing countries. This study thus supports the idea of a conditional resource curse, but dives into the mechanisms that explain why some resource-rich states suffer from corruption while others escape it, despite sharing similar pre-resource-discovery political characteristics (see Menaldo, 2016). Generally, these findings speak to the broader literature on the importance of institutional design, highlighting the need for a better understanding of which specific aspects of institutional choice affect public officials' incentives for opportunism.

A final point is warranted before proceeding. Corruption is an inherently difficult phenomenon to observe and measure with precision. Trying to effectively capture bribery in particular is a challenging feat for several reasons, not least of which is the fact that bribe solicitors and payers go to extraordinary lengths to conceal their activities from transnational authorities such as the Department of Justice. As such, the measures of corruption I use suffer from measurement error and content validity beyond levels typically associated with other measures in political economy. This is an important point to consider when evaluating the rigor of the study's empirical tests, but should not dissuade us from tackling this critical, albeit hard to measure, issue of governance.

Theory and expected implications

What explains the variance in corruption across oil producers? In general, why are some countries more corrupt than others? The conventional wisdom in political economy is that weak political institutions cannot suppress rent-seeking behavior. Earlier arguments were based on "cultures" of corruption whereby differences in moral standards across countries account for the global variation in corruption (Nye, 1967). More recent work stresses the moral as opposed to the institutional determinants of corruption (Fisman and Miguel, 2007), drawing on Jon Elster's emphasis that "the variation in corruption across countries is explained largely by the degree of public-spiritedness of their officials, not by the cleverness of institutional design" (Elster, 1989, 158).

In contrast, Krueger (1974) argues that corruption arises from institutional opportunities. For cases of grand corruption, Rose-Ackerman finds that bribes are facilitated by the ease of making illicit payments without punishment and when "state officials have the power to allocate scarce benefits and impose onerous costs" (Rose-Ackerman, 1999, 39). Extortion often occurs in the process of awarding government contracts (Olken, 2007), especially when officials have more regulatory discretion (Kaufmann and Wei, 1999). For oil-related bribery, these studies would suggest that malfeasance is fostered by the opportunity for high-level officials to solicit bribes when given discretion over awarding valuable state contracts.

There is perhaps the most consensus on the role of economic development: work by Treisman (2007) highlights the robustness of income per capita as a determinant of corruption across different specifications, cases, and time periods. Another literature stresses the role of political competition, since more competitive electoral environments promote greater transparency and accountability of public officials (Montinola and Jackman, 2002). In particular, freedom of information laws and a free press can work to increase the probability and cost for public officials of getting caught engaging in corrupt behavior (Besley, 2006).

With respect to oil wealth and corrupt activity, scholars expect corruption somewhere in the fiscal pathway of oil revenues from the well-head to the treasury because of the large amount and opacity of petroleum rents (Karl, 1997; Leite and Weidmann, 1999; Ross, 2012). A host of cross-national studies find a consistent pattern between natural resource wealth and perceptions of corruption (Bhattacharyya and Hodler, 2010; Vicente, 2010; Arezki and Brückner, 2012; Brollo et al., 2013).

Yet doubts exist on the negative effects of natural resource wealth. Haber and Menaldo (2011) find that oil has a non-negative impact on democracy, while Dunning (2008) shows that the resource curse is conditional on institutional factors that can mediate oil's effect on democracy. Others suggest that these conditions depend on whether or not "good institutional characteristics emerged prior to the discovery of natural resources" (Lederman and Maloney, 2008, 32). In this way, the debate has been re-framed to an analysis of the factors involved in the "conditional resource curse," whereby some countries seem cursed by oil while others seem blessed by it. Though the effects of oil on bribery as conditioned by institutions remain unclear, existing data suggest that oil wealth by itself is not enough to determine corrupt outcomes. Beyond corruption as an outcome, there is also little agreement on the specific conditions in resource-rich countries that either promote or hinder good governance, democratization, regime stability, or conflict.

I propose that the regulatory structure of a country's oil sector is one institution that explains variance in oil-related corruption. Countries where state-owned enterprises have upstream regulatory authority—awarding contracts for drilling rights, supervising companies involved in exploration and production, and overseeing payments of taxes, fees and royalties to the government, among other responsibilities—have the greatest opportunities for grand corruption when compared to countries where regulatory powers are vested in ministries or other agencies.

Granting contract-awarding authority (as opposed to other regulatory authorities) to SOEs will foster an opaque environment, one in which bids are evaluated with little public disclosure and with little oversight by other governmental elements. Such is the case in countries like Algeria, Iran, and Kuwait, where NOCs are not required to disclose decision-making criteria for awarding licenses. The alternative structure is to vest licensing authority in a governing agency, such as a ministry or regulatory body. For example, contracts in Saudi Arabia are overseen by the Supreme Economic Council, not the NOC (Saudi Aramco); in Oman by the Directorate General on Management of Petroleum Investments, not the NOC (Petroleum Development of Oman); and in the UAE by the Supreme Petroleum Council, not the Abu Dhabi National Oil Company. These ministries and agencies are typically overseen by a country's legislature, a higher regulatory agency, or even the executive office.

Both these types of regulatory bodies—ministries and contract-awarding SOEs—can be characterized as agents acting on behalf of their principals in government. If not overseen effectively and consistently, such entities may lack the incentives to act in the public's best interest of no corruption in the procurement process (Weingast, 1984).[3] Classic principal-agent theory suggests that monitoring is one reason, *inter alia*, for this mismatch. Opportunism arises when the principal has difficulties in continuously monitoring the agent's behavior (Holmstrom, 1979). In this case, such moral hazard is the result of asymmetric preferences given the delegation of regulation to an agent that has different incentives than the principal (Besley, 2006, 76). Whereas the government desires to maximize resource revenues to the

[3]Corruption results in selecting a sub-optimal service provider: social welfare is maximized when the most skilled operator—highest long-term production at lowest cost—wins the contract, not the most skilled briber.

treasury (e.g., to fund survival-enhancing expenditures), the regulatory official desires to maximize personal utility. The latter includes growing resource revenues for the state—if strong performance results in improved compensation—but also includes increasing take-home pay via illicit means if the probability of detection and punishment is low. And while the government holds the regulator formally accountable given its ability to sanction officials *via* removal (see Fearon, 1999), it is difficult to punish opportunism if its detection proves challenging.

How does this differ for SOEs compared to ministries? The key difference with respect to monitoring and enforcement of these two types of agents lies in their relative political autonomy. In the oil sector, NOCs gain considerable autonomy vis-à-vis the state because of their fiscal importance. SOEs actively generate revenues from the production and/or sales of extractive resources, giving these entities financial leverage over the state (McPherson, 2003). In extreme cases such as Saudi Arabia, for example, the NOC is the direct source of up to 90% of the government's overall revenues. Extractive ministries do not have such fiscal activities to rely upon, and instead are financed entirely through the state budget (Davis et al., 2003). NOCs are also autonomous given their exceptional status in the legal regime. So as not to bog down the NOC with political interference—in order to improve operational efficiency—states often enact petroleum laws that assign lax reporting and oversight rules that are different from national laws to which non-petroleum companies adhere (Victor et al., 2012). Both factors lead to the phenomenon of the NOC becoming a "state within the state," whereby it makes decisions unilaterally without consulting any other branches of government (Stevens, 2008). This financial independence, coupled with legal exceptionalism, thereby gives SOE officials relatively greater autonomy than their ministerial counterparts.

Agency theory implies that this political autonomy provides an incentive for SOE officials to keep information hidden from the government (Weingast and Moran, 1983). Empirically, there is scholarly consensus that NOCs are not transparent entities (see Mommer, 2002; Victor, 2013). This even applies to so-called internal transparency: NOCs do not disclose complete information about operations, cash flows, and expenditures to the government, let alone to the public (Revenue Watch Institute, 2013). In the context of procurement, extractive resource SOEs maintain complex, subjective criteria in bidding processes that can be difficult to track by other governing agencies (Sayne et al., 2017). By minimizing and misreporting financial disclosures, the informational asymmetry gained from institutional autonomy thus offers cover to engage in opportunistic behavior such as embezzlement, graft, and bribery. Ironically, while the knowledge gap between multinational operators and the host government shrinks when the SOE regulates operations—a key reason why this institutional design is chosen in the first place, as I elaborate below—an asymmetry emerges between SOE and government.

Of course, ministries can also foster information asymmetries. The classic case of the principal-agent problem in political science is between the legislature and its bureaucracies (Weingast, 1984). But these gaps are narrower than is the case for SOEs given ministries' relatively less autonomous position due to their financial reliance on the state. This makes it relatively easier—compared to SOEs—for the government to monitor and sanction officials at ministries and other regulatory agencies. One manifestation of this relative ease is punishment via personnel replacement. Under Dos Santos' governing regime in Angola, for example, ministries and agencies were staffed with rotating casts of political appointees while the state-owned oil company Sonangol maintained continuity of staff over time—keeping many of the same personnel since the country's independence in 1979 (Croese, 2017). This autonomy gives SOEs a level of bureaucratic discretion akin to the general case of independent regulatory agencies (Scott, 2000; Gilardi, 2002). Unlike ministries, SOEs are an archetype of regulatory agencies that are politically independent, defined by their ability to "take day-to-day decisions without the interference of politicians in terms of the offering of inducements or threats and/or the consideration of political preferences" (Koop and Hanretty, 2018, 42).

This autonomy is the mechanism that underlies the impact of institutional design on corruption. NOCs' relative autonomy fosters greater information asymmetries vis-à-vis the state, which leads to greater incentives for opportunistic behavior and malfeasance. Ministry personnel are also incentivized towards opportunism; indeed, corruption is widespread within extractive resource ministries. But given the relative ease with which the state can monitor ministry behavior compared to SOE behavior, there will be relatively less corruption when regulatory authority is vested in ministries as opposed to NOCs. In the context of procurement, placing licensing authority in the hands of NOCs instead of other government agencies should therefore reduce the visibility of how contracts are decided. This opacity lowers the probability of getting caught for both the briber and the bribe recipient.

If this is the case, why would leaders opt for one type of institution over another? This question is orthogonal to the issue of establishing a NOC in the first place, a process which hinges on several political and economic factors such as market conditions, international diffusion, executive constraints, bureaucratic quality, and time horizons (Kobrin, 1984; Jones Luong and Weinthal, 2010; Wilson and Wright, 2017). In addition to political determinants, research on NOC formation suggests that the government's choice of a regulatory agent is also dependent on geological risk at the time of nationalization (typically occurring in the 1960s and 70s). When it comes to regulating the industry, scholars argue that low-risk geological environments tend to favor regulation (and production) by a NOC, whereas high-risk environments necessitate regulation of private firms (who also carry out the majority of production and operations) by the government directly (Nolan and Thurber, 2010; Victor et al., 2012).

A key factor in this decision rests on whether or not the NOC can simultaneously manage its own production while also assessing the ability of foreign firms to operate the country's oil fields. Among other things, this ability depends on the complexity of a country's oil fields. When oil is easy to extract, NOCs—which are generally less efficient and technologically capable than multi-nationals like ExxonMobil, Shell, and BP (Wolf, 2009)—will be able to manage production without setbacks while also regulating multi-national firms. When oil is difficult to extract, NOCs will not only suffer from production difficulties but will also find it harder to monitor these firms and determine which are best for the job. In these cases, governments transfer regulatory responsibilities to an entity outside the SOE that can devote its full energy to overseeing regulations and finding the right bidders to undertake production. Since geological conditions change slowly over time, this institutional choice tends to be "sticky" such that countries sparingly undertake NOC reform.

From the above arguments, I consider the following testable hypothesis: *Among oil-producers, bribery is more likely in states with NOCs with contract-awarding authority than in states where contract-awarding authority is vested in ministries or other agencies.* As a test of the mechanism linking regulatory institutions and incentives for bribery, I also examine whether or not NOCs with contract-awarding powers are less fiscally transparent and more opaque in reporting practices than ministries. In addition, I empirically assess the "state within a state" argument that NOCs are subject to less government oversight than ministries.

A number of excellent studies have examined the role that NOCs play in bad governance, such as weak fiscal regimes, enfeebled state capacity, and opacity in fuel subsidies (see Jones Luong and Weinthal, 2010; Cheon et al., 2015).My theory differs from previous work on NOCs not only by considering how regulatory variation affects specific corruption outcomes such as transnational bribery—and in doing so providing a more direct test of NOC consequences for bad governance—but also in bridging theories on the resource curse with the political economy of corruption.

Two final points are warranted before turning to a discussion of data and methods. First, I empirically focus on how institutions affect one aspect of corruption—bribery—while leaving other aspects such as graft and embezzlement for future research. This choice is based not only on keeping a tractable and feasible scope of analysis, but also on the importance of bribery in the context of political and economic development. Consider that the costs of bribery alone are estimated at \$1.5-\$2 trillion dollars per year, or two percent of global GDP, not accounting for the effects of corruption on innovation and productivity.[4]

Second, because the institutional choice of regulatory structure is by no means exogenous to political factors, it could be the case that corrupt leaders choose to establish a contract-awarding NOC whereas non-corrupt leaders choose otherwise. To this end, I instrument for institutional choice using a politically exogenous factor (geology at the time of nationalization) and find that the main results still hold. In a case study of Kazakhstan's oil sector, I dive into a deeper discussion of the determinants of these institutional choices, analyzing how geology and technical capacity played a role in Nazarbayev's choice of a contract-awarding NOC in 1997 only to reform the NOC in 2010 to a non-regulatory entity.

Data: Categorizing NOCs and measuring foreign bribery

I define and measure a regulatory (contract-awarding) NOC as having the capacity to solicit and award contracts for oil exploration and production to operating companies such as ExxonMobil or BP, or service companies such as Halliburton or Schlumberger. For example, state-owned oil company Petroecuador is outfitted with the authority for engaging in joint venture contracts and participatory production agreements with outside firms. The NOC directly conducts negotiations with foreign oil companies, with minimal interference from other agents within the government.[5] This is in contrast with non-regulatory NOCs, where regulation is vested in a separate and often independent agency such as a ministry, regulatory agency, or government department. In Peru, for instance, state-owned PeruPetro does not have authority over awarding production contracts. Instead, the Ministry of Energy & Mining has the authority to award licenses to operating firms for participation in joint

[4]Estimates from former World Bank Institute director Daniel Kaufmann. See `http://www.newsx.com/world/11830-two-percent-global-gdp-lost-to-corruption-every-year` and `https://twitter.com/kaufpost/status/654134209490104322`, accessed 14 Oct 2015.

[5]Article 2, Law No. 2967 (1978) and subsequent amendments. During the 1970s, CEPE (the predecessor to Petroecuador) had *de jure* authority over awarding contracts, but in practice the Hydrocarbon Ministry would get involved in contract-awarding decisions. In this case, CEPE would be coded a *de facto* non-regulatory NOC, while Petroecuador is coded a *de facto* regulatory NOC.

ventures with PeruPetro, subject to parliamentary review.[6]

I use petroleum laws and NOC/ministry documents to categorize the regulatory structure of all oil-producing states (see Appendix Table 17 for categorization, and Appendix 4 for the bibliography of primary documents). This includes oil-producing countries without NOCs, whose regulatory structure is the same as the non-regulatory NOC cases where ministries or agencies have authority to award contracts. Hence there are two general types of regulatory institutions—contract-awarding NOCs and contract-awarding ministries—lending to a binary independent variable in the analyses below. I initially focus on regulatory structures as of 2012,[7] but for the instrumental variables analysis I measure regulatory structure in the year of nationalization (which varies across countries).

In contrast, measuring bribery has proven difficult in cross-national settings (Treisman, 2007; Escresa and Picci, 2015; Fazekas and Kocsis, 2017). Early studies on corruption relied on survey-based measures of experts' perceptions of corruption in a given country, notably Transparency International's Corruption Perceptions Index (CPI) or the World Bank Governance Index (see Treisman, 2000).

Yet these measures do not allow for analysis of quantifiable acts of bribery as opposed to corruption broadly construed.[8] Nor can perceptions-based measures be employed for analysis of corruption in sector-specific contexts. Some address this problem by measuring differences in prices and costs of services such as infrastructure construction over time (Olken, 2007; Golden and Picci, 2005). Yet, as Daniel Treisman notes, "clearly, these approaches would be hard to extend cross-nationally" (Treisman, 2007, 216).

I leverage a new cross-national dataset of high-profile bribery that is not only compar-

[6]Article 6, Law No. 26221 (1993) and subsequent amendments grant PeruPetro *de jure* contract-awarding authority, but in practice the company is unable to award contracts without Ministry approval.

[7]The categorization of NOCs in 2012 is the same as in 1997, the starting point in the analysis below, except for Colombia and Kazakhstan which switched to a non-regulatory NOC in 2003 and 2010, respectively, and three new NOCs in Congo-Kinshasa, Congo-Brazzaville, and Equatorial Guinea in 1998–2001.

[8]Measures that are more experience-based—such as UNICRI and WBES—ask respondents about their experiences in which a government official asked for bribes for rendered services, but do not capture grand corruption. An excellent exception is a new database on bribery in public procurement by Fazekas and Kocsis (2017); since its coverage is restricted to European states, I do not consider these data in the empirical analysis below.

ative and quantifiable, but also sector-specific. The measure is constructed using bribes paid by multinational firms to foreign government officials that are revealed in violations of the US Foreign Corrupt Practices Act (FCPA) in the oil and gas sector. The FCPA was enacted in 1977 to prosecute any firms—either based in the US or with securities listed in US stock exchanges—bribing "any officer or employee of a foreign government or any department, agency, or instrumentality thereof," including officials at state-owned enterprises.[9] Prosecutions are made by the DoJ and SEC. To get a sense of the global scope of prosecutable companies, consider that seventy-six of the *Oil and Gas Journal* "Top 100" petroleum companies *outside* the US are eligible for prosecution under the FCPA given their listings on American stock exchanges, including national oil companies such as CNOOC (Nasdaq: CEO), PetroChina (NYSE: PTR), and Gazprom (NYSE: OGZPY).[10]

Since 1977 up to 2013, there have been 143 prosecuted cases, with 41 cases involving firms accused of bribing officials for contracts related to the petroleum industry. Within these 41 cases there are 337 specific violations of the FCPA occurring in 35 unique oil-producing countries.[11] Unfortunately most cases do not provide the exact timing of bribery, but rather indicate multi-year periods in which bribes were paid. For this reason, I cannot leverage the temporal nature of the data and instead must focus on a cross-section of bribery data, summing across all instances occurring between 1997 and 2013.[12] In a case study of Kazakhstan following the statistical analysis, I relax this constraint to assess whether bribery patterns changed over time after NOC reforms in 2010.

To create this measure, I aggregate bribe amounts reported in all oil-related FCPA cases

[9] 15 U.S.C. §§78dd-1. See also §78m regarding prosecution of foreign-based firms with shares listed on US stock markets.

[10] A list of the top 100 companies by production is available at `http://www.ogj.com/content/dam/ogj/print-articles/Volume111/sept-02/OGJ100-Leading-oil-and-gas-companies-outside-the-US.pdf`.

[11] One "case" encompasses a collection of multiple counts of "violations" of the FCPA (e.g. one set of bribes paid to one government official), with no given minimum or maximum number of violations sufficient to warrant prosecution.

[12] The starting point is chosen because prior to 1997, only Mexico was implicated in oil-related FCPA violations. Starting in 1997, FCPA investigations into oil-related cases expanded to all other countries.

by country.[13] Consider the example of Total, a French oil firm traded on the NYSE. From 1995 to 2002, Total paid roughly $60 million in bribes to NOC officials in Iran to win the rights to produce oil and gas offshore. Information purporting illegal activity was reported by a whistle-blower to the SEC and French authorities, with the case ultimately settled in May 2013. All bribe-related activity took place in Iran, so the bribe amount is added to bribe amounts from other FCPA cases in Iran. For some cases, there are bribes directed towards foreign officials in multiple countries; in these instances DoJ documents provide bribes broken down by country. Appendix Table 3 contains the full list of cases.

Countries in which no oil-related FCPA violations were prosecuted but in which there were violations in other economic sectors are coded as having zero oil-related bribes. Restricting the analysis to oil-producing countries (as defined above), this leaves a total sample of 59 countries with data on FCPA violations out of a possible 60 oil-producing countries.[14] In Appendix Figure 7, using a country-labeled histogram, I show the distribution of non-zero bribes in the oil sector as captured by FCPA violations.

Typical of nearly all cross-national measures, this variable comes with notable shortcomings. First, FCPA cases are prosecuted with political motivations (Davis, 2015). The DoJ and SEC might be *a priori* inclined to pursue some companies more than others, making the probability of being caught unequal across cases of prosecutable bribery. If there were a protectionist executive agenda that pressures the DoJ to go after non-American firms, the resulting FCPA measure of corruption might be over-estimating bribes in Franco-phone and Anglo-phone countries relative to countries where primarily US-based firms do business. With respect to oil-related bribery this pattern is difficult to accept based on the data: since the oil industry is dominated by a small number of international oil companies, nearly all ma-

[13]For each case, the DoJ or SEC provides detailed information outlining the following facts: (1) firm involved in bribery allegations, (2) country in which bribery was taking place, (3) government agency soliciting/accepting bribes in the host country, (4) penalties paid by prosecuted firms for violating the FCPA—penalties are proportional to the estimated net gain in revenue from having won a contract for which a bribe was paid —and importantly (5) the amount of bribes paid or intended to be paid to foreign officials by the firm in question. There is also information on the value of contracts for which bribes were extorted, though these data are not available for all cases.

[14]The US is excluded because inbound bribes to US officials are not prosecutable under the FCPA.

jor oil companies have been prosecuted with FCPA violations, be they American (Chevron, ExxonMobil, ConocoPhillips, Baker Hughes) or non-American (Total, BP, Shell, Eni).

Relatedly, prosecutorial bias may also lead to the DoJ and SEC refraining from investigations in countries that are "friends of the US" while focusing on corruption occurring in "unfriendly" countries. This could lead to omitted variables bias in the models below if non-allies were more likely to adopt regulatory NOCs. In addition, it could be that international investigators find NOCs easier to police and monitor given their activities in the global market compared to the more domestically-focused activities of ministries. I leave a thorough discussion and analysis of these kinds of prosecutorial bias (as well as measurement error) to Appendix 3, where I use two-step models and Heckman models to capture possible selection effects. In short, while there is evidence of the DoJ going after violations in countries not aligned with the US politically, the main findings are robust to controlling for these elements of bias.

So as not to hinge the empirical analysis on any one measure—especially one that is new and untested in the literature—I employ as outcome variables both the proposed FCPA measure and the CPI, the most commonly used measure in the existing literature. Importantly, using the CPI also alleviates the problem of coverage and sample size: the CPI covers all aspects of corruption in a given country and allows us to expand the number of countries considered from 59 to 155—including countries that fall outside the purview of being major oil-producers. Furthermore, it captures corruption by all possible actors and not just publicly-traded firms. As an additional robustness check, I use the Escresa and Picci (2015) PACI measure of prosecuted corruption which includes violations of the FCPA, the OECD Anti-Bribery Convention, the UK Serious Fraud Office, and several third-party jurisdictions, notably the Chinese Central Commission for Discipline Inspection and the Russian Prosecutor General's Office.

Methods and results: NOCs and transparency

I use two datasets to assess whether regulatory NOCs are less fiscally transparent and subject to less oversight than regulatory agencies. The first is the Resource Governance Index's (RGI) three measures of transparency and oversight specifically in the natural resources sector: (1) *public reporting practices* regarding revenues and contracts; (2) the *enabling environment*, which captures government oversight, the opacity of budgets, and broad accountability; and (3) the *composite* general score of transparency in the sector. Each index runs from 0 to 100, with higher values representing more transparency and oversight.[15] The second is the Hollyer-Rosendorff-Vreeland panel dataset on transparency in government reporting across all economic sectors. This measure regards transparency as "the disclosure of policy-relevant information by the government to the public."[16]

The data support the hypothesis that regulatory NOCs are fiscally opaque and largely free from government oversight. Using the RGI measure, countries with regulatory NOCs fare worse on the index when compared to countries where contract-awarding authority is vested in ministries or other agencies (Appendix Figure 8). This is true for all three measures that capture governance in the natural resources sector: reporting practices, enabling environment (oversight), and a general score of transparency in the natural resources sector.

I similarly find that states with regulatory NOCs have opaque fiscal institutions using panel regressions on transparency in government reporting from 1980 to 2005. As this measure is not specific to the natural resources sector I weight it using a measure of country-level oil reliance, measured as oil and gas income as a percentage of GDP, rescaled to 0–1 ("oil rents % of GDP" from the World Bank World Development Indicators; hereafter, WDI). Given the longitudinal nature of the data with a largely time-invariant independent variable, I use restricted maximum likelihood with country random intercepts. Controls

[15] The index is compiled by surveying country experts about how easy it is for a member of the public to access a variety of information about the natural resource sector. See Revenue Watch Institute (2013).

[16] "HRV Transparency Project" website, `http://0001c70.wcomhost.com/wp2/`, accessed 5 Oct 2015.

include oil and gas income per capita, regime (Polity), and time (years).[17] These results, presented in Appendix Table 4, indicate that states with regulatory NOCs have lower levels of transparency in government reporting.

Both tests show empirical support for the first step in understanding why institutional choice in the oil sector influences corruption: regulatory NOCs operate in oil sectors with little oversight and opaque fiscal environments, where government reporting practices are poor and budget transparency is relatively non-existent. I test this hypothesis in greater detail with the case study of Kazakhstan.[18]

Methods and results: NOCs and bribery

For the analysis of institutional choice and bribery, the outcome measure is the country-level amount of bribes connected to oil-related FCPA violations discussed above. As a second outcome measure, I use the CPI from 2012. Since this is a broad measure of corruption, to capture the relationship between corruption and regulatory choice in the petroleum sector, I weight the CPI by oil reliance (in the same manner as with the transparency index above). I include eight predictors measured at the country level, averaged across the time-frame of FCPA data considered, 1997-2013: a binary variable for the existence of a regulatory NOC, and controls based on existing explanations for corruption, including logged GDP per capita (WDI), logged oil income per capita (Ross), democratic institutions (Polity), press freedom (Freedom House) and logged population (WDI). I also include percent agreement with the USA at the UN General Assembly (Bailey et al., 2016) as a control for potential prosecutorial bias in the FCPA measure (a full discussion of this variable and other determinants of bias using FCPA data can be found in Appendix 3). I present the full model specification in Appendix 1.

[17] Results are robust to using OLS with country fixed effects, but these specifications are highly dependent on 19 countries—out of 121 total—with institutional reform over time (primarily, privatizations and nationalizations in the 1990s).

[18] The main statistical findings presented below remain robust after dropping Kazakhstan from the sample.

These models are estimated using a Bayesian framework. Among others, two reasons stand out for this methodological choice. First, Bayesian analysis allows for easier interpretation of results and the uncertainty of estimated quantities (Jackman, 2009). Second, computation of second-order variables, such as predictions and uncertainty in marginal effects, is more straightforward using Markov Chain Monte Carlo methods given the small sample size ($n = 59$). For robustness, all models are estimated using conventional OLS regressions with results presented in Appendix 1. To test against the endogeneity of institutional choice I use instrumental variables regression.

Results from the Bayesian model are plotted in Figure 2, which visualizes the posterior distributions of the estimated coefficients of the regulatory NOC indicator and the various control measures for oil-related bribes connected to FCPA violations. To allow for ease of comparison (and computation), both the outcome measure and all control variables have been standardized. Model results in table format can be found in Appendix Table 5. A baseline bivariate specification (i.e., without controls) is presented in Appendix Table 9, column 1.

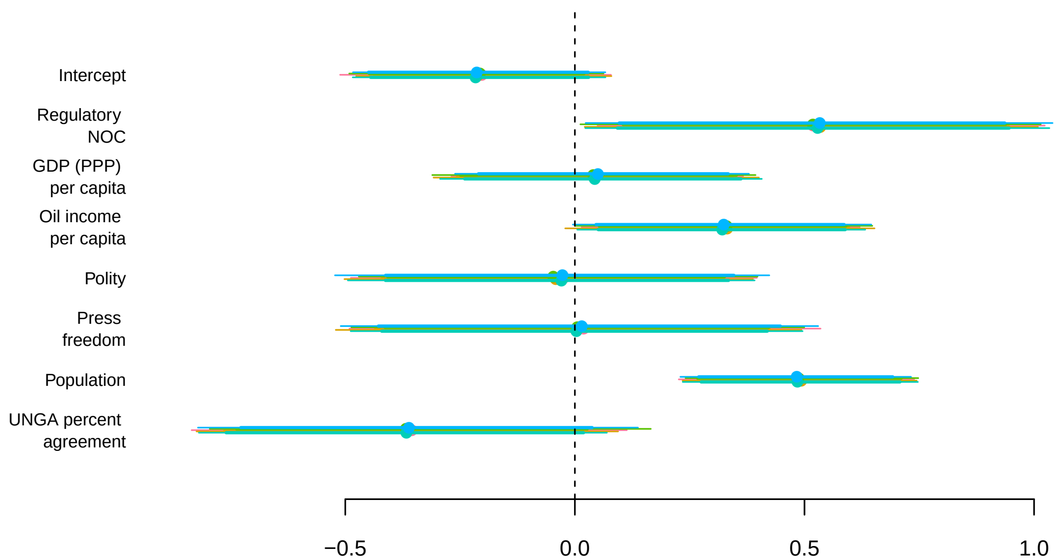
I find that a regulatory NOC structure corresponds to an increase in corruption by 0.51 standard deviations.[19] The integral of the posterior distribution less than zero—akin to a frequentist p-value—is 0.023. Posterior predictions imply that the *average* country with contract-awarding authority vested in a ministry is predicted to have between \$10 and \$614 in FCPA-related bribes, whereas a country with a regulatory NOC is predicted to have between \$216 and \$48,197 in FCPA-related bribes.

To put these numbers in perspective, consider a country like Saudi Arabia—taking into account specific covariate values—where the difference in median predicted bribes would be \$88,772 if it had no regulatory NOC and \$3,632,287 if it had a regulatory NOC.[20] In the database, Saudi Arabia has \$120,000 in reported bribes and has a non-regulatory NOC. It is

[19]This is nearly identical to using OLS; see Appendix Table 9, column 6.

[20]Akin to the difference between Malaysia (\$98,000 in bribes) and Indonesia (\$2,741,749 in bribes) in the FCPA sample.

Figure 2: Results from Bayesian linear analysis: Bribery



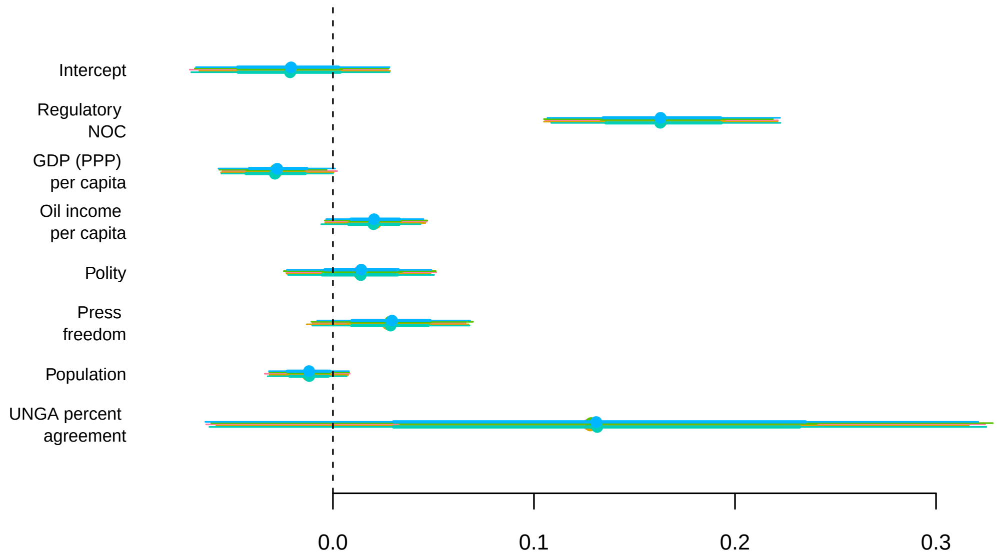
Posterior distributions of coefficients for the Bayesian linear model with FCPA-related bribes as the outcome measure ($n = 59$). The posterior medians from each of the five MCMC chains are plotted, along with 95% (outer) and 68% (inner) credible intervals.

interesting to note that while corruption may be scant in the oil sector, it is prevalent in other sectors of the Kingdom's economy: in 2014, for instance, the DOJ prosecuted French-based Alstom for paying roughly $40 million in bribes to secure rights to build power plants, with much of this money funneled to officials at the state-owned Saudi Electric Company (which regulates contracts).[21] This further supports the argument that it is politically autonomous regulatory institutions, and not "bad governments" *per se*, that foster opportunism.

Turning back to the results in Figure 2, there is no statistically discernible relationship between bribery and GDP, polity, and press freedom. These findings suggest that within the realm of oil-related extortion, countries exhibit both high and low levels of corruption irrespective of wealth and political institutions. I do find a positive correlation between logged population and corruption, supporting early work showing that governments in larger countries have more difficulty preventing officials from partaking in malfeasance (Root, 1999).

[21] *USA vs. Alstom S.A.* 3:14-CR-00246-JBA, USDC District of Connecticut, filed December 22, 2014.

Figure 3: Results from Bayesian linear analysis: weighted CPI



Posterior distributions of coefficients for the Bayesian linear model with weighted CPI as the outcome, rescaled so that higher values indicate more corruption (n = 155*). Weights are assigned based on oil reliance (0–1, with 1 indicating a country whose GDP is 100% reliant on oil rents). The posterior medians from each of the five MCMC chains are plotted, along with 95% (outer) and 68% (inner) credible intervals.*

It could be the case that population is also picking up prosecutorial bias, such that the DoJ and SEC target larger countries to increase the likelihood of finding corruption. I also find a positive, significant coefficient for oil income—suggesting oil has corrupting effects beyond those mediated by NOC type—although this disappears after rescaling the outcome variable to bribes per dollar of oil income (Appendix Table 13).

In an analysis of all states—not just oil producers—I find similar evidence for the relationship between regulatory structure and corruption broadly construed, as measured by CPI scores weighted by a country's reliance on oil. Results presented in Figure 3 show that the correlation is smaller in magnitude—where having a regulatory NOC corresponds to a 0.163 standard deviation increase in corruption—but indicate less uncertainty (akin to frequentist $p < 0.001$) relative to other coefficients in the model (Appendix Tables 8 and 11). These results also indicate that high-income countries correspond to lower corruption, while oil-rich countries correspond to higher corruption (both significant at the 5% level in a one-tailed credible interval). The same pattern holds when using the PACI measure (Appendix Figure 9).

Additional models indicate that the results are robust to dropping established democracies from the sample,[22] since none of these countries have regulatory NOCs and typically have low levels of bribery (Appendix Table 12, Figure 10). The results also do not change when including region fixed effects for Sub-Saharan Africa, Latin America, and the Middle East and North Africa (Appendix Table 7, Figure 11).

Results are also robust to rescaling the dependent variable to account for higher bribes occurring in countries with higher levels of oil wealth to construct the "bribes per barrel of oil" measure (Appendix Table 13); to using a trichotomous measure of no NOCs, non-regulatory NOCs, and regulatory NOCs (Appendix Table 14); and to using FCPA-related penalties assessed by the DOJ and SEC instead of bribe amounts (Appendix Table 15).

Importantly, results are *not* robust to using a dummy variable for whether or not a country was implicated in an oil-related FCPA violation (0 if the country has $0 in FCPA-related bribes; 1 otherwise). These results, presented in Appendix Table 16, suggest that propensity for prosecution by the DOJ does not vary by institutional structure. In Appendix 3, I provide additional evidence to dispel the notion that this measure is too biased to employ in empirical testing given that DoJ- and SEC-instigated prosecutions are politically motivated. Results from two-step models and Heckman selection models indicate that the main findings are robust to incorporating potential sources of prosecutorial bias in FCPA case selection.

Instrumenting for Institutional Choice with Geology

There are several ways to measure geological risks of oil fields: API gravity (lower levels are harder to refine into gasoline), sulfur content (higher levels make oil more difficult to

[22] Australia, Canada, Denmark, Netherlands, Norway, New Zealand, and the United Kingdom.

extract and to refine), well pressure and temperature, offshore depth, acidity, and the need for enhanced (tertiary) oil recovery. Ideally one could use all this information to capture how risky geological conditions were prior to nationalization, yet most of these measures are either not publicly available, not recorded for countries with early nationalizations, or too confounded with other covariates.[23] Based on these concerns, I code geological risks using the average sulfur content of oil being produced prior to nationalization in each country.[24] Prior research on NOCs would predict that countries with higher levels of sulfur in oil production—otherwise known as "sour" oil, with sulfur contents above 1%—will be less likely to create regulatory NOCs, while those with lower sulfur contents will be more likely to establish regulatory NOCs.

Because of its plausible exogeneity to corruption outcomes, I use sulfur content in the years prior to nationalization as an instrument for the formation of regulatory vs. non-regulatory NOCs. One potential violation of the exclusion restriction is that states with favorable geology in the past could attract foreign firms with higher propensities for giving bribes. To check against this possibility, I employ a falsification test of the exclusion restriction by using sulfur content *in the current period* as a placebo instrument. Null results from this test are illustrative of the weak correlation between current geological conditions and institutional choice, as well as the modest relationship between past and current geology (especially for states which nationalized in the 1970s and earlier). In other words, the null effect of the placebo instrument suggests that, in a contemporaneous setting, corruption is just as likely when the extraction process is easy (low sulfur) or difficult (high sulfur).

A second possible threat to the exclusion restriction is that favorable geology could lead to higher oil rents over time (Lima de Oliveira, 2017), which in turn could generate greater

[23]While proprietary data are available on offshore depth and enhanced oil recovery, these metrics are confounded with the historical timing of production: deep-water offshore drilling only commercially emerged in the 1980s, while secondary/tertiary recovery is only necessary for aging fields. Both implicitly measure the rate of technological change in the global industry rather than geological risks specific to a given country. To capture the former, I use the year of nationalization as a alternate variable to capture such temporal effects, but first stage results using this proxy indicate it is a rather weak instrument.

[24]Data are drawn from EIA and USGS *Minerals Yearbooks*.

incentives for bribery. I account for this by controlling for current oil income (averaged for the 1997-2013 period). That the results do not lend support for this causal pathway suggests a weak relationship between past sulfur content and future oil revenues. Indeed, some of the wealthiest oil states today produced both from sour reserves prior to nationalization—notably Iran (pre-1951 sulfur content: 1.50%), Kuwait (pre-1961 sulfur content: 2.88%), and Venezuela (pre-1960 sulfur content: 2.83%)—and from sweet reserves prior to nationalization, notably Algeria (pre-1963 sulfur content: 0.11%), Angola (pre-1976 sulfur content: 0.17%), and Malaysia (pre-1974 sulfur content: 0.10%).

A third possible violation is if sulfur content is predicted by pre-nationalization factors that influence NOC choice. These include regional effects, regime type and state capacity (Jones Luong and Weinthal, 2010), population (Nolan and Thurber, 2010), and the size of the oil sector (Victor et al., 2012). In regressions presented and discussed in Appendix 2.2, I find that none of the pre-nationalization covariates (including region dummies) is a statistically significant predictor of the sulfur content of oil being produced prior to NOC choice.

Given the arguments above, I expect that states with favorable geology (low sulfur content) will have higher levels of bribery in the oil sector. First stage results support the claim that, *at the time of nationalization*, states with favorable geology opt for regulatory NOCs.[25] The second stage results in Table 1 (models 1 and 2) indicate that states with regulatory NOCs are predicted to have higher levels of bribes than states with non-regulatory NOCs, controlling for economic development, current oil rents, the strength of political institutions (polity and press freedom), population, and determinants of FCPA prosecutorial bias (UNGA agreement).[26] Substantively the results are similar to the non-IV (baseline) model,

[25] In Appendix Figure 12, I graph the raw distribution of sulfur content by institutional choice. The Wald F-statistic of the instrument is moderate at 8.45 (p-value: 0.043). This is to be expected given the small sample size and the binary nature of the endogenous variable. When using a logistic regression for the first stage, the likelihood ratio (LR) test of the unrestricted vs. restricted models gives a p-value of 0.001 ($df = 1$).

[26] Note that countries without NOCs are excluded from this analysis since the first stage model is conditional on having nationalized: this, and missingness in the sulfur dataset (Bolivia and Romania), explains why the sample size drops from 59 to 43. In models 1 and 3, both Canada and the UK are included given both had NOCs prior to privatization in the 1980s. These two cases, along with Denmark, Netherlands, and

Table 1: Results from instrumental variables analysis

	Geology instrument		*Placebo instrument*	
	Full sample	Reduced sample (no established democracies)	Full sample	Reduced sample (no established democracies)
	(1)	(2)	(3)	(4)
First stage results, DV: Regulatory NOC (binary)				
Sulfur content (%) *(prior to nationalization)*	-0.202* (0.0696)	-0.206* (0.0718)		
Sulfur content (%) *(2013)*			-0.0636* (0.0158)	-0.0683 (0.0284)
GDP (logged)	-0.316 (0.141)	-0.344 (0.149)	-0.408* (0.142)	-0.433 (0.170)
Oil income (logged)	0.435 (0.161)	0.471 (0.196)	0.401 (0.211)	0.464 (0.238)
Regime (Polity)	0.0608 (0.0738)	0.0831 (0.0686)	0.139 (0.109)	0.134 (0.108)
Press freedom	0.168 (0.0846)	0.166 (0.102)	0.199 (0.106)	0.173 (0.0915)
Population (logged)	0.0894 (0.0432)	0.0766 (0.0411)	0.0347 (0.0445)	0.0465 (0.0319)
UNGA agreement	0.0199 (0.0589)	-0.0568 (0.0917)	0.0374 (0.0926)	0.0728 (0.233)
Constant	0.363** (0.0561)	0.318* (0.0851)	0.380* (0.0877)	0.382 (0.165)
Wald F	8.45	8.20	16.19	5.79
Second stage results, DV: FCPA-related bribes (logged $)				
Regulatory NOC	0.828** (0.306)	0.750** (0.260)	-0.530 (1.101)	-0.281 (1.294)
GDP (logged)	-0.0940 (0.264)	-0.192 (0.233)	-0.654 (0.566)	-0.602 (0.754)
Oil income (logged)	0.991** (0.306)	1.303*** (0.289)	1.545** (0.561)	1.697* (0.796)
Regime (Polity)	-0.0217 (0.183)	-0.111 (0.208)	0.179 (0.159)	0.0205 (0.266)
Press freedom	0.119 (0.209)	-0.0150 (0.310)	0.423 (0.223)	0.271 (0.416)
Population (logged)	0.728*** (0.146)	0.860*** (0.116)	0.783*** (0.146)	0.913*** (0.0931)
UNGA agreement	-0.0987 (0.0868)	0.376 (0.225)	-0.0324 (0.165)	1.048*** (0.311)
Constant	-0.551*** (0.129)	-0.370** (0.138)	-0.0671 (0.447)	0.280 (0.330)
Observations	43	38	43	38

Note: Standard errors clustered by region in parentheses
Note: *p<0.05; **p<0.01; ***p<0.001

albeit with greater uncertainty. The instrumented regulatory NOC increases the amount of bribery in the average country by 0.83 standard deviations, compared to 0.51 standard deviations in the baseline model, while the standard error grows to 0.31 from 0.25.

In models 3 and 4, I use a placebo instrument to test against claims of violating the exclusion restriction. Using sulfur content in 2013—as opposed to sulfur content at the time of nationalization—as an instrument, the second stage results show statistically null effects for regulatory NOCs and corruption. While the first stage results show a modest correlation between current sulfur content and regulatory NOC choice, the high LR test p-value (0.33) confirms the placebo is a rather weak instrument. This result provides refutative evidence that present-day geology is a potential confounder to the relationship between regulatory design and corruption.

Though it is difficult to fully disqualify the existence of reverse causality and spurious correlations with observational data, there is suggestive evidence that the statistical relationship between bribery and institutions is not driven by endogeneity. Instrumental variables models support the argument that institutional choice affects corrupt behavior in the oil sector. Furthermore, null results from a placebo instrument and checks on determinants of the instrument imply (but do not conclude) that historical sulfur content satisfies the exclusion restriction.

NOC reform and corruption dynamics in Kazakhstan

On March 24th, 1997, President Nursultan Nazerbayev established KazakhOil as the NOC by consolidating residual state-owned oil entities that remained from the privatizations that followed the fall of the USSR.[27] Five years later Kazakhoil was merged with state-owned pipeline companies to form KMG, which began simultaneously operating and regulating

Norway, are omitted from models 2 and 4.

[27]Presidential Decree of 4 March 1997, Government Resolution of 24 March 1997. Prior to 1997, the oil sector was in a privatization transition period, whereby former Soviet-run oil companies and their fields were sold off to foreign investors. See Jones Luong and Weinthal (2010) for an excellent review of this period.

joint ventures in onshore fields. Coupled with advances in operating the massive Tengiz field and the ease of extraction from other fields, the 1990s and early 2000s were a period of relatively easy geological conditions for the NOC to manage. But matters changed with the discovery of the Kashagan field, which presented the greatest technical challenges to date in the country, and quite possibly the entire region. Due to KMG's failures in developing this field, Nazarbayev decreed on March 12th, 2010, "the activities of KazMunaiGaz should be purely commercial" and that a newly resurrected Ministry of Oil and Gas would relieve KMG of its contract-awarding authority.[28]

The 2010 reform would prove effective. Not only did production from Kashagan finally commence in 2013, but the business environment of the oil sector grew markedly more transparent. Parliament began monitoring contracts, with the Ministry of Oil and Gas mandated to provide regular reports on procurement.[29] The Ministry also began publicly releasing extensive information about results from auction rounds such as bids received, winning bids and information on final contract awards and blocks licensed.[30] As for the NOC, KMG's annual reports transformed from 80-page documents of mostly charts, pictures, and vague financial summaries in 2006, to 130-page dossiers of detailed operational, fiscal, and strategic activities in 2014—including line-item summaries of each exploration block and joint venture undertaken by KMG.[31] These improvements culminated in October 2013 when Kazakhstan formally became an Extractive Industries Transparency Initiative (EITI) compliant country. While the government announced its commitment to join EITI in mid 2005, it continued to fall short of the agency's transparency standards during its first years as a candidate country. Indeed, Kazakhstan only published two EITI reports prior to the 2010 reform, but followed up with annual reports every year thereafter.[32]

[28] Details on the 1997 creation of a regulatory NOC and the 2010 reform are discussed in Appendix 2.3.
[29] Government Decree N 117, 20 February 2011.
[30] *Resource Governance Index 2012*, Kazakhstan questionnaire, Q.1.2.006.b.
[31] Accessed from `http://www.kmgep.kz/eng/investor\_relations/annual\_reports/` on 20 July 2016.
[32] See `https://eiti.org/Kazakhstan/implementation`.

Dynamics of corrupt practices

There is little doubt that bribery was rampant in the oil sector in the late 1990s and 2000s: the total amount of oil-related bribes illuminated in FCPA cases is $91,322,250, second only to Nigeria on the global list.[33] Beyond the FCPA prosecutions data, which may be hampered by aforementioned concerns about measurement, other sources of information confirm the proliferation of bribery prior to 2010. Interviews conducted by the University of Bremen with 58 petroleum insiders in Astana and Almaty in 2009 indicated that bribes were inherently fixed into the oil and gas procurement process, such that "the usual payment for award of a contract is 10 per cent of the total amount" (Quoted in Heinrich and Pleines, 2012, 213). One study documents allegations of such payments in the 1997-2003 period of industry consolidation, including a $55 million bribe by Belgian company Tractebel for natural gas concessions and payments totaling $115 million by Phillips and BP/Amoco to offshore accounts held by Nazarbayev and his close associates (Peck, 2004).

The trove of documents from the Unaoil email leak in 2016 provides a powerful, heretofore underutilized, source of information on oil-related bribery.[34] Unlike FCPA violations, the Unaoil emails track the corrupt activity of a fixed group of oil companies and middlemen doing business in a consistent group of oil-producing countries, including Kazakhstan, from 1999 to 2012. This allows for a qualitative time-series analysis of bribes paid to Kazakh officials before and after the KMG reforms. The leak highlighted the prominent roles played by two oil companies in bribing KMG officials—Italian firm Eni and Halliburton subsidiary KBR—who were funneling money through Monaco-based Unaoil to secure sensitive information on tenders to outbid their competitors. In one case, for example, over $10 million

[33] Even without the Giffen case (which could be perceived as an international outlier in FCPA prosecutions) the total amount of bribery would put the country ninth on the list, as there were several high-profile cases of transnational bribes being paid to the Kazakh government for oil contracts. These include FCPA cases against ABB Vetco Gray (filed Jun 22, 2004), Baker Hughes (Apr 11, 2007), Paradigm (Sep 21, 2007), and Pride International (Nov 4, 2010), but do not include ongoing investigations into bribes paid between 2004 and 2010 by Chevron, Eni, Lukoil, and BG Group for developing the Karachaganak oil fields, and bribes paid between 2006 and 2009 by Expro International.

[34] The leak was first reported by Australia's Fairfax Media Group on 30 March 2016. The UK Serious Fraud Office (SFO) announced a formal investigation on 19 July 2016 of these allegations.

in bribes went to Unaoil in order to reveal sensitive information about other bidders so that KBR could win tender 2007-0588 for drilling rigs in Kashagan. Eni was typically on the other side, accepting such bribes from KBR to funnel to Kazakh officials to "provide all the tender details, clarifications, evaluations, etc."[35]

But these bribes petered out after the KMG reform. There are no FCPA cases documenting bribes paid since 2010, and the only major prosecuted domestic case in the oil sector was filed against Murat Ospanov, chairman of the Agency for Regulation of Natural Monopolies, for accepting bribes totaling $300,000.[36] The leaked Unaoil emails show no evidence of payments or kickbacks from either Eni or KBR after December 2009. This could partly be due to DOJ investigations of both companies in February 2009 for FCPA violations in Nigeria—and perhaps they decided to "lay low" while under investigation. And yet Eni seemed nonplussed: it continued paying bribes via Unaoil to officials in other oil-producing countries. Leaked emails from 2010 and 2011 implicate Eni managers rigging tenders on behalf of Unaoil's other clients trying to win oil contracts in Iraq, Congo, Algeria, Suriname, and Syria.[37] And to add further insult to injury, Eni (together with Shell) was accused in February 2016 of paying a $207 million bribe to Nigerian officials to secure offshore oil licenses in 2011-2012.[38] Clearly, the company had no qualms about paying bribes to oil officials after 2009—just not in Kazakhstan.

Importantly, the KMG reform did not impact corruption outside the oil economy. Broad measures show that corruption remained a problem in the general economy before and after the oil reforms.[39] Bribery prosecutions remained high outside the oil sector, including allega-

[35]Leaked email from Stefano Borghi (Managing director, Eni) to Cyrus Ahsani (CEO, Unaoil) titled "ciro", sent 16 October 2007. Accessed from `http://www.theage.com.au/interactive/2016/the-bribe-factory/common/emails/single-page-emails/2\_\_ciro.pdf` on 18 July 2016.

[36]"Court issued warrant for arrest of NMRA head Murat Ospanov." *KazPravda*. 3 July 2014. Accessed from `http://www.kazpravda.kz/en/news/incidents/court-issued-warrant-for-arrest-of-nmra-head-murat-ospanov/` on 18 July 2016.

[37]Eni was accused once more of violating the FCPA, this time in 2011, for bribes paid to win oil contracts in Algeria, Brazil, Iraq, Kuwait, Libya, and Nigeria, as well as for its activity in Kazakhstan in 2004.

[38]Claudio Gatti, "L'ENI e il miliardo destinato all'ex ministro del petrolio nigeriano Dan Etete," *Il Sole 24 Ore*, 15 Dec 2015.

[39]Prior to 2010, Kazakhstan ranked between the 67th and 83rd percentile of most corrupt countries in the TI-CPI, while staying roughly in this position, between the 66th and 79th percentile, in each year up to

tions against arms manufacturer UkrSpetsExport for $1.5 million in bribes for a $40 million contract between 2011 and 2013, and the UK-SFO investigation into mining giant ENRC for potentially over $100 million in bribes paid in 2012 for iron ore contracts in Kazakhstan.

These findings suggest that pre-reform environment was prone to transnational bribery to win oil contracts, with little evidence of this behavior in the oil sector after the 2010 reform, despite the persistence of bribery in the non-oil economy. Any inference based on corruption allegations, of course, is highly speculative: ongoing cases, the Unaoil scandal, and other leaked emails about Eni are not as reliable as court documents found in FCPA cases. But these leaks do reveal a level of detail in the actual conversations of oil players engaged in bribery that has heretofore been absent in any public database or scholarly study on corruption.

The 2010 institutional reforms thereby laid the foundation for increased oversight and transparency in the oil sector, given the relatively lower political autonomy of the post-reform Ministry compared to pre-reform KMG. This in turn increased the cost of corruption as a means of awarding and securing contracts. This new environment fostered a decline in transnational bribery, not only in terms of FCPA prosecutions but also as revealed by the pattern of bribery from firms like Eni and KBR doing business in Kazakhstan before and after the reform. While it is impossible to rule out all rival explanations for this decline, the historical record indicates that the change in corruption dynamics could not have been due to systemic factors such as the political system, institutional capacity, size of the public sector, economic growth, or international integration, all of which remained largely stable throughout the period—and help to explain why non-oil corruption remained problematic (for details on these factors, see Appendix 2.3). Within the oil sector specifically, there were few changes other than geological conditions (which I argue led to the reform in the first place), while the size of the sector and the opportunities for new investment both increased. If anything, the latter would suggest *higher* levels of corruption given the greater chances

2015. The annual WEF Executive Opinions Survey identified corruption as either the first or second most problematic factor in conducting day-to-day business transactions every year between 2005 and 2014.

for extorted bribes amidst a growing need to issue new contracts and licenses for operations. Relieving KMG from its authority in awarding contracts thus fostered a tougher environment in which to extort bribes and, with increased government scrutiny and transparency in the procurement process, ultimately led to a drop in corruption in the oil industry.

Conclusion

I show evidence in this study that regulatory institutions help explain the wide variation in corruption across oil-producing countries. A decision made by governments in the past largely on the basis of petroleum geology creates incentives in the present for bureaucrats in some oil sectors to solicit bribes, while in others it dissuades civil servants from malfeasance. The data and statistical results show that states with contract-awarding NOCs, such as Ecuador, Kuwait, and Uzbekistan, foster relatively greater bribery than states with contract-awarding authority vested in ministries and other agencies, such as Peru, Saudi Arabia, and Turkmenistan. A case study of Kazakhstan illustrates both the origins of NOC choice and the decline in corruption after contract-awarding authority was transferred from the NOC to a ministry subject to government oversight and increased transparency standards.

Results from this study corroborate claims about bribery as a consequence of public officials' opportunities for bad behavior (Rose-Ackerman, 1975). State officials within regulatory NOCs are in the position to solicit bribes given their power to grant lucrative contracts with very little oversight and public disclosure. The relative political autonomy of these institutions gives rise to information asymmetries vis-à-vis the state, which faces greater difficulties in monitoring and sanctioning when compared to oversight of ministries and regulatory agencies. While my focus here is limited to transnational bribery in the oil sector, my argument implies that regulatory SOEs in general will also incentivize graft, embezzlement, and even petty corruption at lower levels of management. Broadly, this is a specific case of what could be a general phenomenon: corruption is more likely when governments vest authority in para-statal institutions (such as SOEs) and independent regulatory agencies rather than in bureaucracies.

Lastly, these findings are illustrative not only of the conditionality of the resource curse—that the discovery and production of oil may not necessarily drive a state towards bad governance—but also of the nuances of these conditions (Smith, 2007; Brooks and Kurtz, 2016; Menaldo, 2016). Broad constructs such as the 'presence of democratic government' or 'high levels of economic development' prior to discovery lack the specificity to explain the variation in corruption across resource-rich governments. Instead, this study challenges scholars of the resource curse to explore precise and well-defined conditions for why resource wealth hinders good governance in some contexts but not others.

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