Oil, corruption, and the institutions that foster transnational bribery

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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 institutional choices over how oil extraction is governed. Some governments grant contract-awarding authority to national oil companies (NOCs), while others place this authority in ministries. I argue that this choice matters: because of their fiscal opacity and lack of oversight, NOCs foster bribery in the procurement process whereas ministries disincentivize such corrupt behavior. Using new data on transnational bribes involving high-level government officials in 59 oil-producing countries, I show evidence for a robust link between oil-related institutions and grand corruption, 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 the micro-foundations of international corruption.

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1 Introduction

Within the past year, the oil industries of major Middle Eastern producers such as Kuwait, Iran, Iraq, and the UAE have been rocked by 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 2001; 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.[3] Yet even if there were a causal relationship between oil and corruption, why does the effect vary so greatly across countries?

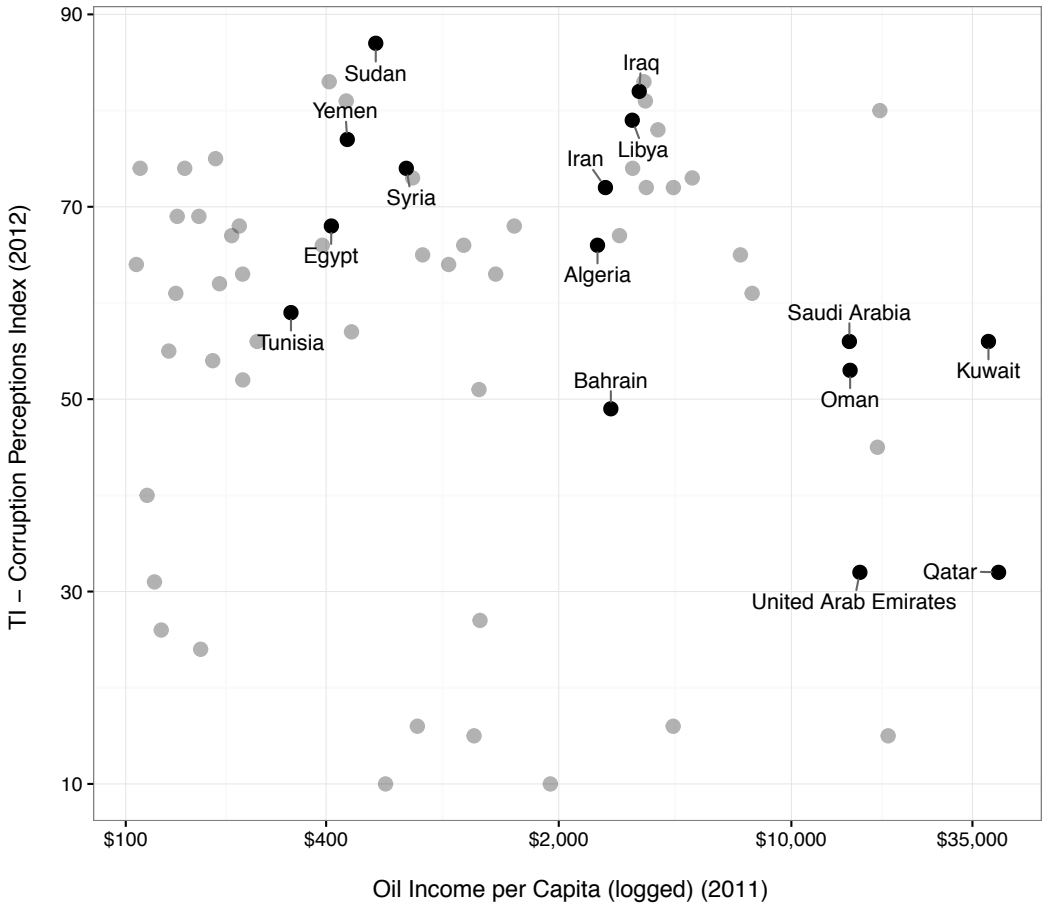
The main goals of this paper are to provide a new theory of how oil wealth affects corruption and to test implications of this theory using new data on oil-related institutions and transnational bribery. I argue that the political institutions employed by states to govern their petroleum wealth explain much of the variation in corrupt outcomes across oil-producing countries. I claim not only that institutions matter for corruption — a long-held view in political economy — but also which specific institutions are relevant to the study of corruption and *why* they matter. Specifically, I argue that when lucrative contracts are managed by national oil companies (NOCs) instead of government ministries, there

[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] A major oil producer is defined as having at least $100 of annual oil income per capita averaged across 1997-2013 (Ross 2012).

[3] Examples include the joint U.N.-World Bank Stolen Assets Recovery Program and the EITI.

Figure 1: Oil and perceptions of corruption in 2011-12



Scatterplot of oil income per capita (x-axis, exponentiated from the log scale) and Transparency International's Corruption Perceptions Index (y-axis; transformed so that higher values represent more corruption) for major oil producers ($n = 60$, including the USA). The mean CPI score for major oil producers is 41.9, with a standard deviation of 20.8.

are greater opportunities and incentives for state officials to solicit bribes. While I do not explicitly test links between institutions and specific aspects of corruption other than bribery, such as graft, embezzlement, fraud, and illegal campaign contributions, I provide observable implications with respect to these aspects for future research.

This paper builds on the broader literature on whether oil hinders good governance (Smith 2004, 2007; Ross 2012; Haber and Menaldo 2011), 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, Moene and Torvik 2006; Robinson, Torvik and Verdier 2006; Wright 2008; Luong and Weinthal 2010; Menaldo 2016). The separate literature on political corruption has similarly shown that rent-seeking is exacerbated by or borne out of so-called "bad" 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 oil promotes corruption difficult to answer is the lack of reliable data on cross-national corruption that is specific to the oil sector. What is needed for refined analysis of the specific mechanisms linking oil to corruption are measures that are comparable across countries but without being conflated by broader social corruption in other, non-resource sectors of the economy.

I contribute to this debate with four innovations. First, I introduce such a measure to capture corrupt practices involving high-level government officials, cases which are often labeled as examples of "grand corruption" (Rose-Ackerman 1975). Following Escresa and Picci (2015), this measure is drawn from court transcripts and documents on violations of international anti-corruption laws — specifically the US Foreign Corrupt Practices Act (FCPA) — in 59 oil-producing countries during the period 1997–2013. (Throughout this paper, I define an "oil-producing country" as any country producing greater than $100 of per capita income from the sale of oil and gas on average during the 1997–2013 period (Ross 2012).[4])

Second, using the Department of Justice (DoJ) and Securities and Exchange Commission (SEC) archives on FCPA violations, I reveal differences in the levels of corruption across oil-producing countries in a way that is both specific to the oil sector and cross-nationally comparable. The measure of transnational bribery, for instance, ranges from a $35,260 bribe

[4]This list is similar is using a threshold of 1,000 metric tonnes of annual oil production.

paid between May 2005 and November 2008 by Swiss-based Weatherford International to senior officials at Algerian national oil company Sonatrach, to an $84.33 million bribe paid in August 1999 by an associate of Mobil Oil to Kazakh President Nursultan Nazarbayev *via* national oil company Kazakhoil.[5]

Third, I show that this variance is in large part associated with a specific institutional choice. I find the highest corruption levels — using both new data on transnational bribery and existing measures of corruption — in oil-producing countries where procurement authority is vested in NOCs instead of in ministries or other regulatory agencies.

Fourth, given the potential endogeneity of oil-related institutions to corrupt outcomes, I use politically-exogenous geological factors as an instrumental variable and still find evidence supporting the institutional determinants of corruption. Furthermore, null effects from a placebo test suggest the instrument satisfies the exclusion restriction.

2 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 corruption is the result of weak political institutions that cannot suppress rent-seeking behavior (Krueger 1974). 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 has also stressed the moral as opposed to the institutional determinants of corruption (Fisman and Miguel 2007), drawing on Jon Elster's emphasis on a values-based explanation 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) and Rose-Ackerman (1975) argue that corruption arises from

[5] *US SEC vs. Weatherford International Ltd.* 4:13-CRIM-00733, USDC Southern District of Texas Houston Division, filed November 26, 2013. *USA vs. James H. Giffen* 03-CRIM-404, USDC Southern District of New York, filed April 2, 2003, p. 47.

opportunities and incentives for officials to engage in corrupt behavior. For cases of grand corruption, Rose-Ackerman finds that bribes are facilitated both by the ease of making illicit payments without getting caught 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 bidding for and winning lucrative government contracts (Olken 2007), especially when government officials have more regulatory discretion (Kaufmann and Wei 1999). For oil-related corruption in particular, these studies imply that corruption can be fostered by the opportunity for high-level officials to solicit a bribe given their capacities for regulating valuable state contracts, which often result in extraordinary profits for winning firms.

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 2001; 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. Lederman and Maloney (2008, 32) suggest that these conditions depend on whether or not "good institutional characteristics emerged prior to the discovery of natural

resources." 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 (Kurtz and Brooks 2011). Though the effects of oil on corruption conditioned by institutions remain unclear, the large variance in corruption outcomes across the oil-producing world 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 place in resource-rich countries that either promote or hinder good governance, democratization, regime stability, or civil and international conflict.

Building on Luong and Weinthal (2010), I propose that the regulatory structure of a country's oil sector is one institution that helps explain the variance in oil-related corrupt behavior. Specifically, I posit that countries where NOCs have the authority to solicit and award concessions have the greatest opportunities for grand corruption when compared to countries either without NOCs or with NOCs that lack regulatory powers. In this way, my argument would suggest that oil indeed causes corruption but its effects are mediated by institutions specific to the oil sector.

I expect this pattern because a regulatory structure that grants contract-awarding authority to a NOC fosters an opaque environment in which bids are evaluated with little public disclosure and with little oversight or control by other governmental elements. The alternative structure is to vest these powers in an independent state agency — such as a ministry, legislative committee, or regulatory body (for example, the Norwegian Petroleum Directorate or Oman's Directorate General of Management of Petroleum Investments) — that is typically overseen by a country's legislature, a higher regulatory agency, or even the executive office. It comes as no surprise that NOCs are not transparent entities (Stevens 2008; Victor, Hults and Thurber 2012; Ross 2012). The vast majority of NOCs with contract-granting powers do not publicly disclose information about contracts, tenders, and the list of bidders vying for concessions (Revenue Watch Institute 2013). Government agencies, on the other hand, are pressured to publish information given their formal ties to legislatures

and judiciaries (even in authoritarian regimes), and informal ties to the mass public (Wilson 1989).

Placing contract-awarding 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. Consider the following example. A major oil company is bidding for contracts to explore for oil in a field that straddles the border of country A and country B. Assume for the moment that the company will pay a bribe to win contracts if it is solicited to do so. Assume also that both country A and country B have NOCs, are developing democracies, and are generally similar in socio-economic terms. In country A, contracts are awarded by a regulatory agency with budgets and decisions overseen by parliament, while in country B contracts are awarded by a NOC with limited oversight by parliament.[6] Officials in both countries know that they can add "special payments" to the contracts if they solicit a bribe from the oil company, given its willingness to win and maintain contracts.

However, officials in country A also know that the risk of getting caught extracting a bribe is relatively high given the difficulty in effectively hiding special payments in contracts from parliament. (The same is true for other aspects of corrupt behavior such as graft and embezzlement.) For officials in country B, this risk is relatively low given there is little oversight of the NOC's fiscal and budgetary operations. It follows that the likelihood of bribery in the oil sector should be higher in country B than in country A. Since the overall magnitude of bribes will influence the likelihood of getting caught, it should also follow that the amount of bribes will be higher in country B than in country A, controlling for the size and value of the prospective oil field.

Such is the distinction between Kazakhstan and Turkmenistan. The two countries share several oil and gas fields along the Mangyshlak sedimentary basin, and both have similar lev-

[6]Parliamentary oversight in country B is limited to approving board members and how much is reinvested in the industry annually. This is the typical arrangement in countries such as Nigeria, Iran, Mexico, and Indonesia.

els of petroleum income per capita at roughly $4,000 per year. Both are fiscally-centralized, personalist dictatorships with histories of Soviet occupation, both lack strong legislative and judiciary bodies, and both routinely violate civil and press freedoms. Yet transnational bribery in the petroleum sector across the 1997–2013 period amounted to $91 million in Kazakhstan while it amounted to nearly $0 in Turkmenistan. Outside the petroleum sector, FCPA-prosecuted corruption amounted to $18.5 million in Turkmenistan and $17.9 million in Kazakhstan, 27th and 29th worst out of 106 countries. Given Turkmenistan's terrible record of government transparency under Berdimuhamedow compared to Nazerbayev's Kazakhstan (Human Rights Watch 2014), we might expect bribery and corruption to be higher in the former than in the latter. Yet one meaningful distinction — among many others I have not listed here — is that Kazakhstan has a contract-awarding NOC whereas Turkmenistan has a NOC that lacks this authority. As I elaborate in more detail below, these institutional choices were made largely on the basis of petroleum geology in each country.[7]

The argument put forth here is not tautological: that is, I am not arguing that "corrupt payments to government officials to win contracts are more likely when government officials control the awarding of contracts." In nearly every country where oil is produced in commercial volumes, subsoil resources are sovereign properties of the state and the authority over contract allocations is vested in the offices of public officials. Even in the United States, perhaps the most deregulated and decentralized oil-producing country in the world, firms seeking to produce oil in federal territories (including the offshore Gulf of Mexico oil fields) must obtain contracts from the Department of the Interior. Thus in any regulatory structure — non-nationalized, nationalized with contract-awarding NOCs, or nationalized without contract-awarding NOCs — there is the possibility for corrupt payments to public officials to procure concessions and licenses.

What makes the contract-awarding NOC structure most susceptible to corruption is a concentration of contract-granting authority in an opaque organizational environment,

[7]Kazakhstan restructured its industry in 2010 and shifted to a non-regulatory NOC framework.

which reduces transactions costs and the probability of being exposed engaging in corrupt behavior. Indeed, from the perspective of compliance officers for Western firms doing business internationally, the risk of corruption "in the front lines" is much higher when state-owned enterprises in general oversee the procurement process.[8]

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 without NOCs or without contract-awarding NOCs.* Notice that this proposed explanation for variance in oil-related corruption does not identify nationalization by itself as the culprit for corrupt governance. The salient dimension of this process is whether regulatory powers are vested in state-owned enterprises or instead in independent state 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 alternative institutions. In addition, I empirically assess if this type of NOC is subject to less oversight than government ministries and NOCs without contract-awarding authorities.

Two final points are warranted before turning to a discussion of data and methods. First, I only 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 as of 2015, 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.[9]

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 regulatory

[8]Panel discussion with James Koukious (partner, Morrison & Foerster LLP) and Richard Bistrong (CEO, Front-Line Anti-Bribery LLC), May 4, 2016, Washington, DC.

[9]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.

NOC whereas non-corrupt leaders choose either not to nationalize or to nationalize but with a NOC without contract-awarding authority. In section 4.4, I instrument for institutional choice using a politically exogenous factor (geology) and find that the main results still hold; in section 4.5, I analyze whether the quality of pre-existing governance correlates with the decision to nationalize and to establish a NOC with regulatory authorities in the post-1980 period.

3 Data

3.1 National oil company data

I define and measure a regulatory NOC as having the capacity to solicit and award licenses, contracts, and/or blocks for oil exploration and production to operating companies (such as ExxonMobil or BP), or service companies (such as Halliburton or Schlumberger). These regulatory NOCs are typically autonomous in making decisions on which bids ultimately are awarded concessions (with the board of directors of the NOC playing a prominent role in the decision-making process).

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.[10] 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 ministries of economy & finance and of energy & mining have the authority to award licenses to operating firms for participation in joint ventures with PeruPetro, subject to parliamentary

[10] Article 2, Law No. 2967 (1978) and subsequent amendments.

review.[11]

I use petroleum laws and NOC/ministry documents to categorize the regulatory structure of all oil-producing states (I provide the full list of primary documents in Appendix 5). This includes countries without NOCs, whose regulatory structure is similar to the non-regulatory NOC cases where ministries or agencies have authority to award concessions. I initially focus on regulatory structure as of 2012,[12] but for the instrumental variables analysis I measure regulatory structure in the year of nationalization (which varies across countries).

The categorization of cases into no NOC, non-regulatory NOC, and regulatory NOC is presented in Table 1, disaggregated by broad region to allow for ease of geographical comparison. There is little geographical clustering of institution types, such that no one region dominates a specific regulatory structure nor does one regulatory structure dominate a given region. Nearly all Middle Eastern and African states have NOCs, though there is reasonable balance across both regulatory and non-regulatory NOCs in each region. In Appendix 2, I provide more details on why governments choose one structure over another and I present further comparisons between countries with regulatory NOC and countries with non-regulatory NOCs.

3.2 Corruption data

Measuring corruption has proven difficult, particularly in cross-national settings given the expected differences between what constitutes an illegal payment in differing contexts (Treisman 2007; Escresa and Picci 2015). 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 (KKZ) (see Treisman (2000) for a review).

Yet these measures do not allow for any analysis of quantifiable acts of corruption. They

[11] Article 6, Law No. 26221 (1993) and subsequent amendments.

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

Table 1: Categorization of regulatory structures for all oil-producing states as of 2012

Region	No NOC	Non-regulatory NOC	Regulatory NOC
Americas	Belize Barbados *Canada* Cuba Suriname *USA*	Argentina Brazil Colombia Peru Trinidad Venezuela	Bolivia Ecuador Mexico
Asia & Oceania	*Australia* *New Zealand* Papua New Guinea Thailand Timor-Leste	India* Pakistan*	Brunei China* Indonesia Malaysia Vietnam
Europe & Eurasia	Croatia Hungary Romania Ukraine *United Kingdom*	*Denmark* *Netherlands* *Norway* Russia Turkmenistan	Azerbaijan Kazakhstan Uzbekistan
Middle East & North Africa		Bahrain Egypt Oman Qatar Saudi Arabia Tunisia UAE	Algeria Iran Iraq Kuwait Libya Syria Yemen
Sub-Saharan Africa	Chad Gabon	Ghana* Equatorial Guinea Uganda*	Angola Cameroon Congo, Dem. Rep.* Congo, Rep. Nigeria Sudan
Total:	*18*	*23*	*24*

∗ *Though they do not meet the threshold requirement of oil producer, these countries are included in the table for illustrative purposes given the prominent role their NOCs (CNOOC, CNPC, and Sinopec in China; Perenco in DRC; GNPC in Ghana; ONGC in India; PSO in Pakistan; and UNOC in Uganda) play in their respective political economies. Countries with less-prominent NOCs that do not meet the threshold of oil-producer (and not represented in this table) are Chile, Poland, and South Africa.*
Countries labeled in italics are long-established democracies, defined as sustaining a democratic government since 1950. These countries are dropped in alternate model specifications in the analyses below.

can be biased by any number of outside factors such as unfavorable media coverage of a country's business sectors or idiosyncratic personal experiences of survey respondents (Treisman 2007; Donchev and Ujhelyi 2014).[13] Nor can perceptions-based measures be employed for analysis of corruption in sector-specific contexts. Studies such as Olken (2007), Golden and Picci (2005), and others address this problem by measuring differences in prices and costs of goods and services such as infrastructure construction and hospital equipment over time. Yet, as Treisman (2007, 216) notes, "clearly, these approaches would be hard to extend cross-nationally." How can we reliably determine the causes of corruption when corruption is either poorly measured or captured in contexts that are difficult to generalize? Furthermore, how can we capture what determines corruption in one specific sector of a country's economy?

I introduce a new cross-national dataset of grand corruption that is not only comparative and quantifiable, but also sector-specific. Using this measure, acts of corruption can be disaggregated by business sectors such as telecommunications, pharmaceuticals, and relevant for the current study, the petroleum sector. What I propose and measure are the quantifiable bribes paid by multinational firms to foreign government officials that are revealed in violations of the FCPA. Specifically, I measure corruption in a given country by the amount of bribes associated with FCPA violations within that country's 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 — doing business abroad that were bribing government officials, who are defined as "any officer or employee of a foreign government or any department, agency, or instrumentality thereof."[14] Importantly, this includes bribing officials at state-owned enterprises, which are included in the FCPA-defined category of "government officials." Prosecutions are made by the DoJ and SEC.

[13] Other measures that are more experience-based — such as UNICRI and WBES — ask survey respondents about their experiences in which a government official asked or expected the respondent to pay a bribe for his/her services, but do not capture grand corruption.

[14] 15 U.S.C. §§78dd-1. See also §78m regarding prosecution of foreign-based firms with shares listed on US stock markets.

To get a sense of the global scope of prosecutable companies, consider that seventy-six of the *Oil and Gas Journal* "Top 100" oil and gas companies *outside* the US are eligible for prosecution under the FCPA given their listing of equities on an American stock exchange.[15] This list includes national oil companies such as CNOOC (Nasdaq: CEO), PetroChina (NYSE: PTR), and Gazprom (NYSE: OGZPY).[16]

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.[17] 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 focus on a cross-section of bribery data and sum across all instances occurring in the period 1997 to 2013.[18]

For each case, the DoJ or SEC provides detailed information along with supplementary case documents outlining the following facts: (1) firm(s) involved in bribery allegations, (2) country(-ies) in which bribery was taking place, (3) government institution(s) or organization(s) soliciting/accepting bribes in the host country(-ies), (4) penalties paid by prosecuted firms for violating the FCPA,[19] and importantly (5) the amount of bribes paid (or intended to be paid) to foreign officials by firms 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.

To create the FCPA measure of corruption, I aggregate bribe amounts reported in all

[15] 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

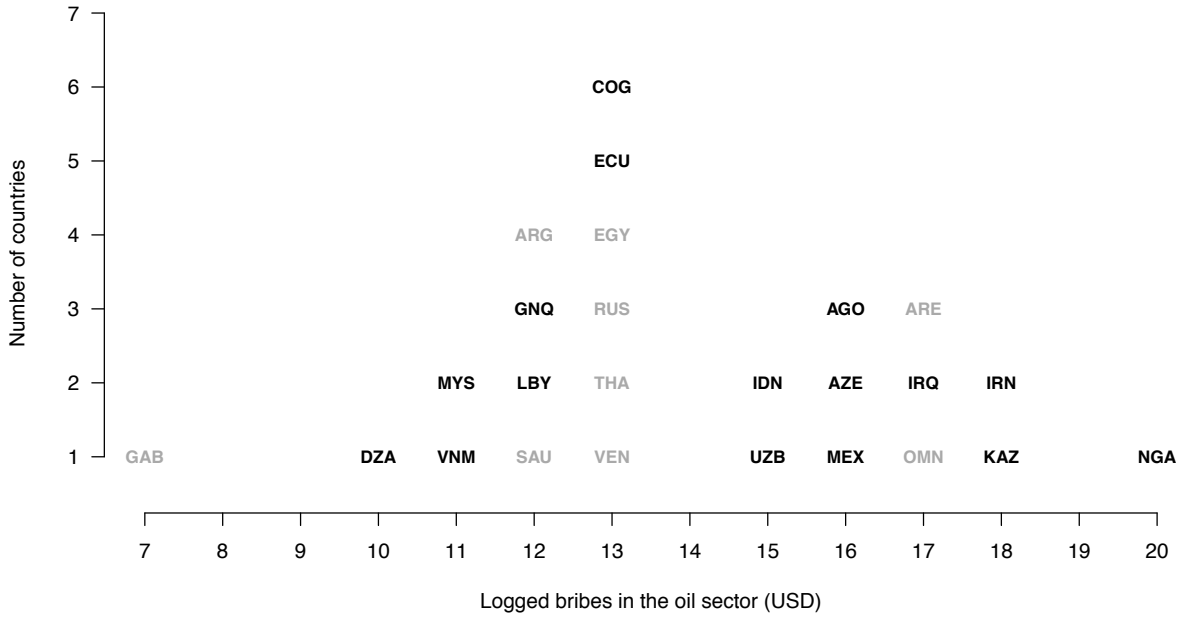
[16] NOCs not listed in any way on a US stock exchange include 15 of the 16 NOCs in the Middle East and Africa as well as NOCs in Mexico, Venezuela, Indonesia, and Malaysia.

[17] 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.

[18] 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.

[19] Penalties are proportional to (a) the perceived amount of bribes paid to foreign officials and (b) the estimated net gain in revenue from having won a contract for which a bribe was paid (Karpoff, Lee and Martin 2015). For FCPA cases in the energy sector for which non-zero bribe amounts are available ($n = 35$), the average bribe-to-penalty ratio is 0.23, implying that penalties are roughly four to five times as large as the perceived bribe amount paid or intended to be paid.

Figure 2: Distribution of oil-related bribery among major producers, 1997-2013



Histogram of bribery with a bin width of 1 logged US dollar. Cases are labeled using World Bank three-letter codes: countries with regulatory NOCs are in black, countries with non-regulatory NOCs or no NOC in dark gray. Countries with zero bribes are omitted from the graph.

oil-related FCPA cases by country. Consider the example of Total, a French oil firm publicly traded on the NYSE. From 1995 to 2002, Total made illicit payments of roughly $60 million to officials at the National Iranian Oil Company (NIOC) to ensure the successful awarding of concessions to the offshore *Sirri* oil and gas fields. 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 energy-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) and excluding the USA, this leaves a total sample of 59 countries with data on FCPA violations out of a possible 60 oil-producing countries.[20] In Figure 2, 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, countries in which no multinationals listed on US stock exchanges operate are not eligible for FCPA violations. A country like Somalia, for instance, is omitted from the FCPA data because no prosecutions are possible. Nonetheless, there are few oil states that are completely closed off to foreign multinationals. Even South Sudan, under heavy sanctions, contains foreign operators in the oil industry such as Canada's Talisman Energy (NYSE: TLM).

A second and more problematic issue is that FCPA cases are prosecuted with political motivations. 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. However, with respect to corruption in the oil industry 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 major oil companies have been prosecuted with FCPA violations, be they American (Chevron, ExxonMobil, ConocoPhillips, Baker Hughes) or non-American (Total, BP, Royal Dutch/Shell).

Prosecutorial bias may also lead to the DOJ and SEC refraining from investigations in countries that are "friends of the US" while focusing most of their time and energy on corruption occurring in "unfriendly" countries. This could lead to omitted variables bias in

[20]This list does not include minor producers such as India, Pakistan, and Uganda which have national oil companies and data on FCPA violations.

the models below if allies were more likely to adopt non-regulatory NOCs and non-allies were more likely to adopt regulatory NOCs. I leave a thorough discussion and analysis of this kind 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 incorporating these elements of bias into the analysis.

To assess the relationship of this measure with existing corruption data, I compare the FCPA measure to the CPI from 2012. The correlation between indicators is relatively low at 0.40. When comparing FCPA *penalties* from all sectors, not just the oil sector – and keep in mind that while bribery data for the non-oil sector is not collected, penalties are proportional to bribe amounts from prosecuted cases – the correlation with CPI scores is 0.46. Not surprisingly, countries ranked as "highly transparent" on the CPI, such as Canada, the Netherlands, and Norway, have the lowest levels of bribery in the oil sector. Indeed, when established democracies are removed, the correlation drops to 0.25. This comparison illustrates that perceptions of corruption in all economic sectors do not strongly correlate with prosecutions of corruption in the oil sector.

The UAE provides an interesting example of the disconnect between perceptions of corruption and corruption in practice. While the Emirates are often believed to be relatively free of corrupt practices (a perception that is reflected in corruption measures from the World Bank and ICRG as well) prosecuted oil-related bribes in the country exceeded $15 million. In terms of FCPA penalties, the UAE is the 37th most corrupt out of 106 countries in the all-sector sample, on par with countries more commonly associated with corruption such as Kyrgyzstan (36th) and the Ivory Coast (44th). This mismatch is exemplary of existing measurement concerns in the literature, notably that "perceived corruption may reflect many other things besides the phenomenon itself" (Treisman 2007, 215).

Nonetheless, 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 of corruption and the CPI, the most commonly used measure in the existing literature.[21] As an additional robustness check, I use the Escresa and Picci (2015) PACI measure of prosecuted corruption which includes violations of the FCPA along with 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.

3.3 Transparency and oversight data

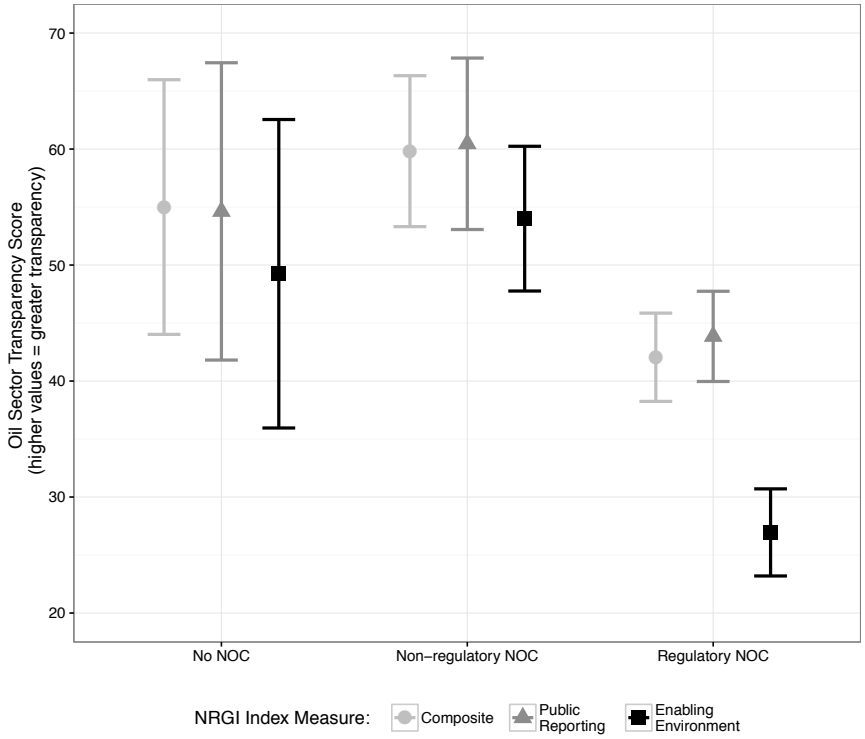
I use two datasets to test whether regulatory NOCs are less fiscally transparent and subject to less oversight than alternative institutional structures. The first is the Resource Governance Index's (RGI) three measures of transparency and oversight specifically in the natural resources sector: (1) *public 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.[22] I also draw on longitudinal data on transparency in government reporting across all economic sectors, as assembled by Hollyer, Rosendorff and Vreeland (2014). This measure regards transparency as "the disclosure of policy-relevant information by the government to the public."[23]

[21] A ProQuest search on February 3, 2016, for "corruption perceptions index" yields 13,768 papers and books; a Google scholar search gives "about 17,300" results. Comparatively, the ICRG measure garners 2,955 results on ProQuest while the World Bank's government effectiveness measure gives 2,750 hits.

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

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

Figure 3: Oversight and transparency in oil governance for 39 oil-producing countries, 2012.



Oversight and transparency is measured by the RGI (range: 0-100, higher values indicate better governance). Means by group are plotted along with 95% confidence bands (mean SE). Refer to Table 1 for a listing of countries by category.

4 Methods and Results

4.1 Institutional choice and transparency

Data on fiscal transparency and government oversight show support for the purported mechanism linking regulatory NOCs to greater incidence of bribery. Using the RGI measure, I show in Figure 3 that countries with regulatory NOCs fare worse on the index when compared to countries without NOCs or with NOCs that do not have contract-awarding authority. 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.

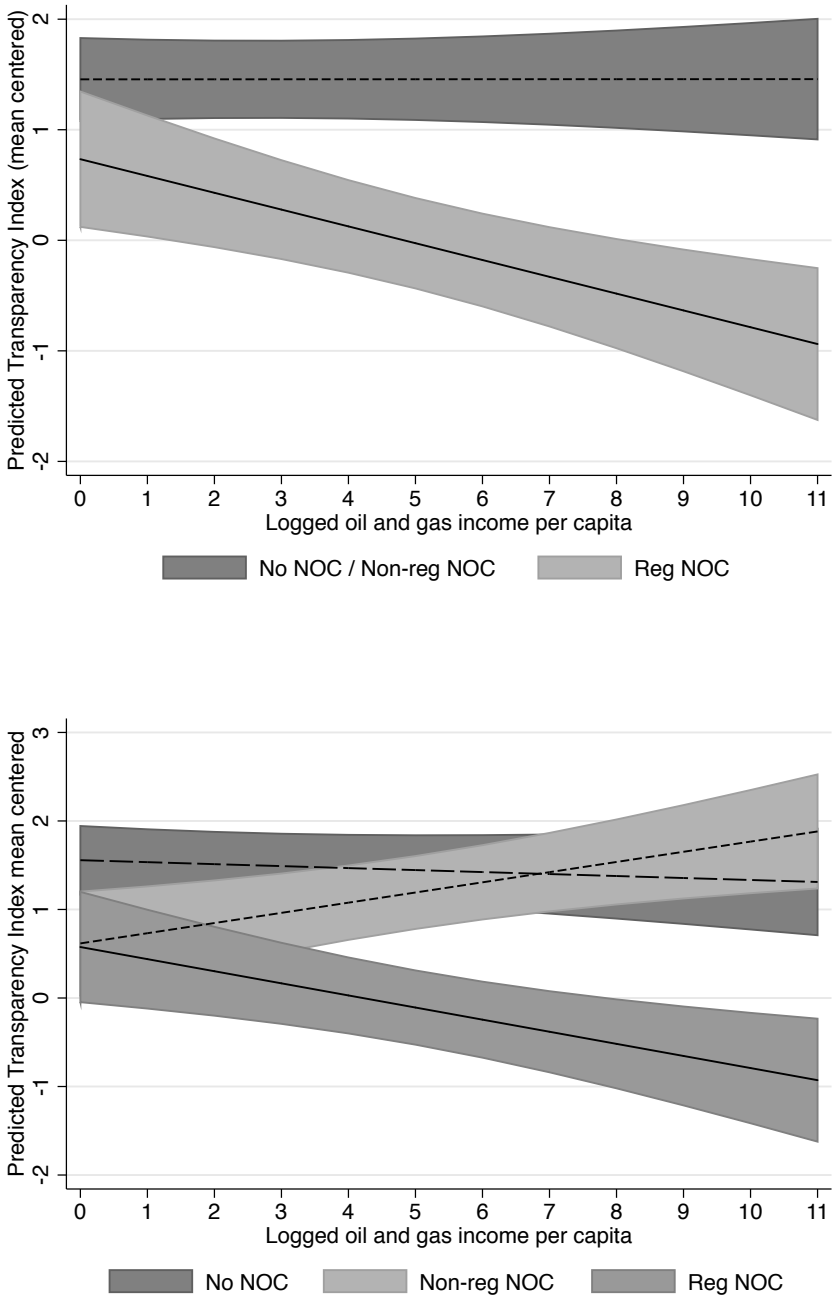
I similarly find that states with regulatory NOCs have opaque fiscal institutions compared to states without this institutional structure using longitudinal data on transparency in government reporting. As this measure is not specific to the natural resources sector, I interact the regulatory NOC indicator with a measure of oil wealth (in this case, logged oil and gas income per capita). Given the longitudinal nature of the data I use restricted maximum likelihood (REML) with country random intercepts, controlling for regime (Polity) and time (years), and employing an identity covariance structure. Model results are robust to using OLS with country fixed effects (see Appendix Table 4).

In Figure 4, I plot the predictive marginal effects of having different regulatory structures. These results indicate that compared to both the no NOC and non-regulatory NOC structures, states with regulatory NOCs have lower levels of transparency in government reporting, though this is only the case at moderate to high levels of oil wealth. Indeed there is no discernible effect of institutional choice at low levels of oil wealth – this is to be expected, however, given there is little theoretical connection between oil-specific institutions and transparency in the broader economy in states with little to no oil wealth on a per capita basis.[24]

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 when compared to non-regulatory NOCs or sectors without NOCs. I now turn to examining whether these opaque institutions indeed foster bribery and corrupt behavior.

[24]Examples of states with different institutional arrangements in low oil income per capita contexts, as of 2013: Turkey, No NOC, $26 oil and gas income per capita; Pakistan, non-regulatory NOC, $49; Chile, Regulatory NOC, $23.

Figure 4: Regulatory NOCs and government transparency



Predictive marginal effects of NOC structure (two- and three-level measures) and petroleum income on transparency, measured using the HRV Transparency Index where low values indicate less transparency. For full model results, refer to Appendix Table 4

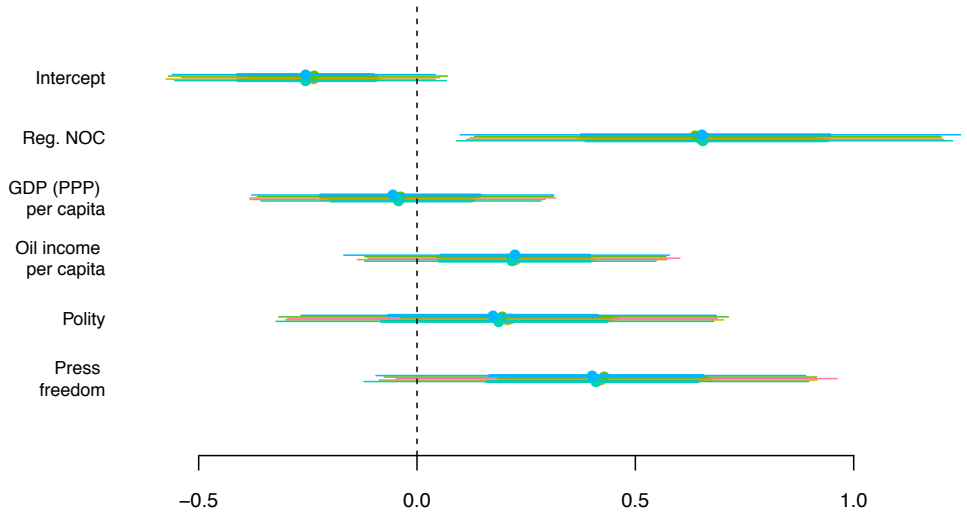
4.2 Methods to analyze institutional choice and corruption

For the analysis of institutional choice and bribery, I include seven predictors measured at the country (j) level, averaged across the time-frame of FCPA data considered, 1997-2013: a constant (x_{1j}), a binary variable[25] for the existence of a regulatory NOC (x_{2j}), and controls based on existing explanations for corruption, including logged GDP per capita from the World Bank *World Development Indicators* (x_{3j}), logged oil income per capita from Ross (2012) (x_{4j}), democratic institutions as measured by Polity scores (x_{5j}), and press freedom as measured by Freedom House (x_{6j}). The outcome measure is the country-level amount of bribes connected to oil-related FCPA violations discussed above. I present the full model specification in Appendix 1. As a second outcome measure, I use the Transparency International Corruption Perceptions Index (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 interact the regulatory NOC variable with a 0-1 continuous measure of country-level oil reliance in 2012. This is calculated as oil and gas income divided by total GDP from the World Bank *WDI*.

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 two different approaches involving instrumental variables and two-stage models, discussed at length in sections 4.4–4.5.

[25]For robustness, I also try a categorical variable with three levels: no nationalization, nationalization without a regulatory NOC, and nationalization with a regulatory NOC. The results are consistent with using a binary measure in terms of the comparison between regulatory NOC and no NOC, and an even larger difference between the regulatory NOC and non-regulatory NOC, which is predicted to have lower corruption levels than the no NOC case as well. See Table 13 in the Appendix.

Figure 5: Results from Bayesian linear analysis: Bribery



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

4.3 Results: Institutional choice and oil-related corruption

I find support for the hypothesized relationship between regulatory NOC ownership structure and oil-related corruption levels as measured by bribes to state officials. States with regulatory NOCs have higher corruption levels than states without NOCs or with NOCs without regulatory authority.

Results from the Bayesian model are plotted in Figure 5, 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 Table 5 in the Appendix, where I also present in Table 6 and Figure 8 substantively and statistically similar results when excluding established democracies.[26]

I find that a regulatory NOC structure corresponds to an increase in corruption by 0.65 standard deviations. Note this is an identical estimate to modeling FCPA measures using OLS which are presented in Appendix Table 9, column 4. Posterior predictions imply that the *average* country with no NOC or a NOC without contract-awarding authority is predicted to have between $20 and $15,000 in FCPA-related bribes with a median $540 in bribes, whereas a country with a regulatory NOC is predicted to have somewhere between $13,000 and $8,000,000 in FCPA-related bribes with a median of $320,000 in bribes.

To put these numbers in perspective, consider a country like Saudi Arabia – taking into account specific covariate values such as its GDP and polity score – where the difference in median predicted bribes would be $74,885 if it had no regulatory NOC and $7,079,724 if it had a regulatory NOC.[27] In the database, Saudi Arabia has $120,000 in reported bribes and has a non-regulatory NOC. It is 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 S.A. in violation of the FCPA for paying roughly $40 million in bribes to secure rights to build 14 steam power generating units, with much of this money funneled to officials at the state-owned Saudi Electric Company (which regulates contracts).[28]

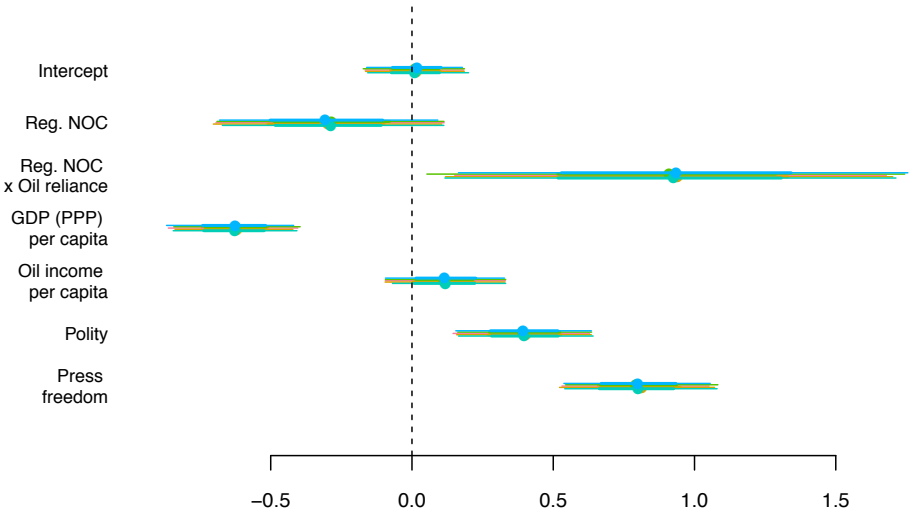
Turning back to the results in Figure 5, there is no statistically discernible relationship between GDP, oil income, polity, and press freedom (though the latter would be significant at the 5% level in a one-tailed test). These findings suggest that within the realm of oil-related

[26] Australia, Canada, Denmark, Netherlands, Norway, New Zealand, and the United Kingdom. These countries exclusively choose either the no NOC or non-regulatory NOC frameworks, and maintain strong institutions and low general corruption. Including them may introduce concerns about selection bias and spurious correlation between regulatory NOCs and corruption.

[27] Such a shift would be akin to the difference between Malaysia ($98,000 in bribes) and Mexico ($10,578,600 in bribes) in the sample of FCPA-related bribes.

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

Figure 6: Results from Bayesian linear analysis: CPI



Posterior distributions of coefficients for the Bayesian linear model with CPI as the outcome measure, rescaled so that higher values indicate more corruption.

extortion, countries exhibit both high and low levels of corruption irrespective of wealth and political institutions.

I find similar evidence for the relationship between regulatory structure and corruption broadly construed, as measured by CPI scores. These results, visualized in Figure 6, show support for the positive relationship between regulatory NOCs and corruption in states with non-zero reliance on oil and gas income, which is scaled to run continuously from 0 to 1. Results are larger in magnitude – where having a regulatory NOC corresponds to a 0.93 standard deviation increase in corruption – but indicate greater uncertainty as represented by wider credible intervals (Appendix Tables 7 and 10). The same pattern holds when using the Escresa and Picci (2015) *PACI* measure of corruption (Appendix Table 8 and Appendix Figure 7).

Additional models indicate that the results are robust to dropping established democracies from the sample, since none of these countries have regulatory NOCs and typically have low levels of corruption (Appendix Table 11, Figure 8); to including region fixed effects (Appendix Figure 9); to rescaling the dependent variable to account for higher bribes occurring in countries with higher levels of oil wealth (Appendix Table 12); to using a trichotomous measure of non-regulatory NOCs and regulatory NOCs, with the no NOC case as the baseline (Appendix Table 13); to using FCPA-related penalties assessed by the DOJ and SEC instead of bribe amounts (Appendix Table 15); and to including all states (not just oil producers) with TI-CPI data (Appendix Table 16).

Importantly, results are *not* robust to using a dummy variable for whether or not a country was implicated in an oil-related FCPA violation (Appendix Table 14). This suggests 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.

4.4 Results: Instrumenting for Institutional Choice

Research on the formation of national oil companies suggests that the government's choice of a regulatory agent *at the time of nationalization* is highly dependent on geological risk in addition to political and economic factors. When it comes to regulating the industry, Victor, Hults and Thurber (2012) 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.

To proxy for (un)favorable geological conditions, I code the average sulfur content of oil

reserves being produced prior to nationalization in each country.[29] A higher sulfur content makes oil both more difficult to extract and to refine into gasoline. Prior research on NOCs would predict that countries with higher levels of sulfur in oil reserves will be less likely to create regulatory NOCs, while those with low levels of sulfur will be the most likely to establish the regulatory NOC structure.

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 run a placebo test using sulfur content *in the current period* as an instrument and find null results. This is 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).

A second possible threat to the exclusion restriction is that favorable geology could lead to higher oil rents over time, which in turn could generate greater incentives for bribery. I account for this by controlling for current oil rents (averaged for the 1997-2013 period); the results do not lend support for this causal pathway given the 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%).

If my argument that regulatory NOCs will lead to higher levels of corruption is correct, then I expect that states with favorable geology (low sulfur content) will have higher levels

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

of bribery in the oil sector based on results of a two-stage least squares model.

First stage results support claims made in historical accounts of NOC formation that, at the time of nationalization, states with favorable geology opt for regulatory NOCs.[30] The Wald F-statistic of the instrument is moderate at 10.34 (p-value: 0.032). 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 0.0045 ($df = 1$).

After instrumenting for the regulatory NOC institutional choice, I still find a strong relationship with high levels of corruption (Table 2, models 1 and 2). The second stage results 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 prior to nationalization (polity and press freedom), and the timing of nationalization (measured as the year of NOC establishment). Note that the no NOC category is excluded from this analysis since the first stage model is conditional on having nationalized.[31]

Substantively the results are similar to the above models, though with greater uncertainty. The instrumented regulatory NOC increases the amount of bribery in the average country by 0.823 standard deviations, compared to 0.654 standard deviations in the original model, while the standard error grows to 0.342 from 0.281. Nevertheless, this exercise suggests that the main findings are not driven by endogeneity once we instrument for the regulatory NOC institutional choice.

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 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 sulfur content (2013) and regulatory NOC choice,

[30] In Appendix Figure 10, I graph the raw distribution of sulfur content by institutional choice.

[31] Data on sulfur content are missing for Bolivia and Romania (both have NOCs). 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 Norway, are omitted from models 2 and 4.

Table 2: 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)*	-0.183 (0.057)	-0.195 (0.064)		
Sulfur content (%) *(2013)*			-0.044 (0.020)	-0.048 (0.023)
GDP (logged)	-0.323 (0.145)	-0.366 (0.187)	-0.398 (0.132)	-0.431 (0.198)
Oil income (logged)	0.341 (0.229)	0.415 (0.292)	0.343 (0.237)	0.402 (0.328)
Regime (Polity)	0.092 (0.031)	0.096 (0.025)	0.161 (0.125)	0.164 (0.109)
Press freedom	0.164 (0.060)	0.182 (0.083)	0.181 (0.122)	0.172 (0.047)
Nationalization year	0.001 (0.005)	0.0001 (0.006)	0.002 (0.004)	0.002 (0.006)
Constant	-2.416 (9.687)	0.002 (12.076)	-3.596 (8.168)	-2.685 (11.987)
Wald F	10.34	9.35	4.77	4.16
Second stage results, DV: FCPA-related bribes (logged $)				
Regulatory NOC	0.823 (0.342)	0.831 (0.328)	-3.156 (2.861)	-3.565 (3.195)
GDP (logged)	-0.302 (0.231)	-0.384 (0.268)	-1.793 (1.035)	-2.184 (1.290)
Oil income (logged)	0.566 (0.264)	0.711 (0.349)	1.764 (0.754)	2.288 (1.107)
Regime (Polity)	-0.019 (0.215)	-0.005 (0.228)	0.739 (0.369)	0.863 (0.391)
Press freedom	0.121 (0.263)	0.103 (0.305)	0.968 (0.495)	1.057 (0.628)
Nationalization year	-0.015 (0.004)	-0.016 (0.005)	0.001 (0.017)	-0.001 (0.022)
Constant	28.97 (7.935)	31.57 (10.41)	-0.499 (31.89)	3.757 (41.43)
Observations	43	38	43	38

Note: Standard errors clustered by region in parentheses

the low F-statistic (4.77) and high LR test p-value (0.40) confirm the placebo is a rather weak instrument.

4.5 Results: Is there any other evidence of spurious correlation?

If countries with pre-existing corruption were more likely to establish regulatory NOCs, then the correlation above could be driven by the effects of pre-existing corruption on both outcomes. Aside from using instrumental variable analysis, testing for this possibility is difficult given that most nationalizers adopted their regulatory framework in the 1970s, whereas reliable cross-national data on perceptions-based corruption only exists after 1980.

I test whether pre-existing corruption determines a regulatory NOC structure by analyzing the few post-1980 nationalization cases where a new NOC was formed with or without regulatory authority.[32] Across different modeling specifications (Appendix Table 18) there is no statistical difference in pre-existing corruption levels across both non-regulatory and regulatory frameworks. While the sample size is too small ($n = 16$) to allow for strong inference, these results show little evidence that pre-existing corruption determines the establishment of regulatory NOCs.

Though it is difficult to fully disqualify the existence of reverse causality and spurious correlations with observational data, there is suggestive evidence that the relationship between bribery and institutions is not driven by endogeneity. Both small-N regression and instrumental variables models support the argument that the institutional choice of oversight mechanism affects corrupt behavior in the oil sector. Furthermore, null results from a placebo instrument are suggestive (but not conclusive) that the proper instrument satisfies the exclusion restriction. In Appendix 4, I describe and rule out a further alternative explanation that centralization, not oversight, of contract-awarding decisions matters for corruption.

[32] Appendix Table 17 provides the full case list.

5 Conclusion

I show evidence in this article that regulatory institutions help to explain the wide variation in bribery 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 from would-be contract winners while in others it dissuades civil servants from such corrupt behavior. Therefore oil wealth by itself does not necessarily cause corruption. It is only when governments decide to establish and maintain regulatory NOCs to manage their oil resources that I find an increased association with higher levels of transnational bribery. The data and statistical results show that non-regulatory NOCs, such as PeruPetro and Saudi Aramco, foster lower levels of bribery than regulatory NOCs, such as Petroecuador and Kuwait Petroleum Company.

Conceptually, I find that state intervention through nationalization writ large is not a principal determinant of corruption. One implication for reform is to decentralize, rather than privatize, the regulatory structure of the oil industry such that the NOC competes with other government agencies in the allocation of contracts. This is in line with policy reforms for NOCs to adopt the "Norwegian Model" of separation of powers in the oil sector, whereby independent agencies monitor both private operators and the NOC; to obtain concessions, the NOC must compete with other firms for bids to explore and produce oil fields (Victor, Hults and Thurber 2012). These reforms have been undertaken so far in Kazakhstan in 2010 and in Mexico in 2015.

This article corroborates claims about corruption as a consequence of public officials' opportunities for corrupt 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, unlike their counterparts in non-regulatory NOCs or regulatory ministries in the absence of a NOC. While my focus here is limited to transnational bribery, my argument implies that the regulatory NOC structure will incentivize graft, embezzlement, and even petty corruption at lower levels of management.

Indeed, results from models with the CPI as an outcome measure support this implication in oil-reliant states. But as noted throughout this article, more research is needed that does not rely on general measures, such as the CPI, in order to make precise and valid statements about corruption in this (or any) industry.

Yet, studying the causes of corruption is a complex endeavor: there is no one predictor or determinant of corruption. Indeed, having a regulatory NOC does not necessitate corrupt behavior, nor does reforming to a non-regulatory NOC necessarily lead to less corruption. The case of Brazil provides a foil to the argument presented here. Despite reforming the oil sector in 1997 to grant contract-awarding authority to a regulatory agency, recent corruption scandals involving Petrobras highlight how corruption can permeate a non-regulatory NOC compared to when Petrobras was a regulatory NOC. Further, given the persistence of institutional choice over time – countries rarely change their NOC structures – my argument is unable to explain how corruption can vary over time within a country with unchanged institutions. Nonetheless, on average and across a number of different settings, this institutional choice does have an impact on levels of bribery.

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; Menaldo 2016). Broad constructs such as the 'presence of democratic government' or 'high levels of economic development' prior to oil discovery lack the specificity to explain the variation in corruption across oil-rich governments. Instead, this article challenges scholars of the resource curse to explore precise and well-defined conditions for why petroleum hinders good governance in some contexts but not others.

References

Ades, Alberto and Rafael Di Tella. 1999. "Rents, Competition, and Corruption." *The American Economic Review* 89(4):982–993.

Arezki, Rabah and Markus Brückner. 2012. "Oil Rents, Corruption, and State Stability: Evidence from Panel Data Regressions." *European Economic Review* 55(7):955–963.

Aslaksen, Silje. 2007. "Corruption and Oil: Evidence from Panel Data." Unpublished manuscript.
URL: *http://www.sv.uio.no/econ/personer/vit/siljeasl/corruption.pdf*

Besley, Timothy. 2006. *Principled Agents? The Political Economy of Good Governance*. New York: Oxford University Press.

Bhattacharyya, Sambit and Roland Hodler. 2010. "Natural Resources, Democracy and Corruption." *European Economic Review* 54(4):608–621.

Brollo, Fernanda, Tommaso Nannicini, Roberto Perotti and Guido Tabellini. 2013. "The Political Resource Curse." *The American Economic Review* 103(5):1759–1796.

Donchev, Dilyan and Gergely Ujhelyi. 2014. "What do Corruption Indices Measure?" *Economics + Politics* 26(2):309–331.

Dunning, Thad. 2008. *Crude Democracy*. New York: Cambridge University Press.

Elster, Jon. 1989. *Nuts and Bolts for the Social Sciences*. Cambridge, UK: Cambridge University Press.

Escresa, Laarni and Lucio Picci. 2015. "A New Cross-National Measure of Corruption." *The World Bank Economic Review* 7371.

Fisman, Raymond and Edward Miguel. 2007. "Corruption, Norms, and Legal Enforcement: Evidence from Diplomatic Parking Tickets." *Journal of Political Economy* 115(6):1020–1048.

Golden, Miriam A and Lucio Picci. 2005. "Proposal for a New Measure of Corruption, Illustrated with Italian Data." *Economics + Politics* 17(1):37–75.

Haber, Stephen and Victor Menaldo. 2011. "Do Natural Resources Fuel Authoritarianism? A Reappraisal of the Resource Curse." *American Political Science Review* 105(1):1–26.

Hollyer, James R, B Peter Rosendorff and James Raymond Vreeland. 2014. "Measuring Transparency." *Political Analysis* 22(4):413–434.

Jackman, Simon. 2009. *Bayesian Analysis for the Social Sciences*. John Wiley and Sons, Ltd.

Karl, Terry Lynn. 1997. *The Paradox of Plenty: Oil Booms and Petro-States*. Berkeley, CA: University of California Press.

Karpoff, Jonathan M, D Scott Lee and Gerald S Martin. 2015. "The Value of Foreign Bribery to Bribe Paying Firms." Unpublished Manuscript.
URL: *http://papers.ssrn.com/sol3/papers.cfm?abstract_id=1573222*

Kaufmann, Daniel and Shang-Jin Wei. 1999. "Does 'grease money' Speed Up the Wheels of Commerce?" NBER Working Paper No. 7093.

Krueger, Anne O. 1974. "The Political Economy of the Rent-Seeking Society." *The American Economic Review* 64(3):291–303.

Kurtz, Marcus J and Sarah M Brooks. 2011. "Conditioning the "Resource Curse": Globalization, Human Capital, and Growth in Oil-Rich Nations." *Comparative Political Studies* 44(6):747–770.

Lederman, Daniel and William Maloney. 2008. "In Search of the Missing Resource Curse." *Economia* 9:1–57.

Leite, Carlos Da Cunha and Jens Weidmann. 2001. "Does Mother Nature Corrupt? Natural Resources, Corruption, and Economic Growth." *IMF Working Paper* (99/85).

Luong, Pauline Jones and Erika Weinthal. 2010. *Oil Is Not a Curse: Ownership Structure and Institutions in Soviet Successor States*. New York: Cambridge University Press.

Mehlum, Halvor, Karl Moene and Ragnar Torvik. 2006. "Institutions and the Resource Curse." *The Economic Journal* 116(508):1–20.

Menaldo, Victor. 2016. *From Institutions Curse to Resource Blessing*. NY: Cambridge University Press.

Montinola, Gabriella R and Robert W Jackman. 2002. "Sources of Corruption: A Cross-Country Study." *British Journal of Political Science* 32(1):147–170.

Nye, Joseph S. 1967. "Corruption and Political Development: A Cost-Benefit Analysis." *American Political Science Review* pp. 417–427.

Olken, Benjamin A. 2007. "Monitoring Corruption: Evidence from a Field Experiment in Indonesia." *Journal of Political Economy* 115(2):200–249.

Revenue Watch Institute. 2013. *The 2013 Resource Governance Index*. New York: Revenue Watch Institute.

Robinson, James A, Ragnar Torvik and Thierry Verdier. 2006. "Political Foundations of the Resource Curse." *Journal of Development Economics* 79(2):447–468.

Rose-Ackerman, Susan. 1975. "The Economics of Corruption." *Journal of Public Economics* 4:187–203.

Rose-Ackerman, Susan. 1999. *Corruption and Government: Causes, Consequences, and Reform*. New York: Cambridge University Press.

Ross, Michael L. 2012. *The Oil Curse: How Petroleum Wealth Shapes the Development of Nations*. Princeton, N.J.: Princeton University Press.

Smith, Benjamin. 2004. "Oil Wealth and Regime Survival in the Developing World, 1960-1999." *American Journal of Political Science* 48(2):232–246.

Smith, Benjamin. 2007. *Hard Times in the Land of Plenty: Oil Politics in Iran and Indonesia*. Ithaca, NY: Cornell University Press.

Stevens, Paul. 2008. "Resource Nationalism and the Role of National Oil Companies in the Middle East: History and Prospects." *Journal of World Energy Law and Business* 1(1).

Treisman, Daniel. 2000. "The Causes of Corruption: A Cross-national Study." *Journal of Public Economics* 76(3):399–457.

Treisman, Daniel. 2007. "What Have We Learned about the Causes of Corruption from Ten Years of Cross-national Empirical Research?" *Annual Review of Political Science* 10:211–244.

Vicente, Pedro C. 2010. "Does Oil Corrupt? Evidence from a Natural Experiment in West Africa." *Journal of Development Economics* 92(1):28–38.

Victor, David G, David Hults and Mark C Thurber, eds. 2012. *Oil and Governance: State-owned Enterprises and the World Energy Supply*. Cambridge, UK: Cambridge University Press.

Wilson, James Q. 1989. *Bureaucracy: What Government Agencies Do and Why They Do It*. Basic Books.

Wright, Joseph. 2008. "Do authoritarian institutions constrain? How legislatures affect economic growth and investment." *American Journal of Political Science* 52(2):322–343.