

Why Do Some Governments Lose? Institutional Capacity and Legal Outcomes in Oil Spill Lawsuits *

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Abstract

Why do some national governments lose lawsuits against oil companies when oil spills occur while others do not? This paper argues that the institutional capacity of a country, particularly its institutional arrangements around the discovery process of evidence in the oil spill event, is what leads a country to a favorable decision or not over the lawsuit. To answer the question, the paper applies a multi-method approach with a formal model supplemented with narratives and dynamic panel regressions in the oil spill cases in Campos Basin, Brazil and Lago Agrio, Ecuador. The findings show that governments lose oil spill lawsuits where rules change abruptly, the institutional capacity of the country is low, and the oil company does not have expectations of continuing working in the country. The findings expand our understanding on how government institutional capacity affect ruling decisions in the recurring interactions between states and companies over oil spill events, while illustrating how a mixed-methods approach strengthens the explanation.

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Introduction

Like many natural resources, oil plays a vital role in a nation's development. Oil enables human mobility, serves as a key source of revenue for modern industrial economies, and securing its supply has become a top priority for governments in both developed and developing countries. Nevertheless, its extraction and production can cause negative effects on health and pollution if not treated properly (Bromley et al. 2006). In particular, some of these negative impacts may result from oil spills, which the literature has shown to be relatively common events (Hoffman and Jennings 2011; Murphy et al. 2016; Caballero-Miguez and Fernandez-Gonzalez 2015; Soto-Oñate and Caballero 2017). Oil spills are considered a violation of international laws and treaties related to environmental pollution and damage and, more importantly, a violation of domestic laws that seek to protect the rights of individuals and their means of income (Olawuyi 2013).

Oil spills are important to study because the repercussions they have on the environment, public health, political-economic systems, etc. (Murphy et al. 2016; GoMRI 2017). Nevertheless, these events can have further implications to the affected nations given that these represent not only an economic issue but also a threat to the well-being of future generations (Bromley et al. 2006; Olawuyi 2013). Additionally, oil spills can lead to other direct repercussions for the parties involved, as disputes may arise over who is responsible and how compensation should be determined and distributed. Thus, something to consider is the interplay of actors in the oil extraction and production processes when spills take place. In particular, what happens if governments delegate oil extraction to third parties and oil spills occurred? How can that dispute be settled? What are the rules, norms, and regulations that govern these events?

The goal of this paper is to explain why some national governments lose lawsuits against oil companies while others do not. It argues that the institutional capacity of a country, particularly the institutional arrangements around the discovery of evidence in the oil spill event, let a country to have a favorable decision or not over the lawsuit.

Clear and explicit rules that settled conflict when these events take place coupled with enforcement mechanisms and actors, decrease uncertainty and held violators responsible for any environmental damage that occurred during the extraction process. In contrast, where rules change abruptly, disputes are created over the responsibility of the incident, and no specific mechanisms or actors to solve the conflict are present, the expectation to win the lawsuit for government diminishes given that external enforcers will not accept these irregularities during the discovery process.

This work focuses on two major oil spills events that occurred in Latin America —Campos Basin in Brazil and Lago Agrio in Ecuador —with varying results for the governments. These cases have in common that oil spills occurred during international companies oil extraction in their territories, different lawsuits and sanctions were imposed on the companies, but the lawsuit decision went in opposite directions. The paper employs a mixed-method approach with a first section that applies a formal model to the cases supplemented with narratives and a second element that tests and refines that inference by estimating dynamic panel regression models in a Time-Series Cross-Sectional data structure. The comparison of these cases sheds light on the reasons for variations within cases, paying particular attention to the institutional capacity of each country on institutional arrangements at the national level and, expands on statistical relationships with proxies of these phenomena. Additionally, and more generally, it expands the implications of the formal model and the quantitative analyses to similar events.

The paper is organized as follows. The next section presents scholarship on oil spill cases in the 21st century indicating why oil spills are important for environmental management, and how national and international actors and laws intervene when oil spills occur. Next, the main theoretical argument is proposed with the formal model to be employed, comparative statics, and a graph of the main actors' expectations regarding the settlement of this dispute for the oil spill event. In particular, this model is useful when the government delegates oil extraction to third parties, which may be the case for lots of nations extracting oil worldwide. The following section introduces the data

and methods employed in this paper focusing on the mixed-method approach by indicating the leverage and robustness gained for explanation. Then, the results section shows the formal model application with the narratives to both cases and the findings of the dynamic panel models. Finally, a discussion and some conclusions are presented.

What do we know about oil spills and lawsuits?

Many significant oil spills have occurred worldwide, with some standing out due to their severity and impact. In particular, the oil spills of Deepwater Horizon—in the Gulf of Mexico—and the Niger Delta have attracted great attention (Olawuyi 2013; Murphy et al. 2016). For instance, in 2010, 4.9 million barrels were spilled into the Gulf of Mexico through the operation of the Deepwater Horizon, with 11 people killed, 17 injured, and 130 lawsuits filed from different agencies to the U.S. courts (Olawuyi 2013). Furthermore, in the Niger Delta, the worst case of oil spill in several decades occurred when Shell announced that around 40,000 barrels of crude oil were spilled near the coast. This spill was not the first one for the company in that country since another that took place in 2008 in the Bodo region (Vidal 22 Dec. 2011) and others for over 50 years (UN 2011).¹ In this regard, these events raise questions and concerns related to the actors and institutions who must be controlling for these to not occur. Which institutions are tasked with handling these events and how they should be avoiding oil spills to happen? How are the institutional arrangements established, formed, and developed in these events? What are the roles and enforcement mechanisms governing the interplay of the government and the oil companies in these cases?

The principle of sustainable development, first articulated in the Brundtland Report from 1987, emphasizes the integration of environmental protection, economic growth, and social equity (WCED 1987; Sands 2003). Thus, oil exploration should always protect natural and human elements of the environment. Oil spills can endanger human health and

¹See Agbonifo (2016) for an in-depth explanation of oil spills in the Niger Delta region.

the environment, and violate international, national, and regional laws (Olawuyi 2013). Part of the literature indicates that the management of large amounts of natural resources—such as petroleum reserves or stocks of ocean fish—in international contexts can cause problems where cooperation of international, national, regional, and local institutions are of great importance (Ostrom et al. 1999; Richerson, Boyd, and Paciotti 2002; Soto-Oñate and Caballero 2017). Important environmental challenges are involved with systems that suffer from global pressures with governance at all levels where the differential in power could reshape the rules of commons to favor particular interests. Thus, some requirements have been suggested for adaptive governance in complex situations. For instance, conflict management and rule compliance are important when designing institutions because they deal with problems and can sanction offenders. Consequently, those who enforce the rules must be seen as legitimate and effective, with fines or jail time to rule breakers if any environmental accident occurs (Dietz, Ostrom, and Stern 2003).

Several institutions have been created at different levels—local to global—to regulate and enable interactions but also to shape environmental impact and provide mechanisms for environmental governance (Dietz, Ostrom, and Stern 2003). In this regard, international environmental law is of paramount importance in oil spill cases because it imposes a cost on the multinationals whenever a spill occurs. The idea behind this is that the polluter pays adequate compensation for environmental damages to the victims, where “international law places an obligation on international oil companies (IOCs) and governments to avoid pollution related to oil production” (Olawuyi 2013, 12). Nevertheless, there are instances where this is not the case. By employing institutional analysis—specifically under the New Institutional Economics (NIE) framework of transaction costs—Caballero-Miguez and Fernandez-Gonzalez (2015) evaluate the implementation of rules and assignment of responsibilities in oil spills events finding that rules are not clearly articulated and the jurisdiction of the courts was limited by international barriers. Moreover, as Soto-Oñate and Caballero (2017) argue about the international regime, due to the individual contexts of different oil producer nations, there are important and greater

divergences on the performance of international conventions and their application. Consequently, even if rules, norms and regulation exist at different levels, the compliance of those depend to a large extent of the functioning of national institutions.

Furthermore, as these events unfold, lawsuits demanding for compensation can be filed from different actors, ranging from affected citizens and governments to countries located near the spills. Given the large number of players in most cases and cooperation issues surrounding the events, however, self-enforcing international agreements are difficult to impose where oil companies do not comply with the rules, deny compensation, and the expectation for legal battles increases (Bromley et al. 2006; Caballero-Miguez and Fernandez-Gonzalez 2015). These issues have seen more prominence during the “second” and “third” waves of environmental management where for the former the attention was focused on companies that acknowledge protection of the environment while the latter was concerned with how humans are altering the ecosystem on a global scale (Hoffman and Jennings 2011; GoMRI 2017). Nevertheless, both waves have incorporated elements to account for instances of lawsuits in oil spills around the world. Consequently, results over the lawsuit’s decision may vary as it is for the cases of this paper where the Brazilian government received compensation meanwhile the Ecuadorian did not. The next section explores these and provides a framework to analyze why this was the case.

Theoretical Framework and Formal Model

The paper argues that the institutional capacity of a country, particularly the institutional arrangements around the discovery of evidence in the oil spill event, let a country to have a favorable decision or not over the lawsuit. In the context of oil spills and natural resources’ extraction, the paper builds on the definition of institutional arrangements that are defined as “the way in which humans organize themselves to extract resources from the environment and eject effluents into it [...]” (Dietz, Ostrom, and Stern 2003, 1907) that operate at different levels and play a critical role in natural resource governance (Andersson and Ostrom 2008). In that regard, it connects them to a further idea of

rules for natural resources as a “potentially linguistic entities that refer to prescriptions commonly known and used by a set of participants to order repetitive, interdependent relationships.” (Ostrom 1986, 5). This idea provides the framework where actors mutually agree to extract oil, understand when an oil spill event occurs, and the possible repercussions that these can bring. Finally, the work develops the idea of institutional capacity elaborating on Besley and Persson’s (2009) state capacity, indicating that this is an economic institutions inherited from the past, set long before, and is an ex-ante investment under uncertainty. The institutional capacity may vary from place to place because of different factors and actions taken by the government, and will determine if rules change abruptly or not. Thus, putting all these together, the theoretical framework illustrates that there exists a preestablished set of rules between actors, the state and the oil company, to extract oil, some enforcement mechanisms —even if weak—, and punishment if any incidents occur.

Consequently, building on all the above, the following formal model presents the interaction between the national government (G) and the Oil Company (OC) when an oil spill occurs. First, the model builds on Helmke’s (2010) structure of a bargaining game of interbranch crisis between institutions to denote if there is an “impasse”. Particularly, it is interested when the Government sues and the Oil Company denies its responsibility, leading to the dispute, and considering how the institutional capacity plays a central role to solve the “impasse”. Second, and contemplating this last idea, it relies on Besley and Persson (2009) to show the institutional capacity of a government, which in this case it argues is the set of institutional arrangements in the process of discovery that makes plausible or not to win the lawsuit. Specifically, this framework indicates that this institution is inherited from the past and plays a role to solve the controversy. Finally, drawing from Cheung and Zhuang (2012) it defines the parameters of the model when the oil spill occurs and the actors’ strategies. Moreover, it is particularly important here to contemplate the assumption regarding the costs of an oil spill. The model assumes that these costs are considered into it when the oil spill occurs and are characterized by

cleanups, fines, and distorted public image. Consequently, Table 1 shows the actors and their actions, and below that the parameters of the model:

Table 1: Actors and actions

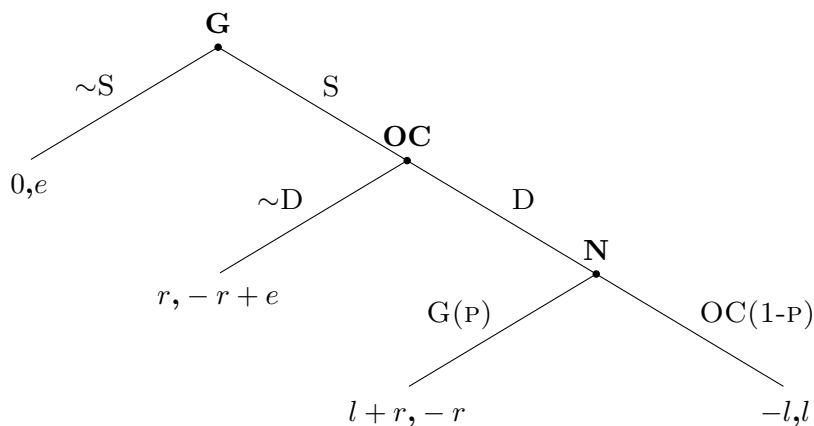
Actors	Description	Possible Actions
Government	Is the owner and protector	Not Sue ($\sim S$)
(G)	of natural resources (oil in this case)	Sue (S)
Oil Company	International company that	Not Deny ($\sim D$)
(OC)	profits from oil extraction	Deny (D)

Parameters of the model

- **e** : the expectation of continuing working with the government in the oil extraction. This parameter is specific to the Oil Company given its goal to maximize utility in the oil industry. It is paramount to consider that if e is high enough, the oil company will desire to stay in the country extracting oil and is more probable that assumes responsibility.
- **r** : this parameter consists on the revenue that the oil company provides to government when it does not deny the claims in the oil spill. Thus, it is positive for the government after it filed the lawsuit and negative for the Oil Company given the associated costs of granting it.
- **l** : the legitimacy parameter stands after the Government filed the lawsuit and the Oil Company denied the claims where no compensation or agreements are reached. Depending on the level of institutional capacity, as the model shows next, whoever wins (loses) the lawsuit receives all (none) of the legitimacy.
- **p** : $I_t^s \in \{0, \Pi_t\}$ where Π_t is the max level of institutional capacity, particularly, institutional arrangements that a Government holds regarding the discovery process that leads to whether it wins or not the lawsuit.

Given the information of the actors, their actions and the parameters of the model, Figure 1 shows the model representation. The model is solved by backwards induction providing Subgame Perfect Nash Equilibrium (Tadelis 2013).² The model assumes that each actor knows its own payoffs and that they know the payoffs of the other actors and so on. The model shows three different possible outcomes: 1) where the Government does not sue ($\sim S$), there is no action from the Oil Company but the latter continues with the expectations of working in the country ($0, e$) with a SPNE ($\sim S$, no move from OC); 2) the Government sues (S) but the Oil Company does not deny the claims ($\sim D$) given the expectation of continuing working in the country, considering the country's strong institutional capacity, and providing a revenue that the Government receives: ($r, -r+e$) with a SPNE ($S, \sim D$) ; and, finally, 3) where the Government sues (S) and the Oil Company denies the claims (D), here the Nature and the institutional capacity will determine the result according to ($l+r, -r$) or ($-l, l$).

Figure 1: A Game Theory Model of an Oil Spill Lawsuit



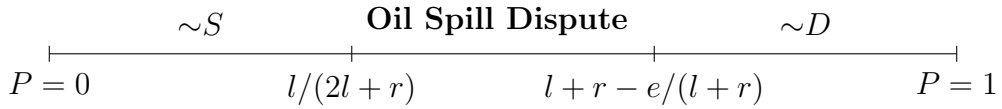
Comparative Statics

The outcomes of the game can be considered as follows. The Oil Company, acknowledging that the institutional capacity of the Government is not enough to win the lawsuit —unstable rules that are changing all the time—will deny any claim when $p < (l+r-e)/(l+r)$.

²See Appendix for solutions.

Moreover, the Government will always sue when $p \geq (l)/(2l + r)$. Conversely, as the Oil Company acknowledges that the institutional capacity of the Government, particularly the institutional arrangements that help in the discovery process behind the oil spill, is high (Π_t) and has expectations on working in the country to extract oil, e , will not deny the claims nor the payment. Thus, the dispute over the oil spill will take place where the Oil Company's expectations of continuing working with the Government (e) and (Π_t) are both low. For the Government, it will always be more suitable to file the lawsuit where there is a chance of winning it without losing legitimacy. Figure 2 shows the spatial representation of this game indicating that there will be an oil spill dispute where these conditions meet.

Figure 2: Government vs. Oil Company oil spill dispute



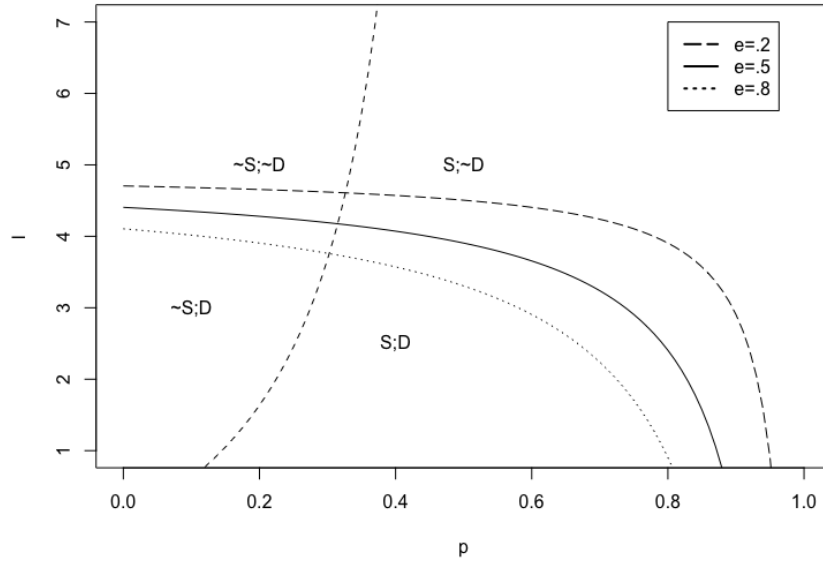
Additionally, there are some predictions that can be contemplated when dealing with this game. Considering the spatial model above, Figure 3 plots the probabilities of an Oil Spill Dispute with the legitimacy level if the institutional capacity comes into play after the Government files the lawsuit and the Oil Company denies the claims.³ Thus, the figure shows how different levels of expectations can increase or decrease the area of the Oil Spill Dispute.⁴ As argued before, this parameter pertains to the Oil Company given its goal is to maximize revenue by extracting oil.⁵ Moreover, if e is high enough, the Oil Company will desire to stay in the country extracting oil and is more probable that it does not deny the claims if an oil spill occurs. Consequently, the figure shows how these levels of expectations from the Oil Company interact with the function of the

³The figure sets the legitimacy level at 7 given two condition: 1) the literature has used legitimacy measures of other kind employing this scale (see Muller and Jukam (1977) and Boulding and Nelson-Núñez (2014)) and 2) graphical representation of the results.

⁴These functions consider the “revenue” parameter. This number was set to 135 and logged to plot the figure. As the cases show, this is the amount of money that was paid to the Government in Brazil.

⁵This parameter was set from 0 to 1 where zero is no expectation to working with the government and 1 is complete desire to do it.

Figure 3: Probability of Government vs. Oil Company on Oil Spill Dispute



Government. Also, the figure exhibits that higher expectations from the Oil Company to working with the Government in the future reduces the area of *Oil Spill Dispute* making the company more prone to reach agreements. Conversely, where these expectations are low, the Oil Company is more prone to deny any claim making the *Oil Spill Dispute* area bigger.

To reiterate, the paper argues that the institutional capacity, specially, the institutional arrangements around the discovery of evidence in the oil spill events lead a country to have a favorable decision or not over the lawsuit. Where rules are explicit and clear, have a history of stability, and there are explicit enforcement mechanisms, the Oil Company will be held responsible for any environmental damage that occurs during the extraction process if there is enough evidence to prove the claims. In contrast, where rules change abruptly, have a history of instability, and unclear enforcement mechanisms, the Oil Company is less likely to be held responsible. For the latter, the expectation of winning the lawsuit by the government will be low given that external arbiters will weight these irregularities during the discovery process. For the former, the government will expect to win the lawsuit given the clear rules that the discovery process will entail. In particular, as the formal model shows, once the oil spill occurs, if a Government files

a lawsuit and the Oil Company denies the claims, the set of institutional arrangements comes into play as a probability that solves the dispute. The main hypothesis indicates:

***H:** where institutional arrangements are unstable with low institutional capacity, in the occurrence of an oil spill, the national government will lose the lawsuit.*

Research Strategy and Data

The paper addresses these concerns by employing a multi-method research design with a formal model supplemented with narratives on two case studies ⁶ and a quantitative analysis with dynamic panel regression models to answer the question of this work. The literature shows that mixed-methods —the combination of tools from quantitative and qualitative traditions—help to improve conceptual power and measurement, observe rival explanations, and reduces uncertainty of results (Lieberman 2005, 2010); complements analysis where experiments are not possible (Goertz and Mahoney 2012); and combines statistical inferences with causal mechanism endeavors (Humphreys and Jacobs 2015; Elman, Gerring and Mahoney 2016; Weller and Barnes 2016). However, as Seawright (2016) suggests, integrative multi-method expands this idea by combining two or more methods from these traditions focusing on their strengths by answering to different strands of the phenomenon but unifying the causal inference. In particular, one method is employed to produce the final inference meanwhile the other can refine, test, expand, etc., that inference. This is where multi-method sets apart from the mixed-method logic.

For this case, the formal model with the narratives develops the causal inference. Additionally, the quantitative method with the regression models refines and expands on these results, specifically assessing how the change in rules have an effect on oil rents revenue. This elucidates how institutional capacity, connected to stability, is paramount for oil rents revenue. Consequently, the goal of employing this combination of methods

⁶Case studies can be defined as in-depth and thorough investigations of a single, spatially delimited unit of analysis —observed at a single point in time or over a consistent period—that aim to reveal characteristics potentially generalizable to a broader population (Gerring 2004, 2006).

is to investigate how the cases unveiled with the formal model supplemented by the narratives, and the factors surrounding them —specifically to their institutional capacity and stability —with the quantitative method (Goertz and Mahoney 2012).

Qualitative approach and cases

The governance of natural resources can be thought at different scales where institutional capacities and arrangements would have repercussions at other levels of analysis (Andersson and Ostrom 2008; Poteete, Janssen, and Ostrom 2010). In this regard, the formal model coupled with the narratives are helpful to understand the process from the oil spill to the lawsuit's final decision, with the goal to explain if a country loses the lawsuit or not. Moreover, the institutional arrangements related to the process of discovery will serve as the framework to explain this outcome. To this end, the paper employs information from academic sources, online news, and national reports to construct the narratives and the solution of the game.⁷ Additionally, the paper focuses on two different oil spills in Latin America: 1) Campos Basin in Brazil and 2) Lago Agrio in Ecuador. These cases have in common that oil spills occurred during oil extraction and lawsuits were filed. However, in the first case, the Government had a favorable decision meanwhile the opposite happened in the Ecuadorian case. Moreover, the countries share other characteristics related to historical legacies, geographic areas, presidential systems, cultural features, and also present variation in the independent variable related to the framework of institutional arrangements. Consequently, a comparative analysis is possible because of this variation (Andersson and Ostrom 2008).

⁷This analysis has some similarities to Bates et al. (1998) with the Analytic Narratives framework that employs, first, narratives to explain cases and then formalize those into game-theoretic models. In contrast, this paper departs from that analysis by designing a generalizable formal model, and integrating narratives to expose information about actors, decisions, strategies, and outcomes later. Nevertheless, it is worth noting the contributions from Bates et al. in these regards.

Quantitative approach and model specification

For the quantitative section of this work, the dependent variable draws on the oil rents as a percentage of the GDP taken from the World Bank (World Bank 2025). This variable captures the earnings from oil production as an overall natural resource contribution to the economy of the country. Thus, it accounts partially to the importance of oil extraction and the possible costs associated to loss of the income if oil spills occur. In addition, the main independent variable is a proxy for the institutional capacity and stability in the country at a national level. Specifically, one way to capture variation concerning institutional capacity, stability and arrangements, as is argued here, is to measure how unstable a country is regarding its rules. The specialized literature argues that institutional change, and instability in particular, can be captured through the continuous change of rules (Levitsky and Murillo 2009, 2014; Brinks, Levitsky, and Murillo 2019). Specifically, Brinks, Levitsky, and Murillo (2019) focus on institutional strength where instability is one the components to account for. The authors define institutional instability as “an excessively high rate of institutional change that leaves political actors unable to develop stable expectations about how the rules work or clear strategies to pursue their interest through them” (Brinks, Levitsky, and Murillo 2019, 24). Consequently, the paper creates an indicator that captures this phenomenon and uses it as the measure of institutional capacity. As mentioned earlier, this approach refines and expand on the qualitative method results by assessing how the changes in formal rules affect oil rents.

In particular, the institutional instability variable focuses on constitutional changes related to amendments and full replacements. Constitutions are of paramount importance given that they regulate and organize the political sphere (Elkins, Ginsburg, and Melton 2009; Elkins and Ginsburg 2021) and that any change they suffer can impact on the stability of the political system and the country more broadly (Negretto 2012; Albertus and Menaldo 2020). Thus, this section employs the Comparative Constitutions Project (Elkins and Ginsburg 2022) to create the variable.⁸ The essay builds on Negretto’s

⁸<https://comparativeconstitutionsproject.org>

work (2012 [Lutz 1995]) considering the number of amendments each constitution has suffered per year of life to create an amendment rate. This variable shows “the number of amendments divided by the number of years the constitution has been in force” (Negretto 2012, 765) creating a proportion of changes that can increase or decrease depending in how many amendments and years every new constitution has suffered. In addition to Negretto’s estimation, the paper advances on his analysis and considers when a full replacement occurs, meaning a full change of rules. This change is even more critical than an amendment given that the costs associated are higher and the legal discontinuity they provoke (Ginsburg 2015). Thus, the continuous change of constitutions, either by remaking or by creating new ones, is the institutional instability measure. Consequently, it is a continuous variable that ranges from 0 to 100, where 100 means the maximum level of instability possible.⁹

Furthermore, some control variables are incorporated into the models related to the level of democracy and the corruption of the regime for each country. These variables explore interrelationships and major conditions with which governments manage their economic and political systems as the literature suggests (Ross 2001, 2015; Arezki and Brückner 2011). These variables come from Varieties of Democracies (Coppedge et al. 2025) indicating the level of electoral democracy (polyarchy) and regimen corruption, respectively. Finally, something else to consider is the model specification and the dynamics given the Time-Series Cross-Sectional data structure. The main equation is shown below:

$$\begin{aligned}\Delta Oil\ Rents_{it} = & \beta_0 + \beta_1 Oil\ Rents_{it-1} + \beta_2 Institutional\ Instability_{it} \\ & + \beta_3 Institutional\ Instability_{it-1} + \Delta \beta_4 Democracy_{it} + \beta_5 Democracy_{it-1} \\ & + \Delta \beta_6 Regimen\ Corruption_{it} + \beta_7 Regimen\ Corruption_{it-1} + \epsilon_{it}\end{aligned}$$

The model starts with an observation y_{it} where i indicates the unit ($i=1,...N$) referring to the country and t indicates time ($t= 1,...T$) as the year. As the equation shows, the specification was chosen after running several tests regarding the independence of the data

⁹Check the Appendix for a practical explanation.

(cross-sectional and temporal), their heterogeneity, and the dynamics (Kittel and Winner 2005; Beck and Katz 2011), as well as the stationarity features of the data and their stochastic components (Pickup 2014; Philips 2018). Consequently, an Error Correction Model specification with Fixed-intercepts (effects) and panel corrected standard errors (PCSE) is estimated to assess the effect on the institutional instability variable on the Oil rents indicator.¹⁰

Results

This section shows the results by combining the multi-method approach mentioned earlier. First, it presents the analysis for each case study by implementing the narratives and applying the formal model. Specifically, the interest of this section is to indicate in which cases do Governments lose a lawsuit over oil spills and in which cases they do not. Furthermore, the section is complemented by the analysis of the quantitative approach with a proxy for institutional capacity —unstable institutional arrangements feature—to assess the structural conditions and country effects on oil rents to unify the inferences as was suggested previously.

Campos Basin in Brazil

The Frade field is located near the coast of Rio de Janeiro in the north of Campos Basin with copious sources of oil and gas available to extract. The field was discovered in 1986 by Petrobras where different companies intervened in drilling activities. By 2006, Chevron announced its incorporation into developing the Frade field with 51.7% of participation and other partners having the rest. The production started in 2009 and it was expected to extract 79,000 barrels of crude oil and natural gas, goal that the company reached in 2011. Additionally, it was expected for the field to remain operational until 2025 given

¹⁰The institutional instability variable is stationary after running both the Im-Pesaran-Shin (ips) and the Fisher bases on the augmented Dickey-Fuller tests. Thus, the model introduces this variable in levels and with its lag value.

that the area was identified as one of the most promising for extraction given the large reservoirs it had (Hartenergy, 21 June 2006; Offshore Technology 29 November 2010; Gilbert and Gonzalez 19 November 2011, ANP 2012).

Event and lawsuit

On November 7, 2011, an oil spill occurred 120km near the coast of Rio de Janeiro with a leak of 3,700 barrels of crude oil into the sea (ANP 2012). At least 18 vessels were deployed to help with remediation activities and the leak was blocked after 6 days (Offshore Technology 29 November 2010; Romero 18 November 2011; ANP 2012). At first, Chevron indicated that the oil spill was related to a geological crack but the company later stated that a miscalculation of the reservoir pressure contributed to it (Rapoza 19 November 2011). Moreover, the company's spokesman said that an internal investigation was going to be conducted and that the company will comply with the Brazilian authorities (Romero 18 November 2011; Gilbert and Gonzalez 19 November 2011).

The ANP (*Agência Nacional do Petróleo, Gás Natural e Biocombustíveis*, acronym in Portuguese) as the oil and gas regulator, indicated that Chevron reported a seepage problem on November 8 of 2011 within 24 hours as required (Darlington 17 November 2011; Rapoza 19 November 2011). Additionally, the Federal Police agency of Rio de Janeiro indicated that those responsible for the oil spill could face up to five years in jail if any environmental laws have been violated. One member of the police environmental department claimed that the reports from Chevron did not match the facts, however (Darlington 17 November 2011; Romero 18 November 2011). Rio de Janeiro's top environmental official indicated that authorities would demand compensation for any damages to the environment (Romero 18 November 2011). Consequently, prosecutors took legal action against the international company, its unit in Brazil, and the contractor. The prosecutors were seeking for a compensation of \$11 billion over the spill, and the company was facing fines from the federal government and Rio de Janeiro state that could exceed \$145 million (Phys.org 15 December 2011).

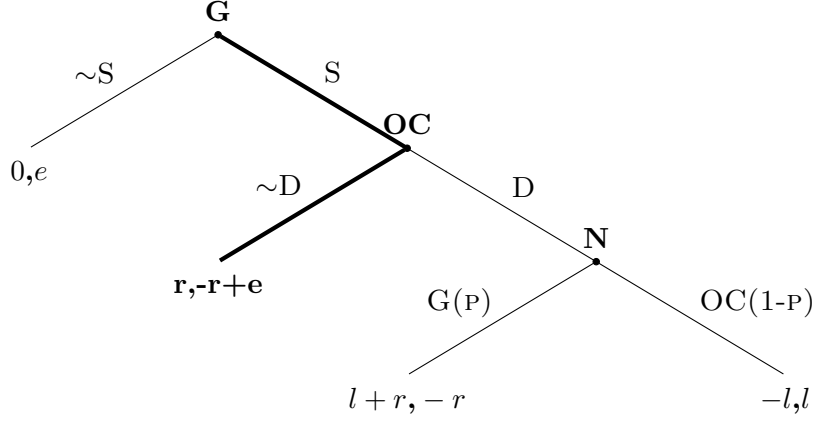
The ANP (2012) carried out a very detailed analysis indicating that the accident could have been avoided if the company had followed the regulations, the good practices of the oil industry, and ANP procedural manuals. The 56-page report provided a comprehensive review of the field, the timeline of the event, the causal factors behind the occurrence of the oil spill, and clear conclusions as to how Chevron handled the event. ANP imposed fines on the company for not following the drill procedure (Blount 1 October 2013). Thus, the initial \$11 billion estimation of the prosecutors was hold and they filed criminal charges against 17 employees and the company. Additionally, oil workers filed a civil lawsuit against the company seeking the cancellation of its operational activities and concessions (Blount 28 March 2012). Nevertheless, after 2 years of legal battle, a Brazilian federal judge from the state of Rio de Janeiro dismissed the lawsuit after a settlement was reached. Chevron committed to spending about \$135 million in compensatory activities and investing in social and environmental programs (Blount 1 October 2013).

Application of the model

Figure 4 shows the model of the oil spill and lawsuit processes in Campos Basin, Brazil. The model shows the two main actors, the Government and the Oil Company, with their respective actions and alternatives. It is worth mentioning that the Government comprises all the institutions that were involved in the process: ANP, federal police, the state of Rio de Janeiro, etc. The Oil Company is mainly Chevron. Consequently, after the oil spill, the government had two alternatives: file the lawsuit or not file the lawsuit. Additionally, expecting the filed of the lawsuit, the company had the option of not deny the claims, in which case the game finished, or to deny and wait for the nature, in particular the institutional capacity regarding the institutional arrangements of the discovery process, to come into play. However, what the case suggests and what the evidence is showing, is an equilibrium where the Oil Company was willing to not deny the claims, once the government —and the oil worker’s federation —filed the lawsuit against it. For this case, the expectations e about continuing working with the government were

higher and, at the same time, the process of discovery showed a strong institutional capacity related to the institutional arrangements of discovery process.

Figure 4: A model of Oil Spill Lawsuit for Brazil



Consequently, the result show that the government Sued (**S**) and that the Oil Company did not Deny the claims (**~D**). The payments for this equilibrium, employing backwards induction, indicate that the Government received the revenue r and that the Oil Company paid the revenue $-r$ but had a positive expectation e of continuing working in the country to extract natural resources. This outcome shows that the company reached a settlement agreement with the government, which resulted in the dismissal of the case. Following this, the company continued working in the field extracting oil, including new contracts with the government. But, why was this the result?

In line with the argument, how humans organize to extract resources from the environment, and particularly how they are able to handle an environmental disaster as this one, played the central role in this case. As Inojosa et al. (2022) show, Brazil has a history of different intervening institutions that work toward the protection and regulation of natural resources and disasters around those. This shows the strong institutional capacity of the Government, and more importantly, was considered by the Oil Company. Additionally, the authorities indicated that violations of environmental could end up with fines and/or legal actions. According to the report from the ANP (2012), the document detailed the causes of the oil spill and identified areas where, according to the

ANP, the company's practices fell short of regulatory and industry standards. This was paramount in the discovery process regarding the institutional arrangements that lead to a final decision. Finally, there are two issues worth mentioning: 1) the company reached a settlement with the government which resolved the issue, and 2) different institutions worked together quickly to manage the issue. Consequently, through this narrative, the model, the settlement, and the decisions made, the government had a favorable result.

Lago Agrio in Ecuador

Texaco began producing oil in the middle 1960s in Ecuador's Amazon region (Buccina, Chene, and Gramlich 2013). In the early 1970s an authoritarian military regime took over the country but oil production did not stop. However, towards the end of the 1990s, and despised by the local people due to alleged environmental damage, the company reached a compensation agreement with the Ecuadorian government at the time for \$40 million. This agreement was conditioned not to present or demand future liabilities from the company. Nevertheless, as the people blamed the company for illness and pressures on the government were constant, in 1993 a lawsuit was filed in the United States courts against the company (Romero and Krauss 14 May 2009). This oil spill legal battle has been one of the longest where a multinational oil company faces claims of damages to the environment (Romero and Krauss 14 May 2009; Randazzo 2 May 2021).

The history of the lawsuit[s]

The 1993 lawsuit was dismissed with the argument that it should be treated in Ecuador. Nevertheless, at that time, the country was suffering from severe political instability where rules and leaders were changing abruptly —eight different presidents by the end of 2006 —which made the oil spill case not so notorious or as relevant (Romero and Krauss 14 May 2009). Furthermore, Chevron acquired Texaco through a merger in 2001 and was then responsible for any lawsuit or legal battle. Nevertheless, in 2003 a new lawsuit was filed in Lago Agrio —the city closest to where oil spills have occurred —where Ecuador's

court appointed an independent expert. This lawsuit took advantage of a newly passed Ecuadorian law that let individuals sue for damage not only attributed to themselves but to the environment as a whole (Buccina, Chene, and Gramlich 2013; Crasson 2017; Randazzo 2 May 2021).

Steven Donziger acted as the lawyer in this case and became the face of Ecuador’s lawsuit. The plaintiffs considered that Chevron should be held accountable for the damage that Texaco was alleged to have caused. The plaintiffs alleged that pollution waste contributed to health concerns, including cancer and death, as well as environmental damage to the amazonian region. However, as an initial setback for the lawsuit, in 2007 a judge in California dismissed the claim related to oncological issues (Romero and Krauss 14 May 2009). In parallel, a newly elected president in Ecuador —Rafael Correa—made his goal to enact a new constitution with some laws related to reforming the petroleum industry for more revenue to the state. Nevertheless, Chevron’s strategy switched trying to show alleged improper acts of the plaintiffs’ lawyer and filing a claim before the Permanent Court of Arbitration in The Hague. The multinational oil company hired a legal firm which probed all the aspects of the case, and argued to possess videotapes of an alleged attempt to bribe an Ecuadorian judge. Consequently, in 2010, Chevron obtained a subpoena to view outtakes of the crude documentary that “[...] alleged to document weaknesses in the due process of the Ecuadorian court system.” (Buccina, Chene, and Gramlich 2013, 115). After this, Chevron presented a civil suit which was filed in 2011 (Buccina, Chene, and Gramlich 2013; Chevron n.d.; Randazzo 2 May 2021).

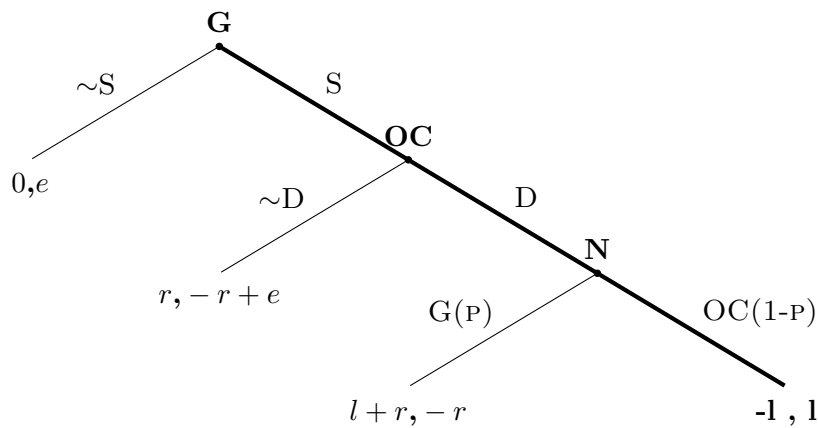
Nevertheless, the conflict continued where an Ecuadorian judge ruled that Chevron was obligated to pay \$9.5 billion in damages. It seemed like the country had a favorable decision over the lawsuit but the oil company claimed that it had identified alleged fraud in the litigation process and that Texaco was granted a release from liability already in the 1990s by the Ecuadorian government and Petroecuador —Ecuadorian oil company—at that time. Thus, in 2014 a federal judge in New York ruled that the plaintiff’s lawyer had engaged in bribery and submitted false evidence, according to that court’s findings.

This ruling was upheld in 2016 by the US Court of Appeals (Chevron n.d.; Crasson 2017). Finally, in 2018 the International Tribunal in The Hague ordered Ecuador to eliminate the court verdict in the country and make it non-enforceable (Chevron 2018; BBC News 8 September 2018; Randazzo 2 May 2021).

Application of the model

For the case of Lago Agrio in Ecuador, Figure 5 shows the oil spill and lawsuit processes. Again, it starts with the two actors, the Government and the Oil Company, and their actions and alternatives. In this case, the Government is the representative of the country, however, others, made their contributions as well. The Oil Company is mainly Chevron with the caveat that Texaco was the company accused of contributing to environmental harm. As in Brazil's case, after the oil spill, the Government had two alternatives: file the lawsuit or not file the lawsuit. Additionally, expecting that, the Oil Company had the option to deny the claims or not and wait for some new event. Consequently, the result is that the Government Sued (**S**) but the Oil Company did Deny the claims (**D**) and the process continued. As mentioned earlier, the game is solved by backwards induction looking for a Subgame Perfect Nash Equilibrium.

Figure 5: A model of Oil Spill Lawsuit for Ecuador



The result indicates that the Government lost the lawsuit with a negative legitimacy $-l$ and there is a positive result for the Oil Company l . It is worth mentioning that the Oil

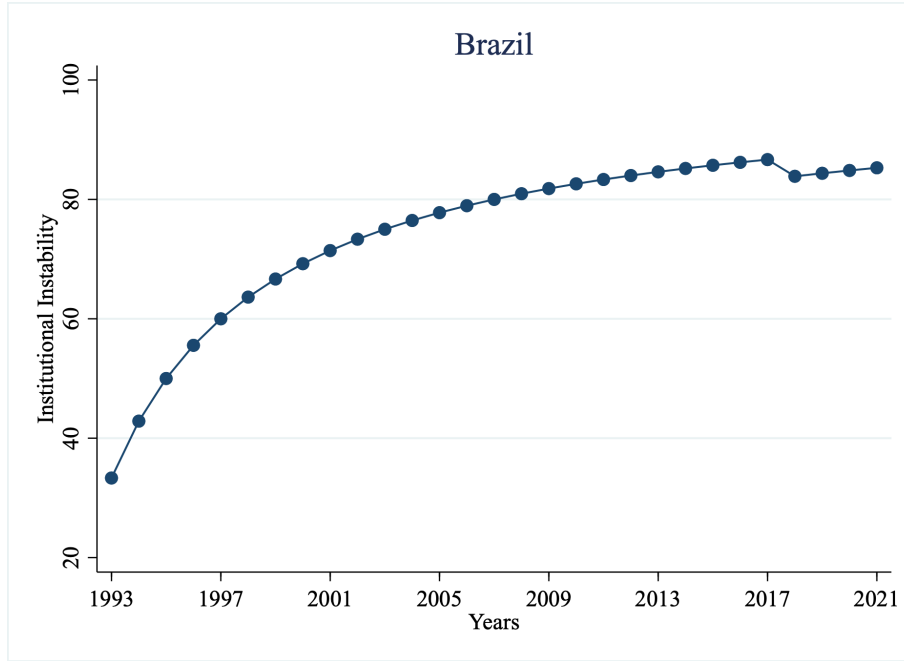
Company, after acknowledging that the Government's level of institutional capacity was low (Π_t), regarding no clear rules and unstable institutional arrangements in the discovery process, chooses to deny the claims leaving the game to the nature. Given the fact that a compensation agreement was reached back in the 1990s, that Chevron was not operating in Ecuador directly, and that the lawsuit was dismissed in the US first, the company refused to provide revenue. After that, Ecuador appealed the ruling with a favorable result from an Ecuadorian court. However, Chevron fought the decision and turned the results. For this case, the evidence from the scholarship and reports suggest that changes in rules as in the constitutions, no specific institution representing Ecuador in the lawsuit, an agreement already reached, and serious allegations of misconduct against Ecuador's lawyer, explain why the government did not have a favorable result. Ecuador's institutional capacity did not provide a transparent framework in the discovery process regarding the institutional arrangements that led to a final decision. Consequently, the government of Ecuador lost the lawsuit.

Quantitative Analysis

The second section shows the quantitative analysis with the estimation of the dynamic panel regression models for the two countries.¹¹ These models show the effect of the institutional instability variable on oil rents as a percentage of GDP and capture the effect of institutional arrangements and institutional capacity discussed above. The models incorporate both countries in the analysis and estimate the effect of institutional instability in present and lagged years on the first difference in oil rents as a percentage of GDP. Moreover, the models include panel-corrected standard errors that assess the characteristics of the data. Nevertheless, something to consider before the estimation of the models is to see how the institutional instability indicator has behaved for these countries during the last 30 years. Consequently, Figures 6 and 7 show the trends of the variable starting

¹¹Given the nature of the data, several tests were performed (cross-sectional and temporal dependence; panel heteroskedasticity; and dynamics) to specify the models that are shown in Table 3 (Pickup 2014; Philips 2018).

Figure 6: Institutional Instability variable for Brazil



Source: Elkins and Ginsburg (2022); Author own calculation

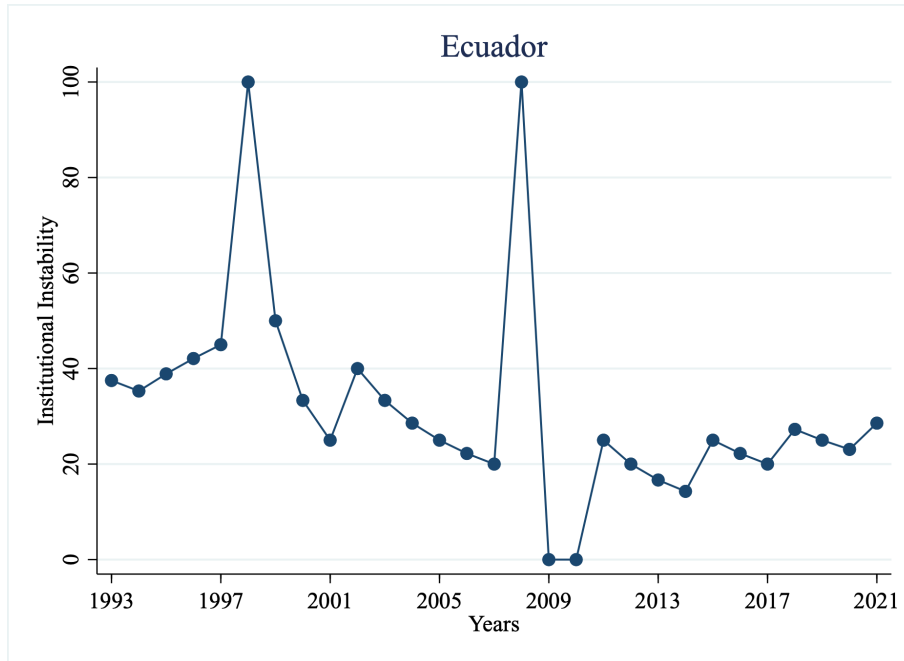
in 1993¹² for Brazil and Ecuador, respectively.¹³

In that regard, as Figure 6 shows, Brazil has had a regular and steady increase in its constitutional changes with no new constitutions since before 1993. As indicated above, constitutions are the main institution that regulate and organize political life in a country. Moreover, there could be some instances where these rules change due to different circumstances that a nation suffers. Nevertheless, the changes that Brazil has suffered seem to be incremental with no abrupt changes to its rules. Moreover, towards the end of the series, it seems to be a minor decline in these changes meaning that no amendments were in place. This can indicate a more stable political system where institutions work with little uncertainty about rule changing episodes. An event that is indisputably valuable for the analysis of this trend has to do with Brazil's Constitutional Amendment No. 9 of November 9, 1995. This amendment to the constitution allowed the Brazilian gov-

¹²The paper takes this year given the focus on the start of the “second wave” of environmental management as indicated in the literature (Hoffman and Jennings 2011)

¹³For Ecuador, the variable from Elkins and Ginsburg (2022) was recoded in four country-year observations (1984, 1993, 1996, and 1997) given that these changes did not create ‘new’ constitutions but where amendments for the constitution enacted in 1978 (Ayala Mora 2018).

Figure 7: Institutional Instability variable for Ecuador



Source: Elkins and Ginsburg (2022): Author own calculation

ernment to celebrate contracts with private companies for the exploitation, exploration, refining, etc., of natural gas and petroleum. More importantly, by the implementation of Law No. 9478 of august 6th, 1997, it provided the control over these activities to the ANP (*Agência Nacional do Petróleo, Gás Natural e Biocombustíveis* were it was formally created (Rossen 2015). Thus, as indicated above, institutions around any unexpected events were created and put in place in the country.

In contrast, the trend is quite the opposite for the case of Ecuador which has suffered from full constitutional replacements as Figure 7 suggests. The graph depicts an unstable variation regarding constitutional events, and an irregular path in the rules of the game. Specifically, two new constitutions were enacted in 1998 and 2008, respectively, changing the landscape and impacting on the stability of the political system given the legal discontinuity these changes may have caused as the literature above suggested. Moreover, both constitutions had experienced from several amendments increasing uncertainty to the political system and changing the expectations of the actors and organization involved. These changes may reflect a low institutional capacity of the country to enforce

its contracts reflecting that institutional arrangements do not hold in time and affect different events as oil spills. In particular, this instability may affect negatively the country in any disputes or lawsuits it has faced.

Table 2: Dynamic Panel Models

	(1)	(2)	(3)	(4)
Oil rents _(t-1)	-0.217** (0.11)	-0.216* (0.12)	-0.336*** (0.13)	-0.477*** (0.15)
Institutional Instability	0.0122 (0.03)	0.0120 (0.03)	-0.00423 (0.03)	0.00353 (0.03)
Institutional Instability _(t-1)	-0.0400* (0.02)	-0.0401* (0.02)	-0.0570** (0.03)	-0.0474* (0.02)
Δ Democracy		0.00360 (16.71)	14.85 (17.91)	13.05 (16.86)
Democracy _(t-1)		0.109 (5.06)	10.77 (8.16)	21.21** (9.15)
Δ Regimen Corruption			11.31 (15.21)	10.62 (14.34)
Regimen Corruption _(t-1)			27.25** (13.04)	30.72** (12.48)
Ecuador				4.324** (1.89)
Constant	2.682* (1.59)	2.614 (3.96)	-19.15 (11.90)	-31.31** (12.72)
N	56	56	56	56

Standard errors in parentheses

PCSE Estimator for all models

* $p < 0.10$, ** $p < 0.05$, *** $p < 0.01$

With these in mind, the main results of the regression models are shown in Table 2. The major finding indicates that the lagged institutional instability variable has a negative effect on oil rents with statistically significant results. This suggests that a high rate of institutional change—for this case unstable institutional arrangements connected to a lower institutional capacity—in a previous period has a negative impact on the oil rents that these two countries could perceive. To be more precise, the table shows four different model specifications where the dynamic of the variables are considered.

Regardless of the specification, the lagged institutional instability variable has a negative and statistically significant effect on the first-difference of the oil rents variable, making its effect more robust to the introduction of controls. However, all of the four models except for the third, show a positive coefficient of the institutional instability variable in levels indicating that this is related to a short lived effect.

Additionally, the models exhibit the controls indicating that the level of electoral democracy (polyarchy) and regimen corruption have positive and some coefficients present statistically significant results. On the one side, the effect of a better democracy can indicate that the political system and its institutions work well improving the oil rents perceived by a country. Nevertheless, contrary to expectations, the regimen corruption variable shows an opposite effect on its sign for all the coefficients—in first-differences and lags—with one statistically significant result. Inspecting this result deeper, the overall correlation of these data indicates a 0.55 value (a high value) for the relationship of the variable (for Ecuador is of 0.49 while for Brazil is 0.38). Since this is not the main objective of the study, further analysis should expand on why this is the case.

Finally, given that the number of observations is relatively low to proceed with a time-series comparison per country, a dummy variable was introduced in the specification of model four to account for possible differences among the countries. The variable indicates that Ecuador has a positive and statistically significant result on oil rents compared to Brazil. These results should be taken with caution given that the dummy introduction does not provide a full picture of the relationship. In consequence, the results of all these models show that the institutional instability variable in lagged values has a negative and statistically significant effect on oil rents. This result suggests that there are differences in how institutional capacity, some institutional arrangements and the instability that these can create, affect oil revenue. Moreover, these results refine and expand on the causal inference presented in the previous subsection.

Conclusions

Why do some national governments lose lawsuits against oil companies when oil spills occur while others do not? The paper argues that the institutional capacity of a country, particularly the institutional arrangements around the discovery of evidence in the oil spill event, let a country to have a favorable decision or not over the lawsuit. Clear and explicit rules with enforcement actors and mechanisms decrease uncertainty and held violators responsible for any environmental damage that occurred during the extraction process. In contrast, where rules change abruptly, have a history of instability, and unclear enforcement mechanisms, the expectation to win the lawsuit for the country decreases given that external enforcers will not accept these irregularities during the discovery process.

Considering the framework, this work answered the question employing an integrative mixed-method approach. By focusing on each method's strength that answer to different questions of the phenomenon but unifying the causal inference, this combination provides a richer explanation of the event to be studied. First, it reviewed the particular historical event of each case; identifying actors, decisions, alternatives and results; and, particularly important, applied a game theory model to explain the outcomes. The actors of the games were the Government (**G**) and the Oil Company (**OC**); the actions were to sue (**S**) or not sue (\sim **S**) for the former and to not deny (\sim **D**) the claims or deny (**D**) for the latter. If a lawsuit was filed and the Oil Company Denied its guilt, the level of institutional capacity regarding the institutional arrangements of the discovery process Π_t came into play. The results show that Governments lose oil spill lawsuits where rules change abruptly, the institutional capacity is low particularly to institutional arrangements on the process of discovery, and where does not exist credible commitments of enforcement mechanisms. Additionally, the expectations of the Oil Company to continue working on the country are important for the probability of the oil spill dispute. Thus, the narratives show that the Government of Brazil had a favorable result, the Oil Company reached an agreement

and expected to continue working in the country $(r, -r+e)$, meanwhile the Government of Ecuador lost the lawsuit and legitimacy, and the Oil Company did not provide revenue and won legitimacy $(-l, l)$.

Furthermore, the quantitative analysis provided dynamic panel models results with a novel way to capture institutional instability by focusing on constitutional changes. This subsection created a variable that captures instances of high rate institutional change and employed it as the measure of institutional capacity indicated in the argument. Moreover, the dependent variable is oil rents as a percentage of the GDP which captures the earnings from oil production as an overall natural resource contribution to the economy of the country and partially accounts for the importance of oil extraction and the possible costs associated to loss of the income if oil spills occur. This combination of methods refined and expanded on the causal inference presented with the formal model and the narratives. In particular, the quantitative evidence indicates that the lagged institutional instability variable has a negative effect on oil rents with statistically significant results. This suggests that previous changes in the rules of the game have an impact on the oil revenue given the rate of institutional change that countries suffer. Regardless of the specification, the lagged institutional instability variable has a negative and statistically significant effect on the first-difference of the oil rents variable, making its effect more robust when controls are introduced. However, something to consider further is the short lived effect that the change of sign in coefficients may suggest. These results support the institutional capacity argument here depicted, specifically the institutional arrangements around the discovery of evidence in the oil spill event that let a country to have a favorable decision or not over the lawsuit.

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Appendix

Oil Company Threshold

$$\begin{aligned} -r + e &\geq p(-r) + (1-p)(l) \\ -r + e &\geq -pr + l - pl \\ pl + pr &\geq l + r - e \\ p(l+r) &\geq l + r - e \\ p &\geq \frac{l+r-e}{l+r} \end{aligned}$$

Government Threshold

$$\begin{aligned} p(l+r) + (1-p)(-l) &\geq 0 \\ pl + pr - l + pl &\geq 0 \\ 2pl + pr &\geq l \\ p(2l+r) &\geq l \\ p &\geq \frac{l}{2l+r} \end{aligned}$$

Oil Company legitimacy

$$\begin{aligned} p &= \frac{l+r-e}{l+r} \\ pl + pr &= l + r - e \\ l - pl &= r - e - pr \\ l(1-p) &= r - e - pr \\ l &= \frac{r-e-pr}{(1-p)} \end{aligned}$$

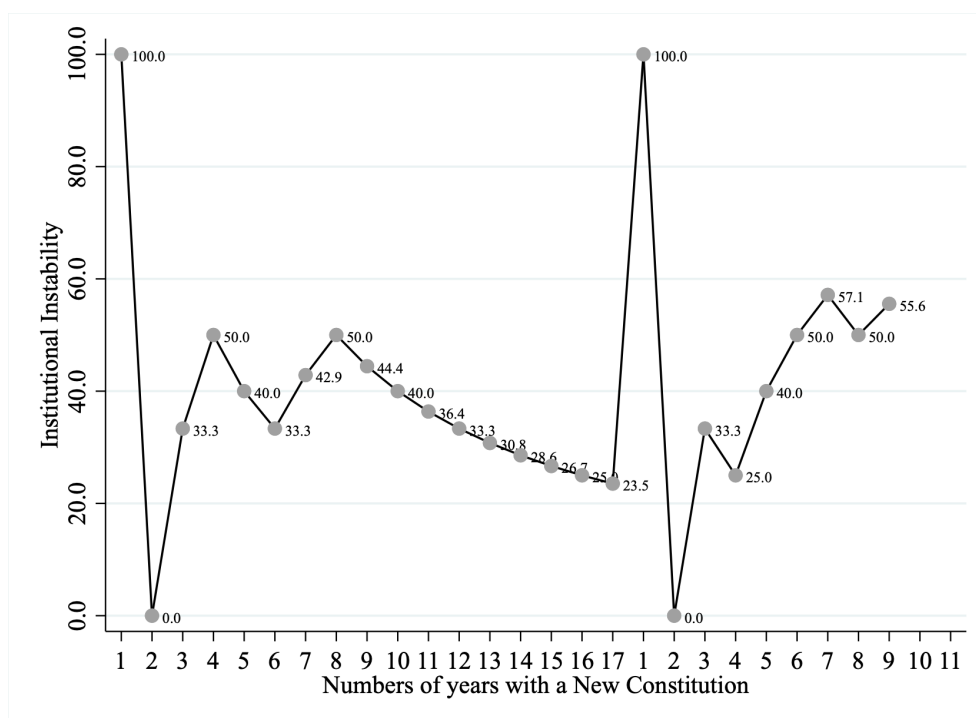
Government legitimacy

$$\begin{aligned} p &= \frac{l}{2l+r} \\ (2l+r)p &= l \\ 2lp + rp &= l \\ l - 2lp &= rp \\ l(1-2p) &= rp \\ l &= \frac{rp}{1-2p} \end{aligned}$$

Institutional Instability

Given the number of constitutions in Latin America where new rules of the game are exhibited with every change, the paper builds on Negretto’s work (2012, 765) [Lutz 1995] by considering the number of amendments each constitution has suffered per year of life to create an amendment rate. This variable shows “the number of amendments divided by the number of years the constitution has been in force”. Additionally, it is considered when a full replacement occurs, meaning a full change of rules. Consequently, this is a continuous variable that ranges from 0 to 100, where 100 means the maximum level of instability possible. Figure 1 shows this measurement with an example of a country where 2 new constitutions were enacted. The first one survived for 17 years and the second for 11 continuous years (the years are shown in the x-axis). Additionally, institutional instability is displayed on the y-axis exhibiting the value of the variable for each of these years. Let’s examine the figure.

Figure 8: Example of Institutional Instability in Latin America



Author’s graph based on Negretto (2012) and Elkins and Ginsburg (2022)

Consider that a full replacement happened in year 1 in our x-axis as the figure shows. As indicated above, that will be a full change of rules with a value of 100 and the first year with a new constitution. However, after that full replacement no amendments were enacted and year 2 receives a value of 0 given that 0 amendments occur (numerator) but two years of the new constitution passed (denominator). Nevertheless, in year 3, one amendment to the new constitution was enacted, indicating that some rules have changed. Thus, year 3 receives a value of 33.3 revealing that 1 amendment occurred (numerator) and 3 years of the new constitution went by. Furthermore, after 8 years of the enactment of the new constitution, 4 amendments were carried out. For that year, we can see an institutional instability value of 50 portraying that 4 amendments (numerator) occurred during 8 years (denominator) of the full replacement of rules. Until year 17, we can see a steady decline of institutional instability for that country showing that fewer amendments took place with less uncertainty of the rules of the game. Nevertheless, after year 17, a new constitution was enacted meaning a value of 100 for institutional instability and the start over of the denominator and, hence, the measure.