

# Can “Soft” Advice From International Organizations Catalyze Natural Resource Sector Reform?\*

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## Abstract

Can international organizations improve natural resource governance? The International Monetary Fund (IMF) is most noted for its role in crisis lending, where it can wield the “teeth” of loan suspensions to push for reforms. But IMF officials also spend a large amount of time conducting routine surveillance through Article IV consultations, which assess a country’s economic developments and provide non-binding recommendations. Do governments follow this “toothless” advice? To answer this question, we examine the content of all Article IV staff appraisals published between 2004 and 2019. Using text analysis and a difference-in-differences estimator, we find that resource-rich developing countries are more likely to adopt legislation reforming the oil, gas, and mining sectors in the wake of an Article IV appraisal that extensively discusses the natural resource sector and recommends natural resource governance reforms. Our results suggest that technocratic advice — a tool often overlooked in international organization scholarship — can lead to the adoption of policies that help ameliorate the resource curse.

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## Introduction

What do Botswana, Chile, Norway, Timor-Leste, and Trinidad and Tobago have in common? They are all rich in non-renewable natural resources like crude oil, natural gas, diamond, or copper. Their governments are, by law, mandated to save part of each year’s resource windfalls in a natural resource fund. And their Central Bank Governors were all invited to a two-day workshop held in Maputo by the Bank of Mozambique and the International Monetary Fund (IMF) in March 2019. Following opening remarks by Mozambican President Filipe Nyusi, the workshop — called *Preparing Mozambique for Natural Gas* — alternated between testimonials from Central Bank Governors and technical presentations from the IMF’s Fiscal Affairs Department, but the message was consistent: having recently discovered offshore natural gas reserves, Mozambique needed a plan to transform its finite natural assets into long-lasting social wealth. Speaking about his own country’s experience with oil, Alvin Hilaire, Governor of the Central Bank of Trinidad and Tobago, advised that there was no need to reinvent the wheel: international bodies like the World Bank and the IMF “provided advice on international best practices, such as on governance, transparency and investment.”

Existing research tends to focus on the IMF’s role in crisis lending, including its practice of conditioning loan disbursement on policy reforms (Vreeland, 2003; Dreher, 2009; Chapman et al., 2017; Goes, 2023). But much of its time is devoted to routine surveillance, as the staff conducts regular “health checks” of economic and financial practices in its 190 member countries. Despite the amount of time and effort devoted to such health checks (formally called Article IV consultations), we know relatively little about what they achieve.<sup>1</sup> Perhaps this is because, unlike crisis lending, where the IMF has the “teeth” to push policy reforms in the form of loan suspensions or withholding future tranches, Article IV consultations are purely advisory: countries are not punished if they fail to follow IMF advice. Still, there is widespread evidence that international organizations (IOs) can also influence government policy through advice and standard setting, including technical assistance from the World Trade Organization (Shaffer, 2005), “positive complementarity” from the International Criminal Court (Dancy and Montal, 2017), or socialization to human rights norms (Greenhill, 2015). Article IV consultations are an obvious way to test whether IOs can disseminate ideas and best practices.

Much like Mozambique, governments often seek out the advice of the IMF upon discovering natural resources. Developing countries typically have a narrow tax base and collect less revenue due to their large informal sector and abundant small-scale firms (Besley and Persson, 2014). This, coupled with their limited access to capital markets in times of need (Wibbels, 2006), means they turn to revenue from natural

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<sup>1</sup>There is a small, but growing literature examining IMF surveillance (Edwards and Senger, 2015; Edwards, 2018; Clark and Zucker, 2023).

resources whenever possible. The possible downsides of resource dependence are well known: oil, natural gas, and minerals can lead to economic volatility, weak fiscal capacity, low levels of government accountability, and political unrest (Ross, 2015). The lure of using resource rents for political purposes and the high cost of institutional development suggest that this sector might be *especially* resistant to large-scale reform. Yet natural resource wealth also harbors the potential for economic growth: if properly managed, windfalls can be used to increase public investment in human capital and infrastructure (Venables, 2016). Governments may see virtue in shoring up their financial house as a preventive measure, rather than waiting for a costly crisis. Article IV consultations promote best practices that reflect a broader consensus in the international community. Though different IOs might give conflicting advice (Breen, Hodson and Moschella, 2020), this is not the case when it comes to natural resource management; for example, the IMF, World Bank, European Union, G8, G20, and United Nations have all endorsed the Extractive Industries Transparency Initiative (EITI) and promote similar practices in this sector (Sovacool et al., 2016).

We argue that expert advice from IMF economists can catalyze natural resource sector reform. As Goes (2023) shows, the terms of an IMF loan have shaped natural resource management decisions since 1980; we argue that non-binding advice can have a similar effect. When Article IV reports place special emphasis on the natural resource sector, we predict that countries will be more likely to adopt legislation reforming this sector. Even if reform-minded governments seek out technical advice, receiving such advice can be what tips them over the edge to actual reform. To test this argument, we examine the content of all Article IV consultations conducted in 77 resource-rich developing countries and published between 2004 and 2019. First, we use text analysis and manual coding to assess how much these published documents cover the natural resource sector and whether they directly recommend reform. Second, we use differences-in-differences to investigate whether countries are more likely to adopt new natural resource legislation in the aftermath of these consultations, conditional on variation in content. Throughout the analysis, we provide qualitative evidence of the Fund’s considerations in drafting Article IV reports, discussing instances in which IMF recommendations lead to reform — or not.

Our analysis speaks not only to a growing body of literature focusing on the linguistic content of IO reports and statements (Busch and Pelc, 2019; Terman and Voeten, 2018) but also to larger debates about whether IOs influence domestic politics. Scholars have examined the role of IOs in democratization (Pevehouse, 2002), trade policy (Allee and Scalera, 2012), capital account liberalization (Chwieroth, 2007), climate policy (McLean and Stone, 2012), human rights practices, and legal reform (Simmons, 2009), among other areas. Much of this work focuses on the role of IOs in disseminating knowledge, promoting ideas, and advocating best practices (Barnett and Finnemore, 2004*b*; Park, 2006; Simmons, Dobbins and Garrett, 2006; Park and Vetterlein, 2010; Haas, 2018). Given that Article IV consultations produce recommendations and

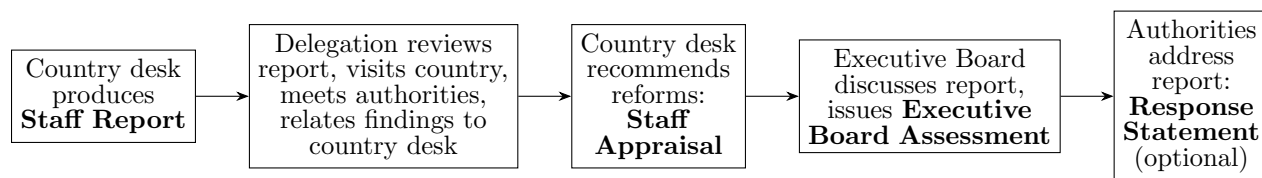
are not accompanied by the direct “stick” of loan suspensions, they are most likely to affect government decision-making by promoting specific reforms or persuading economic officials of the need for reform. Our contribution is to examine whether IOs can influence domestic politics when they have no explicit financial leverage and assess whether such technical assistance matters in a challenging issue area: natural resource governance.

# 1 IMF Surveillance

## 1.1 Background

When the IMF was created in 1944, its member countries consented to 33 Articles of Agreement outlining the Fund’s purposes, membership, and operational structure. Article IV, in particular, stipulated that each member country should “collaborate with the Fund to promote exchange stability, to maintain orderly exchange arrangements with other members, and to avoid competitive exchange alterations” (IMF, 1969, 189). After the collapse of the Bretton Woods monetary system of fixed exchange rates in 1971, Article IV was rewritten to accommodate the new role of the IMF: to “exercise firm surveillance” over a wide array of macroeconomic fundamentals, like fiscal policy, capital mobility, labor regulation, and trade (IMF, 2016). This regular surveillance, called an Article IV consultation, normally takes place every 12 to 24 months, whether or not the country in question is under a loan agreement.<sup>2</sup> It is the IMF’s attempt at “preventive medicine” — addressing the source of crises before they hit.

Figure 1: Outline of the Consultation Process



As outlined by Figure 1, Article IV consultations begin with an IMF country desk producing a Staff Report assessing the state of a country’s economy. This report is internally reviewed before an IMF delegation visits the country for one or two weeks, meeting with the finance minister, the central bank governor, and other senior government officials. After the visit, the delegation reports its conclusions to the country desk, which

<sup>2</sup>Exceptions include extraordinary circumstances like civil war, political instability, or disputes between a country and the IMF. For example, Venezuela’s last consultation was completed in September 2004; the subsequent consultation was scheduled for September 2005, but President Hugo Chávez did not grant access to IMF staff and severed ties with the Fund (at least symbolically) in 2007 (see Saul Hudson. “Venezuela to quit IMF, World Bank.” *Reuters*, 1 May 2007). Argentina, Libya, and Syria similarly missed scheduled consultations. Table A.1 lists missing and delayed consultations. Also, as one might expect, surveillance of compliance with loan conditionality and Article IV consultations often overlap in substance when a country is under an IMF loan.

in turn produces a document connecting these findings to the state of the country’s economy, recommending reforms and proposing a time frame for the next consultation (in the so-called Staff Appraisal). The Executive Board, which represents all member countries, discusses the appraisal. The Executive Board does not vote on the report and, in fact, sometimes expresses competing opinions on the recommendations (Schäfer, 2006). The final document, consisting of the Staff Report, Staff Appraisal, and Executive Board Assessment, is sent to the Executive Director representing the country under appraisal, who in turn can issue a response. Though authorities are free to disagree with the assessment of the Executive Board, they tend to agree 75% of the time (Fayad et al., 2020). Despite proposals to condition crisis borrowing on compliance with past Article IV recommendations, these consultations continue to be only suggestive: countries are not required to follow the appraisal of the IMF.<sup>3</sup>

Since 2004, all consultations are automatically made public, unless the country under surveillance objects. Few countries object: while 47 percent of all consultations conducted between July 1999 and June 2001 were published, this number jumped to 82 percent for the period between November 2007 and December 2008 (Edwards, Coolidge and Preston, 2011, 11), and 95 percent for 2014–2015 (Mihalyi and Mate, 2018). Additionally, several countries retroactively authorized the publication of reports.

## 1.2 Why Technical Advice Matters

The Article IV process seems well-designed for persuasion. First, international bureaucrats are most persuasive when they are seen as more moderate than a rival source of advice (Fang and Stone, 2012) or have special expertise (Herold et al., 2021) — and the IMF staff is widely considered to have special expertise in the natural resource sector, as the case of Mozambique shows. The IMF’s interest reflects a desire to stabilize the macroeconomy, and natural resources a central part of the equation for many developing countries. The IMF has also increasingly become interested in environmental issues, particularly as they may bear on future macroeconomic stability (Clark and Zucker, 2023).

Second, Article IV consultations involve lower stakes than loan programs. Given the IMF’s quota-based voting system, important principals often influence the Fund’s lending decisions (Stone, 2002, 2011), but this is less likely to be the case in less salient cases or when principals are split on a lending decision (Copelovitch, 2010). In such situations, the IMF staff likely play a central role. Likewise, Article IV consultations allow IMF staff to influence policy and leave their mark on developing countries,<sup>4</sup> while remaining less visible than

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<sup>3</sup>Countries can also request a Staff Monitored Program (SMP), a voluntary and informal initiative to showcase the government’s ability to make progress on economic reforms before asking for a loan. SMP progress is monitored under Article IV consultations and may be considered in future loan decisions, but neither compliance with SMPs nor acceptance of Article IV recommendations is a prerequisite for a loan program.

<sup>4</sup>Article IV consultations are most influential in developing countries; they played no role during Congressional and White House debates about the US debt ceiling in 2011–2012, as Edwards and Senger (2015) show.

large crisis loan programs, where geopolitics may come into play. Others have noted that IO bureaucrats are crucial for IO design and reform, developing organizational procedures to increase their legitimacy and protect their bureaucratic “turf” (Johnson, 2014; Barnett and Finnemore, 2004a). Since the IMF’s legitimacy relies on perceptions of its technical competence, we should expect similar behavior from IMF bureaucrats, who might bristle at criticisms of the Fund as controlled by the US or other developed country principals.

Third, Article IV procedures attempt to overcome skepticism through collaborative meetings that involve back and forth with country representatives. This involvement in the consultative process aims to foster domestic ownership from governments (Best, 2007), when “the policy content of the program is similar to what the country would have chosen in the absence of IMF involvement” (Khan and Sharma, 2003, 235). Since the IMF faced many blows to its legitimacy in the past (Seabrooke, 2007), ranging from criticisms of the Washington Consensus to perceived failures during the Asian financial crisis and beyond, this domestic ownership generates a sense of procedural legitimacy, beyond the legitimacy afforded by the expertise of IMF bureaucrats.

Fourth, governments may view Article IV consultations in instrumental terms. Following IMF advice may be useful political cover for the implementation of painful reforms that would otherwise face stiff opposition (Vreeland, 2003).<sup>5</sup> International audiences will likely see cooperation with the IMF as indicative of the government’s commitment to open economic policies (Fang and Owen, 2011). Even citizens may view policy advice and conditionality as a welcome way to hold their own government accountable — particularly if this is a government they do not trust (Clark, Dolan and Zeitz, 2023). Of course, Article IV consultations might provide less effective political cover than loan conditionality, as leaders do not *have* to implement painful reforms to gain access to much-needed capital. But the average citizen cannot distinguish between non-binding technical assistance and binding loan conditionality, and is unlikely to know specific details about the IMF’s operations. Citizens’ perception of IO legitimacy depends on several factors (Breen and Gillanders, 2015; Edwards, 2009), like education, gender, and political trust, all unrelated to the actual “bite” of IO advice. Since loans are the most salient part of the IMF’s work, leaders may capitalize on this lacuna of details to make claims about the need to follow IMF recommendations (even if such recommendations are not binding) to an audience that already values the IMF’s “seal of approval” and believes in the legitimacy of its advice.

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<sup>5</sup>For instance, the 2022 consultation with Nigeria recommended the unpopular move of eliminating fuel subsidies. This advice was widely reported at the time. President Bolu Tinubu announced the end of the fuel subsidy upon taking office, pointing to Nigeria’s declining fiscal outlook and the possibility to channel the revenue savings to programs benefiting the poor, per the IMF’s suggestions (“IMF Urges Nigeria to Scrap Fuel Subsidies, Target Poor With Support.” *Reuters*, 8 February 2022; Chinedu Okafor. “The International Monetary Fund Has Advised the Nigerian Government on How to Prevent an Impending Economic Crisis” *Business Insider Africa*, 9 February 2023). Importantly, Nigeria was not under a loan agreement at the time; except for an emergency loan to address the COVID-19 pandemic in 2020, it has not borrowed from the IMF since 2007.

## 2 Who Reforms?

### 2.1 Hypothesis-Generating Illustrations

Article IV consultations focus on many topics; absent direct transcripts of these collaborative meetings, the published reports are the next best evidence of what topics were discussed. To develop testable hypotheses, specify the causal mechanism, and identify its scope conditions (Levy, 2008), we introduce the illustrative examples of Ghana and Guyana. Seven countries first discovered natural resources after 2004: Ghana (2007), Mozambique (2009), Sierra Leone (2009), Ethiopia (2010), Tanzania (2010), Senegal (2014), and Guyana (2015). In these countries, we can directly observe how IMF advice shifted in response to resource discovery. We discuss the oldest and the newest cases on this list: one case from Sub-Saharan Africa, where oil extraction is a relatively recent phenomenon, and another case from South America, where oil extraction has a longer history. In the Seawright and Gerring (2008) case selection typology, one might consider these “extreme cases,” as the corresponding Article IV consultations are unusually concerned about natural resource management.

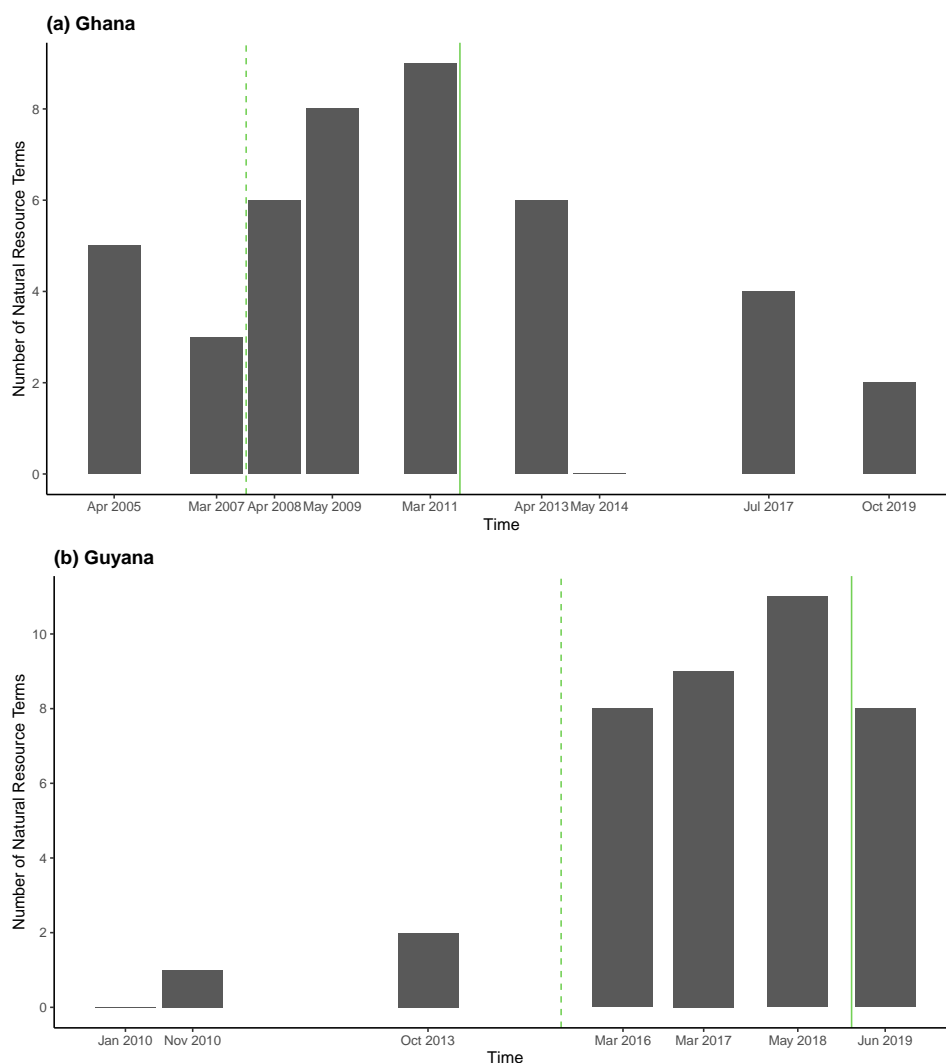
Before 2007, Ghana was an exporter of cocoa, gold, diamonds, and manganese. The 2005 Article IV consultation identified Ghana’s main economic weakness: “Economic prospects are still largely driven by the export of a few commodities. This narrow economic base, together with high world oil prices, contributes to the vulnerability of the economy.”<sup>6</sup> This assessment did not change in the next consultation. Following multiple meetings with Ghanaian authorities in January, February, and March 2007, the IMF staff released its assessment in June 2007 and said nothing about natural resources. However, that same month, Kosmos Energy discovered the giant oil field Jubilee about 60 km offshore. When the IMF returned to Accra between 23 March and 8 April 2008, its advice shifted towards the natural resource sector: “Oil prospects can materially improve Ghana’s medium-term outlook for growth and poverty reduction if it avoids the ‘oil curse’ of rent-seeking and boom-bust cycles ... the Ghanaian authorities are to be commended for already having begun a nationwide consultation on the use of oil resources.”

The IMF insisted on the importance of natural resource reform in 2009: “Reforms are likely to be resisted by pressure groups, particularly as oil production approaches. However, without reform, Ghana risks dissipating its oil revenues with little long-term benefit for growth and poverty reduction.” That year, Ghana also entered a loan agreement with the IMF, which no doubt added more urgency to this advice. Following a staff visit to Accra in February and March 2011, the 2011 consultation (published in June) reiterated the importance of natural resources: “Clear and transparent management of oil revenues is a priority ... It will be important that incomes, expenditures, and savings associated with oil wealth be

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<sup>6</sup>These and other quotes come from the main dataset used in our study, described in more detail in subsequent sections.

Figure 2: Natural Resource Terms in IMF Article IV Consultations with Ghana and Guyana, 2004–2019



This figure shows how many natural resource terms appear in all 9 available Article IV consultations with Ghana (top) and all 7 available consultations with Guyana (bottom); for each country, one consultation does not include any natural resource term. The x-axis indicates when the discussions between the government and the IMF were concluded. Dashed vertical lines indicate the discovery of oil, whereas solid vertical lines indicate the passage of natural resource policy. See Appendix C for a list of natural resource terms.

transparently and comprehensively recorded for dissemination, analysis, and audit purposes.”

Ghana’s Act 815 – Petroleum Revenue Management Act was passed by Parliament and assented to by the President on 11 April 2011, aiming to “regulate the collection, allocation, and management by government of petroleum revenue derived from upstream and midstream petroleum operations.” After that, the IMF staff shifted the focus of its advice. The 2013 consultation only addressed natural resources in one sentence: “Ghana’s strong democratic credentials and favorable prospects for oil and gas production continue to attract significant FDI.” In subsequent consultations, the IMF continued to praise Ghana’s commitment to fiscal



discipline. But as a Figure 2 suggests, the focus of its advice shifted away from the natural resource sector and toward broader improvements in financial management and banking supervision, issues the staff considered more pressing.

On the other side of the Atlantic, Guyana follows a similar trajectory. Before the 2015 discovery of oil deposits, the IMF limited its recommendations to medium-term fiscal reform. The IMF recognized Guyana as a less developed country and recommended investing in low-carbon, sustainable sectors. Staff also advised Guyana to focus on debt relief and maintaining tariffs to protect lower-income citizens. Once ExxonMobil discovered high-quality, oil-bearing sandstone reservoirs off the Guyanese coast in May 2015, the IMF began to recommend more specific resource sector reforms, as Figure 2 shows. The 2017 consultation advised authorities to establish a fiscal framework for managing oil wealth before oil production began in 2020: “As a new oil producer starting from scratch, Guyana is in a good position to put in place a framework that limits procyclical spending and attenuates the impact of oil price volatility on the budget and the economy.” An annex to the report, titled “Best Practices in Managing Oil Wealth,” noted that a clear resource management framework would “contribute to building confidence in the general public and financial markets.”

Though Guyana was not under a loan agreement mandating reforms in exchange for financial support,<sup>7</sup> Guyanese officials seemed eager to incorporate the Fund’s advice. During the 2017 consultation, “the authorities reiterated their plans to anchor future oil wealth management in a comprehensive legal framework. They sought the Fund’s advice on the recently drafted Natural Resource Fund legislation. The authorities informed that they are also working on other key elements of the fiscal regime, including drafting the Petroleum Law and establishing a Petroleum Commission.” Guyana became a candidate member of the Extractive Industries Transparency Initiative (EITI) in October 2017 and passed Act No. 12 – Natural Resource Fund Act in January 2019, incorporating the resource management framework proposed by the IMF. The following Article IV consultation, published in September 2019, covered natural resources in far less detail.

## 2.2 Mechanism and Hypotheses

Ghana and Guyana suggest that IMF surveillance might influence domestic policy, but we lack systematic evidence across countries. There is reason for skepticism. Compliance with loan conditionality is quite mixed (Babb and Carruthers, 2008), as countries are often unwilling or unable to implement reforms. Countries that are strategically important to key principals — especially the US — tend to receive favorable treatment from the IMF (Oatley and Yackee, 2004; Stone, 2004, 2008). In these cases, the IMF cannot credibly threaten to enforce compliance by suspending loans, so these borrowers are less likely to comply with conditionality in

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<sup>7</sup>Guyana’s last IMF agreement ended in 2006.

the first place (Dreher and Jensen, 2007; Stone, 2008; Copelovitch, 2010). Other countries fail to implement reforms due to domestic politics — for example, ahead of elections (Dreher, 2003). Sometimes countries lack the technical or bureaucratic capacity to reform. As a result, only 33 percent of all IMF programs between 1980 and 2015 were fully completed; the remaining 67 percent were interrupted due to non-compliance with conditionality (Reinsberg, Stubbs and Kentikelenis, 2022). If countries struggle to reform when money is on the line, why should they adopt recommendations that have no bite?

The natural resource sector is a hard case in which to look for Article IV influence because technocratic reforms in this sector are unpopular. Since citizens have exaggerated expectations of what natural resource revenue can do, they often misinterpret such reforms as an attempt by political elites to seize rents for private benefits at the expense of public goods provision (Collier, 2017). In limiting governments’ discretion over natural resource revenue, these reforms deprive politicians of vital funds for political survival (Wiens, 2014). Large-scale reform is costly for developing countries, which suffer from weak institutions, fragmented polities, and low administrative capacity (Besley and Persson, 2014). In sum, there are many reasons why rent-seeking or politically-constrained governments might fail to implement well-meaning advice in the face of public demands for increased spending.

At the same time, economic planners in Ghana, Guyana, and beyond are aware of the adverse political, social, and economic effects associated with reliance on natural resource wealth and increasingly request technical assistance from international financial institutions to help mitigate such effects. For instance, upon discovering copper, gold, uranium, and coal reserves, Mongolia’s leaders worked with the World Bank to develop policies that insulated the economy from commodity price volatility.<sup>8</sup> Guinea similarly requested technical assistance from the IMF, the African Development Bank, and the US-based nonprofit Natural Resource Governance Institute before passing a mining law and negotiating contracts with mining companies.<sup>9</sup> The IMF, in particular, provides the most comprehensive and highest-quality data to its member governments (Lombardi and Woods, 2008). In direct consultation with governments, the IMF leverages its expertise to propose reforms backed by research across countries, based on years of meticulously-collected data. This may be particularly useful for nations that lack the human capital, statistical capacity, and bureaucratic structures to conduct such research themselves. As discussed before, framing a reform as recommended by IO experts may also help politicians “sell” said reform to their constituents, regardless of whether this reform is the product of binding loan conditionality or non-binding technical assistance. Mongolia and Guinea might have wanted to overhaul the extractive sector, but it is unclear if they would succeed without the technical

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<sup>8</sup>Michael Fortshythe. “Mongolian Harvard Elites Aim for Wealth without Dutch Disease.” *Bloomberg*, 15 February 2010.

<sup>9</sup>Thomas Lassourd and Patrick Heller. “Guinea’s Mining Reforms: A Time to Act for a ‘Government of Action.’ ” *Natural Resource Governance Institute*, 14 February 2014. Also: IMF. “IMF Survey: Policy Reforms, Mining Boom Power Guinea’s Recover.” *IMF News*, 6 April 2012.

assistance and the “seal of approval” from IOs.

We argue that governments are more likely to reform the natural resource sector in the wake of Article IV consultations. Specifically, the *content* of a consultation matters: when reports emphasize the natural resource sector or make specific recommendations for reform, countries are more likely to adopt policies consistent with this advice. If a report discusses a particular topic at more length than others, policymakers may be more likely to take note and consider steps to address such topic. Article IV reports rarely dwell on non-issues, instead highlighting areas of under performance or that need structural reform. Highlighting a specific issue indicates how much urgency the IMF places on the issue. When a consultation occurs with a country like Ghana or Guyana, one that seeks advice about natural resource sector management and that — in the absence of reform — would be susceptible to the resource curse, much of the discussion focuses on natural resource governance. The published Staff Appraisal will reflect the tenor of that discussion. Even if the emphasis on this topic is driven by government officials who want reform, Article IV consultations can catalyze nascent or stalled reform efforts. We propose the following hypotheses:

***Hypothesis 1:** Governments are more likely to adopt natural resource reforms when an Article IV consultation directly mentions or promotes natural resource governance.*

***Hypothesis 2:** Governments are more likely to adopt natural resource reforms as the Article IV report places greater emphasis on the natural resource sector.*

## 3 Data

### 3.1 Article IV Consultations

We examine all 700 Article IV consultations conducted and published between 1 January 2004 and 31 December 2019 for 77 developing nations classified as resource rich by the IMF (Venables, 2016), the Natural Resource Governance Institute (2021), or both. Mihalyi and Mate (2018) compiled this dataset for 2004–2018; we extend it until 2019.<sup>10</sup> For most countries, Article IV consultations take place every 12 to 24 months, though some are monitored more frequently than others, depending on their regional importance, size of outstanding loans, and perceived macroeconomic risk.

As Figure 1 shows, every Article IV consultation consists of at least three parts: a press release condensing the views of the IMF Executive Board; a Staff Report providing key information about the country; and an Informational Annex summarizing the country’s history with the IMF and identifying potential statistical

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<sup>10</sup>Our dataset includes consultations for the 2004–2018 period that had not been published at the time of Mihalyi and Mate’s data collection. While some information is available for 2020, most consultations that year were suspended due to the COVID-19 pandemic, which is why our analysis ends in December 2019.

issues with the data supplied by local authorities. We focus on the Staff Report, specifically the subsection titled Staff Appraisal. This section is formal and technocratic, whereas the assessment of the Executive Board is more susceptible to informal influence from large countries.<sup>11</sup> From now on, whenever we speak of Article IV consultations, we will be referring exclusively to the Staff Appraisal.

We quantify IMF advice in several ways. First, we read all Staff Appraisals to assess whether each document *promotes* natural resource governance, that is, whether it includes general language advising countries to “establish a comprehensive framework for managing oil wealth” (Guyana, 2017) or specific advice that “it is important that a petroleum fund be established swiftly in time for increased inflows of oil/gas revenues” (Timor-Leste, 2004). We use this information to generate a dichotomous variable coded one if a country-year pair is associated with a Staff Appraisal that promotes natural resource governance, and zero otherwise. A mere mention of natural resources is not enough, nor is a mention of resource prices or subsidies; we only consider that a consultation promotes natural resource governance if the IMF actively encourages governments to promote policy changes in the resource sector. In generating *Consultation Promotes Natural Resource Governance* (which takes the value of one 253 out of 700 times), our strategy is equivalent to that of Kentikelenis, Stubbs and King (2016), Rickard and Caraway (2019), and several others who quantify the effect of IMF conditionality by manually coding whether agreements promote a certain policy in their Letters of Intent.

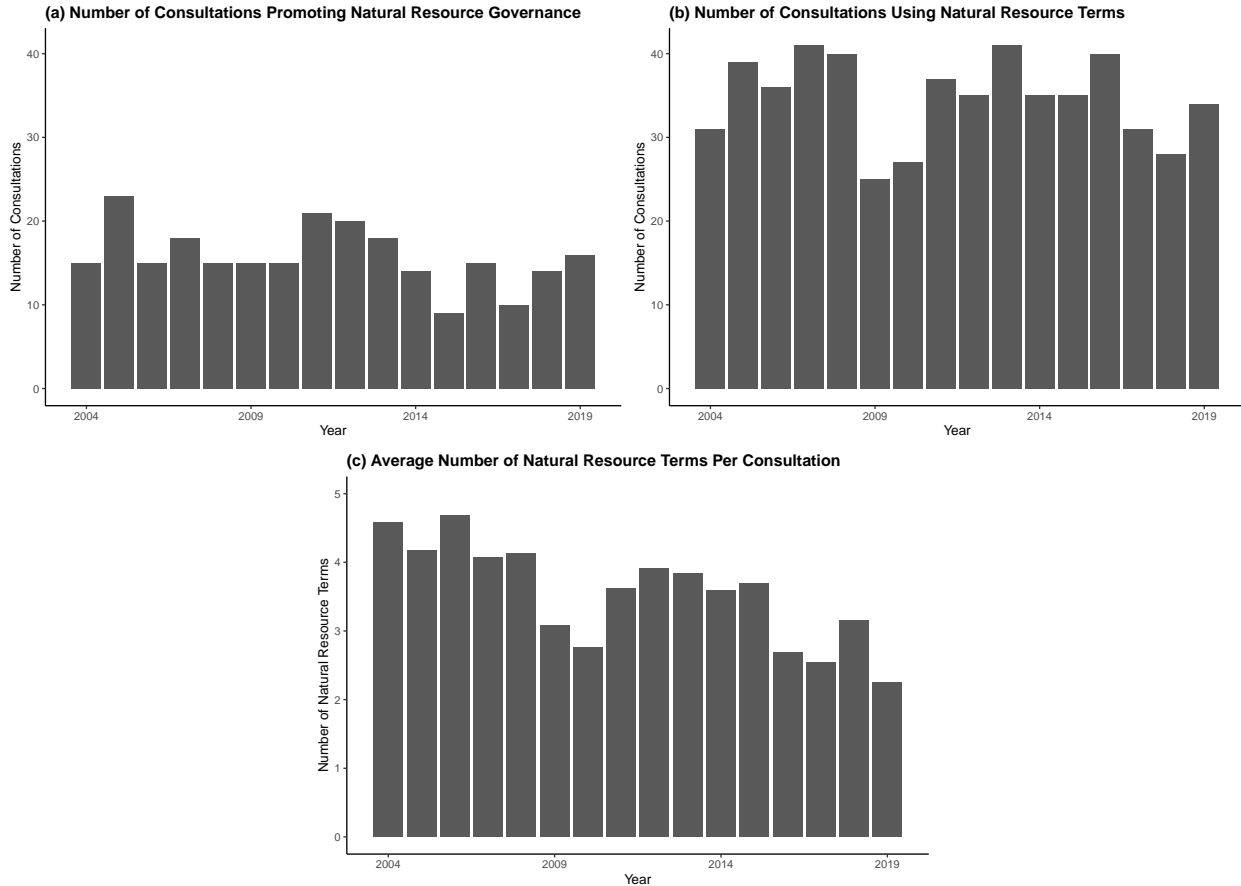
Second, we tally the number of times each Staff Appraisal mentions natural resources — much like Clark and Zucker (2023), who hand-code individual “climate” mentions in Article IV consultations. Although there are no direct transcripts of meetings during Article IV consultations, the Staff Appraisal can only cover issues discussed with authorities during actual meetings (IMF, 2022), and its content likely reflects how extensively each topic was discussed. This, in turn, might signal how necessary the IMF considers natural resource reform to be. We generate a dictionary of resource-related terms (like *natural resource*, *oil*, *hydrocarbon*, or *EITI* — see Appendix C for full list), count how often such terms are mentioned, and use this information to generate the dichotomous variable *Consultation Uses Natural Resource Terms* as well as the count variable *Natural Resource Term Frequency*. In years where *Consultation Uses Natural Resource Terms* is zero, *Natural Resource Term Frequency* is also zero; in years where the former is one, the latter indicates how many terms were used. On average, Staff Appraisals use 875 terms in total, about 3.5 of which relate to natural resources. The maximum number of natural resource terms — 18 — was used in Angola’s 2004 consultation. Of the 700 consultations, 145 do not mention a single natural resource term, and 106 mention

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<sup>11</sup>For example, 5 of the 24 members of the Executive Board are appointed by the IMF’s largest shareholders (France, Germany, Japan, the United Kingdom, and the US). Stone (2011, 56) shows that “the Executive Board ratifies whatever the IMF management proposes.” Since the management is controlled by the largest shareholders, the assessment of the Executive Board is likely influenced by their political preferences.

just one. Since Staff Appraisals can vary considerably in length — ranging from 350 terms (Senegal 2010) to 2,538 terms (China 2010) —, our robustness checks (reported in Appendix F) replace *Natural Resource Term Frequency* with the term frequency–inverse document frequency (TF–IDF) statistic, which gives more weight to less frequent terms.

Figure 3: How Article IV Consultations Cover Natural Resources Over Time, 2004–2019



This figure indicates how many Article IV consultations promote natural resource governance each year (a), how many use natural resource terms (b), and how many terms, on average, appear in all consultations published each year (c).

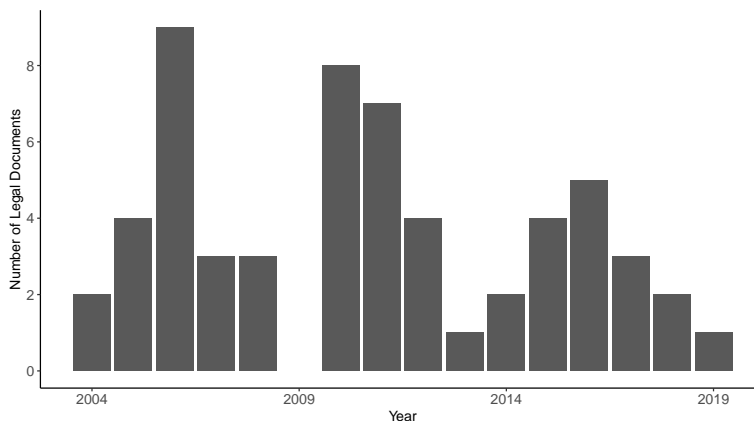
Figure 3 shows the distribution of *Consultation Promotes Natural Resource Governance*, *Consultation Uses Natural Resource Terms*, and *Natural Resource Term Frequency* over time. Comparing panels (a) and (b), consultations seem more likely to mention natural resource terms in general than to promote natural resource governance directly, though the number of natural resource terms used per consultation varies, as panel (c) shows. We expect these variables — which are significantly correlated — to have a positive effect on natural resource reform: all else equal, countries should be more likely to reform the natural resource sector if they participate in a consultation that promotes natural resource governance and mentions natural resources, particularly if these mentions are frequent.

### 3.2 The Emergence of Natural Resource Funds

In its appraisal, the IMF staff often recommends the adoption of one policy tool: a natural resource fund (Chwieroth, 2014). According to the IMF, these funds can “support the implementation of sound fiscal policies” and “enhance the transparency and credibility of fiscal policy” (Baunsgaard et al., 2012, 20). We examine whether variation in the content of Staff Appraisals increases the odds that a country will pass any legal document (a law, statute, act, code, or executive decree) related to a natural resource fund in the following year. Goes (2023) collected these legal documents from Official Gazettes, based on information provided by the Natural Resource Governance Institute (2021). We opt for this dependent variable, rather than more general fiscal rules, to maximize comparability across countries in policies adopted.

During the period under study, 40 of the 77 governments passed 58 such legal documents (which we call “natural resource policy” in brief). Ecuador leads the list, with four organic laws (in 2005, 2006, 2008, and 2018) creating or regulating three different oil funds to stabilize the economy and reduce the size of the public debt. Figure 4 showcases the distribution of such documents from 2004 until 2019.

Figure 4: Distribution of Legal Documents Over Time, 2004–2019



This figure shows the number of legal documents passed on every year from 2004 until 2019. At least one legal document was passed every year other than 2009.

Though these legal documents vary in length, their content is similar: they outline the purpose of the fund, appoint a committee to manage the fund’s assets, delimit what assets the fund can invest in, and stipulate annual deposit as well as withdrawal limits (what percentage of resource revenue must be deposited into the fund and how much of this revenue can enter the public budget every fiscal year). Guyana’s Act No. 12 – Natural Resource Fund Act begins by outlining the purpose of the Natural Resource Fund: “to manage the natural resource wealth of Guyana for the present and future benefit of the people.” It assigns management duties to the Minister of Finance and creates the Public Accountability and Oversight Committee to assess “whether the Fund has been managed in accordance with the principles of transparency, good governance

and international best practices.” The Fund must invest in safe assets, including treasury bills issued by countries with a sovereign credit rating of A or above and equities included in the MSCI World Index. All oil royalties, profits from production-sharing agreements, and taxes levied on the profits of oil-producing companies must be deposited into the Fund. Finally, all withdrawals must be approved by parliament and cannot exceed the Economically and Fiscally Sustainable Amount, calculated according to annual inflation, exchange, debt, and growth rates. All these measures align with the best practices identified by the IMF (e.g. [IMF, 2008](#)). In fact, the 2019 Article IV Consultation specifically included an annex called “Progress on 2018 Article IV Policy Recommendations” that commended Guyanese authorities: “NRF legislation was assented to law in January 2019, providing a legal framework for managing Guyana’s natural resource wealth and includ[ing] provisions for public oversight.” This measure was rated by the IMF staff as “broadly consistent” with its own prior advice.

Our outcome of interest is a country-year dichotomous indicator of *Policy Passage*. This variable says little about policy outcomes — we do not know if Guyana’s Natural Resource Fund is actually managed according to international best practices or if all withdrawals are truly approved by parliament. But passing a legal document is a good indicator that countries follow IMF advice. Even if implementation is partial, the willingness to enact *de jure* reform is a necessary step toward *de facto* reform ([Amick, Chapman and Elkins, 2020](#)). In fact, IOs often encourage *de jure* institutional reforms — which are easier to measure and accomplish — as the first practical step toward enacting concrete changes ([Buntaine, Parks and Buch, 2017](#)). Thus, our outcome of interest is a policy input (rules, institutions, and procedures), rather than a policy outcome, which is often beyond government control and difficult to operationalize across countries ([Masaki and Parks, 2020](#)).

### 3.3 Alternative Explanations

Though we expect IMF advice to have a positive effect on natural resource sector reform, officials’ views of the usefulness of such advice might vary. [Heinzel et al. \(2020\)](#) find that similarity in economic policy beliefs determines perceptions of impartiality of the IMF and World Bank, and hence receptiveness to their recommendations. It is possible that technocratic policymakers — who share the training and the economic beliefs of IMF staffers — are more attuned to the resource curse, more likely to request technical advice about natural resources, and more likely to promote reforms in response to such advice. To account for this alternative explanation, we follow [Chwieroth \(2013\)](#) and [Nelson \(2017\)](#) in using the CIA Chiefs of State and Cabinet Members of Foreign Governments directory to identify all finance ministers. We then collect individuals’ educational backgrounds using newspapers and government websites. The resulting variable,

*Technocratic Finance Minister*, takes the value of one if the finance minister in question attended graduate school in an economics department in the US, and zero otherwise.

Market actors might pay close attention to Article IV reports out of belief that the IMF’s “stamp of approval” reflects the quality of an investment environment. If so, countries that rely heavily on inward investment flows should face a greater incentive to announce reforms addressing the IMF’s criticisms to assuage market actors, preventing a decline in future inflows. There is little evidence that surveillance affects developing countries’ financial markets (Edwards, 2018; Lombardi and Woods, 2008), and a survey of 1,784 government officials finds that “credibility signaling to investors and donors appears to be, at best, a secondary consideration” when implementing policies in response to external performance assessments (Masaki and Parks, 2020, 393).<sup>12</sup> But we control for this alternative explanation using UNCTAD’s Inward FDI Performance Index, which is the ratio of a country’s share in global FDI flows to its share in global GDP.

Our models incorporate additional economic and political variables that might explain why governments reform the natural resource sector. These include simultaneous participation in an IMF program (using data collected by Kentikelenis and Stubbs 2023); crude oil prices (both level and change, in 2022 US dollars, as reported by the US Energy Information Administration); GDP share of resource rents, logged GDP per capita, and GDP growth (all reported by the 2022 World Development Indicators); and the discovery of a giant, supergiant, or megagiant oil and gas field (with over 500 million recoverable barrels of oil or 3 trillion cubic feet of gas, using data from Horn 2014).<sup>13</sup> We control for regime type using Coppedge et al.’s (2023) electoral democracy index (*Polyarchy*, ranging from zero to one, which higher values indicating more democratic regimes); for the ideology of the executive (*Left Executive*, drawn from Cruz, Keefer and Scartascini 2021); and for the number of protests recorded by the Mass Mobilization Project every year, serving as a proxy for political instability (Clark and Regan, 2020). As Stone (2004) and others argue, implementation of structural economic reforms is less likely during periods of political unrest. Lastly, we include a dichotomous indicator of whether the country in question has passed natural resource policy in the past.

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<sup>12</sup>The main consideration is whether these performance assessments provide “practical solutions to help address critical issues facing the country” (Masaki and Parks, 2020, 393).

<sup>13</sup>Horn’s coverage ends in 2014; Cust, Mihalyi and Rivera-Ballesteros (2021) extend it to 2019.



## 4 Research Design and Results

### 4.1 Difference-in-Differences

Before examining the effect of IMF advice on natural resource reform, we explore what makes the IMF give out such advice in the first place. What predicts variation in *Consultation Promotes Natural Resource Governance*, *Consultation Uses Natural Resource Terms*, and *Natural Resource Term Frequency*? Models reported in Appendix D identify two main predictors: *IMF Program* and *Field Discovery*. On average, consultations are 6.4 percent less likely to promote natural resource governance, 14 percent less likely to use natural resource terms, and use about one natural resource term less when the country under appraisal is under an IMF program. Under these circumstances, IMF advice prioritizes fiscal, monetary, and debt issues over natural resource policy. Consultations are also 13 percent more likely to promote natural resource governance, and tend to use 1.8 additional natural resource terms, if the country has discovered a large oil and gas field in the previous year. Other significant predictors include *Log GDP Per Capita* and *GDP Growth*.

As these preliminary models establish, not all countries are equally likely to receive natural resource advice. Self-selection could be an issue: governments that just discovered an oil or gas field might be more inclined to request natural resource advice *and* more inclined to reform the natural resource sector, for example. To account for potential selection bias, we quantify the effect of IMF advice on natural resource policy passage using the fixed effects counterfactual estimator (FEct) developed by [Liu, Wang and Xu \(2023\)](#). This estimator is an improvement over traditional difference-in-difference models (DiD), which are biased in the presence of staggered treatment timing with dynamic and heterogeneous treatment effects, as is our case ([Baker, Larcker and Wang, 2022](#); [Roth et al., 2023](#)). Our treatment is staggered because countries are not all treated at once; they can receive natural resource advice at any moment between 2004 to 2019. Our setting includes heterogeneous and dynamic treatment effects because treatment effects differ across cohorts (that is, “late adopters” and “early adopters” respond to the treatment differently), but also over time. The effect of IMF advice in 2008, when oil prices hit 127.67 US dollars per barrel, is likely different from its effect in 2004, when a barrel of oil cost 56.40 US dollars (both values reported in constant 2022 US dollars).

Our chosen approach, the FEct (discussed in more detail in Appendix E), not only handles staggered treatment timing with dynamic and heterogeneous treatment effects, it also allows for the inclusion of time-varying covariates ([Liu, Wang and Xu, 2023](#)). The IMF is more likely to give natural resource advice to countries with higher GDP per capita that have recently discovered an oil or gas field and are not involved in a loan agreement, so the parallel trends assumption is conditional on the inclusion of these covariates (see Appendix E for corroborating evidence). The variables *IMF Program*, *Field Discovery*, *Log GDP Per*

*Capita*, and *GDP Growth* (the latter three of which are lagged) capture a government’s ex-ante “propensity” to receive natural resource advice; including them in the model ensures that any effect observed after the treatment is only a function of the received advice.

Since our outcome variable is dichotomous, the coefficients correspond to those of a linear probability model: they indicate the probability of observing *Policy Passage*. We favor the linear probability model due to its ease of interpretation (Angrist and Pischke, 2009); the alternative, a non-linear DiD estimator (e.g. Athey and Imbens, 2006), is far less common and much harder to implement or interpret. Linear probability models tend to generate fitted values outside of the  $[0, 1]$  bounds, but we are less interested in the fitted values and more interested in the average *difference* between fitted values of the treatment and control groups.

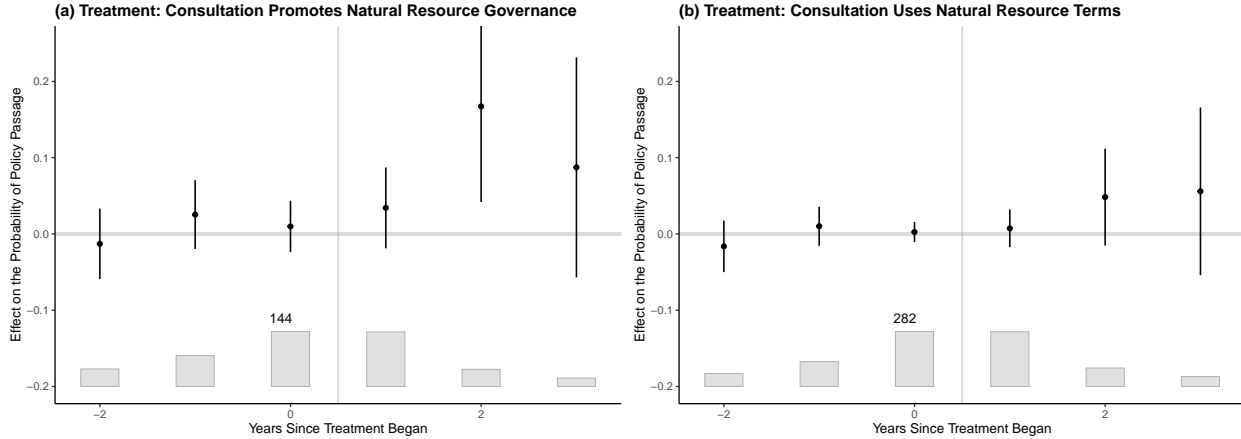
Table 1: Average Treatment Effects

	<i>Dependent Variable:</i>	
	Policy Passage	
	(1)	(2)
Consultation Promotes Natural Resource Governance, t-1	0.070*** (0.024)	
Consultation Uses Natural Resource Terms, t-1		0.017 (0.019)
IMF Program	0.020 (0.019)	0.007 (0.023)
Field Discovery, t-1	0.038 (0.029)	0.060 (0.037)
Log GDP per Capita, t-1	0.090* (0.050)	0.075 (0.056)
GDP Growth, t-1	-0.001 (0.001)	-0.001 (0.001)
Number of Units	77	77
Number of Time Periods	16	16

Models include bootstrapped standard errors. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

Table 1 shows the period-wise average treatment effect on the treated (ATT), with 95 percent confidence intervals, giving each observation equal weight. Targeted natural resource advice at  $t - 1$  — as indicated by the treatment *Consultation Promotes Natural Resource Governance* — has a positive and statistically significant effect on the outcome of interest ( $p = 0.003$ ). Figure 5 allows us to visualize the effect of receiving the treatment relative to the control group at different points in time. This effect increases over time and is largest at  $t + 2$ : policy reform is a lengthy process, as the cases of Ghana and Guyana illustrate. The broader treatment, *Consultation Uses Natural Resource Terms* at  $t - 1$ , also has a positive effect on *Policy Passage* at  $t$ , though this effect is not statistically significant. Authorities are more likely to prioritize natural resource sector reform when their discussions with the IMF staff cover this topic, particularly when these discussions

Figure 5: Predictors of Natural Resource Policy Passage, 2004–2019 (Period-Wise ATT)



This figure shows the estimates of the average treatment effect on the treated (ATT) for *Consultation Promotes Natural Resource Governance* (a) and *Consultation Uses Natural Resource Terms* (b) on *Policy Passage*, with 95 percent confidence intervals, conditioning on *IMF Program*, *Log GDP Per Capita*, *GDP Growth*, and *Field Discovery* (the latter three of which are lagged). Models include country and year fixed effects. Standard errors are bootstrapped.

actively promote changes in the resource sector.<sup>14</sup>

Our modeling choice was partly driven by the need to account for heterogeneous treatment effects: the effect of IMF advice is bound to differ over time. In Appendix E, we provide evidence confirming this expectation. The influence of the IMF was highest in the mid-2000s: a consultation promoting natural resource governance in 2006, for instance, would be associated with an average 30 percent increase in the odds of passing natural resource policy. This effect was not cumulative and waned in the following years. Overall, these results suggest that countries pay attention to the tenor of IMF advice, which is what we turn to next.

## 4.2 Natural Resource Term Frequency and Policy Passage

The *content* of Article IV Consultations matters: countries are significantly more likely to pass natural resource policy following a consultation that promotes natural resource governance. Beyond that, we investigate whether the *frequency* of mentions matters, as captured by the third explanatory variable *Natural Resource Term Frequency*. Are countries more likely to reform the more often the IMF talks about natural resources? To answer this question, we estimate a linear probability model with country and year fixed effects; standard errors are clustered by country.

Table 2 shows that governments tend to follow IMF advice related to the natural resource sector, even when this advice lacks “teeth.” Every additional use of a natural resource term is significantly associated

<sup>14</sup>In Appendix E, we estimate additional models with the treatments at time  $t$ , rather than  $t - 1$ , and corroborate these findings.

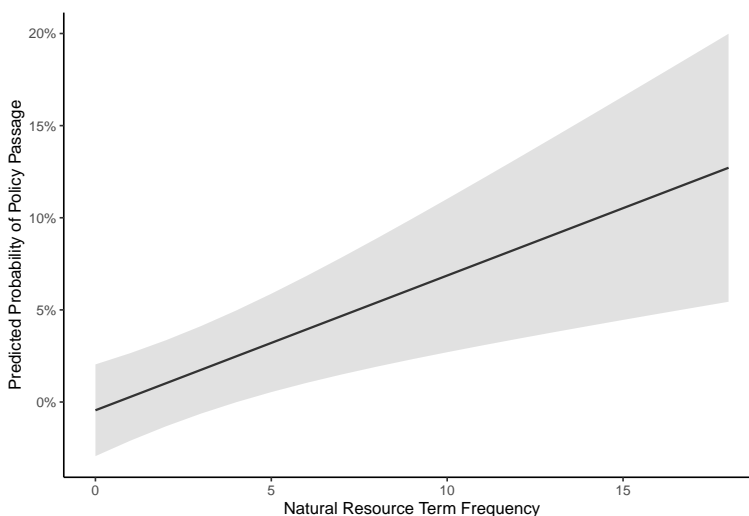
Table 2: Predictors of Natural Resource Policy Passage, 2004–2019 (Linear Regression)

	<i>Dependent Variable:</i>
	Policy Passage
Natural Resource Term Frequency, t-1	0.008** (0.003)
Previous Policy Passage = 1	-0.034 (0.041)
Technocratic Finance Minister = 1	0.012 (0.025)
FDI Performance Index	0.005* (0.003)
IMF Program = 1	0.031* (0.016)
Crude Oil Price, t-1	-0.0002 (0.002)
Crude Oil Price, $\Delta$	0.001 (0.002)
Resource Rents, t-1	0.001 (0.001)
Log GDP Per Capita, t-1	0.099* (0.057)
GDP Growth, t-1	-0.003 (0.002)
Field Discovery = 1, t-1	0.052 (0.038)
Polyarchy	-0.101 (0.129)
Left Executive	0.004 (0.027)
Protest Count	0.001 (0.001)
Constant	-0.602** (0.273)
Observations	997
R <sup>2</sup>	0.164
F Statistic	1.842*** (df = 96; 900)

Models include country and year fixed effects as well as standard errors clustered by country. \*p<0.1; \*\*p<0.05; \*\*\*p<0.01.

with a 0.8 percent increase in the odds of passing natural resource policy. The more the IMF staff talks about natural resources, the more likely countries are to respond by creating or regulating a natural resource fund. Figure 6 allows us to visualize this effect, keeping in mind that the predicted probabilities fall outside of the [0,1] bounds because this is a linear probability model. In addition, countries are significantly more

Figure 6: Predicted Probability of Policy Passage at Different Values of Natural Resource Term Frequency, 2004–2019



This figure shows the predicted probability of observing *Policy Passage* at different values of *Natural Resource Term Frequency*, with 95 percent confidence intervals. It is based on a model similar to that in Table 2 but averaged across all countries and years. Since this is a linear probability model, the predicted probabilities at the bottom left fall outside of the [0,1] bounds.

likely to pass natural resource policy when they attract more inward investment flows, are under an IMF agreement, have a larger economy, and are experiencing an economic contraction. These findings are not contingent on modeling choice: a logistic regression, reported in Appendix F, corroborates the findings of Table 2. The remaining variables have no significant effect on the outcome of interest.

Our results confirm the expectation that states are significantly more likely to reform the natural resource sector when published reports encourage such reforms (*Consultation Promotes Natural Resource Governance*), an effect that increases as the report includes more resource-related words (*Natural Resource Term Frequency*). The IMF, in turn, takes note of who is listening — for instance, in a section called “Responses to Fund Advice,” included in Ghana’s 2011 consultation: “A large part of initial oil revenues is being saved, as recommended in the 2009 Article IV.”

### 4.3 Robustness Checks

Endogeneity in the content of Staff Appraisals could be a problem. Loan agreements are the product of a negotiation between government officials and the IMF, so borrowers might negotiate specific conditions that are politically convenient or that they know they will be able to meet (Vreeland, 2003; Rickard and Caraway, 2014). A similar issue might exist with Article IV consultations: policymakers who already *want* to create natural resource funds might bring up the oil, gas, and mining sector during conversations with

the IMF staff. Each government has some power to set the agenda and the tone of its Staff Appraisal: it can grant the IMF delegation access to some senior officials, but not others, and it might request advice on specific issues at the expense of others. Though the clear structure of these consultations allows us to isolate the evaluation of IMF technocrats (Staff Appraisals) from the preferences of government officials (Response Statements), a country’s underlying willingness to reform might increase both the odds of passing natural resource policy *and* the inclination to engage with Article IV advice, which would hinder our ability to make accurate statements about the effect of this advice on natural resource policy.

In the context of IMF loans, [Beazer and Woo \(2016\)](#), [Chapman et al. \(2017\)](#), and others use instrumental variables to address similar endogeneity issues. The challenge lies in finding a variable that meets the exclusion restriction: it predicts variation in the content of IMF conditionality without an independent effect on the outcome of interest. An instrument proposed by [Lang \(2021\)](#) and developed by [Stubbs et al. \(2020\)](#) follows a DiD logic: it interacts a country-specific component with a year-specific component. To instrument for the content of conditionality, [Lang \(2021\)](#) proposes interacting a country-specific average number of conditions with the year-specific IMF liquidity ratio (liquid resources divided by liquid liabilities, reflecting the lending constraints faced by the IMF each year). Though the validity of the exclusion restriction cannot be established empirically ([Sovey and Green, 2011](#)), [Lang \(2021\)](#) argues that the interaction between both components is exogenous, even if each component is not.

Since the advice given in Article IV Consultations is not tied to lending, the liquidity ratio plays no role in our context. However, given the paucity of research on IMF surveillance, there is no established instrument for the content of Staff Appraisals, which is why we follow [Lang \(2021\)](#) in proposing an instrument for *Natural Resource Term Frequency* that similarly consists of a country-specific and a year-specific component. We interact the average *Natural Resource Term Frequency* for each country with the average *Natural Resource Term Frequency* for each year. This interaction term plausibly meets the exclusion restriction: it is likely to have a strong effect on *Natural Resource Term Frequency* without independently affecting *Policy Passage*. We perform a two-stage least squares (2SLS) estimation using this instrument, present the results in Appendix F, and summarize them here. The model’s F-statistic indicates how strongly the instrument predicts variation in the endogenous independent variable *Natural Resource Term Frequency* after controlling for the covariates described above. The conventionally accepted threshold for a strong instrument is 10 ([Sovey and Green, 2011](#)), so our F-statistic of 7.695 fails to pass the test. Worse, the Wu-Hausman test fails to reject the null hypothesis that 2SLS and OLS are equally consistent ( $p = 0.901$ ). If 2SLS and OLS are equally consistent, OLS is better because it is more efficient, hence our choice to present OLS results in Table 2.

We also use sensitivity analysis to assess the robustness of these results, seeking to quantify how susceptible the effect of *Natural Resource Term Frequency* on *Policy Passage* is to omitted variable bias. How strong

would unobserved confounders need to be to disprove our main results? The results, presented in Appendix F, indicate that only an omitted variable three times as strong as *IMF Program* could explain away all the observed effect of *Natural Resource Term Frequency* on the outcome. Since we control for several plausible explanations for natural resource policy passage, it is unlikely that we missed an unobserved confounder that is multiple times stronger than an observed covariate. Taken together, these robustness checks reassure us that the potential issue of endogeneity is not driving the results presented in Table 2.

Finally, we use event history analysis to understand how the content of Article IV consultations influences the *initial* passage of natural resource policy across countries. This modeling strategy captures a series of binary outcomes, indicating whether an event occurred at a given time. It includes all country-years from 2004 until event occurrence; once a country experiences the event (that is, it passes the first legal document creating a natural resource fund), it drops out of the dataset, as it is no longer considered to be at risk of passing new policy. Countries that did not experience the event until December 2019 are included and right-censored; their contribution to the dataset is a vector of zeroes (Box-Steffensmeier and Jones, 2004). This is not our preferred modeling strategy because governments are constantly at risk of passing new policy; they can, and do, create several different natural resource funds over time. Besides, our analysis begins in 2004 (because Article IV consultations were not published in a systematic manner until then), but 15 countries suffer from “unobserved histories” (Box-Steffensmeier and Jones, 1997, 1422): they experienced the event before 2004.<sup>15</sup> Since we cannot observe the effect of Article IV consultations on *initial* policy passage for these countries, we omit them from the survival analysis. Though this modeling strategy is imperfect, it allows us to examine the effects of Article IV consultations from yet another angle; the results, reported in Appendix F, support our expectation that IMF advice can meaningfully influence natural resource policy passage.

## Conclusion

Since the implementation of Article IV advice is not tied to loans, IMF surveillance could amount to much ado about nothing. Yet recent literature has noted the ways in which international bureaucrats can shape outcomes, independent of powerful state principals. Article IV consultations are a good example of this phenomenon, but they are understudied, despite occupying considerable time and resources of the Fund. Our study is among the first to examine the *content* of Article IV reports and the extent to which such reports influence legal reform.

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<sup>15</sup>These countries are Algeria (2000), Azerbaijan (1999), Botswana (1997), Chad (1999), Chile (1981), Ecuador (2000), Gabon (1998), Iran (2000), Kazakhstan (2000), Malaysia (1988), Mexico (2000), Namibia (1996), Papua New Guinea (2000), Peru (1999), and Russia (2003).

We argue that Article IV surveillance is an opportunity for international bureaucrats to shape policies in the developing world through disseminating best practices and providing technical assistance. Although these consultations lack “teeth,” IMF staff can offer expert advice and help persuade authorities to adopt policies that improve fiscal and monetary governance. The emphasis reports place on different topics matters. When reports call attention to the natural resource sector and suggest specific reforms, governments are more likely to take heed and act. These reforms are often difficult and politically costly. We do not claim that the IMF *causes* natural resource sector reform. Governments have agency: they can, and do, refuse to adopt IMF-promoted measures if the associated political costs are too high. Still, our analysis indicates that IMF advice has a catalytic effect: such reforms are more likely when Article IV consultations make the case for them, even after controlling for other common determinants of reform.

Incumbents rarely want to relinquish control of resource rents, despite knowing the likely consequences of the resource curse. Their time horizons are too often incompatible with reform. But under the right circumstances, technical advice can make a difference. Since we find evidence of IMF influence in the difficult case of natural resource reform, where the stakes are high and governments are unwilling to cede control of windfalls, there is reason to believe these consultations can impact other sectors as well.

The IMF has come under criticism for the high rate of recidivism among borrowers and low compliance with conditionality, but also for imposing harsh austerity measures on struggling economies. Apart from these debates about conditionality and the efficacy of crisis lending, our analysis suggests that the IMF can nudge countries toward improved fiscal management in non-crisis moments. This slow and steady progress might not be as high profile as large-scale lending programs but can nonetheless help build the fiscal foundations to help resource-rich nations avoid crises in the first place.

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# Appendix for Can “Soft” Advice From International Organizations Catalyze Natural Resource Sector Reform?

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## A Data Availability

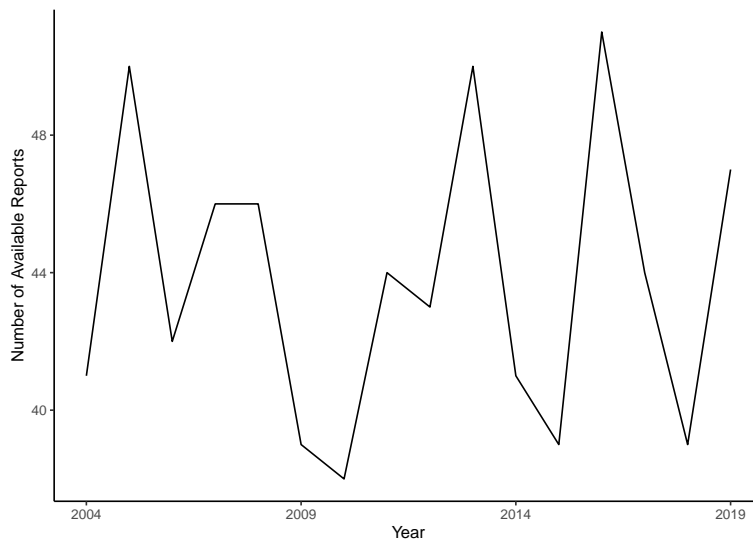
### A.1 Countries Included in the Analysis

Afghanistan, Albania, Algeria, Angola, Argentina, Azerbaijan, Bangladesh, Bolivia, Botswana, Brazil, Burkina Faso, Cameroon, Central African Republic, Chad, Chile, China, Colombia, Congo, Côte d'Ivoire, Democratic Republic of the Congo, Ecuador, Egypt, Equatorial Guinea, Ethiopia, Gabon, Ghana, Guatemala, Guinea, Guyana, India, Indonesia, Iran, Iraq, Kazakhstan, Kyrgyz Republic, Laos, Liberia, Libya, Malaysia, Mali, Mauritania, Mexico, Mongolia, Morocco, Mozambique, Myanmar, Namibia, Nauru, Niger, Nigeria, Pakistan, Papua New Guinea, Peru, Philippines, Romania, Russia, São Tomé e Príncipe, Senegal, Sierra Leone, South Africa, South Sudan, Sudan, Suriname, Syria, Tanzania, Thailand, Timor Leste, Togo, Trinidad and Tobago, Tunisia, Uganda, Ukraine, Uzbekistan, Vietnam, Yemen, Zambia, Zimbabwe.

### A.2 Publicly Available Article IV Consultations

Since several countries retroactively authorized the publication of reports, the number of reports per year is evenly distributed across our sample, as Figure A.1 confirms.

Figure A.1: Number of Publicly Available Reports, by Year, 2004–2019

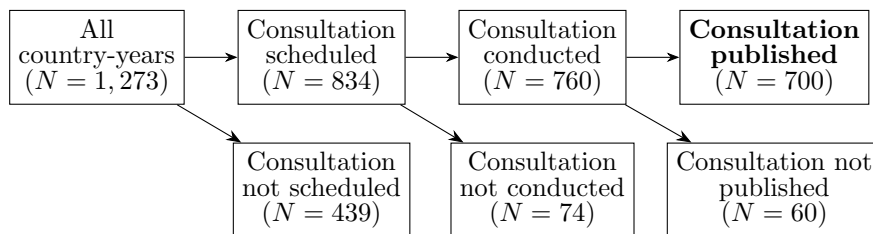


This figure shows the number of Article IV consultations that were conducted and made publicly available for each year between 2004 and 2019.

Figure A.2 summarizes the types of observations included in our sample. We initially collected information for 80 countries over 16 years, but only eight years are available for South Sudan, which became independent in 2011; hence,  $N = 1,273$ . Among these 1,273 country-years, we identified 834 for which consultations were

scheduled and 439 for which consultations were not.

Figure A.2: Types of Observations



Though a consultation was scheduled for 834 country-years, these scheduled consultations did not always happen, due to political unrest or because authorities and staff could not agree on a date to meet. Since 2012, the IMF publishes a yearly list of such consultation delays (e.g. IMF, 2023), allowing us to make general inferences about 74 consultations that *should have happened and did not*. This is the case of Venezuela, whose last consultation was completed in September 2004. Thus, Venezuela is “behind” on 15 consultations that would otherwise have happened after 2004. Argentina, Libya, Syria, and others similarly missed scheduled consultations, as Table A.1 indicates.

Table A.1: Article IV Consultations, Missing or Delayed (as of January 2020)

Country	Year Scheduled	Year Conducted	No. Delayed
Venezuela	2005	–	15
Argentina	2007	2016	9
Eritrea	2010	2019	9
Syria	2011	–	9
Libya	2014	–	6
Ecuador	2009	2014	5
Yemen	2015	–	5
Central African Republic	2013	2016	3
Democratic Republic of the Congo	2016	2019	3
Republic of the Congo	2016	2019	3
Egypt	2011	2014	3
Equatorial Guinea	2017	–	3
Gabon	2018	2019	1

A scheduled consultation was successfully conducted in 760 cases, but sometimes the country under appraisal opposed the publication of the resulting report. For instance, Turkmenistan took part in regular consultations: even though the IMF did not publish the full reports, it released short summaries, in the form of Public Information Notices or Press Releases. Finally, there are 700 country-years for which consultations were scheduled, conducted, and published. Since this is the norm, we exclude the three countries that have strategically selected out of Article IV consultations: Eritrea, Turkmenistan, and Venezuela.

## B Summary Statistics

Table B.1: Summary Statistics

Statistic	N	Mean	St. Dev.	Min	Max
Policy Passage	1,225	0.047	0.211	0	1
Previous Policy Passage	1,225	0.338	0.473	0	1
Consultation Promotes Natural Resource Governance	1,225	0.207	0.405	0	1
Natural Resource Term Frequency	1,225	2.028	3.164	0	18
Natural Resource Term Frequency (TF-IDF)	1,225	0.204	0.319	0.000	1.814
Technocratic Finance Minister	1,132	0.123	0.328	0	1
FDI Performance Index	1,193	1.984	3.404	-14.240	49.867
IMF Program	1,225	0.336	0.472	0	1
Crude Oil Price	1,225	88.321	30.218	44.730	135.390
Crude Oil Price, $\Delta$	1,225	1.370	23.564	-54.360	32.170
Resource Rents	1,199	12.740	12.644	0.000	81.913
Log GDP Per Capita	1,220	7.755	1.001	5.555	9.831
GDP Growth	1,219	4.628	6.531	-50.339	86.827
Field Discovery	1,224	0.061	0.240	0	1
Polyarchy	1,209	0.451	0.213	0.072	0.896
Left Executive	1,123	0.272	0.445	0	1
Protest Count	1,177	4.007	6.230	1	91
Year	1,225	2,011.526	4.610	2,004	2,019

## C Natural Resource Dictionary

To generate the independent variables *Natural Resource Term Frequency* and *Natural Resource TF-IDF*, we use a dictionary consisting of the following terms: *natural resource, natural resources, extractive industry, extractive industries, oil, petroleum, crude oil, gasoline, diesel, LNG, natural gas, fuel, fuels, energy, refinery, hydrocarbon, mineral, mining, mine, mines, copper, gold, diamond, iron, steel, phosphate, EITI*.

## D Predictors of IMF Advice

### D.1 Linear Regressions

Before examining the effect of IMF advice on natural resource reform, we use linear regressions to explore what makes the IMF give out such advice in the first place. What predicts variation in *Consultation Promotes Natural Resource Governance*, *Consultation Uses Natural Resource Terms*, and *Natural Resource Term Frequency*? All models include country and year fixed effects; standard errors are clustered by country; and the variables *FDI Performance Index*, *Crude Oil Price* (levels), *Resource Rents*, *Log GDP Per Capita*, *GDP Growth*, and *Field Discovery* are lagged by one year to prevent simultaneity bias.

Table D.1: Predictors of IMF Advice, 2004–2019 (Linear Regressions)

	<i>Dependent Variable:</i>		
	Consultation Promotes	Consultation Uses	Natural Resource
	Natural Resource	Natural Resource	Term Frequency
	Governance = 1	Terms = 1	(Count)
	(1)	(2)	(3)
Technocratic Finance Minister = 1	0.033 (0.046)	0.102 (0.068)	0.502 (0.337)
FDI Performance Index	0.002 (0.006)	-0.008 (0.007)	0.036 (0.058)
IMF Program = 1	-0.064** (0.032)	-0.141*** (0.046)	-0.973*** (0.281)
Crude Oil Price, t-1	-0.007 (0.005)	-0.003 (0.006)	-0.072* (0.043)
Crude Oil Price, $\Delta$	-0.007 (0.006)	-0.009 (0.007)	-0.046 (0.041)
Resource Rents, t-1	0.003 (0.003)	0.004 (0.003)	0.045* (0.025)
Log GDP Per Capita, t-1	0.225* (0.125)	-0.035 (0.162)	0.325 (1.027)
GDP Growth, t-1	0.002 (0.003)	0.007** (0.003)	0.052** (0.024)
Field Discovery = 1, t-1	0.130** (0.058)	0.105 (0.068)	1.824*** (0.538)
Polyarchy	0.185 (0.163)	0.156 (0.282)	3.192** (1.510)
Left Executive	-0.039 (0.045)	-0.061 (0.062)	-0.055 (0.364)
Protest Count	-0.001 (0.002)	-0.001 (0.002)	0.002 (0.016)
Constant	-0.844 (0.615)	0.632 (0.836)	1.879 (5.149)
Observations	997	997	997
R <sup>2</sup>	0.325	0.233	0.333
F Statistic (df = 94; 902)	4.614***	2.921***	4.792***

Models include country and year fixed effects as well as standard errors clustered by country.  
\*p<0.1; \*\*p<0.05; \*\*\*p<0.01.

Table D.1 identifies two main predictors of natural resource advice: *IMF Program* and *Field Discovery*. On average, consultations are 6.4 percent less likely to promote natural resource governance, 14 percent less likely to use natural resource terms, and use about one natural resource term less when the country under appraisal is under an IMF program. Under these circumstances, IMF advice tends to prioritize fiscal, monetary, and debt issues, rather than natural resource policy. Consultations are 13 percent more likely to

promote natural resource governance, and tend to use 1.8 additional natural resource terms, if the country has discovered a large oil and gas field in the previous year. A one-unit increase in the Polyarchy score (which ranges from zero to one) correlates with 3.2 additional natural resource terms. All these results are statistically significant. Among the remaining variables, changes in GDP per capita correlate with increases in the odds of observing *Consultation Promotes Natural Resource Governance*, whereas oil price levels, resource rents, and economic growth are correlated with variation in *Natural Resource Term Frequency*, but these coefficients are substantively small and/or only statistically significant at  $p < 0.1$ .

We present linear regressions because their coefficients are easier to interpret, as shown in the next section.

## D.2 Robustness: Logistic and Poisson Regressions

Since *Consultation Promotes Natural Resource Governance* is a binary variable and *Natural Resource Term Frequency* is a count variable, we also model these outcomes using logistic and Poisson regressions, respectively, including country and year fixed effects. Given the inclusion of fixed effects, a traditional logistic regression would drop countries or years that did not experience the event under study: these “homogeneous units” would be perfect predictors of the outcome of interest (Beck, 2020). To mitigate these issues, we use penalized maximum likelihood (Cook, Hays and Franzese, 2020). Table D.2 presents the results, which are substantively and statistically identical to those obtained with linear regressions. As an alternative to the Poisson model, we also estimated a negative binomial model that did not converge, suggesting that overdispersion is not an issue.

Table D.2: Predictors of IMF Advice, 2004–2019 (Logistic and Poisson Regressions)

	<i>Dependent Variable:</i>		
	Consultation Promotes Natural Resource Governance = 1	Consultation Uses Natural Resource Terms = 1	Natural Resource Term Frequency (Count)
	<i>Logit</i>	<i>Logit</i>	<i>Poisson</i>
	(1)	(2)	(3)
Technocratic Finance Minister = 1	0.382 (0.398)	0.513 (0.317)	0.247 (0.173)
FDI Performance Index	0.018 (0.033)	-0.030 (0.029)	0.015 (0.018)
IMF Program = 1	-0.641** (0.250)	-0.609*** (0.202)	-0.471*** (0.140)
Crude Oil Price, t-1	-0.047 (0.034)	-0.016 (0.031)	-0.033* (0.019)
Crude Oil Price, $\Delta$	-0.052 (0.040)	-0.043 (0.035)	-0.021 (0.022)
Resource Rents, t-1	0.006 (0.017)	0.019 (0.015)	0.014 (0.009)
Log GDP Per Capita, t-1	1.636* (0.863)	-0.154 (0.791)	0.191 (0.489)
GDP Growth, t-1	0.012 (0.018)	0.028* (0.016)	0.016** (0.007)
Field Discovery = 1, t-1	0.775** (0.339)	0.525 (0.331)	0.591*** (0.141)
Polyarchy	2.113 (1.649)	0.703 (1.370)	1.874* (0.975)
Left Executive	-0.307 (0.446)	-0.340 (0.325)	0.001 (0.199)
Protest Count	-0.004 (0.018)	-0.004 (0.012)	0.002 (0.007)
Constant	-9.053** (4.385)	0.703 (4.166)	-0.911 (2.543)
Observations	997	997	997
Log Likelihood	-337.967	-557.090	-2,090.186
Akaike Inf. Crit.	865.934	1,304.181	4,370.372

Models include country and year fixed effects as well as standard errors clustered by country.  
\*p<0.1; \*\*p<0.05; \*\*\*p<0.01.

## E Difference-in-Differences

### E.1 The Fixed Effects Counterfactual Estimator (FEct): An Overview

The canonical DiD setup assumes that there are two time periods,  $t = 1, 2$ , and two groups. Between  $t = 1$  and  $t = 2$ , one of the groups receives the treatment of interest, whereas the other group remains untreated,

leading to the outcomes  $Y_{it}(1)$  and  $Y_{it}(0)$ , respectively, for unit  $i$  at time  $t$ . According to the parallel trends assumption, all factors affect all units between  $t = 1$  and  $t = 2$  in the same way, such that the trends in the outcome of interest would be the same for both groups in the absence of treatment; the treatment alone explains all the deviation. If the parallel trends assumption holds, we can estimate the average treatment effect by differencing between groups,  $\delta = Y_{it}(1) - Y_{it}(0)$ . When there are more than two units and two time periods, the standard approach is to estimate the two-way fixed effect (TWFE) specification

$$y_{it} = \alpha_i + \lambda_t + \delta D_{it} + \epsilon_{it}, \quad (1)$$

where  $y_{it}$  is the outcome of interest,  $\alpha_i$  and  $\lambda_t$  are unit and period fixed effects, respectively, and  $D_{it}$  is a treatment dummy corresponding to  $\alpha_i \times \lambda_t$  (Goodman-Bacon, 2021, 255).

Recent research shows that the standard TWFE specification is biased in the presence of staggered treatment timing with dynamic and heterogeneous treatment effects, as is our case (Baker, Larcker and Wang, 2022; Roth et al., 2023). Our treatment is staggered because countries are not all treated at once; they can receive natural resource advice at any moment between 2004 to 2019. Our setting includes heterogeneous and dynamic treatment effects because treatment effects differ across cohorts (that is, “late adopters” and “early adopters” respond to the treatment differently), but also over time. For example, the effect of IMF advice in 2008, when oil prices hit 127.67 US dollars per barrel, is likely different from its effect in 2004, when a barrel of oil cost 56.40 US dollars (both values reported in constant 2022 US dollars).

Our chosen approach, the FEct (Liu, Wang and Xu, 2023), allows researchers to find the average treatment effect by imputing counterfactuals for observations in the treatment group. Although treated observations are missing from the control outcome matrix (in the sense that we cannot observe their untreated potential outcomes), we can impute them using untreated observations with similar values. Another advantage of the FEct is that it allows for the inclusion of time-varying covariates. Not all countries are equally likely to receive natural resource advice: the IMF is more likely to give such advice to countries with higher GDP per capita that have recently discovered an oil or gas field and are not involved in a loan agreement. Thus, the parallel trends assumption is conditional on the inclusion of these covariates (see next section for corroborating evidence). As identified in Table D.1, the variables *IMF Program*, *Log GDP Per Capita*, *GDP Growth*, and *Field Discovery* (the latter three of which are lagged) capture a government’s ex-ante “propensity” to receive natural resource advice, ensuring that any effect observed after the treatment is a function of the received advice.

## E.2 Tests

We estimate the DiD models using the R package `fect`, which tests for the existence of pre-trends and placebo effects using “both a conventional difference-in-means (DIM) approach, which tests against the null of no difference, and an equivalence approach, which flips the null and tests against a pre-specified difference” (Liu, Wang and Xu, 2023, 3). When the number of observations is small, limited power can be a concern; under these circumstances, the authors favor the equivalence test over the DIM approach. For this reason, we only report the p-values for the equivalent approach below. Our models pass the pre-trend test at  $p < 0.1$  or better, rejecting the null that the treated and untreated groups display a pre-specified difference. They also pass a placebo test looking at the periods immediately before treatment.

Figure E.1: Pre-Trend Tests

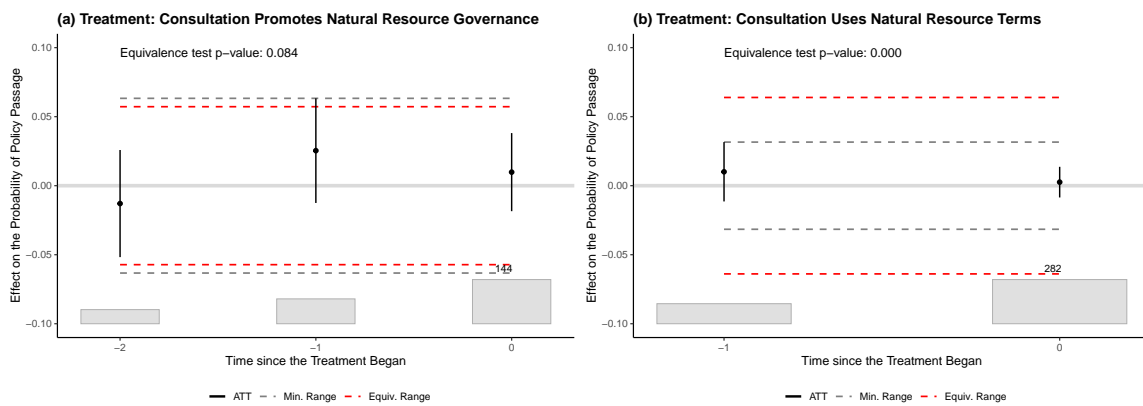
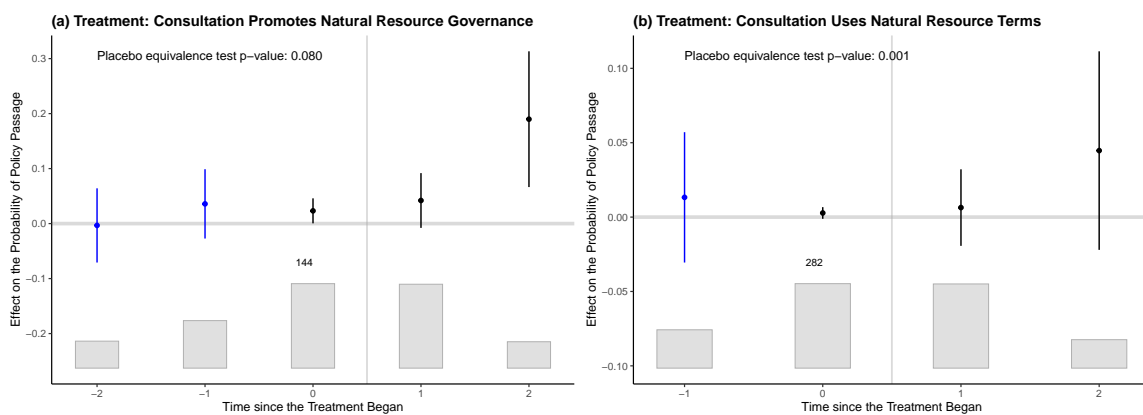


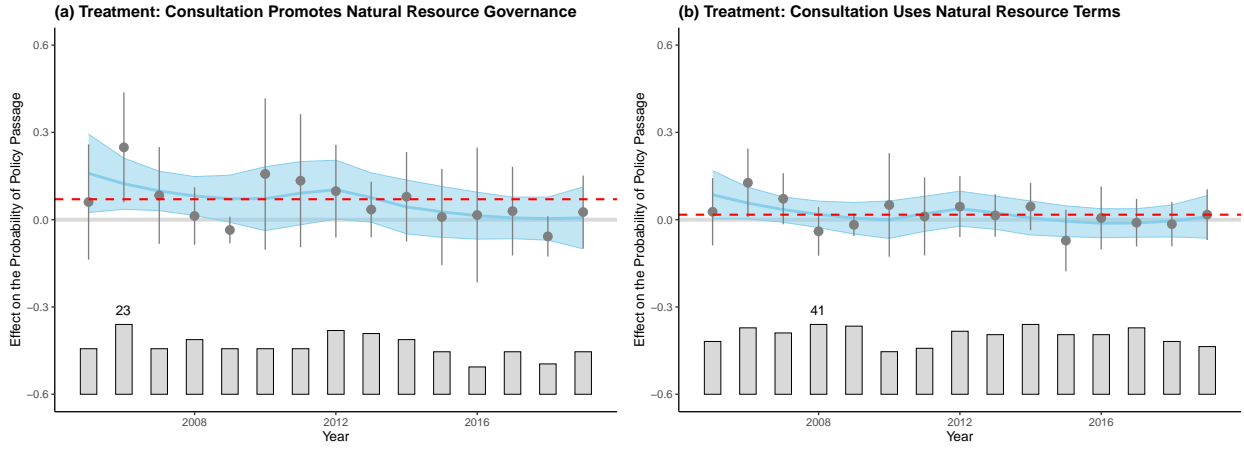
Figure E.2: Placebo Tests





### E.3 Heterogeneous Treatment Effects

Figure E.3: Predictors of Natural Resource Policy Passage, 2004–2019 (ATT by Year)



This figure shows treatment effect estimates for *Consultation Promotes Natural Resource Governance* (a) and *Consultation Uses Natural Resource Terms* (b) on *Policy Passage*, with 95 percent confidence intervals, for every year. Dashed horizontal lines represent the ATT averaged over all time periods. The blue curve represents a loess fit of the estimates, with the corresponding 95 percent confidence intervals.

### E.4 Robustness: Simultaneous Treatments

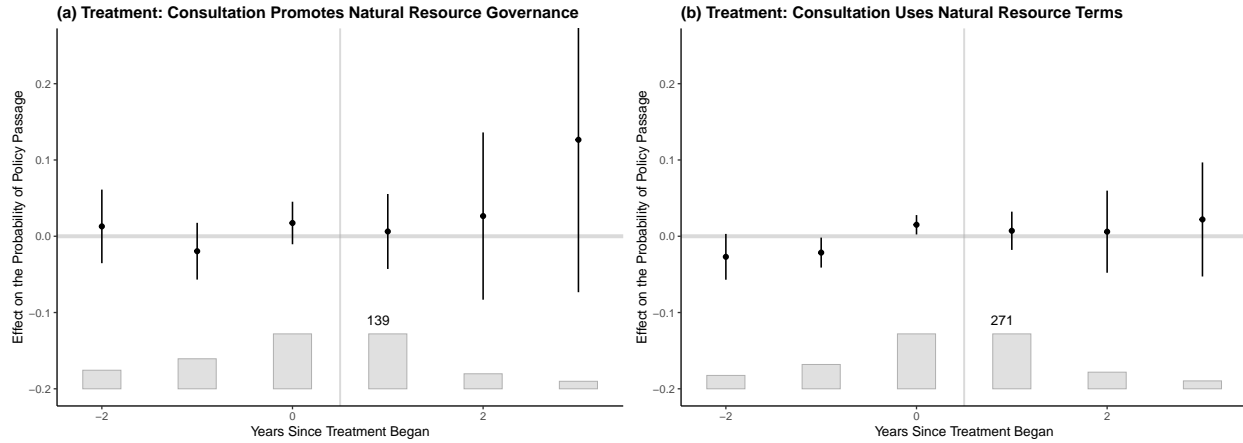
Table E.1 replicates Table 1 of the manuscript, but with both treatments at time  $t$ , rather than  $t - 1$ . As Figure E.4 confirms, now *Consultation Uses Natural Resource Terms* has a strong and significant effect on *Policy Passage*, whereas *Consultation Promotes Natural Resource Governance* has a weaker effect that is not statistically significant.

Table E.1: Average Treatment Effects: Simultaneous Treatments

	<i>Dependent Variable:</i>	
	Policy Passage	
	(1)	(2)
Consultation Promotes Natural Resource Governance	0.037 (0.027)	
Consultation Uses Natural Resource Terms		0.025** (0.012)
IMF Program	0.012 (0.018)	0.007 (0.025)
Field Discovery, t-1	0.054 (0.036)	0.086* (0.050)
Log GDP per Capita, t-1	0.089* (0.048)	0.098 (0.060)
GDP Growth, t-1	-0.001 (0.001)	-0.001 (0.001)
Number of Units	77	77
Number of Time Periods	16	16

Models include bootstrapped standard errors. \*p<0.1; \*\*p<0.05; \*\*\*p<0.01.

Figure E.4: Predictors of Natural Resource Policy Passage, 2004–2019 (Period-Wise ATT)



This figure shows the estimates of the average treatment effect on the treated (ATT) for *Consultation Promotes Natural Resource Governance* at  $t - 1$  (a) and *Consultation Uses Natural Resource Terms* at  $t - 1$  (b) on *Policy Passage*, with 95 percent confidence intervals, conditioning on *IMF Program*, *Log GDP Per Capita*, *GDP Growth*, and *Field Discovery* (the latter three of which are lagged). Models include country and year fixed effects. Standard errors are bootstrapped.

## F Robustness: Predictors of Policy Passage

### F.1 Logistic Regressions

Since *Policy Passage* is a binary variable, we also model this outcome using a logistic regression, estimated with penalized likelihood to prevent the loss of “homogeneous units.” Table F.1 reports the results. Each additional natural resource word in a consultation is associated with a significant 13.3 percent increase in the odds of policy passage ( $e^{0.125}$ ), an effect larger than the one reported by the linear regression in Table 2 of the manuscript.

Table F.1: Predictors of Natural Resource Policy Passage, 2004–2019 (Logistic Regression)

	<i>Dependent Variable:</i>
	Policy Passage
Natural Resource Term Frequency, t-1	0.125*** (0.033)
Previous Policy Passage = 1	-0.970** (0.452)
Technocratic Finance Minister = 1	0.131 (0.385)
FDI Performance Index	0.132*** (0.036)
IMF Program = 1	0.657** (0.282)
Crude Oil Price, t-1	0.050 (0.040)
Crude Oil Price, $\Delta$	0.087** (0.042)
Resource Rents, t-1	0.047** (0.019)
Log GDP Per Capita, t-1	3.325*** (1.054)
GDP Growth, t-1	-0.094*** (0.027)
Field Discovery = 1, t-1	1.045*** (0.355)
Polyarchy	-2.249 (1.657)
Left Executive	-0.301 (0.401)
Protest Count	0.035*** (0.011)
Constant	-27.753*** (5.361)
Observations	997
Log Likelihood	-128.157
Akaike Inf. Crit.	450.314

Models include country and year fixed effects as well as standard errors clustered by country. \*p<0.1; \*\*p<0.05; \*\*\*p<0.01.

## F.2 Using Weighted Natural Resource Term Frequency

Table F.2: Predictors of Natural Resource Policy Passage, 2004–2019, Using Natural Resource TF-IDF (Logistic and Linear Regressions)

	<i>Dependent Variable:</i>	
	Policy Passage	
	<i>OLS</i>	<i>Logit</i>
	(1)	(2)
Natural Resource Term Frequency (TF-IDF), t-1	0.082** (0.032)	1.240*** (0.327)
Previous Policy Passage = 1	-0.034 (0.041)	-0.970** (0.452)
Technocratic Finance Minister = 1	0.012 (0.025)	0.131 (0.385)
FDI Performance Index	0.005* (0.003)	0.132*** (0.036)
IMF Program = 1	0.031* (0.016)	0.657** (0.282)
Crude Oil Price, t-1	-0.0002 (0.002)	0.050 (0.040)
Crude Oil Price, $\Delta$	0.001 (0.002)	0.087** (0.042)
Resource Rents, t-1	0.001 (0.001)	0.047** (0.019)
Log GDP Per Capita, t-1	0.099* (0.057)	3.325*** (1.054)
GDP Growth, t-1	-0.003 (0.002)	-0.094*** (0.027)
Field Discovery = 1, t-1	0.052 (0.038)	1.045*** (0.355)
Polyarchy	-0.101 (0.129)	-2.249 (1.657)
Left Executive	0.004 (0.027)	-0.301 (0.401)
Protest Count	0.001 (0.001)	0.035*** (0.011)
Constant	-0.602** (0.273)	-27.753*** (5.361)
Observations	997	997
R <sup>2</sup>	0.164	
Log Likelihood		-128.157
Akaike Inf. Crit.		450.314
F Statistic	1.842*** (df = 96; 900)	

Models include country and year fixed effects as well as standard errors clustered by country. \*p<0.1; \*\*p<0.05; \*\*\*p<0.01.

### F.3 Instrumental Variables Estimation

Table F.3: Predictors of Natural Resource Policy Passage, 2004–2019 (Two Stage Least Squares Regressions)

	<i>Dependent Variable:</i>	
	Policy Passage	
	(1)	(2)
Natural Resource Term Frequency, $t-1$	0.005 (0.037)	
Natural Resource Term Frequency (TF-IDF), $t-1$		0.049 (0.367)
Previous Policy Passage = 1	-0.034 (0.042)	-0.034 (0.042)
Technocratic Finance Minister = 1	0.014 (0.030)	0.014 (0.030)
FDI Performance Index	0.005 (0.005)	0.005 (0.005)
IMF Program = 1	0.028 (0.032)	0.028 (0.032)
Crude Oil Price, $t-1$	0.0001 (0.004)	0.0001 (0.004)
Crude Oil Price, $\Delta$	0.001 (0.003)	0.001 (0.003)
Resource Rents, $t-1$	0.001 (0.001)	0.001 (0.001)
Log GDP Per Capita, $t-1$	0.101 (0.062)	0.101 (0.062)
GDP Growth, $t-1$	-0.003 (0.002)	-0.003 (0.002)
Field Discovery = 1, $t-1$	0.054 (0.042)	0.054 (0.042)
Polyarchy	-0.093 (0.160)	-0.093 (0.160)
Left Executive	0.003 (0.029)	0.003 (0.029)
Protest Count	0.001 (0.001)	0.001 (0.001)
Constant	-0.636 (0.477)	-0.636 (0.477)
Observations	997	997
F-Statistic for Instrument	7.695**	7.695**
Wu-Hausman	0.015	0.015
R <sup>2</sup>	0.163	0.163

Models include country and year fixed effects as well as standard errors clustered by country. \* $p < 0.1$ ; \*\* $p < 0.05$ ; \*\*\* $p < 0.01$ .

Table F.4: Predictors of Natural Resource Policy Passage, 2004–2019 (First Stages of Two Stage Least Squares Regressions)

	<i>Dependent Variable:</i>	
	Natural Resource Term Frequency, t-1 (1)	Natural Resource Term Frequency (TF-IDF), t-1 (2)
Instrument: Natural Resource Term Frequency	0.339** (0.147)	
Instrument: Natural Resource Term Frequency (TF-IDF)		3.358** (1.458)
Previous Policy Passage = 1	0.246 (0.416)	0.025 (0.042)
Technocratic Finance Minister = 1	0.497 (0.310)	0.050 (0.031)
FDI Performance Index	0.096** (0.044)	0.010** (0.004)
IMF Program = 1	-0.763*** (0.280)	-0.077*** (0.028)
Crude Oil Price, t-1	0.131*** (0.042)	0.013*** (0.004)
Crude Oil Price, $\Delta$	0.087** (0.040)	0.009** (0.004)
Resource Rents, t-1	-0.001 (0.025)	-0.0001 (0.002)
Log GDP Per Capita, t-1	0.303 (0.979)	0.031 (0.099)
GDP Growth, t-1	0.004 (0.026)	0.0004 (0.003)
Field Discovery = 1, t-1	0.486 (0.519)	0.049 (0.052)
Polyarchy	2.387* (1.382)	0.241* (0.139)
Left Executive	-0.132 (0.333)	-0.013 (0.034)
Protest Count	0.004 (0.018)	0.0004 (0.002)
Constant	-11.273** (4.544)	-1.136** (0.458)
Observations	997	997
R <sup>2</sup>	0.326	0.326
F Statistic (df = 96; 900)	4.540***	4.540***

Models include country and year fixed effects as well as standard errors clustered by country.  
\*p<0.1; \*\*p<0.05; \*\*\*p<0.01.

## F.4 Sensitivity Analysis

Since we cannot quantify a country’s ex-ante willingness to reform, we cannot exclude the possibility that other factors predict both the term frequency and the choice to pass natural resource policy. One way to investigate the potential effect of omitted variable bias is to run a sensitivity analysis. We use the R package `sensemakr`, developed by Cinelli and Hazlett (2020), to investigate how our estimate of *Natural Resource Term Frequency* (lagged) is sensitive to unobserved confounders. Table F.5 reports the estimated coefficient (0.008) for *Natural Resource Term Frequency* as well as its standard error (0.002) and t-value (3.39); these are the values obtained in Table 2 of the manuscript. The table then presents three sensitivity statistics. In terms of notation,  $D$  stands for the treatment variable (*Natural Resource Term Frequency*),  $Y$  is the outcome of interest (*Policy Passage*),  $\mathbf{X}$  is a matrix of *observed* covariates, and  $Z$  is an *unobserved* confounder.

The first sensitivity statistic is the partial  $R^2$  of the treatment with the outcome (1.3%). In an extreme scenario, an unobserved confounder that explains 100% of the residual variance in the outcome would need to explain at least 1.3% of the residual covariance of the treatment to fully account for the observed estimated effect. The second sensitivity statistic is the robustness value ( $RV_{q=1}$ ) required to reduce the estimate to zero, which corresponds to a bias of 100% of the original estimate. To explain away all the observed effect of the treatment *Natural Resource Term Frequency* on the outcome *Policy Passage*, an unobserved confounder would need to explain at least 10.7% of the residual variance of both treatment and outcome. The third sensitivity statistic is the robustness value for testing the null hypothesis that the coefficient of *Natural Resource Term Frequency* is zero ( $RV_{q=1, \alpha=0.05}$ ). If the unobserved confounder explains more than 4.6% of the residual variance of both the treatment and the outcome, it is strong enough to bring the estimate of *Natural Resource Term Frequency* to a range where it is no longer statistically different from zero (at the significance level of  $\alpha = 0.05$ ).

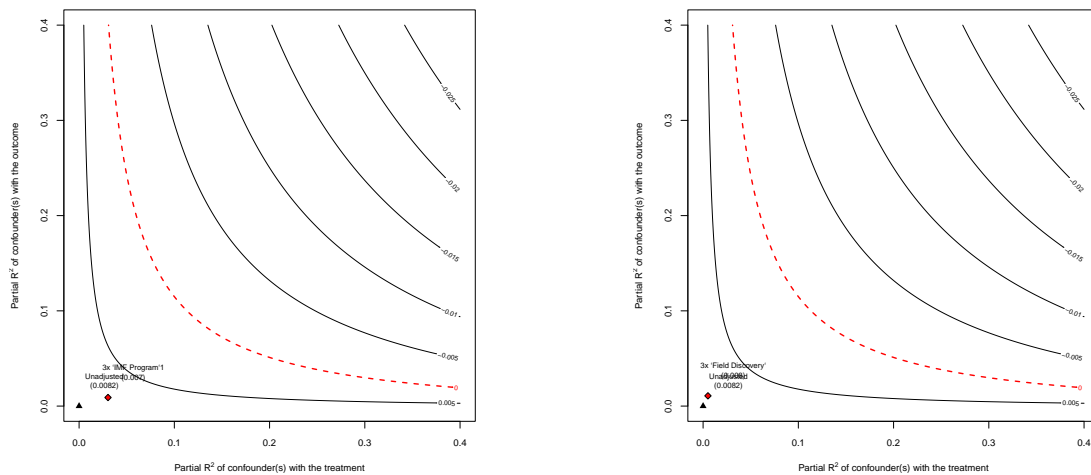
These values indicate what we would need to know in order to safely rule out confounders that could be problematic. We compare these values to an unobserved confounder that is once, twice, or three times as strong as *IMF Program* or *Field Discovery* in explaining outcome variation ( $R_{Y \sim Z | \mathbf{X}, D}^2$ ) and treatment variation ( $R_{D \sim Z | \mathbf{X}}^2$ ). Not even an unobserved confounder that is three times as strong as *IMF Program* or *Field Discovery* could bring the estimate of *Natural Resource Term Frequency* to a range where it is no longer statistically different from zero or could explain away all the observed effect of *Natural Resource Term Frequency* on the outcome of interest. These, of course, are hypothetical claims; since we control for several plausible explanations for natural resource policy passage, it is unlikely that we missed an unobserved confounder that is multiple times stronger than a certain observed covariate.

Figure F.1, generated using Cinelli and Hazlett’s package, helps us grasp the meaning of these results.

Table F.5: Minimal Reporting on Sensitivity to Unobserved Confounders, Benchmarks: Resource Rents and Field Discovery

Outcome: <i>Policy Passage</i>							
Treatment	Est.	S.E.	t-value	$R_{Y \sim Z   \mathbf{X}}^2$	$RV_{q=1}$	$RV_{q=1, \alpha=0.05}$	
<i>Natural Resource Term Frequency</i>	0.008	0.002	3.39	1.3%	10.7%	4.6%	
df = 900; <i>Bound (1x IMF Program)</i> : $R_{Y \sim Z   \mathbf{X}, D}^2 = 0.3\%$ , $R_{D \sim Z   \mathbf{X}}^2 = 1\%$							
df = 900; <i>Bound (2x IMF Program)</i> : $R_{Y \sim Z   \mathbf{X}, D}^2 = 0.6\%$ , $R_{D \sim Z   \mathbf{X}}^2 = 2\%$							
df = 900; <i>Bound (3x IMF Program)</i> : $R_{Y \sim Z   \mathbf{X}, D}^2 = 0.9\%$ , $R_{D \sim Z   \mathbf{X}}^2 = 3\%$							
df = 900; <i>Bound (1x Field Discovery)</i> : $R_{Y \sim Z   \mathbf{X}, D}^2 = 0.4\%$ , $R_{D \sim Z   \mathbf{X}}^2 = 0.2\%$							
df = 900; <i>Bound (2x Field Discovery)</i> : $R_{Y \sim Z   \mathbf{X}, D}^2 = 0.7\%$ , $R_{D \sim Z   \mathbf{X}}^2 = 0.3\%$							
df = 900; <i>Bound (3x Field Discovery)</i> : $R_{Y \sim Z   \mathbf{X}, D}^2 = 1.1\%$ , $R_{D \sim Z   \mathbf{X}}^2 = 0.5\%$							

Figure F.1: Sensitivity Contour Plots in the Partial  $R^2$  Scale



This figure shows the sensitivity contour plot of the point estimate for *Natural Resource Term Frequency*, including unobserved confounders with the hypothetical strength of three times the value of *IMF Program* (left) and three times the value of *Field Discovery* (right). The hypothetical estimates (in red) are very close to the unadjusted estimate (in black).

The x-axis shows the hypothetical residual share of variation of the treatment explained by unobserved confounding ( $R_{D \sim Z | \mathbf{X}}^2$ ), whereas the y-axis does the same for the residual share of variation of the outcome explained by unobserved confounding ( $R_{Y \sim Z | \mathbf{X}, D}^2$ ). The contours show what would be the estimates for *Natural Resource Term Frequency* if we were to include unobserved confounders that have once, twice, or three times the strength *IMF Program* (left) or *Field Discovery* (right). In both cases, the dashed red line indicates combinations of values that would shrink the estimated effect of *Natural Resource Term Frequency* to zero. As the figures show, an unobserved confounder three times as strong as *IMF Program* or *Field Discovery* would reduce the effect of *Natural Resource Term Frequency* from 0.008 to 0.007. This gives us more confidence that our findings are not a function of omitted variables.



## F.5 Survival Analysis

Table F.6: Predictors of Natural Resource Policy Passage, 2004–2019 (Cox Proportional Hazards Models)

	<i>Dependent Variable:</i>	
	Time to Policy Passage	
	(1)	(2)
Natural Resource Term Frequency	0.240*** (0.077)	
Natural Resource Term Frequency (TF-IDF)		2.376*** (0.768)
Technocratic Finance Minister = 1	0.315 (0.819)	0.315 (0.819)
FDI Performance Index, t-1	0.108 (0.072)	0.108 (0.072)
IMF Program = 1	0.652 (0.624)	0.652 (0.624)
Resource Rents, t-1	0.029 (0.022)	0.029 (0.022)
Log GDP Per Capita, t-1	0.349 (0.354)	0.349 (0.354)
GDP Growth, t-1	-0.106** (0.053)	-0.106** (0.053)
Field Discovery = 1, t-1	0.829 (0.848)	0.829 (0.848)
Polyarchy	0.757 (1.697)	0.757 (1.697)
Left Executive	0.175 (0.586)	0.175 (0.586)
Protest Count	-0.112 (0.114)	-0.112 (0.114)
Observations	668	668
R <sup>2</sup>	0.040	0.040
Log Likelihood	-49.435	-49.435
Wald Test (df = 11)	22.720**	22.720**
Score (Logrank) Test (df = 11)	36.945***	36.945***

\*p<0.1; \*\*p<0.05; \*\*\*p<0.01.

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